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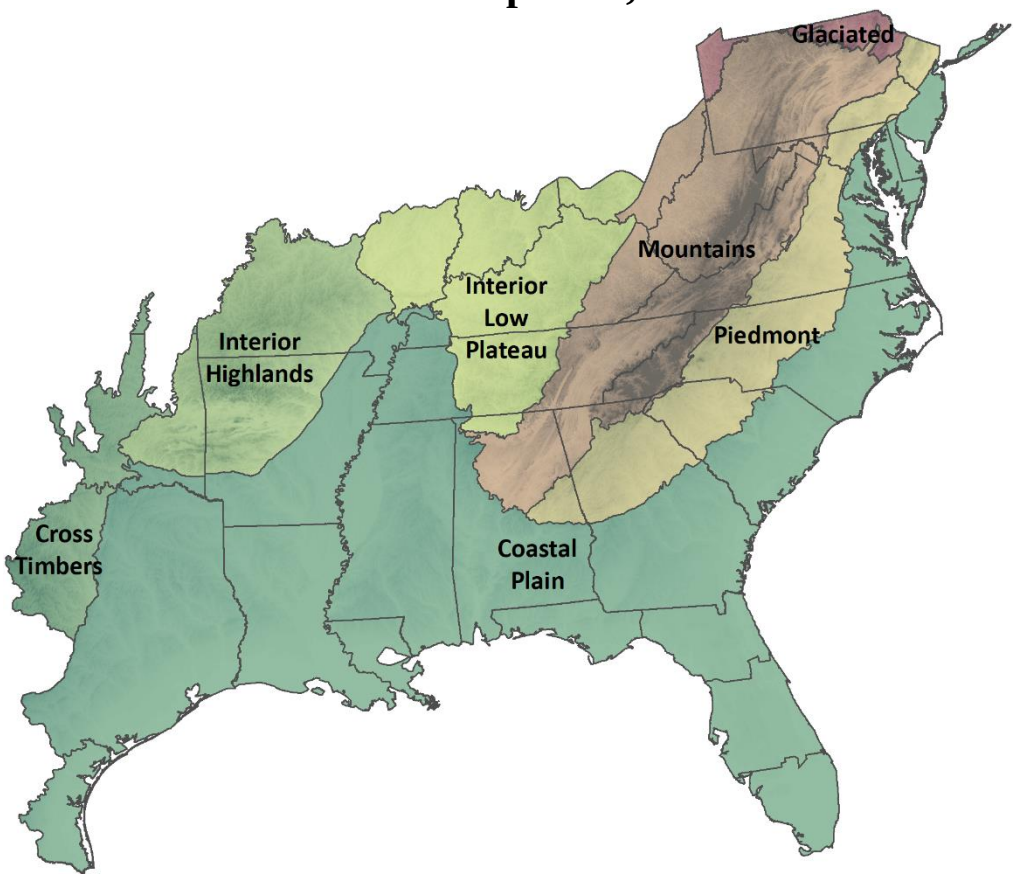

by

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394. CAMPANULACEAE A.L. de Jussieu 1789 (Bellflower Family) [in ASTERALES] 820
400. MENYANTHACEAE Dumortier 1829 (Buckbean Family) [in ASTERALES] 825
402. CALYCERACEAE R. Brown ex Richard 1820 (Calycera Family) [in ASTERALES] 825
403. ASTERACEAE Martinov 1820 (Aster Family) [in ASTERALES] 826
408. VIBURNACEAE Rafinesque 1820 (Viburnum Family) [in DIPSACALES] 927
409A. DIERVILLACEAE Pyck 1998 (Bush-honeysuckle Family) [in DIPSACALES] 930
409B. CAPRIFOLIACEAE A.L. de Jussieu 1789 (Honeysuckle Family) [in DIPSACALES] 930
409C. LINNAEACEAE Backlund 1998 (Twinflower Family) [in DIPSACALES] 932
409D. VALERIANACEAE Batsch 1802 (Valerian Family) [in DIPSACALES] 933
409E. DIPSACACEAE A.L. de Jussieu 1789 (Teasel Family) [in DIPSACALES] 934
413. PITTOSPORACEAE R. Brown 1814 (Pittosporum Family) [in APIALES] 934
414. ARALIACEAE A.L. de Jussieu 1789 (Ginseng Family) [in APIALES] 934
416. APIACEAE Lindley 1836 (Carrot Family) [in APIALES] 937

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AN IMPORTANT NOTE TO USERS OF THE 2022 EDITION

I started this project a little more than 30 years ago, initially as a means of providing Natural Heritage biodiversity explorers in North Carolina with the most effective keys possible (and with an emphasis on vegetative features) to the set of species recognized most currently. Since that time, I have expanded the geographic boundaries of the Flora's coverage to meet the needs of effective biodiversity inventory and science in other parts of the southeastern United States. This geographic expansion, first to Virginia, then to Georgia, then led to the 2015 Flora region: southeast of the Mississippi River, Ohio River and Mason-Dixon Line but excluding peninsular Florida. Having gone so far, it now makes sense that the Flora embrace the biogeographic region of the moist, relictual, unglaciated southeastern North America: south of the glacial boundary and east of the "dry line" to the west that marks a marked floristic boundary to the Great Plains prairies to the northwest and the Madrean woodlands and scrub to the southwest. I differ with Takhtajan (1986: Floristic Regions of the World), however, by regarding the parts of southeastern North America inland in the "hard rock provinces" but south of the glacial boundary as being fundamentally "southeastern", connected to the Coastal Plain, and retaining the core diversity of the critical temperate Eastern North American relictual flora, badly needing coverage in a modern treatment. I have also rounded off (actually "straightened off") the Flora boundary to include the glaciated portions of two states that are primarily unglaciated, Pennsylvania and New Jersey, to provide comprehensive coverage for state-based usage in those states.

Some of the goals and principles underlying the Flora have always been and remain:

1. It should be a catalog of the species in the region as modern and accurate as possible and based on modern species concepts.
2. It should be a basic resource focused on biodiversity exploration and inventory, including the discovery of populations of rare species, and the accurate reporting of species from ecological plots and site inventory lists. This to me implies keys based as much as possible on plant characteristics readily observable (especially vegetative characteristics) throughout the growing season.
3. It should have broad geographic coverage to promote discoveries of range extensions in the still-very-imperfectly-explored southeastern United States.
4. It should provide detailed information on the habitats of species, in order to emphasize an ecological perspective on our flora and its exploration.
5. The keys should be structured non-traditionally and pragmatically to juxtapose species or groups superficially similar and easily mistakable (e.g., *Hydrastis*, *Podophyllum*, and *Diphylleia* should be keyed near one another, as should *Nyssa* and *Diospyros*, and *Polygonatum*, *Smilacina*, *Uvularia*, *Prosartes*, and *Streptopus*). Identification notes should call attention to similar and mistakable taxa, even if they are not taxonomically close. Keys should NOT be written "by those who don't need them, for those who won't be able to use them".
6. Biogeographical understanding should be facilitated, by making clear the distributions of species within the region and beyond, and the nativity status should be immediately clear (including uncertainty about nativity). The "little maps" provided for each species have been designed to provide the most concentrated biogeographic information possible in a small space.
7. The advantages of a geographically narrowly focused flora and a geographically broader flora can be largely combined with digital tools and subsets -- which we are innovating and have begun to make available in "derivative floras" and apps.
8. The Flora should not be dry, academic, and devoid of life, but should reflect the immense wonder of the subject – while also being scientifically rigorous, exhaustively researched, and referenced in ways to facilitate the interested user's additional exploration in the scientific literature.
9. It should be open source, open access, and developed collaboratively from all information available.

Put another way – I'm trying to create the Flora I've always wished I had had!

The number of species (and other unique "finest level taxa", e.g. varieties and subspecies when a species has more than one in the Flora region) has increased from about 7,500 in 2015 to 10,046 in 2020, to 10,719 in the 2022 edition.

Areas added to the Flora in the 2022 Edition include:

1. "Trans-Mississippian Southeast", the part of the Southeast west of the Mississsippi River:
    a. The Interior Highlands of Arkansas, southern Missouri, and Oklahoma. Floristically, the Ozarks and Ouachitas are part of the core "unglaciated warm temperate interior Southeast" and share most of their flora with the other upland provinces than can be so described. The Ozarks and Ouachitas also have profound relationships with the

Appalachians and Interior Low Plateau eastwards, high endemism, and have not been well-covered in a modern Flora.

b. The western half of the Mississippi River Alluvial Plain. This is very similar to the eastern side of the River and adds few species not already included in the Flora – though some in areas like the Grand Prairie of Arkansas and the Mississippi River delta of Louisiana.
c. The narrowly-defined West Gulf Coastal Plain of primarily western Louisiana and eastern ("Pineywoods") Texas (but including portions of southern Arkansas and southeastern Oklahoma). The West Gulf Coastal Plain is an intrinsic part of the core southeastern Coastal Plain, in part characterized by the longleaf pine ecosystem. Many genera and species of that ecosystem are disjunct west of the River, but there is also substantial endemism, in an area poorly served by modern floras.
d. The remainder of the North American Coastal Plain in Texas and Oklahoma and adjacent areas (ecoregions often referred to as Gulf Prairies and Marshes, Post Oak Savanna, Blackland Prairies, and Cross Timbers). These areas admittedly represent a transition in the northern part of the region (Oklahoma and northeastern Texas) to Plainsian ecosystems and further south to Tamaulipan/Madrean ecosystems, but retain a predominantly southeastern floristic affinity and many species (including endemics) of southeastern genera. The 2022 edition includes the entirety of the Cross Timbers ecoregion (Fig. 1), which includes portions of TX, OK, and KS. The Cross Timbers region, while marking the vegetational boundary between the southwest arid zones and Great Plains to the west and the eastern deciduous forests to the east, still contains a strong overlap with the flora of the Southeast.

2. Peninsular Florida. Most of peninsular Florida, its plant species and its ecosystems are clearly part of the core Southeastern Coastal Plain. Even coastal fringes of the central peninsula and breadth of the southern peninsula, though, have a predominantly Southeastern North American flora (including dominant species, like *Taxodium ascendens*, *Quercus virginiana*, etc., missing from the West Indies) with an increasing admixture of tropical and subtropical components of West Indian affinity or broader Caribbean affinity, and a few more generally neotropical or pantropical taxa. And while the Monroe County keys have a more strongly West Indian flora, their flora has a very strong overlap with mainland Florida and it would make little sense to orphan them from a "Southeastern Flora".
3. The "southern Midwest" of unglaciated southern Illinois, southern Indiana, and southern Ohio. The unglaciated portions of these states "face south" -- are floristically similar to areas just to the south across the Ohio River (Kentucky, West Virginia) and Mississippi River (southeastern Missouri). Their inclusion is straightforward and adds few taxa; in contrast, glaciated portions of these states have several hundred additional species (especially wetland and northern prairie species), and the Great Lakes shores of these states would add more – so I have not "gone there".
4. Pennsylvania, New Jersey, and New York (southern Long Island). These areas are primarily unglaciated (or were formed as sandy, terminal moraine outwash plains) and clearly have an "unglaciated warm temperate interior Southeast" flora in their interior ("hard rock") provinces, and a Southeastern Coastal Plain floristic component-- the Coastal Plain flora strongly developed in s. New Jersey and s. Long Island (Pine Barrens), but only barely present in Pennsylvania (a narrow fringe along the Delaware River, now mainly urbanized). Central and southern Pennsylvania represents the north range extend for many Southern Appalachian and Southern/Central Appalachian endemics, and the Pine Barrens are likewise the northern range edge of many Southeastern Coastal Plain species and includes a flora with endemics with southern sister species. "Rounding off" the northern Flora boundary by including glaciated northwestern New Jersey, northeastern Pennsylvania, and northwestern Pennsylvania does add (less than a hundred) species more characteristic of the glaciated northeastern United States and Canada, but has the pragmatic advantage of making the Flora useful for state-based users in Pennsylvania, New Jersey, and southern New York.

What does all this mean for users of the 2022 Edition?

The process of fully adding several thousand species, several hundred genera, and several tens of families to the Flora is incomplete. I have prioritized to a degree by various factors: taxonomic level (working generally from finest upwards), geography (northern fringe of NJ, PA, OH, IN, IL, nontropical FL peninsula, and LA, AR, and MO first, leaving southernmost FL, and OK and TX for later), nativity (natives first, as more important for biodiversity conservation work), and abundance (more common species first). Genera and families around the periphery of the Southeast (especially western areas of OK and TX and tropical Florida) have been "worked over" less intensely, with less reassessment of taxonomic decisions, less use (so far) and citation of literature, and some keys are entirely absent, incomplete, or simply less perfect than I would wish them.

For each genus key, taxa that are not keyed are shown under "Unkeyed taxa: XX" (for nonwaif taxa that have not yet been included in the key) and "Unkeyed waifs: YY" (for waifs that have not yet been included in the key). 259 genera have one or more non-waif species unkeyed, mostly taxa occurring only in the OK, TX, or southern FL parts of the Flora region. 176 genera have one or more waif species unkeyed, also mostly in the OK, TX, and southern FL. When keying a plant, be sure to note if there are "unkeyed" taxa listed for that genus. For those taxa not keyed, you may be able to deduce the identity of your

plant by checking the range maps for each taxon as there is a reasonable possibility that they may not occur within your region (i.e., the key may very likely be complete for your location, even though it is not fully complete for the entire flora).

There is no equivalent indication for genera that have not been included in the family's key to genera, or for genera or families that have not been included (or not fully and completely included) in the "Big Key" – what is in most floras a key to families, but in this Flora is pragmatically a key to families or in many cases genera that best key distinctively and practically at that level of key.

In the plans for 2022 and 2023: completing all the keys (within the big keys and genus keys), redesigning and further improving many of the "older" keys, more specific habitat descriptions for each taxon, a redesigned FloraQuest app (or suite of apps) covering the Southeastern United States (with geography and waif filtering), aggregating and inputting photos for all taxa, and more.

A final note: A flora is not so much proscriptive as suggestive. In something as complex and understudied as the plant life (10,000 species strong) of the diverse southeast, there is no One Truth, but a best approximation at this point in time – a compilation that makes useful the accumulated (but often conflicting) ideas about what the plants of the region are, their habitats, distributions, and best means of identification. This Flora is my critical, creative compilation -- based on over 5000 scientific papers, untold numbers of specimens, 46 years of field exploration of the region, conversations with other botanists, and teaching about the flora in the classroom and the field.

I still have a lot to learn (we still don't know jack).

Thanks for your support for this work!

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University of North Carolina at Chapel Hill

CITATIONS OF THIS FLORA AND ITS DERIVATIVES. Please cite as:

Weakley, A.S., and Southeastern Flora Team 2022. Flora of the southeastern United States. University of North Carolina Herbarium, North Carolina Botanical Garden.

In the case of derivative (subset) floras covering smaller area, please cite as

Weakley, A.S., and Southeastern Flora Team 2022. Flora of the southeastern United States: {derivative name, such as Arkansas, eastern Coastal Plain, etc.}. University of North Carolina Herbarium, North Carolina Botanical Garden.

PREFACE. {eventually to be greatly changed and expanded}

The Flora

In the nineteenth and early twentieth centuries, the botanical exploration of a region and writing a flora to summarize that information was seen as a basic societal need leading to the discovery of economically valuable information. Financial support for the research and writing of floras has waned in recent decades, though, as they have been increasingly regarded as "old science" and resources have shifted to areas of plant science seen as more "cutting edge". Even in taxonomic research, the advent of molecular techniques has largely supplanted detailed taxonomic research (at generic levels and below) and the writing of floras, and the great majority of papers in plant systematics now address phylogenetic relationships within a particular group of plants, and mostly at higher taxonomic levels. Traditional monographic taxonomy, with descriptions of taxa, keys to facilitate their identification, distribution maps, and assessments of habitat and relative abundance or rarity, has become increasingly rare.

Yet, paradoxically, the societal uses and needs for the translation of taxonomic information to a useable form, such as floras, have never been greater. Globalization of human societies and economies has meant that plants are regularly introduced far away from their regions of nativity, and many become established and can be either benign or cause economic and conservation damages. Increasing human utilization of land resources has fueled a biodiversity crisis, with many species now imperiled. In the United States and elsewhere, this has resulted in considerable governmental and nongovernmental activity focused on biodiversity inventory and conservation, "recovery" of endangered and threatened species, ecological studies and ecological restoration, and assessment and suppression of invasive exotics. All these activities require an accurate and sophisticated understanding of the flora of an area. These activities also generate new information about the taxonomy, distribution, and conservation status of components of a region's flora which then needs to be incorporated into new iterations.

In the southeastern United States, the publication fifty-two (52) years ago of the Manual of the Vascular Flora of the Carolinas, by A.E. Radford, H.E. Ahles, and C.R. Bell (Radford, Ahles, & Bell 1968), was a landmark. In the half century since its publication, it has served as the primary reference for the identification of plants in the Carolinas, and throughout the southeastern United States (since most other states were not covered by comparable, "recent" references). The effort to research and write the Manual of the Vascular Flora of the Carolinas took about 11 years, and resulted in a series of publications, the Guide to Vascular Flora of the Carolinas (Radford, Ahles, & Bell 1964), the Atlas of the Vascular Flora of the Carolinas (Radford, Ahles, & Bell 1965), and finally the Manual itself (1968). Once published, the existence of "the Manual" helped generate an interest in and further studies of the flora of the region; since then, many additional species have been documented as part of the region's flora, additional alien species have become naturalized, new species have been described, monographs have given new taxonomic insights into groups, nomenclature accepted in 1968 has been found to be invalid, new and more reliable keys have been developed, and systematic treatments have changed and advanced. Increasingly, identification of the flora of our region by academic researchers, agency personnel, and the interested public is hampered by the lack of an up-to-date flora. Without such a flora, identification must involve reference to herbaria and thousands of monographs, papers, and other floras – resources not readily available to many people who need them. The absence in the region of a single-source modern standard for the systematic treatment, nomenclature, and identification of the flora compromises scientific studies, ecological research, and agency inventory, management, and monitoring of ecosystem and species biodiversity.

The Flora includes treatment of all vascular plant taxa in the flora region of Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, New Jersey, North Carolina, Pennsylvania, South Carolina, Tennessee, Virginia, West Virginia, and varying portions of the additional states of New York, Texas, Oklahoma, Kansas, Missouri, Illinois, Indiana, and Ohio (see Figure 1). Approximately 10,000 taxa are keyed and treated, making the Flora a comprehensive resource for understanding the flora of all the southeastern United States east of the "dry line" and south of the glacial extent.

Sources of information.
This new flora is based on all resources available: herbarium specimens, published literature, grey literature, Natural Heritage databases and rare species lists, and personal communication with a regional network of botanists and taxonomic experts. Herbarium specimens have been consulted at major institutions in the region.

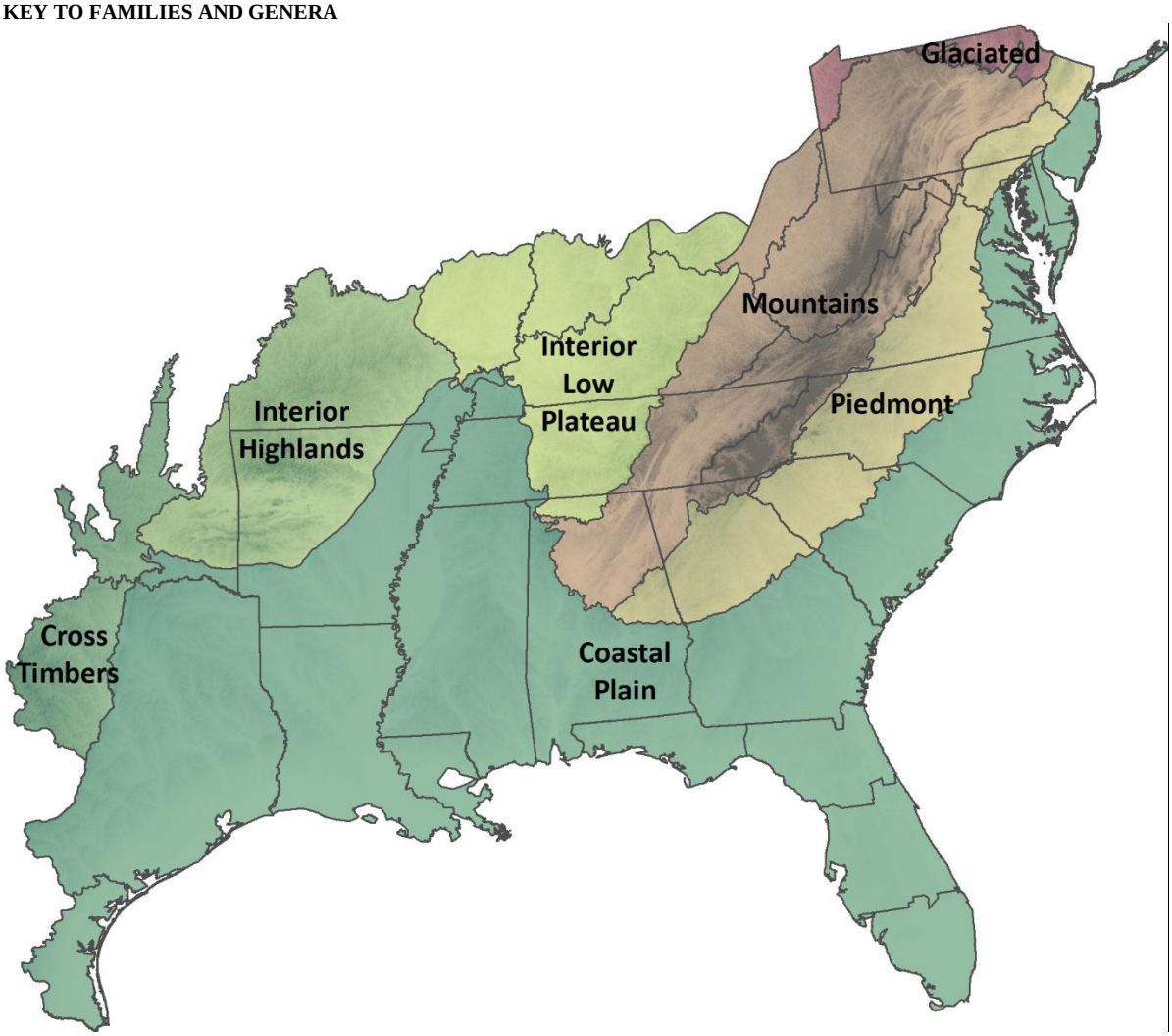


Figure 1. Map of the region covered by the Flora.

Criteria for inclusion of taxa.

One of the first challenges that the author of a flora encounters is to decide the criteria for the inclusion of taxa. The general rule in most floras can be simply summarized as "all native taxa and naturalized alien taxa," but within this simplistic phrase hide many complicated issues, and floras often differ widely in the actual criteria and judgments that they apply (Pyšek et al. 2004; Palmer, Wade, & Neal 1995). In particular, coverage of alien species is very uneven in floras, and the frequent exclusion of many alien species from floras hampers ecological studies, conservation efforts, and efforts to minimize the ecological and economic impacts of invasive aliens.

The following categories of taxa are included and treated fully as "primary" species:

1. Native taxa documented from the Flora region, whether extant or presumed extinct. Some authors, such as Isely (1990), have "excluded" taxa from a flora if they believed them to be extinct or extirpated. This philosophy seems poorly considered: these taxa may prove not to be extinct or extirpated and their inclusion in the Flora will facilitate possible rediscovery. Even if never found again, specimens of them in the herbarium need to be identified or confirmed, and their former existence in the region should be documented.
2. Alien taxa introduced by whatever means and demonstrably established and reproducing (sexually or vegetatively) as a component of the flora. Parallel to #1 above, established alien taxa which have been presumably eradicated (such as *Striga asiatica* in the Carolinas) are included, as their eradication may not have been effective, they may be reintroduced, specimens need to be identifiable using the Flora, and their former existence should be documented.
3. Alien taxa substantially cultivated in the Flora region as crops, such as *Triticum aestivum*, *Zea mays*, *Vitis vinifera*, and *Pinus clausa*. Such species are variably represented in herbaria, and are often included in floras only if one or more herbarium specimens indicate that the species is persisting, or has been collected around a dump or in the edge of a field "out of cultivation." This seems an arbitrary criterion to apply to species which are among the most commonly seen and

economically most important in a region, and may cover many thousands of acres or square miles in the region covered by the flora.

Additional categories of taxa are included and treated as "secondary" species:

1. Native taxa with uncertain documentation, this varying from literature reports not definitely verifiable with specimens (some of these old and some new), to sight reports regarded as probably correct. Taxa in this category are included as secondarily-treated taxa, and their imperfect documentation is described.

Species which have been reported from the Flora region but which are excluded for one reason or another are also listed and the reason for their exclusion mentioned or discussed.

Taxonomic philosophy. Taxonomic treatments generally follow recent monographic and revisionary work, but an effort has been made to provide a certain rough consistency of "splitting" vs. "lumping" across different taxonomic groups. As is generally true in recent treatments, generic and family concepts are often narrower than those used in the Radford, Ahles, and Bell (1968) Manual, based on new evidence, including (but not limited to) phylogenetic analyses. Ironically, these results have often resulted in a validation of earlier, narrower generic (and familial) concepts espoused by J.K. Small, P.A. Rydberg, and others (see Weakley 2005 for extensive discussion). Varieties are less frequently recognized than by Fernald (1950), though a considerable number of species and infraspecific taxa "lumped" by Radford, Ahles, and Bell (1968) are recognized (generally following more recent monographic or revisionary work). Some taxa not formally recognized are discussed and characters for their recognition provided in the text, to draw attention to putative taxa that may warrant recognition after further evaluation.

Format and features.

Detailed keys. Keys have been subjected to rigorous testing in the field and herbarium by hundreds of users. To the degree feasible, keys are structured to emphasize characters that are readily observable and available for long parts of the year, such as vegetative characters; this is not feasible for all groups, of course. Multiple characters are provided. Terminology strives to avoid abstruse technical terms which do not significantly add meaning (for some genera, an introduction to morphological characters and terms used is provided as "Identification notes" preceding the key). Geographic distributions and habitats are sometimes included in the keys as pragmatic, useful, secondary "characters," but are placed in brackets to indicate that they are not "true" characters. The keys include (or are in the process of including) all species from the Flora region. In some cases, several alternate keys are provided. The primary emphasis of the keys is pragmatism – effective and efficient identification. For this reason, a key to a genus sometimes includes closely similar taxa not in the genus that may be mistaken for it. Another example is that the "family key" to ferns and fern allies is actually a key to genera, allowing an emphasis in the key on readily observable characteristics, rather than the technical characters often needed to distinguish fern families. Keys are based on herbarium specimens, though reference is made when characters based on live or fresh plants may differ from those of pressed and dried specimens. Some keys have been adapted from literature cited; where the adaptation is particularly close, credit is given to the source by specific citation.

Habitat. Information is provided about the habitat of the taxon. This information is largely from the field experience of the author, supplemented by information from other botanists, from herbarium labels, and from the literature. For species with wide ecological amplitudes, the habitat may be described simply and broadly ("a wide variety of upland forests"), while the habitat of more localized, specialized, or rare taxa may be described in considerable detail ("moist outcrops of calcareous to semi-calcareous metamorphic rocks, such as mylonite or marble, near waterfalls in humid escarpment gorges with high rainfall, at low elevations").

Native status. The native or alien status is stated. Also, an asterisk prior to the species' name indicates that it is considered alien throughout the Flora region. Some past floras, including Radford, Ahles, and Bell (1968), were haphazard in their inclusion of this information, which is a very important attribute of each recognized taxon. If there is a question, it is mentioned or discussed. For aliens, an opinion is given as to whether the taxon is naturalized, persistent, waif, etc. in the Flora region.

Flowering/fruiting dates. Flowering and fruiting dates are provided for the Flora region. These are derived from herbarium specimens viewed by the author (collected from within the Flora region), from field observations by the author (within the Flora region), and from literature cited.

Distribution of species. A statement of the range wide distribution of each taxon treated is provided. This is based on published distribution maps and distribution statements in other floras, amended and improved by additional herbarium specimens and published records (such as the "Noteworthy Collections" section in the journal Castanea). The distribution within the primary area is provided by state and physiographic province.

These distribution statements are augmented by a map; see Figure 2 for symbology used. The map shows distribution within the Flora area symbolically, with each state × physiographic province area. The native/alien status of the taxon is shown by squares for native

occurrence and triangles for alien occurrence. Note that some species have distributions including both alien and native distributions, so *Dionaea muscipula* for instance is native in the Coastal Plain of NC and SC, but alien in the Coastal Plain of FL and NJ.

In the lower left and right corners are spaces that also provide distributional information. If the species is endemic to the Flora region, you will see "EN." If the species is alien, you will see the region of the world to which it is native. If the species is native but not endemic, you will see a compass rose. Seven arrows depict the native distribution of the taxon outside of the Flora region. Arrows can be long (common at least somewhere in that region), or short (only uncommon or rare in that region).

The regions to which the seven arrows point are:
N arrow -- ne. North America (PA and n. NJ north to the Canadian maritime provinces, west through QC to se. ON and e. and s. OH);
NW arrow -- nw. North America (w. OH, MI, w. ON, and NU west to AK, BC, and OR, north of and including n. MO, NE, WY, ID, and OR);
W arrow -- w. United States (the western "Southeast" of trans-Mississippi LA, AR, s. MO, OK, and e. TX), west to sw. United States;
SW arrow -- Mexico, Central America, and South America;
SE arrow (dashed to indicate oversea) -- West Indies (including Bahamas) and Bermuda;
E arrow (dashed to indicate oversea) -- Asia and/or Africa;
NE arrow (dashed to indicate oversea) -- Europe.

Literature. Nearly all genera have citations to recent, pertinent systematic literature, as well as more limited citations to literature on ecology and population biology. The intent is to provide the user with access into more detailed literature, and to document the literature basis of the treatment followed in the Flora. About 5164 references have been consulted and are cited.

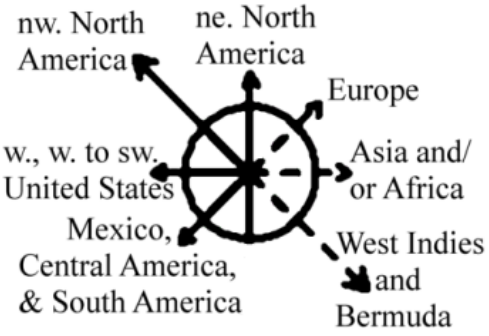
Synonymy. Cited synonymy is provided to regional floras, monographs, revisions, and other significant floristic and monographic treatments (over 5000 references are used), at the end of the account and encoded in brackets: […]. This allows comparison of the taxonomic treatment in the Flora to other treatments, and convenient access to the taxonomic opinions and additional information available in those other treatments.

Synonymy is (or is in the process of being) provided comprehensively for the following floras:
Ar = Gentry et al. (2013) Atlas of the Vascular Plants of Arkansas
Bah = Correll & Correll (1982) Flora of the Bahama Archipelago
C = Gleason & Cronquist (1991) Manual of Vascular Plants of Northeastern United States and Adjacent Canada, Second Edition
ETx = Diggs et al. (2006) Illustrated Flora of East Texas – by volume number (only 1 published)
F = Fernald (1950) Gray's Manual of Botany, Eighth Edition
Fl = Wunderlin, Hansen, (& Franck) (2015 et seq.) Flora of Florida – by volume number (1-6)
FlGr = Hall (2019) Grasses of Florida
FNA = Flora of North America north of Mexico (1993 et seq.) – by volume number (1-26, with some volumes not yet published)
FoC = Flora of China (1993 et seq.) – by volume number
G = Gleason (1952) Manual of Vascular Plants of Northeastern United States and Adjacent Canada
GrPl = Great Plains Flora Association (1986)
GW = Godfrey & Wooten (1979/1981) Aquatic and Wetland Plants of the Southeastern United States – by volume number (1-2)
I = Isely (1998) Native and Naturalized Leguminosae (Fabaceae) of the United States
Il = Mohlenbrock (2014) Vascular Flora of Illinois: a Field Guide, Fourth Edition
K or K1 = Kartesz (1999) Floristic Synthesis of North America
K2 = Kartesz (2010) Floristic Synthesis of North America
K3 = Kartesz (2015) Floristic Synthesis of North America
K4 = Kartesz (2021) Floristic Synthesis of North America
Ky = Jones (2005) Plant Life of Kentucky
Md = Brown & Brown (1984) Herbaceous Plants of Maryland
Meso = Flora Mesoamericana (1995 et seq.)
Mex = Villaseñor (2016) Checklist of the native vascular plants of Mexico / Catálogo de las plantas vasculares nativas de México
Mi = Voss & Reznicek (2012) Field Manual of Michigan Flora
Mo = Yatskievych (1999, 2006, 2013) Steyermark's Flora of Missouri – by volume number (1-3)
NcTx = Diggs, Lipscomb, & O'Kennon (1999) Shinners & Mahler's Illustrated Flora of North Central Texas
NE = Haines (2011) New England Wildflower Society's Flora Novae Angliae
Pa = Rhoads & Block (2007) The Plants of Pennsylvania, Second Edition
RAB = Radford, Ahles, & Bell (1968) Manual of the Vascular Plants of the Carolinas
S = Small (1933, 1938) Manual of the Southeastern Flora
Sf = Small (1938) Ferns of the Southeastern States
SE = Vascular Flora of the Southeastern States (Cronquist 1980, Isely 1990) – by volume number (only 1 and 3 published)
SFl = Long & Lakela (1976) A Flora of Tropical Florida

KEY TO FAMILIES AND GENERA

Tn = Tennessee Flora Committee (2015) Guide to the Vascular Flora of Tennessee
Tx = Correll & Johnston (1970) Manual of the Vascular Plants of Texas
TxFerns = Diggs & Lipscomb (2014) The Ferns and Lycophytes of Texas
Va = Weakley, Ludwig, & Townsend (2012) Flora of Virginia
W = Wofford (1989) Guide to the Vascular Plants of the Blue Ridge
WH3 = Wunderlin & Hansen (2011) Guide to the Vascular Plants of Florida, Third Edition
WI = Acevedo-Rodríguez & Strong (2012) Catalogue of Seed Plants of the West Indies
WV = Strausbaugh & Core (1978) Flora of West Virginia, Second Edition

	Native	Maybe Exotic	Exotic
Waif, persistent, or questionably naturalized	n/a	*	*
Rare	□	◇	△
Uncommon	▣	◈	◬
Common	■	◆	▲
Endemic	EN	n/a	n/a
Extirpated	X	X	X
Historical (not recently seen but still plausibly present)	H	H	H
No (reported and report rejected)	N	N	N
Questionable (report is out of range, requires additional documentation)	?	?	?



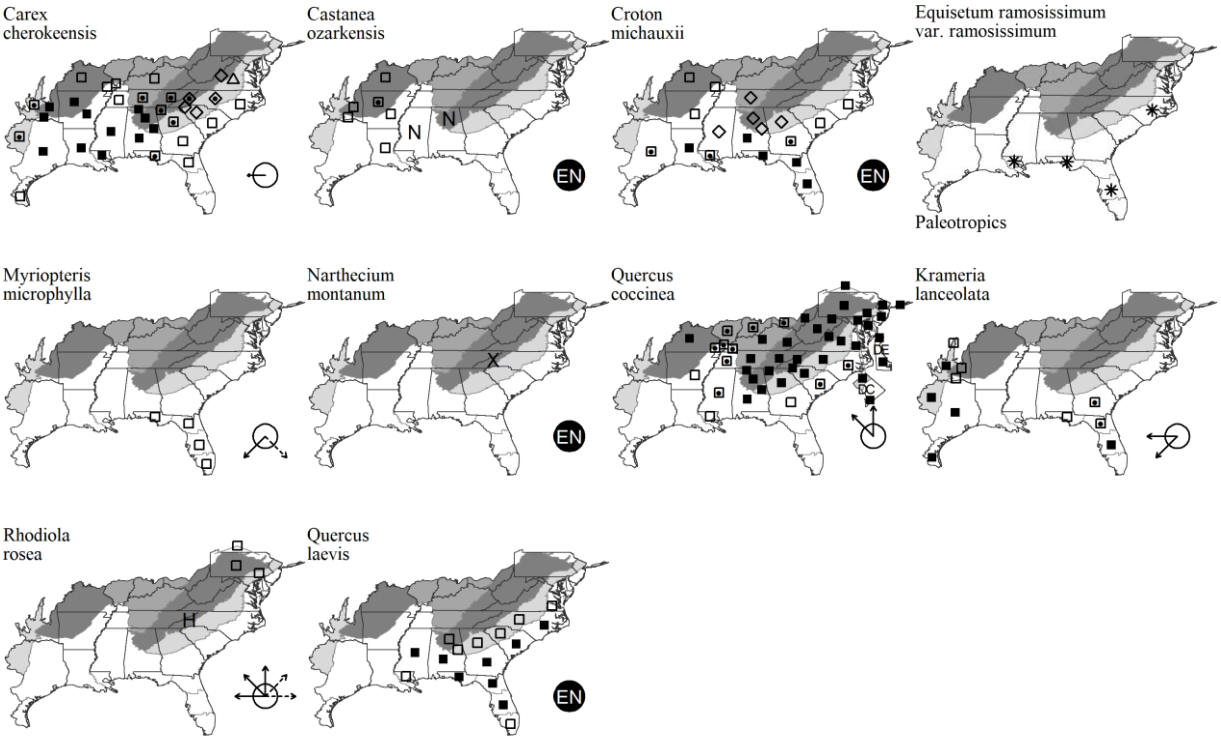


Figure 2: Distribution map key and sample distribution maps

All names known to me to be attributed to the ***Flora*** area in the other floras cited above, significant monographs and revisions, and important regional publications are accounted for, from Small (1933) and forward in time, with the exception that the process has not yet been completed for several floras.

It is important to recognize that this is not a conventional "synonymy" listing, but a **concept-mapping** that provides additional information on the details of the relationship between each taxon-represented-by-a-name in this Flora, and each taxon-represented-by-a-name in the other 5000 taxonomic references whose concept intersects the 10,000 taxa in the Flora. Prior to the name cited, a symbol is inserted to convey the conceptual relationship of the two names – in other words, the relationship of the name and associated taxonomic concept being applied in the Flora to the name and associated taxonomic concept in the other references, regardless of the nomenclatural relationship of the two names. "=" means that the two concepts are believed to be identical (the names may differ by rank, spelling, or genus, but the conceptual entity is the same). If the taxonomic concept is identical and the name is also

the same, the name is omitted. "<" means that the name in use in the Flora is finer than (a split relative to, and wholly included within) the name as used in the reference(s) listed (once again the names may differ by rank, spelling, or genus – or be exactly the same, even though the concept differs). ">" means that the name and associated taxonomic concept in use in the Flora is broader than (a lump relative to, and wholly including) the name as used in the reference(s) listed. "><" means that there is a complex and cross-cutting relationship between the name and associated taxonomic concept used in the Flora and the name and associated taxonomic concept used in the reference(s) listed. "?" means that the relationship between the taxonomic concepts is not understood by me (or at least has not been indicated here) at this time (often this means that there are complications outside the flora area, and often outside of North America, that make the concept relationship difficult to determine or characterize simply).

NatureServe Global Conservation Status Ranks and US Endangered Species Act (USESA) Listed Species. These statuses are provided by NatureServe for all species that can be easily and unambiguously crosswalked between the Flora and NatureServe's taxonomic concepts. In the previous version of the Flora, we crosswalked based on exact name matches. In this version, we crosswalked using the synonymy data in the Flora, and resulted in many new matches from unambiguous name changes (e.g., *Benthamidia florida*). It also created situations where a rank was no longer displayed for exact name matches that are taxonomically ambiguous (e.g., *Andropogon glomeratus*). The ranks provided are current as of the publication of this version of the Flora. For more information on Global Rank definitions, updates, additions, and supporting documentation, see NatureServe Explorer (explorer.natureserve.org), accessible for each species through a link in the PDF version of the Flora. Entries missing Global Rank or USESA status may reflect taxonomic ambiguity and should not be assumed to be secure or not listed.

Comments and discussion. Miscellaneous comments and discussion are provided for many species and genera, including discussion of biogeography, more details on distribution of rare species, additional notes on identification not included in the keys, information of particular interest on species biology and ecology, habitat, uses, discovery in the flora area or a state, etc. These "idiosyncratic comments" add to the general usefulness and interest of what is intended to be a rigorous, practical, and interesting flora.

Acknowledgments

I began this project 34 years ago (in 1988) and have managed it to provide an openly and freely available resource, with updated versions posted and available for download. An important goal throughout has been to incorporate the insights of all knowledgeable students of the flora of the region – professional and amateur, non-academic and academic, taxonomist and natural historian – and to access information from traditional sources for floras (herbaria, journal articles, other floras) as well as less traditional sources (gray literature, agency reports, and increasingly botany-oriented Facebook groups, and citizen science platforms like iNaturalist).

Contributor	Taxa covered	Families/Genera
M. Alford	38	Xylosma, Salicaceae, Casearia, Flacourtia, Oncoba
H. Ballard	78	Viola
W. Barger	32	Lobelia
K. Bradley	51	Evolvulus, Scutellaria, Dodonaea
E. Bridges	18	Pityopsis, Elytraria
M. Brock	27	Silphium
R. Carter	28	Cyperus
D. Estes	28	Clematis, Penstemon
G. Fleming	29	Stachys
A. Floden	7	Trautvetteria, Blephilia
R. Folk	17	Heuchera
J. Horn	5	Stillingia
Z. Irick	34	Clematis
J. Kees	184	Cyperus, Oenothera
W. Knapp	56	Juncus
R. Lance	111	Crataegus
R. LeBlond	338	Scleria, Paspalum, Coleataenia, Dichanthelium, Panicum, Rhexia, Rhynchospora
L. Majure	22	Opuntia
H. Medford	21	Smilax

T. Murphy	34	Clematis
Z. Murrell	14	Cornaceae
L. Musselman	32	Isoetes
J. Nelson	29	Stachys
G. Nesom	9	Ligustrum
R. Peet	13	Carya
D. Poindexter	395	Cornaceae, Abies, Scutellaria, Stachys, Taenidia, Carex
M. Pyne	71	Solanum, Physalis
P. Schafran	32	Isoetes
E. Schilling	4	Blephilia
B. Sorrie	719	Scutellaria, Lobelia, Coreopsis, Euthamia, Carex, Viola, Pityopsis, Diodia, Juncus, Myriophyllum, Sabatia, Sisyrinchium, Viburnum, Buchnera, Eleocharis, Lechea
D. Spaulding	32	Lobelia
J. Townsend	10	Boltonia
J. Triplett	4	Arundinaria
S. Ward	~200	Orchidaceae (in part), Asteraceae (in part)
S. Zona	33	Arecaceae

KEY TO GENERA AND FAMILIES

General advice on keying. The keys in this Flora are artificial and unabashedly pragmatic. One can get to the sub-keys (Key A, Key B, Key A7, etc.) by proceeding through the general key, or by jumping directly to the sub-key based on its "description". In order to accommodate both access methods, some taxa are keyed in 2 or more sub-keys, but would logically be found only in one sub-key if one proceeded accurately through the general key. For instance, floating aquatic pteridophytes are keyed in both Key A2 and Key C1, though a logical procession through the general Key would key them into Key C1 and not allow them to appear in Key A2; they are keyed as well in Key A2, so that if it is apparent or determinable to the user that they are vascular cryptogams, they can be found via that key as well.

Identification keys are a time-honored and useful way to arrive at a tentative decision about the identity of a plant in the field, on an herbarium sheet, or in an image. A key is essentially a decision tree, where you are presented with a series of dichotomous ("choose A or B") choices that arrive eventually at an "answer". "Keying" takes some practice, though, and we here provide some advice and information to help you use the keys in the Flora of Virginia. The keys in this book are indented keys, which take more space but provide easier visual understanding of the structure of the key and make it easier to backtrack, when that is needed, or to look ahead, which is often helpful, particularly for those who are more experienced with the plants of Virginia. Each choice in the decision tree (key) is represented as a couplet with 2 leads. Each couplet in a key has a unique (and sequential) number, which reduces errors in following the key, particularly in longer subkeys, in which the two leads to be compared may be some distance apart and even on different pages. Some characters require some magnification; a high-quality 10× hand lens is adequate for use of the Key to Genera and Families and for use in nearly all the subsequent keys to genera and species in the families (greater magnification and a dissecting scope are helpful or necessary in some families and genera with small, technical features).

It is important to **read both leads of a couplet** and to make a choice based on the **preponderance of the evidence**. In most couplets, 2 or more characters are used, and the character states of each of those characters are contrasted. Sometimes the contrast for a particular character may be an incomplete one, such as "petals 4 or 5" vs. "petals 5 or 10" – if your plant has 4 or 10 petals, the choice based on that character is clear, but if your plant has 5 petals, this character provides no useful information for you and you will need to rely on other characters used in the same lead. This illustrates the problem of just reading the first lead and making a snap decision ("oh, it has 5 petals, so I will choose the first lead"). Many couplets use one or more characters that may not be available on your specimen, or at least not readily determinable, such as the number of petals on a plant in fruiting stage, or the fruit type on a plant in flowering stage (though see "Sleuthing Characters" below for some advice on determining character states that may not be readily apparent). Occasionally, you may run into a couplet which represents a "dead end" for you, in that the plant you are keying does not have the feature(s) you are asked to judge (e.g., the petal number of a plant not in flowering stage). A "dead end" does not mean that you cannot arrive at an "answer", though it does make it somewhat more difficult. In this situation, as well as in any situation in which the choice between the two leads of a couplet is somewhat or completely ambiguous, it is a good idea to record or remember the location or identity of the ambiguous couplet ("Key N1, couplet 11"), take one lead and see what answer results, then take the other lead and see what answer results. Occasionally, the answer will be the same (some species and genera are keyed in multiple places), but often this will lead you to two contrasting potentially correct answers which must then be compared (see below for advice about testing the "answer" arrived at in a key). Often, you will get an indication that one way is the wrong way because you will be confronted with couplets that do not make sense relative to the plant you have in hand.

The Key to the Genera and Families has been structured in a somewhat novel way, emphasizing vegetative characters (those not involving flowers and fruits). Many professional and amateur users of floras nowadays need or want to name plants throughout the growing season, and not only during the somewhat short periods of time when flowers or fruits may be present on the plant. For this reason, more readily observable features of the growth form of the plant, the arrangement of the leaves, whether it is woody or herbaceous, a vine or not, and other characters that are readily observable over a long period are used as much as possible in the keys, and those vegetative characters are especially used in the early portions of the keys, so that based strictly on more observable and less "technical" characteristics, you can key down to an answer or at least to a relatively small subset of the species in the Flora. In other words, we have tried to minimize the use of difficult choices, ambiguities, and technicalities at all, but when they have proven necessary, we have "pushed them" as far down into the latter parts of keys as possible, so that if a true "dead end" is reached in the key, an identification can possibly be made based on comparison of the relatively few possibilities remaining.

Confirming identifications. Identification keys are a tool, but not an infallible one, and it is therefore critical to confirm your identifications. It is easy to make the dangerous assumption that "it keys to it, so it must be it". You may have made a simple error (such as jumping down a line in the key), or an error of interpretation in deciding between the two leads. The key may be imperfect, having failed to accommodate an unusual species or genus, or unusual conditions (character states) in a species or genus (e.g., abnormally large leaves, leaves whorled by developmental anomaly in a typically opposite-leaved species, etc.). Or, you may have found a native or alien species not known before from Virginia and therefore not provided for in the key! For these reasons, it is

important that you compare your "answer" from keying to the description and drawings in the Flora of Virginia, to written technical descriptions and drawings in other floras (increasingly available online, such as the Flora of North America), to specimens in area herbaria, and to photographic images available in other books and online.

Leaf arrangement. The arrangement of leaves (**alternate**, **whorled**, or **opposite**) and their **disposition** (**basal** or **cauline**) is used frequently in the keys. Alternate leaves are attached at the stem 1 per node, opposite leaves 2 per node, and whorled leaves 3 or more per node. Note, however, that alternate leaves are sometimes closely clustered (with very short internodes) and mistakable as whorled or opposite. Note also that some plants (*Hypericum*, *Eupatorium*, many Lamiaceae, many others) have a strong tendency to have axillary shoots in the axils of primary leaves; these are often referred to as **axillary fascicles**. These can superficially make it appear that there are many leaves at a node. Axillary fascicles tend to have smaller leaves (at least for a time) than the primary leaves and to have short and compressed internodes; these should not be interpreted as whorled if the primary leaves are not whorled. Also, many herbs with opposite leaves have occasional developmental "errors" that result in the leaves being in whorls of 3; these cannot be reliably accommodated under "leaves whorled" choices in the key, so if a plant with whorled leaves does not key well under "leaves whorled", it should also be sought under "leaves opposite".

Leaf duration. The longevity of leaves is used in the keys for woody plants. **Evergreen** plants are those that retain full leaf cover through the winter, while **deciduous** plants lose their leaves at the end of the growing season (for some species, sometimes well before autumn). Some plants are also described as **tardily deciduous** or **semi-evergreen**, meaning that they drop leaves gradually into the winter, so that they are sparsely bedecked with leaves or even bare by the time of initiation of new growth in the spring. Unless you are in a position to observe the plant repeatedly through the seasons, leaf duration must be interpreted, and this can be difficult, especially on herbarium specimens. In general, evergreen leaves tend to be darker green (at least on the upper surface), often shinier, and usually thicker in texture and stiffer than deciduous leaves, but there are exceptions to all these tendencies. It can be helpful to see if the specimen or living plant has two obviously different ages of leaves present: older, tougher, more ragged and insect-eaten leaves of last year as well as younger leaves of the year. On many woody plants, it is easy to determine what is new (this year's) growth from older growth, and the younger vs. older leaves may be spatially separated on shoots of the season vs. on older wood. Note, though, that some "evergreen" shrubs or trees essentially replace all their leaves at leaf-out in the spring, all of last year's leaves being sloughed as the current year's leaves are emerging.

Growth form or habit. The basic growth form or habit of the plant is used extensively in the keys. **Woody** plants have substantial secondary or diameter growth of wood, which makes their stems (in general) thicker, stronger, stiffer, and tougher; they also have "perennating structures" (normally buds) borne above ground on their woody stems. **Woody plants** are further subdivided into **trees**, **shrubs**, **rosette shrubs**, **subshrubs**, **rosette subshrubs**, and **lianas**. **Trees** are generally more than 5 meters tall at maturity and usually have single stems which are not interconnected by subterranean rhizomes (forming clonal patches). However, some tree species are characteristically multi-trunked or tend to produce a multi-trunked growth form as a result of stump-sprouting following logging, and stressful ecological conditions (such as shallow soil over rock or maritime exposure) can produce trees shorter than 5 meters. **Shrubs** are generally less than 5 meters tall and are often multi-stemmed from the base or near it (though some shrubs are characteristically single stemmed); quite a few are also clonal and produce many above-ground stems from a series of interconnected underground rhizomes). Some species grow as both trees and shrubs or have an ambiguous form; these are generally keyed as both trees and shrubs. Note that trees have seedlings or saplings that are shorter than 5 meters tall and may be multi-stemmed in growth form, especially in burned habitats; these are not keyed as shrubs and can generally be recognized as tree seedlings or saplings by the presence in the habitat of adult trees of the same species and by their lack of sexual reproduction (flowers, fruits, cones, etc.) because of their juvenile condition. **Subshrubs** are somewhat to strongly woody, but short in stature (often < 2 dm tall); while they have woody growth, they are often mistaken for herbs. **Rosette shrubs** and **rosette subshrubs** have basal leaves (see **Leaf location**, below) from an above-ground but short woody stock. **Lianas** are woody vines: in essence shrubs with specialized structures for climbing, including a) adventitious roots, b) twining growth of main stems, or c) simple or branched tendrils that either twine themselves or have adhesive "holdfast" tips. Some plants are keyed both as lianas and as shrubs. **Herbaceous plants** lack substantial secondary growth of wood and are either annual or have perennating organs (such as buds) on subterranean rhizomes, crowns, caudices, or corms. Herbaceous plants are further subdivided into **herbs** and **herbaceous vines**. **Herbs** are erect, sprawling, or trailing, but lack specialized adaptations for climbing (twining, tendrils, etc.); whereas **herbaceous vines** have these specialized adaptations. The interpretation of "woodiness", between shrub and herb (and liana and herbaceous vine), can be difficult, especially with herbarium specimens. Some herbaceous plants can become suffrutescent: tough, fibrous, or thick in ways that mimic or approach woodiness. The presence of vegetative buds (not flower buds) in the axils of leaves on the aerial stems clearly indicates a woody plant. Some plants which are ambiguously woody and likely to be mistaken one way or the other are keyed both ways.

Leaf disposition. The disposition of the leaves, whether basal or cauline, is used as a distinction to separate some of the major subkeys (in the woody plants separating Keys A7, B1, and E from the others, and in the herbaceous plants separating Key N from Keys O, P, Q, R, and S), as well as in a few other places. **Basal leaves** arise from underground buds (on rhizomes, crowns, caudices, or corms) or from the very base (ground level) of an aerial stem. **Stem leaves** (cauline leaves) are those which arise from above-ground (aerial) stems of the plant. Many plants, however, have **basally disposed** leaves, where the largest leaves are basal (and usually persistent through the growing season as a "basal rosette"), but smaller stem leaves extend up the above-ground stem. This can

be ambiguous, though, and the persistence of basal leaves can be affected by season and conditions. While many taxa are keyed both in Key N and in one or more of Keys O, P, Q, R, and S), if this choice seems at all ambiguous and keying one way does not work well, the other choice should be tried.

Leaf type. Leaves are described as either **simple** or **compound**. Simple leaves are not divided into separate leaflets; the leaf tissue is continuous with all other leaf tissue of the leaf. By contrast, compound leaves are separated into 2 or more separate leaflets, connected only by various stalks (petiolules, rachises, rachillas) that lack leaf tissue. Simple leaves may be **unlobed**, **pinnately** lobed, or **palmately** lobed, and the lobes may be variously shallow or cut nearly to the midvein or base of the leaf. Perhaps the easiest way to determine whether leaf lobing is pinnate or palmate is to look at the major veins in the leaf. Pinnately lobed leaves have lobes arrayed in a line along either side of the midvein, and the lobes are associated with the major secondary veins of the (pinnately veined) leaf. The lobes of palmately lobed leaves are associated with the 3 or more palmate veins that arise together from the base of the leaf blade (note that the lobes of palmately lobed leaves are sometimes themselves sublobed, and that these sublobes are often pinnately arrayed: the leaf is still considered palmately lobed). **Compound leaves** are further classified by the number of leaflets, whether the leaflets are arrayed in a pinnate or palmate manner, and whether there is a single order of division or 2 or more orders of division. **Palmately compound** leaves have all leaflets attached at a single point, at the end of the petiole. Palmately compound leaves in our flora have from 3 to ca. 21 leaflets and are never further compound beyond the single order of division (in other words, the leaflets are not themselves compound). **Pinnately compound** leaves have leaflets attached to one or more axes (rachises, rachillas) that extend beyond the end of the petiole, and many taxa have 2 or more orders of division. Bifoliolate (**2-foliolate**) leaves are very rare in our flora. Trifoliolate leaves (**3-foliolate**, and sometimes called "ternate") are very common in our flora and can be either **palmately 3-foliolate** or (especially in the Fabaceae) **pinnately 3-foliolate.** Pinnately compound leaves have a short rachis extending past the end of the petiole (and the point of attachment of the 2 lateral leaflets via their petiolules), with the terminal leaflet attached at the end of this rachis via its petiolule; the joint between the rachis and the terminal petiolule is usually obvious because of a change in diameter, color, vestiture, and/or texture. The distinction between palmately 3-foliolate and pinnately 3-foliolate leaves is not used in the Key to Genera and Families but is important in some other keys, especially the key to genera of the Fabaceae. Pinnately compound leaves with 4 or more leaflets are very common in our flora, especially in some families. **Even-pinnately compound** leaves (the less common situation) have an even number of leaflets, often paired along the rachis or rachillas, and lack a terminal leaflet at the tip of the rachis or rachilla and extending along its axis; these taxa are concentrated in the Fabaceae and a few other smaller families. **Odd-pinnately compound** leaves have a terminal leaflet and therefore usually an odd number of leaflets. Odd-pinnately compound leaves with 2 or more orders of division are typically described in the keys as **complexly compound**. Other floras variously describe leaves of this sort as 2-pinnate, 3-pinnate, decompound, biternate, or other terms, but these have largely been avoided in the keys in this work because the "compoundness" is often complex, mixed between pinnate and ternate, and therefore difficult to describe accurately with such terminology. For instance, many members of the Apiaceae have complexly compound leaves, which are initially 3-forked (ternate), each of these forks may then be 3-forked again (though with the lateral forks supporting fewer or smaller leaflets than the terminal one), and these 3-order divisions are then often pinnately compound. Note that **deeply lobed leaves** can sometimes be easily mistaken for **compound leaves**. Compound leaves have no leaf tissue connecting the individual leaflets, whereas lobed leaves have at least a narrow flange of leaf tissue along the rachis or rachilla that connects the leaf tissue of one lobe with the leaf tissue of the next. In some taxa, this is difficult to interpret, and these have generally been keyed both ways.

Lobes and teeth. The presence, absence, number, and shape of **lobes** or **teeth** along the margin of the leaf are very useful vegetative characters. The term "tooth" or "teeth" is here used in a broad sense to include any of the small marginal projections covered under the terms dentate, denticulate, serrate, serrulate, crenate, crenulate, spinose, spinulose, doubly serrate (biserrate), or erose. In other words, teeth can be rounded, pointed, or spine-tipped, and of various shapes and sizes. The term "tooth" or "teeth" does not include undulations out of the main plane of the leaf, hairs, or epidermal projections in the plane of the leaf margin, described by terms such as ciliate, ciliolate, or scabrous-margined. Teeth are often regular in size and position but in some species are irregular in form, shape, and even presence (these species are keyed in several places). The term "lobe" or "lobes" is also used in a broad sense to mean a larger feature of the leaf margin. Relative to teeth, lobes are typically both actually larger and relatively larger in relation to the size of the leaf, and also more widely spaced, often with a sinus (the depression between 2 lobes) extending $1/10^{th}$ to $9/10^{th}$ of the way from the outer leaf outline to the midrib. Lobes are typically spaced 1 cm or more apart, though the term is also applied to more closely spaced features with relatively deep sinuses (at least $3/10^{th}$ of the way to the midrib), especially in pteridophytes and in flowering plants with small leaves. Teeth are truly marginal, typically meeting 2 or 3 of the following 3 conditions: spaced < 1 cm apart, the sinuses between them usually extending < $1/10^{th}$ of the way to the midrib, and the tooth itself (measured on its shorter side if it not equilateral) < 4 mm long. Occasionally we have also used the number of "**points**" as a character in the keys. This is the total number of lobe points and tooth points along one side of the leaf (base to apex on one side of the midvein). Note that some leaves are unlobed except for the presence of 2 basal lobes (one on either side, often described as cordate, sagittate, auriculate, or hastate depending on the shape, size, and orientation of the lobes); this situation is not keyed in the "lobed" sections of the key (as noted in the pertinent couplets).

Learning families. Learning plant families, especially those that are particularly important in the Southeastern United States flora or that are especially distinctive, is an extremely useful aid in identifying plants. While "learning" a family often starts with understanding its distinctive characteristics, often including some rather technical characteristics, with experience it becomes a more "gestalt" sense that, for instance, "that plant just looks like Asteraceae", even if the features that would allow it to be keyed are not

present. Knowing plant families often allows one to bypass the Key to Genera and Families entirely or facilitates decisions at particular couplets in it. A few of the families that are particularly useful to learn are Apiaceae, Asteraceae, Brassicaceae, Cyperaceae, Euphorbiaceae, Fabaceae, Juncaceae, Lamiaceae, Poaceae, Ranunculaceae, Rosaceae, and Rubiaceae.

Sleuthing characters. Some characters used in the key may seem initially impossible to find on your plant or specimen, but may actually be findable or deducible. Old fruits can sometimes be found on woody species, or on the ground under the tree or shrub. Old flower stalks (from the previous year) are sometimes present in perennial herbs, allowing the size of the plant and the type of inflorescence to be assessed. The calyx is often persistent after the petals have fallen, and calyx merosity (number in the whorl) and symmetry is usually the same as the merosity and symmetry of the corolla (though not always). Various fruit characters can sometimes be deduced from the flowers, and various flower characters can be deduced from the fruits. When capsules are immature (sometimes even in the stage of an ovary while in flower), dehiscence can often be deduced by the presence of visible lines on the fruit (sutures, visible at 10×). The number of carpels and locules can usually be determined from either the ovary or the immature or mature fruit, by making a careful ×-section. Stamens are sometimes present as shriveled remnants on fruits, allowing the number of stamens to be determined. Hair types (e.g., simple vs. stellate) may seem impossible if the leaf appears superficially glabrous, but hairs often remain to the end of the season on even apparently glabrous leaves in protected places, especially on the lower surface in the main vein axils. The bulbous or papillose bases of some hairs remain after the rest of the hair has worn off. Deducing the presence of stipules is often possible by looking for scars (usually linear) that extend beyond the leaf scar proper.

Winter identification. Note that no attempt has been made to make the key work consistently for plants in winter condition. Woody plants with evergreen foliage will generally be "keyable" in Keys B, D, E, F, G, H, I, and J, but deciduous species will not; there are various winter twig and bud keys available in print and online for the winter identification of trees and shrubs. Herbaceous plants with winter rosettes or otherwise green winter foliage will generally be found in Key N, but an impractical number of ambiguous or "dead end" leads will be encountered.

Botanical terminology. While the use of specialized terminology and jargon has been reduced, some of these terms are useful and unavoidable, and provide a precise meaning without a lengthy explanation. Terms can be found in the glossary, and there are print and online resources that provide definitions and often illustrations as well. Particularly recommended at the time of writing is Harris and Harris (2001), Plant Identification Terminology: an Illustrated Glossary.

Characteristics of major groups of vascular plants. At various points in the key, a kind of shorthand is used in key leads to indicate the main evolutionary group involved: Lycophytes, Pteridophytes, Gymnosperms, Basal Angiosperms, Eudicots, and Monocots. This shorthand is not placed in every couplet in which it could be, but is used where it is likely to be helpful to the user. While the readily visible characteristics of these groups have many exceptions, the following table} will aid in their recognition (note that this table is pragmatically based only on the characteristics of those taxa in our flora).

KEY TO FAMILIES AND GENERA

	Lycophytes	**Pteridophytes**	**Gymnosperms**	**Basal Angiosperms**	**Eudicots**	**Monocots**
Leaf size	**Very small** (< 20 mm long), or linear quill leaves in *Isoetes*	Very small scale to very large	Very small scale leaves to very large pinnately compound leaves	Small to large (> 3 cm long)	Very small scale to large	Very small scale to giant leaves
Leaf complexity	**Simple**	**Usually complexly compound** (1-5× compound), but also simple or variously less complicatedly compound	Simple and scale-like or needle-like (or 1-pinnately compound in Zamiaceae and Cycadaceae, and fan-shaped and dichotomously veined in *Ginkgo*)	**Simple** (or dichotomously compound in *Cabomba*)	Simple to complexly compound	**Simple with few exceptions** (except palmately or pedately compound in *Arisaema* and palmately or pinnately compound in the giant leaves of Arecaceae)
Leaf or leaflet toothing	**Entire or minutely toothed**	Often toothed (diversely so), but sometimes entire	**Entire or minutely toothed**	**Entire**	Entire or variously toothed	**Entire** (often marginally scabrous or ciliate; rarely with spinulose teeth in some aquatics)
Leaf or leaflet lobing	**Leaves not lobed (leaflets never present)**	Leaves and/or leaflets often lobed (diversely so)	**Leaves or leaflets not lobed**	**Leaves not lobed** (except the base sometimes cordate or auriculate)	Leaves and/or leaflets often lobed (diversely so)	**Leaves or leaflets not lobed**
Leaf arrangement	Alternate, opposite, or whorled	**Alternate**	Alternate, opposite, whorled, or fascicled	**Alternate** (rarely opposite, in *Cabomba*, *Calycanthus*, and *Asarum*)	Alternate, opposite, or whorled	**Almost always alternate** (rarely opposite or whorled)
Leaf disposition	Cauline scale leaves (basal quill leaves in *Isoetes*)	**Basal**	**Cauline** (or basal in Zamiaceae and Cycadaceae)	**Cauline** (or basal in Nymphaeaceae and *Brasenia*)	Cauline or basal	Cauline or basal
Leaf venation	A single unbranched vein	Complex and variable, often with some dichotomous portions	Single midvein or several parallel (dichotomous in *Ginkgo*)	1° and 2° veins pinnate or palmate, ultimate veins netted or free	1° and 2° veins pinnate or palmate, ultimate veins netted or free	1° and 2° veins parallel or penni-parallel, smaller veins cross-veins at right angles
Reproductive structures	**Spores**, borne in sporangia axillary to scale leaves (or in *Isoetes* embedded in the base of quill leaves)	**Spores**, mostly borne on the undersurface of leaves, but also in a variety of specialized structures (but not as in Lycophytes)	Seeds, **borne naked on scales, or in berry- or drupe-like structures**	Seeds, borne in fruits	Seeds, borne in fruits	Seeds, borne in fruits
Perianth	N.A.	N.A.	N.A.	Typically **many-merous**, the segments borne **spirally** or in whorls	Typically **4-5-merous** (sometimes many), the segments in whorls	Typically **3-merous**, the segments in whorls
# of carpels	N.A.	N.A.	N.A.	**Typically > 6** (rarely 1-6)	**Typically 4-5 or 1-2**, sometimes many, very rarely 3	**Typically 3** (rarely 1, 2, 4, or 6)
Carpel fusion	N.A.	N.A.	N.A.	Usually separate (sometimes fused)	Usually fused, sometimes separate	**Always fused**
Perianth connation	N.A.	N.A.	N.A.	Perianth segments typically separate (fused in Nymphaeaceae or Aristolochiaceae)	**Perianth segments often fused**, but also often separate	Perianth segments typically separate (sometimes fused)

KEY TO FAMILIES AND GENERA

Key to keys - Key to Plantae

1 Plant minute, consisting of filaments or thalli (undifferentiated into leaves, stems, and roots), generally a single cell thick, usually with abundant single-celled gemmae (specialized bud-like groups of cells for asexual reproduction), a free-living fern gametophyte, superficially resembling bryophytes in lacking vascular tissue, reproducing only vegetatively (by gemmae); [usually growing on vertical or overhanging bedrock (epipetric)]; [Pteridophytes] ..... ***Key A1***

1 Plant more complex, with stems (or rhizomes), leaves, roots, the leaves generally > 1 cell thick (except in sporophytes of *Didymoglossum*, *Crepidomanes*, *Vandenboschia*, and *Hymenophyllum*), with vascular tissue, reproducing by seeds or spores (and often also with various vegetative means of reproduction); [growing in very diverse habitats, including epipetric on bedrock]; [Lycophytes, Pteridophytes, Gymnosperms, Monocots, Basal Angiosperms, and Eudicots].

2 Plants floating aquatics, never rooted to the substrate (though sometimes stranded by dropping water levels); plants often thalloid in structure (lacking clear differentiation of stems and leaves) ..... ***Key C1***

2 Plants terrestrial, wetland, or aquatic, normally rooted to the substrate (sometimes becoming detached and then floating in the water column, though usually not on the water surface, and lacking obvious adaptations for surface flotation); plants generally with clear differentiation of stems and leaves (with some exceptions).

3 Plants woody, either trees, shrubs, lianas (woody vines), subshrubs, or rosette shrubs, with perennating structures (buds) borne on long-lived, above-ground, woody stems or caudices.

4 Stems fleshy and flattened, green and photosynthetic (becoming gray on older stems), the nodes scattered on the flattened pads and bearing glochidia and also often spines; leaves absent ..... ***CACTACEAE***

4 Stems not both fleshy and flattened, usually brown, gray, or tan (sometimes green and photosynthetic), lacking glochidia (sometimes bearing spines, prickles, or thorns); leaves present, usually obvious, but sometimes scale-like.

5 Plants rosette shrubs or subshrubs, the leaves strongly basally disposed and few to many, the above-ground stem stout (> 1 cm in diameter), usually < 1 dm tall; leaf arrangement alternate (but often with very short internodes).

6 Leaves 'fern-like', 1-pinnate-pinnatifid or more divided, deciduous; plants lacking both flowers and seeds, reproducing by spores; [Pteridophytes] ..... ***Key A7***

6 Leaves either simple, 1-pinnate, or palmately compound, evergreen; plants bearing seeds, with or without flowers; [Gymnosperms, Monocots, and Eudicots].

7 Leaves 1-pinnate; plants bearing seeds in cone-like strobili; [Gymnosperms] ..... ***Cycas in CYCADACEAE***

7 Leaves simple or palmately compound; [Monocots and Eudicots] ..... ***Key E***

5 Plants trees, shrubs, or lianas (woody vines), the leaves usually many and cauline (borne along the stem), the above-ground stem usually > 2 dm long, if shorter, then not stout (< 0.5 cm in diameter); leaf arrangement alternate, opposite, or whorled.

9 Leaf venation dichotomous (with even Y-forks, the veins alike, no vein dominant); leaf fan-shaped, deltoid, 3-8 cm wide; leaves alternate, borne in clusters or short, spur shoots; [Gymnosperms] ..... ***Ginkgo in GINKGOACEAE***

9 Leaf venation various, parallel, pinnate-reticulate, palmate-reticulate, with differentiation into primary, secondary, and finer levels of venation, most vein branches showing dominance by one of the two veins; leaf shape various, but not fan-shaped and ginkgo-like; leaves alternate, opposite, whorled, or fascicled; [Gymnosperms, Eudicots, Basal Angiosperms, Monocots].

10 Leaves stiff or scarious, needle or scale-like, in ×-section flat, nearly terete, or variously angled, with or without an obvious midvein and generally lacking noticeable secondary venation; leaf arrangement alternate, opposite, whorled, or grouped into fascicles of 2-5 with a scarious sheath at the base; seeds not enclosed by an ovary or a true fruit, either borne naked on the upper surface of ovuliferous scales aggregated into a cone (the cone sometimes modified and fleshy and "berrylike) or the seed solitary and mostly or completely enclosed in a fleshy or leathery aril or receptacle; [Gymnosperms] ..... ***Key B3***

10 Leaves generally not stiff (some exceptions), usually broader and with well-developed leaf blades (therefore flat in ×-section), usually with a midvein and well developed secondary and tertiary venation (some exceptions); leaf arrangement alternate, opposite, or whorled; seeds borne in fruits, which develop from ovaries; [Eudicots, Basal Angiosperms, and Monocots].

11 Leaves alternate; [Eudicots, Basal Angiosperms, and Monocots].

12 Leaves compound; [Eudicots and Monocots] ..... ***Key F***

12 Leaves simple; [Eudicots, Basal Angiosperms, and Monocots] ..... ***Key G***

11 Leaves opposite or whorled; [Eudicots].

13 Leaves whorled ..... ***Key H***

13 Leaves opposite.

14 Leaves compound ..... ***Key I***

14 Leaves simple ..... ***Key J***

3 Plants herbaceous, herbs, or herbaceous vines (though sometimes with a tough, semi-woody texture), annual, biennial, or perennial, if the latter, with perennating structures borne below-ground (or on the ground surface) as crowns, offsets, etc., or as buds on woody rhizomes.

15 Plants aquatics, all of the plant (except sometimes the reproductive structures) normally submerged or suspended in water, or floating on its surface; {some ambiguously aquatic taxa keyed both here and under 14b} ..... ***Key C***

15 Plants terrestrial or amphibious, all or most of the plant, including most of its leaves and its reproductive structures normally borne in the air, emergent plants may have their bases permanently submerged, and other wetland plants may be occasionally submerged by high waters.

16 Plants completely lacking chlorophyll (white, pink, orange, tan, red), strictly parasitic or mycotrophic; [Eudicots and Monocots] ..... ***Key K***

16 Plants with chlorophyll (usually all or partially green, the green pigment sometimes wholly or partly masked by non-green pigments), at least in part autotrophic (many are also partially mycotrophic or parasitic).

17 Plant reproducing by spores; [Lycophytes and Pteridophytes] ..... ***Key A***

17 Plant reproducing by seeds, developing in fruits derived from flowers; [Eudicots, Basal Angiosperms, and Monocots].

18 Plants epiphytic, normally growing attached to plants and not rooting in soil; [note that epiphytic Pteridophytes are not keyed here, and should be sought in Keys A4 and A6] ..... ***Key L***

18 Plants terrestrial, rooted in soil (sometimes on logs or in tree knotholes, hollows, or tree-limb crotches where soil has accumulated, but not truly epiphytic).

19 [Monocots; see combination of features in Table 1] ..... ***Key M***

19 [Eudicots and Basal Angiosperms; see combination of features in Table 1]

20 Leaves strictly basal, or strongly "basally disposed" (the basal leaves the largest, and usually persistent through most of the growing season) ..... ***Key N***

20 Leaves cauline (if plant with basal leaves, these not noticeably the largest, often senescing early) [note: many taxa keyed in both leads].

21 Leaves alternate.

22 Leaves compound ..... ***Key O***

22 Leaves simple ..... ***Key P***

21 Leaves opposite or whorled or appearing whorled (a few plants have leaves or leaf-like structures which appear whorled but anatomically are opposite or alternate with leaflets divided to the stem).

23 Leaves whorled (some taxa with normally opposite leaves can have occasional developmental errors that result in an individual plant having 3-whorled leaves; these are not accommodated in the key as "whorled" [if a plant does not key readily as "whorled", try it as "opposite"]) or appearing so ..... ***Key Q***

23 Leaves opposite.

24 Leaves compound ..... ***Key R***

24 Leaves simple ..... ***Key S***

Key A - lycophytes and pteridophytes

1 Plant minute, consisting of filaments or thalli (undifferentiated into leaves, stems, and roots), generally a single cell thick, usually with abundant single-celled gemmae (specialized budlike groups of cells for asexual reproduction), and superficially resembling bryophytes in lacking vascular tissue; [usually epipetric on vertical or overhanging bedrock; [Pteridophytes] ..... ***Key A1***

1 Plant more complex, with vascular tissue, with stems (or rhizomes), leaves, and roots, the leaves generally > 1 cell thick (except in sporophytes of Hymenophyllaceae), reproducing by spores; [growing in very diverse habitats, including on bedrock]; [Lycophytes, Pteridophytes].

2 Plant aquatic, either floating and unattached, or rooting and largely submersed ..... ***Key A2***

2 Plant of various habitats, including wetlands, where sometimes growing in soils saturated or intermittently flooded, but not aquatic.

3 Leaves 'un-fern-like': unlobed, variously awl-shaped, scale-like, terete, strap-shaped, or palmately lobed; [Lycophytes or Pteridophytes] ..... ***Key A3***

3 Leaves 'fern-like': variously lobed or divided, ranging from pinnatifid to 4-pinnate; [Pteridophytes].

4 Leaf blades (not including the petiole) small, < 30 cm long or wide (some species will key either here or in the next lead).

5 Epipetric or epiphytic, growing on rock, tree bark, walls, or over rock in thin soil mats or in small soil pockets ..... ***Key A4***

5 Terrestrial, growing in soil, not associated with rock outcrops ..... ***Key A5***

4 Leaf blades medium to large, > 30 cm long or wide.

6 Epipetric or epiphytic, growing on rock, walls, over rock in thin soil mats or in small soil pockets, or on tree trunks ..... ***Key A6***

6 Terrestrial, growing in soil, not associated with rock outcrops ..... ***Key A7***

Key A1 - pteridophytes reduced to thalloid or filamentous, free-living gametophytes

1 Gametophytes filamentous in part or in whole, forming felt-like mats. ..... ***Crepidomanes intricatum in HYMENOPHYLLACEAE***

1 Gametophytes thalloid, ribbon-like and branched.

3 Gemmae absent or spatulate (the gemma > 1 cell wide) ..... ***Hymenophyllum in HYMENOPHYLLACEAE***

3 Gemmae with cells uniseriate (the gemma 1 cell wide) ..... ***Vittaria in PTERIDACEAE***

Key A2 - pteridophytes and lycophytes growing as floating or rooted aquatics

1 Plant with at least some leaves palmately or pinnately lobed or 1-4× pinnately divided ('fern-like') and > 2 cm long ..... ***Ceratopteris in PTERIDACEAE***

1 Plant either a floating aquatic with leaves <5 cm long, or with clover-like or linear leaves.

2 Plant a floating aquatic ..... ***SALVINIACEAE***

2 Plant a rooted aquatic.

3 Plant clover-like, with 4 leaf segments borne terminally ..... ***Marsilea in MARSILEACEAE***

3 Leaves linear.

4 Plants cormose or with short rhizomes; leaves numerous, undivided leaves ..... ***Isoetes in ISOETACEAE***

4 Plants with creeping rhizomes; leaves few, reduced to a winged petiole ..... ***Pilularia in MARSILEACEAE***

Key A3 - lycophytes and pteridophytes with leaves not 'fern-like' (unlobed, variously awl-shaped, scale-like, or terete)

1 Stem obviously jointed; leaves scale-like, borne in a whorl at each of the distant joints; spores borne in a terminal strobilus with peltate scales ..... ***Equisetum in EQUISETACEAE***

1 Stem (or rhizome) not jointed; leaves scale-like or larger, but if scale-like not borne in whorls at distant joints; spores borne variously, but if in a terminal strobilus the scales not peltate.

2 Leaves linear, grass-like, 1-60 cm long, 20× or more as long as wide.

3 Leaves solitary (though often the internodes very short from a thin, creeping rhizome); sporangia borne in a spherical (ca. 3 mm in diameter) sporocarp on a separate branch from the rhizome ..... ***Pilularia americana in MARSILEACEAE***

3 Leaves numerous from a corm or short-creeping rhizome; sporangia either borne in the expanded leaf bases (*Isoetes* in ISOETACEAE) or in 2 rows at the tip of the linear fertile leaves (*Schizaea* in SCHIZAEACEAE), or in a sub-marginal groove on either side of the midrib (*Vittaria* in PTERIDACEAE).

4 Leaves straight and stiff, arching, or flaccid, from a 2-3-lobed corm; sporangia borne in the expanded, hyaline leaf bases ..... ***Isoetes in ISOETACEAE***

4 Leaves either straight and stiff or notably spiral-curly, from a short-creeping rhizome; sporangia borne in 2 rows either at the expanded pectinate tip of the fertile leaves or along much of the length of the linear leaves. ..... ***Vittaria in PTERIDACEAE***

2 Leaves various (scale-like, awl-like, moss-like, or flat), but not linear and grass-like, mostly 1-10 (-20)× as long as wide.

6 Leaves inconspicuous, reduced to a few nerveless scales (< 1.5 mm long), the internodes much longer than the leaves; sporangia yellowish, 3-locular, 1-2 mm in diameter; stems upright, repeatedly branched dichotomously ..... ***Psilotum nudum in PSILOTACEAE***

6 Leaves either larger or, if scale-like, with 1 or more nerves and longer than the internodes (the leaves thus overlapping); sporangia yellowish to brownish, 1-locular, < 1 mm in diameter; stems either subterranean or surficial rhizomes or erect or ascending (and sometimes dichotomously branched in whole or in part in *Huperzia* in HUPERZIACEAE, and *Diphasiastrum* and *Dendrolycopodium* in LYCOPODIACEAE).

7 Plant with leaves very numerous and overlapping along the creeping, ascending, erect, or pendant stems, the leaves scale-like or awl-like, 0.5-2 (-3) mm wide, typically acute, acuminate, or hair-tipped; sporangia either in terminal strobili (axillary to specialized, smaller leaves) or axillary to normal leaves; [Lycophytes].

8 Sporangia borne in flattened or quadrangular strobili sessile at the tips of leafy branches; spores and sporangia each of two sizes, the megasporangia larger and borne basally in the strobili ..... ***SELAGINELLACEAE***

8 Sporangia borne either in the axils of normal foliage leaves, or in strobili sessile at the tips of leafy branches or stalked on specialized branches with fewer and smaller leaves; spores and sporangia each of one size.

9 Leafy stems erect or pendant, simple or dichotomously branched, the ultimate branches vertically oriented (upwards or downwards); sporophylls like the sterile leaves or only slightly reduced, in annual bands along the stem; vegetative reproduction by leafy gemmae near the stem apex (*Huperzia*) or lacking gemmae (*Phlegmariurus*) ..... ***HUPERZIACEAE***

9 Leafy stems prostrate or erect, if erect then generally branched, the ultimate branches spreading (horizontal) or ascending; sporophylls differing from sterile leaves, either broader and shorter, or more spreading, aggregated into terminal cones; lacking vegetative reproduction by gemmae. ..... ***LYCOPODIACEAE***

7 Plant with leaves not as above (see below for details); [Pteridophytes].

12 Plant with 1 (-several) leaves, divided into separate sterile and fertile segments, the sterile leaf blade 0.3-90 cm long, ovate to lanceolate, entire-margined, unlobed, obtuse, the longer fertile portion with 2 rows of sporangia somewhat imbedded in it ..... ***OPHIOGLOSSACEAE***

12 Plant with many leaves, generally 5 or more, not divided into separate sterile and fertile segments, the leaves either (a) small, 0.3-1.6 cm long, obovate, scattered along a very thin creeping rhizome, or (b) larger, (2-) 8-30 cm long, cordate at base, the tip long-attenuate (often proliferous, bearing a plantlet at the tip).

13 Leaf blades (2-) 8-30 cm long, cordate at the base, the tip long-attenuate, often proliferous (bearing a plantlet at the tip); sporangia grouped into indusiate sori on the undersurface; leaf texture moderately thick; rhizome erect or ascending, 1.0-1.5 mm in diameter, the leaves clustered from its tip ..... ***Asplenium in ASPLENIACEAE***

13 Leaf blades 0.3-15 cm long, cuneate at the base, acute to rounded or obtuse at the tip, not proliferous; sporangia solitary in a marginal pocket on the leaf; leaf texture very thin; rhizome creeping on the surface of rock or bark, either 0.1-0.3 or 0.5-1.5 mm in diameter, the leaves scattered along it ..... ***HYMENOPHYLLACEAE***

Key A4 - small 'fern-like' pteridophytes, epipetric or epiphytic, growing on rock, tree bark, or walls

1 Leaves pinnatifid or bipinnatifid, the pinnae not fully divided from one another (the rachis winged by leaf tissue most or all of its length).

2 Leaves pinnatifid, the pinnae not lobed.

3 Leaf blades with a long-attenuate apex, blade lobed for up to 2/3 its length; sori elongate ..... ***Asplenium in ASPLENIACEAE***

3 Leaves without a long-attenuate apex, blade lobed for > 4/5 of its length; sori round ..... ***POLYPODIACEAE***

2 Leaves bipinnatifid, at least the lowermost pinnae deeply lobed.

4 Leaves of a very delicate texture, 1 cell thick; sori borne in cups on the leaf margins; [rock outcrops with high air humidity] ..... ***HYMENOPHYLLACEAE***

4 Leaves of an herbaceous, subcoriaceous, or coriaceous texture, > 1 cell thick; sori otherwise; [various habitats, not strictly of moist sites]. ..... ***Pteris in PTERIDACEAE***

1 Leaves pinnate, pinnate-pinnatifid, 2-pinnate, or even more divided, to 5-pinnate (the rachis naked for most of its length, often winged in the apical portion).

7 Leaves pinnate or pinnate-pinnatifid.

8 Leaves of a very delicate texture, 1 cell thick; sori borne in cups on the leaf margins; [rock outcrops with high air humidity] ..... ***HYMENOPHYLLACEAE***

8 Leaves of an herbaceous, subcoriaceous, or coriaceous texture, > 1 cell thick; sori otherwise or sporangia not grouped in sori; [various habitats, not strictly of moist sites].

9 Pinnae > 1 cm wide; leaves subcoriaceous to coriaceous ..... ***Cyrtomium in DRYOPTERIDACEAE***

9 Pinnae < 1 cm wide; leaves herbaceous to subcoriaceous.

13 Sori on the undersurface of the leaf, located away from the margins ..... ***Asplenium in ASPLENIACEAE***

13 Sori on the undersurface of the leaf, marginal and more-or-less hidden beneath either the unmodified revolute leaf margin or under a modified, reflexed false indusium ..... ***PTERIDACEAE***

7 Leaves bipinnate or more divided.

14 Leaf blade pentagonal, broadly triangular, or narrowly triangular in outline, ca. 1-2.5× as long as wide. ..... ***Arachniodes in DRYOPTERIDACEAE***

14 Leaf blade elongate, mostly lanceolate, generally > 4× as long as wide (except in *Adiantum*, with leaf blade often only 1.5-3× as long as wide, but not notably triangular or pentagonal in outline).

20 Sori marginal, usually more-or-less hidden under the revolute margin of the pinnule ..... ***Adiantum in PTERIDACEAE***

20 Sori not marginal, either exposed, or slightly to strongly hidden by indusia.

21 Leaf blades 3-12 cm long; sori elongate, covered by a flap-like, entire indusium ..... ***Asplenium in ASPLENIACEAE***

21 Leaf blades 4-30 (-50) cm long; sori globular, surrounded or covered by an entire, ciliate, or divided indusium.

22 Veins reaching the margin; indusium attached under one side of the sorus, hood-like or pocket-like, arching over the sorus; petioles glabrous or sparsely beset with scales, the petiole bases not persistent ..... ***Cystopteris in CYSTOPTERIDACEAE***

22 Veins ending short of the margin; indusium attached under the sorus, either cup-like (divided into 3-6 lanceolate to ovate lobes which surround the sorus from below) or of minute numerous septate hairs, which extend out from under the sorus on all sides; petioles often densely beset with scales, the petiole bases persistent ..... ***Woodsia in WOODSIACEAE***

Key A5 - small 'fern-like' pteridophytes, terrestrial, growing in soil, not associated with rock outcrops

2 Petiole branched once dichotomously, each branch then bearing 3-7 pinnae on the same side of the 2 rachis branches, the overall outline of the blade in the shape of a fan and often broader than long ..... ***Adiantum in PTERIDACEAE***

2 Petiole not branched dichotomously, the outline of the blade either longer than broad or triangular and about as wide as long.

3 Leaves pinnatifid or bipinnatifid, most of the pinnae not fully divided from one another (the rachis winged by leaf tissue most or all of its length).

4 Sporangia borne on an erect stalk that arises at or above ground level from the petiole of the sterile leaf blade (joining the petiole of the sterile leaf above the rhizome) ..... ***OPHIOGLOSSACEAE***

4 Sporangia either borne on normal leaf blades or on specialized (fertile) leaves separate from the rhizome.

5 Leaves monomorphic, the sori borne on normal leaf blades ..... ***Phegopteris in THELYPTERIDACEAE***

5 Leaves dimorphic, the sori borne on leaves significantly different from normal leaves.

6 Fertile leaf woody, with bead-like segments; margins of sterile pinnae entire, often wavy or the lowermost even somewhat lobed; pinnae mostly with obtuse apices, tending to be borne oppositely ..... ***Onoclea in ONOCLEACEAE***

6 Fertile leaf stiff but herbaceous, the pinnae linear, not at all bead-like; margins of sterile pinnae finely serrulate, otherwise slightly wavy or straight; pinnae mostly with acute apices, tending to be borne alternately ..... ***Lorinseria in BLECHNACEAE***

KEY TO FAMILIES AND GENERA

3 Leaves pinnate, pinnate-pinnatifid, 2-pinnate, or even more divided (the rachis naked for most of its length, often winged in the apical portion).
7 Leaves broadly triangular in outline, about as broad as long.
.....***Sceptridium in OPHIOGLOSSACEAE***
7 Leaves lanceolate in outline, definitely longer than broad; sporangia either borne on normal leaf blades, or on slightly dimorphic blades, or on the basalmost pinnae of the leaf, or on an erect stalk that arises at or above ground level from the petiole of the sterile leaf blade (joining the petiole of the sterile leaf above the rhizome).
12 Sori elongate; leaf blades somewhat dimorphic, the fertile larger and erect, the sterile smaller and prostrate, the larger leaf blades 2-4 (-6.5) cm wide; petiole with 2 vascular bundles, uniting upwards into 1 ×-shaped bundle.....***Asplenium platyneuron in ASPLENIACEAE***
12 Sori round; leaf blades monomorphic (or slightly dimorphic in *Cystopteris*); the larger leaf blades 5-15 cm wide; petiole with 2 vascular bundles, uniting upwards into 1 U-shaped or V-shaped bundle.
13 Leaf vestiture nearly lacking (if present, not of unicellular acicular hairs or gland-tipped hairs).....***Cystopteris in CYSTOPTERIDACEAE***
13 Leaf vestiture of unicellular acicular hairs 0.2-1 mm long intermixed with short-stalked or sessile yellowish glands .....***THELYPTERIDACEAE***

Key A6 - medium to large 'fern-like' pteridophytes, epipetric on rock or walls, or epiphytic on tree trunks

1 Leaf vine-like, 0.3-10 m long, the branching dichotomous, 1 branch of each dichotomy terminating in a pair of pinnae, the pinnae often widely spaced (> 10 cm apart) ..... ***Lygodium in LYGODIACEAE***
1 Leaf not vine-like, 0.3-3 m long, the branching not as described above, the pinnae regularly and more-or-less closely spaced (mostly < 10 cm apart).
2 Leaves (at least the sterile leaves if the leaves are dimorphic) 1-pinnate-pinnatifid or less divided (the pinnae entire, toothed, lobed or pinnatifid).
4 Sori marginal, continuous, covered by a reflexed false indusium along the leaf margin; pinnae usually opposite, linear, not toothed or lobed.....
.....***Pteris in PTERIDACEAE***
4 Sori neither marginal nor continuous, slightly to entirely covered by an elongate or roundish indusium (sometimes ciliate, toothed, or divided into narrow segments); pinnae usually at least in part alternate, mostly lanceolate, toothed, lobed, or pinnatifid.
5 Sori elongate, the indusium flap-like, attached along the side; leaf blades < 7 cm wide when > 30 cm long.....***Asplenium in ASPLENIACEAE***
5 Sori circular or globular, the indusium peltate, reniform, or cuplike; leaf blades > 5 cm wide when > 30 cm long.
6 Leaves pinnatifid ..... ***POLYPODIACEAE***
6 Leaves 1-pinnate or, 1-pinnate-pinnatifid, or 2-pinnatifid.
7 Leaves 1-pinnate, the pinnae toothed and each with a slight to prominent lobe near the base on the side toward the leaf tip; indusia peltate, reniform, or crescent-shaped.
8 Leaves pale green, thin in texture; pinnae articulate to rachis, deciduous with age; rhizome bearing elongate, thin, wiry stolons; indusia reniform or crescent-shaped.....***Nephrolepis in NEPHROLEPIDACEAE***
8 Leaves dark-green, subcoriaceous to coriaceous; pinnae not articulate and deciduous with age; rhizome not producing stolons; indusia peltate
.....***DRYOPTERIDACEAE***
7 Leaves 1-pinnate-pinnatifid or 2-pinnatifid, the pinnae pinnatifid, generally lacking a prominent basal lobe; indusia either reniform or cuplike.
11 Vascular bundles in the petiole 3-7.....***Dryopteris in DRYOPTERIDACEAE***
11 Vascular bundles in the petiole 2.
12 Indusium reniform, arching over the sorus .....***THELYPTERIDACEAE***
12 Indusium cuplike, attached beneath the sorus and consisting of 3-6 lanceolate to ovate segments.....***Woodsia in WOODSIACEAE***
2 Leaves (at least the sterile leaves if the leaves are dimorphic) 2-pinnate or more divided (the pinnae divided to their midribs).
14 Sori marginal and borne on the underside of the false indusium (modified, marginal flaps of the leaf margin); petioles and rachis shiny black or reddish-black; pinnules fan-shaped or obliquely elongate .....***Adiantum in PTERIDACEAE***
14 Sori not marginal, borne on the undersurface of the leaf blade (if marginal, as in *Pteridium* and *Dennstaedtia*, borne on the undersurface of the leaf); petioles darkened only basally (if at all), rachis green, tan, or reddish; pinnules not notably fan-shaped or obliquely elongate.
15 Outline of leaf blade narrowed to base, the widest point > 7 pinna pairs above the base, the lowermost pinnae < 1/4 as long as the longest pinnae; rhizomes long-creeping, the leaves scattered, forming clonal patches.....***THELYPTERIDACEAE***
15 Outline of the leaf blade slightly if at all narrowed to the base, the widest point < 5 pinna pairs from the base, the lowermost pinnae > 1/2 as long as the longest pinnae; rhizomes short-creeping, the leaves clustered, not forming clonal patches (or with rhizomes long-creeping, leaves scattered, forming clonal patches in *Dennstaedtia* in DENNSTAEDTIACEAE).
17 Vascular bundles (3-) 5 (-7) in the petiole .....***Dryopteris in DRYOPTERIDACEAE***
17 Vascular bundles 2 in the petiole (or uniting near the leaf blade into 1).
18 Leaves 25-65 cm wide, with whitish, straight, acicular hairs; [species adventive and weedy] .....***Macrothelypteris in THELYPTERIDACEAE***
18 Leaves 5-25 (-30) cm wide, with scales and minute glands (sometimes also with septate hairs); [native species].
19 Leaves 1-pinnate-pinnatifid; indusium cup-like, attached beneath the sorus and consisting of 3-6 lanceolate to ovate segments.....
.....***Woodsia in WOODSIACEAE***
19 Leaves 2-pinnate-pinnatifid; indusium flap-like, pocket-like, or hood-like, attached at one side of the sorus and arching over it.
20 Leaves 10-30 cm wide, the tip acute to acuminate; indusium flap-like.....***ATHYRIACEAE***
20 Leaves 4-9 cm wide, the tip long-attenuate; indusium pocket-like or hood-like.....***Cystopteris in CYSTOPTERIDACEAE***

Key A7 - medium to large 'fern-like' pteridophytes, terrestrial, growing in soil, not associated with rock outcrops

1 Leaf vine-like (with indeterminate growth), 0.3-10 m long, the branching dichotomous, 1 branch of each dichotomy terminating in a pair of pinnae, the pinnae often widely spaced (> 10 cm apart).
2 Vine-like leaves scrambling or trailing; sporangia borne 6-12 per sorus.....***Dicranopteris in GLEICHENIACEAE***
2 Vine-like leaves twining; sporangia borne singly, each subtended by an indusium-like flap .....***Lygodium in LYGODIACEAE***
1 Leaf not vine-like, 0.3-3 m long, the branching not as described above, the pinnae regularly and more-or-less closely spaced (mostly < 10 cm apart).
3 Leaf blades broadly (about equilaterally) triangular, pentagonal, or flabellate in outline, 0.7-1.3× as long as wide.
4 Leaf blades flabellate or fan-shaped in outline, the petiole branched once dichotomously, each branch bearing 3-7 pinnae on one side of the rachis only .....
.....***Adiantum pedatum in PTERIDACEAE***
4 Leaf blades pentagonal or broadly triangular in outline, the petiole not branched dichotomously.
5 Leaf blade pentagonal in outline, the terminal pinna the largest; sori either submarginal, roundish, the indusium reniform, or marginal and continuous, covered by a false indusium; [alien, uncommonly naturalized].
.....***Arachniodes in DRYOPTERIDACEAE***

KEY TO FAMILIES AND GENERA

5 Leaf blade broadly triangular in outline, the basal pinnae the largest; sori marginal, linear, indusium absent, the sporangia either protected by the revolute leaf margin and a minute false indusium (*Pteridium*), or borne in a stalked, specialized, fertile portion of the blade (*Botrypus*); [native, collectively common].
7 Sporangia borne in a stalked, specialized, fertile portion of the blade; texture of mature blades somewhat fleshy; plants solitary from a short underground rhizome with thick, mycorrhizal roots; [primarily of moist forests] ..... ***Botrypus in OPHIOGLOSSACEAE***
7 Sporangia borne in marginal, linear sori, indusium absent, the sporangia protected by the revolute leaf margin and a minute false indusium; texture of mature leaf blades hard and stiff; plants colonial from deep-seated rhizomes; [primarily of moist to dry woodlands and savannas] ..... ***Pteridium in DENNSTAEDTIACEAE***

3 Leaves elongate in outline, mostly ovate, lanceolate, oblanceolate, or narrowly triangular, 1.5-10× or more as long as wide.
8 Leaves 2-pinnate or more divided (the pinnae divided to their midribs).
9 Leaf blade divided into sterile and fertile portions, the sterile pinnae basal, the sterile pinnules 30-70 mm long and 8-23 mm wide, serrulate, rounded basally, rounded to somewhat acute apically, the fertile pinnae terminal and greatly reduced in size, the fertile pinnules 7-11 mm long and 2-3 mm wide..... ***Osmunda spectabilis in OSMUNDACEAE***
9 Leaf blade not divided into sterile and fertile portions (though often not all pinnules on a leaf bearing sporangia), the sporangia-bearing pinnules only slightly if at all reduced in size, both fertile and sterile pinnules usually 4-20 mm long and 2-10 mm wide.
10 Rhizomes long-creeping, leaves scattered, forming clonal patches; vascular bundles in the petiole either 1, U-shaped (even in the lower petiole) or 3 or more; sori very small, marginal in sinuses, the indusium cup-like, 2-parted, the outer part a modified tooth of the leaf blade; leaf blades conspicuously puberulent with septate hairs or glabrous to puberulent with glandular trichomes..... ***DENNSTAEDTIACEAE***
10 Rhizomes short-creeping, ascending, or erect, the leaves clustered, not forming clonal patches; vascular bundles in the lower petiole 2-7 (sometimes uniting to 1 in the upper petiole); sori mostly larger, mostly not marginal, the indusium not as above (though cuplike in *Woodsia obtusa*); leaf blades either glabrous, glabrescent, with flattened scales, or puberulent with glandular trichomes.
11 Vascular bundles (3-) 5 (-7) in the petiole..... ***DRYOPTERIDACEAE***
11 Vascular bundles 2 in the petiole.
13 Leaves 25-65 cm wide, with whitish, straight, acicular, septate hairs; [species adventive and weedy] ..... ***Macrothelypteris in THELYPTERIDACEAE***
13 Leaves 5-25 (-50) cm wide, with scales and minute glands (sometimes also with septate hairs); [native species, widespread].
14 Leaves 1-pinnate-pinnatifid; indusium cup-like, attached beneath the sorus and consisting of 3-6 lanceolate to ovate segments ..... ***Woodsia in WOODSIACEAE***
14 Leaves 2-pinnate-pinnatifid; indusium flap-like, pocket-like, or hood-like, attached at one side of the sorus and arching over it.
15 Leaves 4-9 cm wide, the tip long-attenuate; indusium pocket-like or hood-like..... ***Cystopteris bulbifera in CYSTOPTERIDACEAE***
15 Leaves 9-30 cm wide, the tip acute to acuminate; indusium flap-like ..... ***ATHYRIACEAE***
8 Leaves 1-pinnate-pinnatifid or less divided (the pinnae entire, toothed, lobed or pinnatifid).
16 Leaves 1-pinnatifid, most of the pinnae not fully divided from one another (the rachis winged by leaf tissue most or all of its length); leaves either dimorphic, the fertile much modified, stiff and/or woody (*Onoclea* in ONOCLEACEAE or *Lorinseria* in BLECHNACEAE), or not dimorphic (*Pecluma* in POLYPODIACEAE).
18 Fertile leaf woody, with bead-like segments; margins of sterile pinnae entire, often wavy or the lowermost even somewhat lobed; pinnae mostly with obtuse apices, tending to be borne opposite..... ***Onoclea in ONOCLEACEAE***
18 Fertile leaf stiff but herbaceous, the pinnae linear, not at all bead-like; margins of sterile pinnae finely serrulate, otherwise slightly wavy or straight; pinnae mostly with acute apices, tending to be borne alternate..... ***Lorinseria in BLECHNACEAE***
16 Leaves 1-pinnate or 1-pinnate-pinnatifid, the pinnae fully divided from one another (the rachis naked for most of its length, often winged in the terminal portion); leaves dimorphic or not.
19 Rhizomes long-creeping, leaves scattered, forming clonal patches.
20 Sori elongate, along either side of the main veins ..... ***BLECHNACEAE***
20 Sori roundish, borne away from the main veins. ..... ***THELYPTERIDACEAE***
19 Rhizomes short-creeping, the leaves clustered, not forming clonal patches (or rhizomes of both types, but leaves borne only in clusters on the short erect ones, in *Matteuccia*)
21 Plants moderately to very robust, the leaves typically 6-50 dm tall; leaves <u>either</u> strongly dimorphic, the fertile leaves very unlike the sterile, brown at maturity (*Matteuccia* and *Osmundastrum cinnamomeum*), <u>or</u> the fertile pinnae very unlike the sterile, brown at maturity, borne as an interruption in the blade, with normal green pinnae above and below (*Osmunda claytoniana*), <u>or</u> the fertile pinnae toward the tip of the leaf and with sporangia entirely covering the lower surface (*Acrostichum*); rachises scale-less, petioles scale-less (except at the base in *Matteuccia*). ..... ***OSMUNDACEAE***
21 Plants mostly less robust, the leaves 3-10 dm tall (except *Dryopteris ludoviciana*, *D. celsa*, *D. goldiana*, and *Nephrolepis exaltata* to 15 dm); leaves not at all or only slightly dimorphic, the fertile differing in various ways, such as having narrower pinnae (as in *Dryopteris ludoviciana*, *Polystichum acrostichoides*, *Diplazium*, *Deparia*, and *Thelypteris palustris*) or the fertile leaves taller and more deciduous (as in *Asplenium platyneuron* and *Dryopteris cristata*), but not as described in the first lead; rachises and petioles variously scaly or scale-less, but at least the petiole and often also the rachis scaly if the plants over 1 m tall.
24 Sori elongate, the indusium elongate, attached along one side as a flap.
25 Petiole and rachis lustrous brownish-black; fertile leaves 2-8 (-12) cm wide ..... ***Asplenium in ASPLENIACEAE***
25 Petiole and rachis green; fertile leaves 10-20 (-30) cm wide.
26 Leaves 1-pinnate-pinnatifid (the pinnae pinnatifid)..... ***ATHYRIACEAE***
26 Leaves 1-pinnate (the pinnae entire)..... ***Diplaziopsis in DIPLAZIOPSIDACEAE***
24 Sori roundish, the indusium kidney-shaped or roundish, attached by a central stalk.
27 Leaves 1-pinnate, the pinnae toothed and each with a slight to prominent lobe near the base on the side toward the leaf tip (except *Nephrolepis exaltata* in NEPHROLEPIDACEAE); indusium peltate (*Polystichum* in DRYOPTERIDACEAE) or reniform or crescent-shaped (*Nephrolepis* in NEPHROLEPIDACEAE).
28 Leaves pale green, thin in texture; pinnae articulate to rachis, deciduous with age; thin, rhizome bearing elongate, thin, wiry stolons; [mostly, if not entirely, alien in our area, rare] ..... ***Nephrolepis in NEPHROLEPIDACEAE***
28 Leaves dark-green, subcoriaceous to coriaceous; pinnae neither articulate nor deciduous with age; rhizome not producing stolons; [native, common] ..... ***Polystichum in DRYOPTERIDACEAE***
27 Leaves 1-pinnate-pinnatifid, the pinnae pinnatifid, generally lacking a prominent basal lobe; indusium reniform.
29 Vascular bundles in the petiole 4-7 ..... ***Dryopteris in DRYOPTERIDACEAE***
29 Vascular bundles in the petiole 2, uniting above ..... ***THELYPTERIDACEAE***

Key B - gymnosperms

1 Leaves 1-pinnately compound ..... ***Cycas in CYCADACEAE***
1 Leaves simple.
2 Leaves broad and fan-shaped, > 30 mm wide, with conspicuous dichotomous venation, seasonally deciduous ..... ***Ginkgo in GINKGOACEAE***
2 Leaves needle-like or scale-like, < 10 mm wide, evergreen (seasonally deciduous in *Larix* and *Taxodium*) ..... ***Key B3***

Key B3 - gymnosperm trees and shrubs with scale or needle leaves

1 Leaves opposite or in whorls of 3.
..... ***CUPRESSACEAE***
1 Leaves either alternate, or in fascicles of 2-5 (basally bound by a scarious sheath), or on short shoots in clusters of many 10-60 leaves in apparent whorls.
5 Leaves either borne in fascicles of 2-5 (basally bound by a scarious sheath) (*Pinus*) or on short shoots in clusters of many leaves in apparent whorls (*Cedrus*, *Larix*) ..... ***PINACEAE***
5 Leaves alternate.
8 Leaves very soft in texture, seasonally deciduous as twiglets; [primarily Coastal Plain] ..... ***Taxodium in CUPRESSACEAE***
8 Leaves stiffer in texture, evergreen; [collectively more widespread].
9 Leaves tapering from base to a long-acuminate tip ..... ***Cunninghamia in CUPRESSACEAE***
9 Leaves with parallel margins for most of their length, or widest near middle and gradually tapering to base and apex, the apex acute, obtuse, or retuse.
10 Cone dry, brown, and woody at maturity ..... ***PINACEAE***
10 ”Cone” fleshy, red or purplish at maturity
..... ***Podocarpus in PODOCARPACEAE***

Key C - aquatics

1 Plants floating aquatics, never rooted to the substrate (though sometimes stranded by dropping water levels); plants sometimes thalloid in structure, lacking clear differentiation of stems and leaves ..... ***Key C1***
1 Plants rooted aquatics (sometimes uprooted and then floating in the water column, or rooted in floating, peaty vegetation mats); plants always with clear differentiation of stems and leaves (except *Podostemum*).
2 Leaves or leaf-like stems basal, or arising in clusters from along a buried rhizome.
3 Leaves variously compound or divided ..... ***Key C2***
3 Leaves or leaf-like stems simple.
4 Leaves broad, usually long-petiolate, with strong differentiation between petiole and blade, the blade margins not parallel, the blade < 6× as long as wide and > 2.5 cm wide ..... ***Key C3***
4 Leaves or leaf-like stems linear, sessile or essentially so (lacking strong differentiation of a blade and a petiole), the blade margins more-or-less parallel or tapering from base towards apex, the blade > 10× as long as wide and < 2 cm wide ..... ***Key C4***
2 Leaves cauline.
5 Leaves variously compound or divided ..... ***Key C5***
5 Leaves simple.
6 Leaves alternate ..... ***Key C6***
6 Leaves opposite or whorled ..... ***Key C7***

Key C1 - floating aquatics

1 Individual leaves > 2 cm wide.
2 Leaves obovate, cuneate at the base, sessile, pale green; plants floating because of “unwettable” leaf surfaces ..... ***Pistia in ARACEAE***
2 Leaves orbicular, cordate or truncate at the base, petiolate, dark green; plants floating because of petioles inflated as bladders, or inflated cells centrally located on each leaf.
3 Petiole terete, not air-filled; plants floating because of inflated cells centrally located on each leaf (most easily seen on the lower surface) .....
..... ***Limnobium in HYDROCHARITACEAE***
3 Petiole conspicuously expanded into an air-filled bladder; plants floating because of petioles inflated as bladders.....
..... ***Oshuna crassipes in PONTEDERIACEAE***
1 Individual leaves or “fronds” < 2 cm wide, or leaves absent.
4 Submersed portions of the plant with small (< 4 mm in diameter) bladder-traps ..... ***Utricularia in LENTIBULARIACEAE***
4 Submersed portions of plant lacking small bladder traps.
5 Plants dichotomously forked, upper surface of leaves velvety or variously hairy ..... ***SALVINIACEAE***
5 Plants unbranched, or if branched, irregularly so; upper surface of leaves glabrous, waxy.
..... ***ARACEAE***

Key C2 - rooted aquatics with basal leaves, compound or divided

1 Leaves palmately 4-foliolate, with very clear differentiation of the long petiole from the 4 leaflets ..... ***Marsilea in MARSILEACEAE***
1 Leaves pinnately compound.
2 Plants usually attached to rocks in flowing water of streams and rivers; [mainly Piedmont, Mountains, Interior Low Plateau, and Interior Highlands] .....
..... ***Podostemum in PODOSTEMACEAE***
2 Plants in mud or soil of stagnant waters; [Coastal Plain] ..... ***Ceratopteris in PTERIDACEAE***

Key C3 - rooted aquatics with basal and simple, broad leaves

1 Leaves peltate.

KEY TO FAMILIES AND GENERA

2 Leaf blades oval in shape, ca. 1.5-2× as long as wide, at maturity floating on the water's surface; underwater portions of fresh plant coated in transparent mucilage ..... ***Brasenia in CABOMBACEAE***

2 Leaf blades orbicular in shape, ca. 1× as long as wide, at maturity floating on the water's surface, emersed, or submersed; underwater portions of fresh plant not mucilaginous (though possibly with green algae, etc.).

3 Leaves small, < 8 cm in diameter, at maturity emersed or submersed ..... ***Hydrocotyle in ARALIACEAE***

3 Leaves large, > 20 cm in diameter, at maturity floating on the water's surface or emersed ..... ***Nelumbo in NELUMBONACEAE***

1 Leaves not peltate, the petiole attached at a cuneate, cordate, or sagittate base.

4 Leaf blades cuneate, rounded, or truncate at the base.

5 Basal leaves lanceolate, 3-6 mm long ..... ***Gratiola amphiantha in PLANTAGINACEAE***

5 Basal leaves variously shaped, > 10 mm long.

6 Main veins palmate from the leaf base and also diverging from the midvein, the secondary and tertiary veins then reticulating; inflorescence a spike; [Eudicots] ..... ***Plantago cordata in PLANTAGINACEAE***

6 Main veins either parallel or palmate from the leaf base with cross-veins at nearly right angles to the main veins; inflorescence either a diffuse raceme or panicle of white flowers, or a linear spadix of tightly packed golden-yellow flowers; [Monocots].

7 Inflorescence diffuse, a raceme or panicle with whorled branches or pedicels, the flowers widely spaced and white; leaves green, "wettable" ..... ***ALISMATACEAE***

7 Inflorescence tightly packed with flowers, an elongate, golden yellow spadix; leaves blue-green, "unwettable" ..... ***Orontium in ARACEAE***

4 Leaf blades cordate or sagittate at the base.

8 Leaf blades sagittate, the two lobes distinctly acute; leaf apex acute; leaf blade 1.3-3× as long as wide ..... ***Sagittaria in ALISMATACEAE***

8 Leaf blades cordate, the two lobes rounded or sub-acute; leaf apex rounded or apiculate; leaf blade 0.8-8× as long as wide.

9 Leaf blade margins serrate, dentate, and/or incised ..... ***Hydrocotyle in ARALIACEAE***

9 Leaf blade margins entire or obscurely crenate.

10 Flowers 4-5-merous (sepals 4-5, petals 4-5, stamens 4-5); [Eudicots]

11 Leaves emersed or submersed, on stout, stiff petioles (the submersed and winter leaves cuneate-based and lanceolate); flowers 4-merous (sepals 4, petals 4, stamens 4); inflorescence a spike ..... ***Plantago cordata in PLANTAGINACEAE***

11 Leaves floating, on slender, flexuous petioles (all leaves cordate-based); flowers 5-merous (sepals 5, petals 5, stamens 5); inflorescence an umbel ..... ***Nymphoides in MENYANTHACEAE***

10 Flowers 3-merous or many (>5-) -merous; [Basal Angiosperms or Monocots].

12 Perianth parts numerous (usually showing differentiation into sepals and petals, though often with some intergradation), borne in a spiral; stamens numerous; leaves usually > 10 cm long or > 10 cm wide, or both (a few northern species of *Nymphaea* with leaves as small as 2.5 cm × 2.5 cm); [Basal Angiosperms] ..... ***NYMPHAEACEAE***

12 Perianth parts 3-6 (either differentiated or not into sepals and petals); stamens either 3, or 9-12 (-18), or >20; leaves 1-10 cm long, 1-10 cm wide; [Monocots].

14 Flowers unisexual, white, the sepals and petals separate; stamens 3, 6, 9, 12, 15, or 18; leaves either with a central area of spongiform cells (most easily seen on the lower leaf surface) (*Limnobium*), or without spongiform cells (*Ottelia*) ..... ***HYDROCHARITACEAE***

14 Flowers bisexual, white to blue, the perianth segments united below into a perianth tube 3-45 mm long; stamens 3; leaves lacking a central area of spongiform cells ..... ***PONTEDERIACEAE***

Key C4 - rooted aquatics with basal and simple, linear leaves

1 Leaves thread-like or quill-like, about as thick as wide.

2 Plants bulbous at base, and with the leaf bases expanded and containing sporangia; plant tufted or with very short rhizomes; [Lycophytes] ..... ***Isoetes in ISOETACEAE***

2 Plants either somewhat bulbous or not at the base, the leaf-bases not containing sporangia; plant rhizomatous; [Pteridophytes, Eudicots, Monocots].

3 New leaves unfurling with circinate vernation (a fiddlehead); plants reproducing by spores, from sporocarps on short stalks from the rhizome; [Pteridophytes] ..... ***Pilularia in MARSILEACEAE***

3 New leaves lacking circinate vernation; plants reproducing by flowers and seeds.

4 Perianth differentiated, with either 3 sepals and 3 petals or 5 sepals and 5 petals; stamens either 7-many or stamens 4. ..... ***Sagittaria in ALISMATACEAE***

4 Perianth undifferentiated, with 0, 3, or 6 tepals; stamens 1, 2, or 3; [Monocots].

6 Gynoecium of 2 or more pistils, each pistil with 1 carpel and with 1 stigma ..... ***Triglochin in JUNCAGINACEAE***

6 Gynoecium of 1 pistil, each pistil with (2-) 3 carpels and (2-) 3 stigmas.

7 Fruit an achene; perianth absent ..... ***CYPERACEAE***

7 Fruit a capsule; perianth of 6 tepals ..... ***Juncus in JUNCACEAE***

1 Leaves ribbon-like or strap-like, distinctly flattened (sometimes only near the tip of the leaf).

8 Subterranean portions of plant bearing bladder-traps; flowers yellow or purple, bilaterally symmetrical ..... ***Utricularia in LENTIBULARIACEAE***

8 Subterranean portions of plant lacking bladder traps; flowers white, green, gray, radially symmetrical (except bilaterally symmetrical in *Glossostigma* in PHRYMACEAE).

9 Leaves broadened towards the tip; [Monocots, Eudicots].

10 Flowers 3-merous; [Monocots] ..... ***ALISMATACEAE***

10 Flowers 4- or 5-merous; [Eudicots]. ..... ***Lilaeopsis in APIACEAE***

9 Leaves parallel-margined or tapering towards the apex over much of their length; [Monocots].

12 Leaves tapering towards the apex over much of their length; plant either tufted and not rhizomatous, or short rhizomatous;.

13 Plant tufted, not rhizomatous; leaves spreading radially; inflorescence a tightly button-like head of very numerous small flowers, white, gray, tan, yellowish, or blackish; roots thickened, septate (not requiring magnification), unbranched ..... ***Eriocaulon in ERIOCAULACEAE***

13 Planted short-rhizomatous; leaves distichous, equitant; inflorescence either a subglobular, ovoid, or cylindrical head, of spirally imbricate scales, or a diffuse corymb; roots not thickened, not septate, branched.

14 Inflorescence a diffuse corymb; rhizomes and roots bright red ..... ***Lachnanthes in HAEMODORACEAE***

14 Inflorescence a subglobular, ovoid, or cylindrical head of spirally imbricate scales subtending individual flowers; rhizomes and roots not bright red . ..... ***Xyris in XYRIDACEAE***

12 Leaves parallel-margined; plant usually rhizomatous.

15 Plants of marine habitats, growing submersed in salt water; [FL and the Gulf Coast of AL, MS, and LA] ..... ***Thalassia in HYDROCHARITACEAE***

15 Plants of freshwater or slightly to somewhat brackish habitats; [collectively widespread].

16 Leaves lacking any midvein; flowers and fruits in globose heads ..... ***Sparganium in TYPHACEAE***

16 Leaves with a midvein; flowers and fruits solitary or in diffuse inflorescences.
17 Leaves with a distinct, broad lacunar band along the midvein ..... ***Vallisneria in HYDROCHARITACEAE***
17 Leaves lacking a distinct lacunar band along the midvein.
..... ***ALISMATACEAE***

Key C5 - rooted aquatics with cauline leaves, compound or divided

1 Leaves (or leaf-like adventitious roots) 1-pinnately compound or divided (with a central axis bearing pinnae, the pinnae not further divided).
2 Leaves crowded at the upper end of the stem, supported by inflated branches ..... ***Hottonia in PRIMULACEAE***
2 Leaves (or leaf-like adventitious roots) spaced along the stem, no branches inflated.
..... ***HALORAGACEAE***
1 Leaves dichotomously or otherwise complexly (2-3×) compound or divided.
4 Plants bearing numerous bladder-like traps ..... ***Utricularia in LENTIBULARIACEAE***
4 Plants lacking bladder-like traps.
5 Leaves alternate; leaf segments complexly (but not dichotomously) branched.
6 Leaf dissection 2-pinnate to 3-pinnate; flowers in racemes; petals 4, white ..... ***Rorippa in BRASSICACEAE***
6 Leaf dissection 2-ternate to 3-ternate; flowers solitary; petals 5, yellow or white ..... ***Ranunculus in RANUNCULACEAE***
5 Leaves opposite or whorled; leaf segments dichotomously branched.
7 Leaves whorled; leaf segments entire or toothed with denticles.
..... ***Ceratophyllum in CERATOPHYLLACEAE***
7 Leaves opposite; leaf segments entire.
..... ***Cabomba in CABOMBACEAE***

Key C6 - rooted aquatics with simple, cauline, alternate leaves

1 Leaves broad, < 4× as long as wide.
2 Floating leaves peltate ..... ***CABOMBACEAE***
2 Floating or emersed leaves cuneate to rounded at base.
4 Leaves emersed, lanceolate to narrowly elliptic; flowers 5-merous; [Eudicots] ..... ***Hydrolea in HYDROLEACEAE***
4 Leaves emersed or floating, suborbicular or elliptic (if emersed, then suborbicular; flowers 3-merous; [Monocots].
..... ***Potamogeton in POTAMOGETONACEAE***
1 Leaves narrow, > 4× as long as wide.
6 Leaves 0.3-1.4 cm long, very numerous and tightly spaced ..... ***Mayaca in MAYACACEAE***
6 Leaves 2-35 cm long, fewer and scattered along the stem.
7 Leaf divided into a sheath and blade, with a ligule 0.5-8 mm long at the juncture; inflorescence a spike, raceme, or panicle of spikelets ..... ***POACEAE***
7 Leaf not divided into a sheath and blade, but if basally sheathing lacking a ligule (though sometimes with 1-2 conspicuous stipules); inflorescence various, but not as above.
8 Leaves terete, to 35 cm long, 0.3-2 mm wide; plants of marine habitats, growing submersed in salt water; [FL and the Gulf Coast of AL, MS, and LA] .....
..... ***Syringodium in CYMODOCEACEAE***
8 Leaves flat or terete, to 200 cm long; plants of fresh or brackish waters (if of marine waters, *Zostera*, the leaves obviously flat, 1.5-6 mm wide); [collectively widespread].
9 Leaves filiform, terete or nearly so; stipules present, adnate to the leaf base and forming a sheath around the stem > 10 mm long.
10 Stipule free at its tip, the sheathing portion not appearing inflated; flowers > 2, in an interrupted spike .....
..... ***Stuckenia in POTAMOGETONACEAE***
10 Stipule adnate its entire length to the leaf base, appearing inflated; flowers usually 2, on a flexous, elongate peduncle .....
..... ***Ruppia in CYMODOCEACEAE***
9 Leaves flat; stipules absent, or if present, either free or adnate to the leaf base and forming a sheath for < 10 mm.
11 Leaves lacking a midvein; perianth parts 6, yellow ..... ***Heteranthera in PONTEDERIACEAE***
11 Leaves with a midvein; perianth parts 0 or 4, variously colored (not yellow).
12 Plants pubescent (at least on the upper stem); leaves pinnately veined; [Eudicots] ..... ***Hydrolea in HYDROLEACEAE***
12 Plants nearly or entirely glabrous; leaves with parallel venation; [Monocots].
13 Inflorescences of flowers solitary or in 2-4 flowered racemes, axillary; spathe lacking; perianth conspicuous with 3 pink to purple petals .....
..... ***Murdannia in COMMELINACEAE***
13 Inflorescence a spike, terminal or axillary; with or without a spathe; perianth lacking.
14 Inflorescence a cylindrical, interrupted spike, lacking a spathe; leaves either parallel-margined or variously with a narrow blade differentiated from a petiole; [fresh to brackish waters] ..... ***Potamogeton in POTAMOGETONACEAE***
14 Inflorescence either a flattened spike sheathed by a spathe-like bract, or solitary; leaves parallel-margined, to 20 dm long; [saline (marine) to brackish waters].
..... ***Halodule in CYMODOCEACEAE***

Key C7 - rooted aquatics with simple, cauline, opposite or whorled leaves

1 Leaves whorled, most nodes with 3 or more leaves.
3 Leaves tipped by a callus (visible at 10× magnification); leaf margins entire; flowers many, grouped in a terminal involucrate head; [Eudicots] .....
..... ***Sclerolepis in ASTERACEAE***
3 Leaves not callus-tipped; leaf margins finely toothed or at least with conical protrusions remaining from the disintegration of better-developed deciduous teeth; flowers solitary on elongate, flexuous stalks; [Monocots] ..... ***HYDROCHARITACEAE***
1 Leaves opposite, no nodes with 3 or more leaves.
4 Cauline leaves in 1 pair ..... ***Gratiola amphiantha in PLANTAGINACEAE***
4 Cauline leaves in 2-many nodes.
6 Flowers 3-merous; [Monocots].
7 Leaf margins (or at least leaf sheaths) serrate or minutely spiny; fruits sessile, entire; leaves 5-15× as long as wide .....
..... ***Najas in HYDROCHARITACEAE***

7 Leaf margins (including sheaths) entire; fruit stalked, dentate on one side; leaves >20× as long as wide ..... ***Zannichellia in POTAMOGETONACEAE***
6 Flowers 4- or 5-merous; [Eudicots].
8 Leaves 1-12 cm long; flowers borne in axillary or terminal spikes or clusters ..... ***Hygrophila in ACANTHACEAE***
8 Leaves 0.5-3 (-5) cm long; flowers solitary, axillary.
9 Carpels 4-5, separate; fruit an aggregate of follicles; leaves succulent ..... ***Crassula in CRASSULACEAE***
9 Carpels 2-5, fused; fruit capsular (variously dehiscent); leaves thin in texture or somewhat succulent (e.g. *Bacopa* in PLANTAGINACEAE).
10 Leaves dimorphic, the terminal leaves usually spatulate (strongly expanded towards the apex); corolla absent; stamen 1 ..... ***Callitriche in PLANTAGINACEAE***
10 Leaves monomorphic, obovate, oblanceolate, or parallel-margined; corolla present (absent in *Didiplis* in LYTHRACEAE); stamens 2-6.
11 Flower radially symmetrical, 3-4-merous; petals absent or separate
12 Stems lacking ridges running down from leaf bases ..... ***Elatine in ELATINACEAE***
12 Stems with ridges running down from leaf bases ..... ***LYTHRACEAE***
11 Flower bilaterally symmetrical, 4-5-merous; petals present, fused at least basally, forming a tube.
13 Corolla 4-merous ..... ***LINDERNIACEAE***
13 Corolla 5-merous ..... ***PLANTAGINACEAE***

Key E - angiosperm shrubs and subshrubs with basally-disposed leaves

1 Leaves giant, either pinnately compound and > 15 dm long, or palmately divided into numerous segments and > 6 dm wide; [Monocots] ..... ***ARECACEAE***
1 Leaves small to giant, simple or 3-foliolate; leaves < 9 dm long and < 2 dm wide (except *Agave*, with leaves < 20 dm long and < 2.5 dm wide); [Eudicots or Monocots].
2 Leaves linear-lanceolate, flat or channeled or V-shaped in ×-section, > 3 dm long; flowers 3-merous; rosette shrubs; [Monocots]. ..... ***AGAVACEAE***
2 Leaves either broader in shape or distinctly fleshy and essentially terete in ×-section, < 2 dm long; flowers 5-merous; rosette subshrubs; [Eudicots].
5 Leaves toothed; flowers white (to pale pink) ..... ***DIAPENSIACEAE***
5 Leaves entire; flowers bright pink.
6 Leaves linear, terete in ×-section ..... ***Phemeranthus in MONTIACEAE***
6 Leaves elliptic, flat in ×-section ..... ***Talinum in TALINACEAE***

Key F - woody angiosperms with alternate, compound leaves

2 Leaves trifoliolate.
3 Plant a liana, climbing by twining, by tendrils, or by adventitious roots.
4 Leaves untoothed and unlobed ..... ***Lackeya in FABACEAE***
4 Leaves coarsely toothed or lobed. {add *Eleutherococcus trifoliatus* ARALIACEAE}
5 Leaflets obovate or broadly elliptic (broadest at or above the middle), the teeth or lobes primarily or solely in the apical half of the leaf; plant climbing by leaf-opposed tendrils ..... ***Cissus trifoliata in VITACEAE***
5 Leaflets orbicular or ovate (broadest at the middle or below the middle), the teeth or lobes primarily or solely in the basal half of the leaf; plant climbing by stem twining or by dense, reddish adventitious roots.
6 Plant climbing by the stem twining; [plant not actually woody, but so robust as to often be assumed to be so] ..... ***Pueraria in FABACEAE***
6 Plant climbing by dense, reddish adventitious roots attaching the stem to tree trunks or rock outcrops ..... ***Toxicodendron in ANACARDIACEAE***
3 Plant a shrub (sometimes scrambling or occasionally high-climbing with the support of other vegetation, but lacking the specialized climbing structures listed above).
7 Stems armed with small prickles or stout thorns.
8 Stems with stout thorns at the nodes; fruit a hesperidium (orange-like, but densely hairy) ..... ***Citrus in RUTACEAE***
8 Stems with many small prickles along the internodes; fruit either a legume, or an aggregate of drupelets, or a hip.
9 Leaflets with 2 rounded lateral lobes near the base, otherwise entire; fruit a legume ..... ***Erythrina in FABACEAE***
9 Leaflets serrate and sometimes also cleft; fruit either an aggregate of drupelets or a hip ..... ***ROSACEAE***
7 Stems unarmed.
10 Leaflets serrulate, crenulate, serrate, with a few coarse and jagged teeth (spine-tipped or not), or shallowly lobed.
11 Leaflets serrulate or crenulate ..... ***Ptelea in RUTACEAE***
11 Leaflets serrate, with a few coarse and jagged teeth (spine-tipped or not), or shallowly lobed.
12 Leaflets with 2 prominent, rounded lobes near the base; fruit a legume; flowers > 3 cm long, corollas bilaterally symmetrical, red, in a terminal raceme ..... ***Erythrina in FABACEAE***
12 Leaflets serrate and sometimes also cleft, or with a few coarse and jagged teeth (spine-tipped or not); fruit either a tan or red drupe or a red berry; flowers < 1 cm across, corollas radially symmetrical, green, yellow, or white, in axillary or terminal panicles or racemes ..... ***ANACARDIACEAE***
10 Leaflets entire and unlobed.
14 Terminal leaflet sessile.
15 Leaflets < 2 cm long; stems and branches dark green ..... ***Cytisus scoparius in FABACEAE***
15 Leaflets 5-15 cm long; stems and branches tan to brown ..... ***Ptelea in RUTACEAE***
14 Terminal leaflet with a petiolule.
16 Leaves pinnately trifoliolate, a rachis present as an extension of the petiole past the point of attachment of the 2 lateral leaflets, the terminal leaflet borne on a petiolule at the terminus of the rachis, with an obvious joint present between the rachis and petiolule ..... ***FABACEAE***
16 Leaves palmately trifoliolate, the terminal leaflet typically with a longer petiolule than the lateral leaflets, but lacking a rachis (the petiolule of the terminal leaflet attached at the same point as the 2 lateral leaflets and unjointed) ..... ***Toxicodendron in ANACARDIACEAE***
2 Leaves with 5-many leaflets (poorly developed leaves in some species with only 3 leaflets).
17 Leaves palmately or palmately-pedately compound.
18 Leaves palmately-pedately 5-foliolate (the lateral 2 leaflets on each side borne on a common Y-shaped stalk). ..... ***Causonis in VITACEAE***
18 Leaves palmately compound (all the leaflets attached at a single point).
20 Leaves > 6 dm wide ..... ***ARECACEAE***
20 Leaves < 3 dm wide.
21 Leaflets with entire margins ..... ***Akebia in LARDIZABALACEAE***

21 Leaflets with serrate margins.
22 Stems armed with prickles scattered in the internodes ..... ***Rubus in ROSACEAE***
22 Stems unarmed or with paired nodal spines.
..... ***Parthenocissus in VITACEAE***
17 Leaves pinnately, bipinnately, or complexly compound.
24 Leaves at least in part pinnate-pinnatifid, 2-pinnate, or otherwise more complexly compound than 1-pinnate.
25 Leaves evenly 2-pinnately compound..... ***FABACEAE***
25 Leaves oddly pinnate-pinnatifid, 2-pinnately compound, or more complexly compound than 2-pinnate.
27 Plant a liana, climbing by tendrils ..... ***Nekemias in VITACEAE***
27 Plant a shrub or tree, not climbing.
28 Plant armed with prickles on the stem, and sometimes also on the axes and main veins of the leaves ..... ***Aralia in ARALIACEAE***
28 Plant unarmed.
29 Plant a shrub, < 2.5 m tall.
..... ***Nandina in BERBERIDACEAE***
29 Plant a tree, > 3 m tall when flowering and fruiting.
31 Leaflets entire..... ***Gymnocladus in FABACEAE***
31 Leaflets serrate.
32 Fruit a globose drupe, tan at maturity, 10-15 mm in diameter; inflorescence an axillary panicle; corolla lavender.....
..... ***Melia in MELIACEAE***
32 Fruit an inflated capsule, 30-50 mm long; inflorescence a terminal thyrse; corolla yellow ..... ***Koelreuteria in SAPINDACEAE***
24 Leaves 1-pinnately compound.
33 Leaves even-pinnately compound (generally with 2 leaflets at the apex of the rachis, these obviously and symmetrically paired).
34 Leaflets rounded to obtuse at the apex (or acute to acuminate in *Gymnocladus*); fruit a legume; inflorescence various, but not as below.....
..... ***FABACEAE***
34 Leaflets acuminate at the apex; fruit a drupe; inflorescence a panicle with many, small, radially symmetrical flowers.
35 Tree dioecious; drupe ca. 5 mm long; stamens (of male flowers) 3-5 (-7)..... ***Pistacia in ANACARDIACEAE***
35 Tree bisexual; drupe ca. 13 mm long; stamens 8-10..... ***Sapindus in SAPINDACEAE***
33 Leaves odd-pinnately compound (generally with a single leaflet at the terminus of the rachis).
36 Leaves very large, > 10 dm long..... ***ARECACEAE***
36 Leaves small to large, < 10 dm long.
37 Stems armed with prickles or stipular or nodal spines; leaves often also with prickles.
38 Leaves with conspicuous leafy stipules, often adnate to the petiole; plant a liana or small to medium shrub; leaves serrate, often sharply and prominently so; leaves not strongly aromatic when fresh, lacking pellucid punctate glands on the surface..... ***ROSACEAE***
38 Leaves lacking leafy stipules; plant a tree or tall shrub; leaves entire or obscurely crenate or serrate; plant a tree or tall shrub; leaves either strongly aromatic when fresh, with conspicuous pellucid punctate glands or not aromatic and not pellucid-punctate.
39 Leaves not aromatic when fresh, lacking pellucid punctate glands; leaves never with prickles on the rachis; leaflet apices rounded .....
..... ***Robinia in FABACEAE***
39 Leaves strongly aromatic when fresh, with conspicuous pellucid punctate glands; leaves often with prickles on the rachis; leaflet apices usually acuminate..... ***Zanthoxylum in RUTACEAE***
37 Stems unarmed (leaflets with spinose margins in some species, or the stem with dense hispid hairs).
40 Leaflets entire.
41 Plant a liana, climbing by twining ..... ***Wisteria in FABACEAE***
41 Plant an upright shrub or tree, not climbing.
42 Plant a medium or tall tree.
..... ***FABACEAE***
42 Plant a shrub or small tree to 7 (-10) m tall.
45 Flowers bilaterally symmetrical, papilionaceous (reduced in *Amorpha* to a single petal); stamens 10; fruit a legume; leaves with stipules..... ***FABACEAE***
45 Flowers radially symmetrical, stamens 4-5; fruit <u>either</u> a drupe (Anacardiaceae), <u>or</u> a 1-3-seeded berry or a samara (Picramniaceae); leaves without stipules.
..... ***ANACARDIACEAE***
40 Leaflets serrate or crenate.
47 Leaflets crenate, the teeth rounded and often inconspicuous.
48 Leaflets with obscure crenations, not as below nor bearing glands; leaf rachis narrowly to conspicuously winged, especially towards the tip; fruit a drupe; plant a shrub or small tree..... ***ANACARDIACEAE***
48 Leaflets (especially the basal and on the basalscopic side) with 1-5 large rounded teeth, each bearing a prominent dark green gland; leaf rachis not winged; fruit a schizocarp, with 2-5 samaroid mericarps; plant a medium to large tree..... ***Ailanthus in SIMAROUBACEAE***
47 Leaflets serrate.
49 Leaf serrations spinose..... ***Berberis in BERBERIDACEAE***
49 Leaf serrations not spinose.
50 Inflorescences axillary.
51 Plant a tree, freely branched; rhizome inner bark not brightly colored; flowers unisexual, the male flowers in catkins, the female flowers solitary or few in a spike, the perianth greenish or tan and inconspicuous; fruit a nut covered by a dehiscent or indehiscent involucre..... ***JUGLANDACEAE***
51 Plant a short shrub, < 1 m tall, little branched; rhizome inner bark of fresh plants bright yellow; flowers bisexual, petals absent, the 5 petaloid sepals maroon; inflorescence a drooping panicle from the base of the new year's growth; fruit an aggregate of follicles ...
..... ***Xanthorhiza in RANUNCULACEAE***
50 Inflorescences terminal.
54 Fruit a drupe ..... ***Rhus in ANACARDIACEAE***
54 Fruit an inflated membranaceous capsule ..... ***Koelreuteria in SAPINDACEAE***

Key G - woody plants with alternate, simple leaves

1 Leaves palmately or pinnately lobed.

KEY TO FAMILIES AND GENERA

2 Leaves pinnately lobed (the midvein dominant, with 2, 4, or more lateral veins diverging into the lobes from the midvein above the base of the leaf blade) ..... ***Key G1***

2 Leaves palmately lobed or bilobed (3, 5, or more veins diverging from the base of the leaf blade into the lobes) ..... ***Key G2***

1 Leaves not lobed (entire or serrate, sometimes coarsely so), or only with 2 small auriculate lobes at the base of an otherwise unlobed leaf blade (such as various *Magnolia* species).

3 Woody grasses (bamboos), infrequently flowering, with hollow stems..... ***Key A in Poaceae***

3 Lianas, shrubs, or trees, not grasses, generally with solid stems.

4 Lianas (plant generally with obvious adaptations for climbing, such as adventitious roots, twining stems, or tendrils)..... ***Key G3***

4 Shrubs, subshrubs, or trees (sometimes scrambling or occasionally high-climbing with the support of other vegetation, but lacking the specialized climbing structures listed above).

5 Shrubs or subshrubs.

6 Leaves entire (sometimes cilate or scabrous on the margin)..... ***Key G4***

6 Leaves serrate, crenate, serrulate, crenulate, or doubly serrate ..... ***Key G5***

5 Trees.

7 Leaves entire (sometimes cilate or scabrous on the margin)..... ***Key G6***

7 Leaves serrate, crenate, serrulate, crenulate, or doubly serrate ..... ***Key G7***

Key G1 - woody plants with alternate, simple, pinnately lobed leaves

1 Shrubs or subshrubs.

4 Leaf blades 4-30 cm long; leaf lobing evenly from base to apex, or predominantly towards the tip of the leaf; flowers small, in catkins ..... ***Quercus in FAGACEAE***

4 Leaf blades 2-7 cm long; leaf lobing predominantly basal (hastate, or with larger basal lobes becoming smaller and more like serrations towards the apex); flowers larger, in various diffuse inflorescences.

5 Leaves hastate, with 2 acute basal lobes, merely serrate towards the apex; [alien species, of s. GA southward] ..... ***Pavonia in MALVACEAE***

5 Leaves lobate towards base, the lobes rounded in outline, progressively less lobed towards the apex, becoming doubly serrate upwards; [native and alien species, collectively widespread] ..... ***ROSACEAE***

1 Trees.

6 Leaves even-pinnately lobed, with 4 (or sometimes 6 or 8) lobes, the apex a very broad V-notch or truncate..... ***Liriodendron in MAGNOLIACEAE***

6 Leaves odd-pinnately lobed, with 3, 5, 7, etc. lobes (or sometimes with 2 lobes, but one obviously central and the other smaller and to the side, mitten-like), the apex obtuse to acute.

7 Leaf lobe margins entire.

8 Leaves deeply 2- or 3-lobed (or rarely with 1-4 additional very small, tooth-like lobes towards the base), most branches with a mixture of unlobed, 2-lobed (mitten), and 3-lobed leaves; fruit a blackish-seeded drupe; fresh plants strongly aromatic ..... ***Sassafras in LAURACEAE***

8 Leaves shallowly or deeply 3-25-lobed; fruit either an acorn or a rather fleshy spherical multiple fruit; fresh plants not aromatic.

9 Leaves shallowly or deeply 3-25-lobed; fruit a nut in a cupule (an acorn)..... ***Quercus in FAGACEAE***

9 Leaves shallowly 3-lobed (or mostly unlobed); fruit a rather fleshy multiple fruit..... ***Maclura in MORACEAE***

7 Leaf lobe margins serrate.

10 Leaves irregularly toothed, the teeth tipped by a soft bristle; fruit a nut in a cupule (an acorn); small to large trees ..... ***Quercus in FAGACEAE***

10 Leaves evenly and rather finely serrate, not bristly-tipped; fruit at least somewhat fleshy, either a pome or a multiple of nutlets surrounded by a fleshy calyx; small trees.

11 Petals absent (the individual flowers inconspicuous and aggregated into catkins); fruit a multiple, of nutlets surrounded by a fleshy calyx (mulberry) or a syconium (fig); leaves mainly larger, at least some on a branch > 8 cm long ..... ***MORACEAE***

11 Petals 5, conspicuous, white or pink; fruit a pome; leaves mainly small, generally < 8 cm long..... ***Crataegus in ROSACEAE***

Key G2 - woody plants with alternate, simple, palmately lobed leaves

1 Lianas.

2 Lianas climbing by adventitious roots..... ***Hedera in ARALIACEAE***

2 Lianas climbing by twining or by tendrils.

3 Lianas climbing by twining..... ***MENISPERMACEAE***

3 Lianas climbing by tendrils.

4 Tendrils branched, leaf-opposed; leaves mostly 5-7-lobed, the margins also serrate or dentate..... ***VITACEAE***

4 Tendrils simple (though paired in *Smilax* in SMILACACEAE), axillary; leaves 3-lobed, the margins entire, serrulate, or prickly.

5 Leaves longer than wide, entire or prickly-margined; stems armed with prickles; flowers 6-merous, greenish, in umbels borne in leaf axils; tendrils stipular, 2 per leaf axil, adnate to the petiole basally ..... ***Smilax in SMILACACEAE***

5 Leaves wider than long, entire or serrulate; stems not armed; flowers 5-merous, blue-purple or yellow, solitary or in small fascicles in leaf axils; tendrils 1 per leaf axil..... ***Passiflora in PASSIFLORACEAE***

1 Trees or shrubs. {add: *Vernicia* in EUPHORBIACEAE, *Firmiana* in MALVACEAE, *Kalopanax* in ARALIACEAE, *Ficus* in MORACEAE}

6 Trees.

7 Leaves > 3 dm long and wide; tree monopodial, with a single, unbranched stem (rarely with a few branches). ..... ***ARECACEAE***

7 Leaves < 3 dm long and wide; tree branching; [Eudicots].

11 Leaf blades (3-) 5 (-7) lobed, to 15 cm wide and long, each lobe finely serrate-crenate (>3 teeth per cm of margin) and rarely with a small sub-lobe; multiple fruit spherical and spiky, consisting of multiple bird-beak-like loculicidal capsules; buds axillary..... ***Liquidambar in ALTINGIACEAE***

11 Leaves 3 (-5)-lobed, to 35 cm wide and long, each lobe coarsely toothed or sublobed, the teeth or sublobes (at most 1-2 per cm of margin) attenuate-acuminate; multiple fruit spherical and merely rough on the surface, consisting of multiple achenes with tawny bristles; buds infrapetiolar (completely hidden in the swollen petiole base)..... ***Platanus in PLATANACEAE***

6 Shrubs.

12 Leaf lobe margins entire (or undulate to sublobed at the tip) ..... ***Manihot in EUPHORBIACEAE***

12 Leaf lobe margins serrate.

13 Leaves glabrous..... ***Ricinus in EUPHORBIACEAE***

13 Leaves pubescent (slightly or strongly).

14 Pubescence of simple hairs; plants armed or not with nodal spines

15 Leaves 10-30 cm long and wide; fruit a berry; inflorescence of solitary to a few flowers, or a raceme..... ***Ribes in GROSSULARIACEAE***
15 Leaves 2-10 cm long and wide; fruit an aggregate of drupelets; inflorescence a cyme ..... ***Rubacer odoratum in ROSACEAE***
14 Pubescence of stellate hairs; plants unarmed.
16 Leaves > 30 cm wide..... ***Tetrapanax in ARALIACEAE***
16 Leaves < 15 cm wide..... ***MALVACEAE***

Key G3 - lianas with alternate, simple, and unlobed leaves

1 Leaves serrate.
2 Leaf venation palmate, the leaf often lobed or at least pentagonal in shape (as well as serrate); plants climbing by leaf-opposed tendrils..... ***VITACEAE***
2 Leaf venation pinnate, the leaf neither lobed nor pentagonal; plants climbing by other mechanisms (see below).
4 Plants climbing by adventitious roots; leaf base cordate or subcordate, and also slightly to strongly oblique..... ***Ficus pumila in MORACEAE***
4 Plants climbing by twining, or by growing through bark layers of *Taxodium ascendens* or *Chamaecyparis thyoides*; leaf base cuneate, rounded, or cordate.
6 Leaf blades mostly 2-6 cm long, 0.3-2 cm wide; plants climbing by growing through bark layers of *Taxodium ascendens* or *Chamaecyparis thyoides*..... ***Pieris in ERICACEAE***
6 Leaf blades mostly 6-13 cm long, 3-8 cm wide; plants climbing by twining..... ***Schisandra in SCHISANDRACEAE***
1 Leaves entire.
7 Stems with well-developed prickles; tendrils paired, stipular (diverging from the leaf petiole above its base); [Monocots]..... ***Smilax in SMILACACEAE***
7 Stems lacking prickles; tendrils either absent or (if present) not stipular and paired; [Eudicots or Basal Angiosperms].
8 Plant climbing by dense, reddish adventitious roots..... ***Hedera in ARALIACEAE***
8 Plant climbing by twining or by tendrils.
9 Plant climbing by tendrils..... ***POLYGONACEAE***
9 Plant climbing by twining.
10 Leaves elliptic or ovate, obviously longer than broad, most leaves > 1.4× as long as wide; leaf blade base narrowly cuneate, broadly cuneate, rounded, or subcordate.
11 Leaves 3-8 cm long, rounded to broadly cuneate at the base and rounded or obtuse at the apex; lateral leaf veins straight, parallel, not forking; inflorescence a terminal thyrse or panicle..... ***Berchemia in RHAMNACEAE***
11 Leaves 6-15 cm long, cuneate at the base and acuminate at the apex; lateral leaf veins forking at or beyond the middle; inflorescence a solitary, axillary flower..... ***Schisandra in SCHISANDRACEAE***
10 Leaves orbicular to very widely ovate, most leaves < 1.4× as long as wide; leaf blade base deeply cordate, subcordate, rounded, or broadly cuneate
12 Leaf venation pinnate, but "pseudopalmate", with 3 primary veins from the marginal point of attachment of the petiole, the 2 lateral veins then promptly rebranching (< 1 cm from the leaf base) into 2-3 prominent veins (the remainder of the venation pinnate along the midvein); basalmost pair of primary veins exposed (lacking leaf tissue) on their basal side for > 2 mm; leaf blade base deeply cordate; leaf with no tendency to lobing, the leaf outline convex from the base to the apex (except in the immediate vicinity of the petiole and sometimes immediately near a slightly acuminate apex..... ***ARISTOLOCHIACEAE***
12 Leaf venation palmate, with (3-) 5-9 primary veins from the marginal or peltate point of attachment of the petiole, these primary veins then rebranching well above the leaf base; basalmost pair of primary veins completely included within leaf tissue; leaf blade base cordate, subcordate, rounded, or broadly cuneate; leaf with a tendency to lobing, the leaf outline with 1 or more concave areas between the base and the apex (except *Cissampelos* of s. FL)..... ***MENISPERMACEAE***

Key G4 - shrubs and subshrubs with alternate, simple, unlobed, entire leaves

1 Leaves evergreen. {add to 1a: *Scaevola* in GOODENIACEAE, *Morella* (*inodora*) in MYRICACEAE, *Ternstroemia* in PENTAPHYLACACEAE, *Pittosporum* in PITTOSPORACEAE, *Myrsine* in PRIMULACEAE, *Pyracantha* in ROSACEAE, *Dodonaea* in SAPINDACEAE, *Cestrum* in SOLANACEAE, *Thymelaea* in THYMELAEACEAE, *Conocarpus* in COMBRETACEAE}
3 Leaves linear, > 15× as long as wide; [Monocots]..... ***Yucca in AGAVACEAE***
3 Leaves broader, < 15× as long as wide; [Eudicots, Basal Angiosperms, or Monocots].
4 Plant a creeping subshrub, < 1 dm tall ..... ***Epigaea in ERICACEAE***
4 Plant not creeping, > 3 dm tall.
5 Inflorescence an involucrate head..... ***ASTERACEAE***
5 Inflorescence solitary (*Illicium* in ILLICIACEAE) or variously branched, spicate, racemose, or fascicled, not an involucrate head.
6 Carpels separate; fruit an aggregate; fresh foliage strongly fragrant; [Basal Angiosperms] ..... ***Illicium in ILLICIACEAE***
6 Carpels fused; fruit a berry, drupe, acorn (nut), capsule, or legume; fresh foliage not strongly fragrant; [Eudicots, Monocots, and Basal Angiosperms].
9 Leaves largely covered with silver and/or bronze lepidote scales and/or dense stellate hairs below (visible at 10× or higher magnification), giving the lower leaf surface a slightly shiny to almost metallic appearance. {add *Lyonia ferruginea* and *L. fruticosa* in ERICACEAE; add *Loropetalum* in HAMAMELIDACEAE}
10 Petals present, conspicuous, connate, white, the corolla rotate; fruit a berry with several seeds; fresh foliage with a strong, tar-like odor ..... ***Solanum in SOLANACEAE***
10 Petals absent or inconspicuous, greenish and separate if present (note that the calyx is petaloid and white or yellowish in *Elaeagnus* of ELAEAGNACEAE); fruit a dry capsule with 3 seeds, or a drupe with a single seed; fresh foliage lacking a strong odor.
11 Perianth 4-merous; petals absent; petaloid sepals white to cream, fused and salverform; carpel 1; fruit a fleshy, red drupe, with a single seed .. ***Elaeagnus in ELAEAGNACEAE***
11 Perianth 5-merous; petals green and separate, or absent; sepals greenish, separate; carpels 3; fruit a 3-valved capsule with 3 seeds..... ***Croton in EUPHORBIACEAE***
9 Leaves with various vestiture, but not as above.
12 Flowers in spikes, these solitary opposite leaves or in axillary umbels..... ***PIPERACEAE***
12 Flowers other types of inflorescences.
13 Leaves 1-foliolate on the upper stems, sometimes 3-foliolate below, or all reduced to phyllodial spines; flowers papilionaceous, bright yellow; fruit a legume; stems bright green..... ***FABACEAE***
13 Leaves simple throughout; flowers either small, inconspicuous, tannish, borne in catkins (*Quercus*), or larger and urceolate, or with almost separate and spreading petals, white to pink, in various terminal or axillary, branched inflorescences; fruit either a nut in a cupule (an acorn), or a (3-) 5-valved capsule, or a spherical berry or drupe; stems generally brown or tan (sometimes green).
14 Flowers small, inconspicuous, tannish, borne in catkins; fruit a nut in a cupule (an acorn)..... ***Quercus in FAGACEAE***

14 Flowers white to pink, either urceolate or tubular or with separate and spreading petals, in various terminal or axillary inflorescences; fruit either a (3-) 5-valved capsule, or a spherical berry with 10+ seeds, or a 4-8 seeded fleshy drupe, or a 1-seeded dry or fleshy drupe.
15 Flowers white to pink, rotate or urceolate (the petals united at least basally), in various terminal or axillary inflorescences; fruit either a 2-5 valved capsule or a spherical berry with 10+ seeds.
16 Leaves 1 per node or also paired (on one side of the stem) at some nodes (the leaves then uneven in size); inflorescences leaf-opposed; fruit a berry..... ***Solanum in SOLANACEAE***
16 Leaves 1 per node; inflorescences terminal or axillary, never leaf-opposed; fruit a valved capsule
17 Seeds without fleshy aril or attachment; ovaries 5-10 carpellate; flowers urceolate; leaves serrate or entire..... ***ERICACEAE***
17 Seeds with fleshy aril or attachment; ovaries 2-4 carpellate; flowers rotate; leaves entire or very remotely serrulate. ***PITTOSPORACEAE***
15 Flowers white, petals spreading, separate even at the base, in axillary fascicles or racemes; fruit either a fleshy drupe with 4-8 pyrenes, or a dry single-seeded drupe.
19 Shrub rhizomatous and colonial; fruit an ellipsoid drupe, 2-3 cm long..... ***CHRYSOBALANACEAE***
19 Shrub not rhizomatous; fruit either a fleshy or dry drupe, < 1 cm long.
20 Inflorescence an axillary fascicle or cluster; fruit a fleshy drupe with 4-8 pyrenes..... ***Ilex in AQUIFOLIACEAE***
20 Inflorescence an axillary raceme; fruit a dry drupe with 1 seed..... ***CYRILLACEAE***

1 Leaves deciduous. {add: *Ditrysinia* in EUPHORBIACEAE, *Glochidion* in PHYLLANTHACEAE, *Phyllanthopsis* in PHYLLANTHACEAE, *Nierembergia* in SOLANACEAE, *Edgeworthia* in THYMELAEACEAE, *Ipomoea* (*I. carnea*) in CONVOLVULACEAE; *Swida* (*S. alternifolia*) in CORNACEAE}
21 Inflorescence an involucrate head ..... ***ASTERACEAE***
21 Inflorescence branched, spicate, a catkin, or consisting of a solitary flower or axillary clusters or whorls, not an involucrate head.
22 Inflorescence a catkin; flowers unisexual; plants dioecious
..... ***Salix in SALICACEAE***
22 Inflorescence various, not a catkin; flowers bisexual; plants hermaphroditic.
24 Inflorescence of a solitary, axillary flower; perianth 3-4-merous; fresh plants fragrant with a strange, musky odor; berry oblong, 3-7 (-10) cm long, greenish-yellow when ripe; [Basal Angiosperms]..... ***ANNONACEAE***
24 Inflorescence of 2 or more flowers; perianth 3-5-merous; fresh plants not musky-fragrant; fruits various, not as above.
25 Flowers 3-merous; fruit fleshy, red or greenish-yellow at maturity; ovary superior; [Basal Angiosperms or Eudicots].
26 Leaves elliptic or narrowly elliptic, broadest near the middle; fresh plants strongly fragrant with a citrus-like aroma; stems unarmed; fruit a drupe, with a single seed..... ***LAURACEAE***
26 Leaves obovate or oblanceolate, broadest near the apex; stems armed with nodal spines; fresh plants not fragrant; fruit a berry, with several seeds. ...
..... ***Berberis in BERBERIDACEAE***
25 Flowers 4-5-merous; fruit fleshy or dry, black, blue, brown, tan, or red at maturity; ovary superior or inferior; [Eudicots].
27 Fruit a 4-5-valved capsule with many seeds; inflorescence either terminal, a corymb or panicle, or an axillary whorl..... ***ERICACEAE***
27 Fruit either a drupe or berry (indehiscent, and variously fleshy or dry) or a dry 3-valved capsule with 1 seed; inflorescence axillary (solitary, clusters, fascicles, or racemes), or in a terminal raceme (*Pyrularia* in SANTALACEAE).
28 Leaves largely covered with silver and/or bronze shiny lepidote scales below, giving the lower leaf surface an almost metallic appearance.....
..... ***Elaeagnus in ELAEAGNACEAE***
28 Leaves with various vestiture, but not as above.
29 Ovary inferior or half-inferior; inflorescence an axillary cluster or raceme, or a terminal raceme.
30 Fruit a spherical berry, with 10 or more seeds..... ***ERICACEAE***
30 Fruit an elongate drupe (definitely longer than thick), with 1 seed.
31 Fruit 15-30 mm long; inflorescence a terminal raceme..... ***Pyrularia in CERVANTESIACEAE***
31 Fruit 6-10 mm long; inflorescence an axillary fascicle..... ***Symplocos in SYMPLOCACEAE***
29 Ovary superior; inflorescence an axillary cluster or an axillary raceme (borne themselves in clusters).
32 Fruits elongate, 8-20 mm long.
33 Fruit a red or orange berry, 8-20 mm long; leaves usually on spur-shoots; [salty coastal areas, or aliens of disturbed situations].....
..... ***Lycium in SOLANACEAE***
33 Fruit a yellowish-green drupe, 12-15 mm long; leaves on main stems; [rich forests, mainly inland]..... ***Dirca in THYMELAEACEAE***
32 Fruits spherical, < 10 mm long.
34 Inflorescence a narrowly cylindrical raceme, clustered several to many at the tip of the previous year's wood and below the current season's growth; fruit < 3 mm in diameter..... ***Cyrilla in CYRILLACEAE***
34 Inflorescence an axillary cluster; fruit > 4 mm in diameter
35 Fruit dry, opening by 3 valves, 1-seeded; leaf pubescence stellate ..... ***Styrax in STYRACACEAE***
35 Fruit fleshy, with 4-8 seeds; leaf pubescence simple or absent.
..... ***RHAMNACEAE***

Key G5 - shrubs and subshrubs with alternate, simple, unlobed, toothed leaves

1 Subshrubs or dwarf shrubs, aboveground stems creeping or erect, < 15 cm tall; leaves evergreen.
2 Leaves 1.5-3 cm wide, coarsely toothed; flowers lacking sepals and petals; [alien species, sparingly naturalized or spreading in suburban situations].....
..... ***Pachysandra in BUXACEAE***
2 Leaves < 1.5 cm wide, finely toothed or entire; flowers with sepals and petals; [native species, collectively widespread and common].
3 Leaves fleshy, terete in ×-section; petals 5, bright pink..... ***Talinum in TALINACEAE***
3 Leaves flat, not fleshy; petals white or pale pink.
..... ***ERICACEAE***
1 Shrubs, aboveground stems erect, > 30 cm tall; leaves evergreen or deciduous.
5 Inflorescence an involucrate head subtended by phyllaries, the heads solitary or many and variously arrayed in secondary inflorescences, the ovary inferior, the corolla connate and tubular at least basally, the calyx absent, the stamens 5, the fruit a cypsela..... ***ASTERACEAE***
5 Inflorescence, flower, and fruit structure various, but not with the combination of features as above.
6 Leaves evergreen. {add to 6a *Ardisia* in PRIMULACEAE, *Rhaphiolepis* in ROSACEAE, *Camellia* in THEACEAE}
7 Leaves glandular-punctate on one or both surfaces with golden-yellow glands; flowers unisexual, lacking a perianth; fruit a pale gray, waxy drupe with a single seed..... ***Morella in MYRICACEAE***
7 Leaves not glandular punctate; flowers bisexual or unisexual, with a white, pink, or yellow perianth; fruit various, a red, blue, or black drupe or berry with several seeds, or a capsule.

8 Petals connate and urceolate, white to pale pink; flowers bisexual; leaves ovate, lanceolate, or elliptic, broadest near the middle or towards the base, the teeth well-distributed along most of the margin on either side; fruit either a capsule or a red, blue, or black berry..... ***ERICACEAE***

8 Petals distinct, yellow or white; flowers unisexual or bisexual; leaves oblanceolate or elliptic, broadest towards the tip or near the middle, the teeth usually concentrated in the upper half of the leaf; fruit either a black or red drupe with several pyrenes or a red berry with several seeds.

9 Plants lacking thorns; flowers unisexual, with a white perianth; fruit a black or red drupe with several pyrenes..... ***Ilex in AQUIFOLIACEAE***

9 Plants with nodal, simple or tripartite thorns; flowers bisexual, with a yellow perianth; fruit a red berry with several seeds..... ***Berberis in BERBERIDACEAE***

6 Leaves deciduous.

10 Plants with nodal, simple or tripartite thorns; leaf teeth spinulose..... ***Berberis in BERBERIDACEAE***

10 Plants lacking thorns; leaf teeth acute, blunt, rounded, or callus-tipped, but not spinulose.

11 Leaves crenate-wavy, with 1-2 teeth per cm of leaf margin; leaves usually obliquely cordate or angled-truncate at the base; pubescence of leaves and stems stellate..... ***HAMAMELIDACEAE***

11 Leaves crenulate, serrate or serrulate, with >2 teeth per cm of leaf margin; leaves cuneate, rounded, or subcordate at base, not oblique; pubescence of leaves and stems absent or simple.

12 Leaves prominently 3-veined from the base.

13 Ovary 5-locular; stamens many or 5, fused or separate; fruit a 5-valved capsule or of 5 mericarps; flowers yellow or pink, or white with a pink blaze..... ***MALVACEAE***

13 Ovary 3-locular; stamens 5, separate; fruit a 3-valved capsule or drupe; flowers white or pale green..... ***RHAMNACEAE***

12 Leaves pinnately veined.

14 Flowers in catkins; perianth absent or very small; fruit a 1-seeded nut, samara, or waxy drupe (capsule in *Salix* in SALICACEAE).

15 Leaves > 4 cm wide, lacking punctate glands; fruit a 1-seeded nut or samara..... ***BETULACEAE***

15 Leaves < 3 cm wide, either punctate-glandular on one or both surfaces or lacking punctate glands; fruit a 1-seeded waxy drupe or a capsule.

16 Leaves punctate-glandular on one or both surfaces; fruit a 1-seeded waxy drupe..... ***MYRICACEAE***

16 Leaves lacking punctate glands; fruit a capsule..... ***Salix in SALICACEAE***

14 Flowers arrayed variously, but not in catkins; perianth present, conspicuous; fruit a 1-many-seeded capsule, pome, berry, or follicle.

17 Ovary inferior; fruit fleshy and indehiscent, a berry or pome.

18 Fruit a berry; leaves lacking stipules..... ***Vaccinium in ERICACEAE***

18 Fruit a pome; leaves usually prominently stipular..... ***ROSACEAE***

17 Ovary superior; fruit either dry and dehiscent, a capsule or an aggregate of follicles or achenes, or fleshy and indehiscent, a drupe with 4-8 pyrenes.

19 Flower apocarpous; fruit an aggregate of follicles or achenes..... ***ROSACEAE***

19 Flower syncarpous; fruit either a capsule or a fleshy drupe.

20 Ovary 1-carpellate; fruit a 1-seeded drupe..... ***Prunus in ROSACEAE***

20 Ovary 2-8-carpellate; fruit either a capsule or a drupe with 4-8 pyrenes

21 Ovary 2-8-locular; fruit fleshy and indehiscent, a drupe with 2-8 pyrenes; flowers mostly functionally unisexual (or sometimes bisexual in RHAMNACEAE).

22 Petals connate at the base; stamens alternate to the petals and opposite to the sepals; fruit 4-8-locular, with 4-8 pyrenes..... ***Ilex in AQUIFOLIACEAE***

22 Petals separate (or absent in *Rhamnus alnifolia*); stamens opposite to the petals (when present) and alternate to the sepals; fruit 2-4-locular, with 2-4 pyrenes..... ***RHAMNACEAE***

21 Ovary 2-3- or 5-locular; fruit dry and dehiscent, a capsule; flowers bisexual (except *Stillingia* in EUPHORBIACEAE).

23 Ovary and capsule 5-locular; stamens 10-many.

24 Stamens 10; corolla urceolate, sympetalous..... ***ERICACEAE***

24 Stamens many; corolla spreading, apopetalous..... ***Stewartia in THEACEAE***

23 Ovary and capsule 2-3-locular; stamens 2, 5, or 10.

25 Leaves > 5× as long as wide; stamens 2; ovary and capsule 3-locular; [plants of the Coastal Plain of SC, GA, AL, and FL]..... ***Stillingia in EUPHORBIACEAE***

25 Leaves < 3× as long as wide; stamens 5 or 10; ovary and capsule 2-3-locular; [plants collectively widespread].

26 Stamens 5; ovary and capsule 2-locular; leaves elliptic (widest near the middle), the teeth fine (usually > 5 points per cm of margin), and along much of the margin; inflorescence a terminal raceme; hairs of the lower leaf surface simple, erect..... ***Itea in ITEACEAE***

26 Stamens 10; ovary and capsule 3-locular; leaves obovate (widest towards the apex), the teeth obscure to coarse (usually < 4 points per cm of margin), and primarily in the upper half of the leaf; inflorescence a terminal or axillary raceme or cyme; hairs of the lower leaf surface either simple and appressed, or stellate.

27 Leaf margins regularly and evenly serrate in the upper half of the leaf (usually nearly entire towards the base); inflorescence an elongate, many flowered (>30) raceme borne at the end of branchlets of the season; corolla of separate petals, the stamens separate; hairs of the lower leaf surface simple and appressed..... ***Clethra in CLETHRACEAE***

27 Leaf margins wavy or irregularly dentate, mainly in the upper half of the leaf; inflorescence a few flowered (<20) axillary raceme, cyme, or cluster; corolla fused basally into a tube, the stamens adnate to the tube; hairs of the lower leaf surface stellate..... ***Styrax in STYRACACEAE***

Key G6 - trees with alternate, simple, unlobed, entire leaves

1 Leaves evergreen. {add to 1a: [*Conocarpus*] COMBRETACEAE; [*Maytenus*] CELASTRACEAE}

2 Leaves tiny, scale-like, broadest at the base and more or less clasping the stem, < 10 mm long and < 1 mm wide..... ***Tamarix in TAMARICACEAE***

2 Leaves larger and broader, > 40 mm long and > 8 mm wide.

3 Fruit a hesperidium; petiole flanged or winged for most of its length, constricted at the base of the blade (except linear in *C. medica*)..... ***Citrus in RUTACEAE***

3 Fruit various (but not a hesperidium); petiole linear (not flanged or winged with leafy tissue).

4 Leaves pubescent with stellate hairs or peltate scales (sometimes hairs simple), or glandular punctate, appearing as translucent dots (best seen on lower leaf surfaces, with at least 10x magnification).

5 Leaves (fresh) strongly odorous, glandular-punctate (appearing as translucent dots), with strongly parallel venation; bark on medium-aged to mature trees papery and peeling..... ***Melaleuca in MYRTACEAE***

5 Leaves (fresh) not strongly fragrant, with stellate hairs or punctate scales, leaf venation various but not strongly parallel, bark various but not papery

6 Vestiture of the lower leaf surface of silvery and/or reddish peltate scales; plants hermaphroditic, the flowers bisexual; fruit a fleshy drupe..... ***Elaeagnus in ELAEAGNACEAE***

6 Vestiture of the lower leaf surface in part of stellate hairs (and also of simple acicular hairs and gland-tipped hairs); plants monoecious, the male flowers in yellow to brownish catkins, the female flowers solitary or in small spikes; fruit a nut in a cupule (an acorn)..... ***Quercus in FAGACEAE***

4 Leaves glabrous, or if hairy, with strictly simple hairs.

7 Flowers solitary, terminal, large (> 5 cm in diameter); pistils many, carpels separate; petals many (typically > 8); leaves mostly > 10 cm long (at least some on a branch longer than 10 cm); fruit an aggregate of follicles, each dehiscing along 1 suture; stipule scar circumferential at each node, encircling the twig..... ***Magnolia in MAGNOLIACEAE***

7 Flowers either in axillary racemes, panicles, umbels, fascicles, or solitary, or in terminal corymbs, umbels, compound cymes, or racemes, small (< 5 cm in diameter); pistil 1, with 1-8 fused carpels; petals 3-8; leaves < 30 cm long; fruit either a drupe, berry, or capsule; stipule scars either absent or linear or triangular, not circumferentially encircling the twig.

8 Inflorescence terminal, a corymb, umbel, compound cyme, or raceme; fruit either a capsule (dehiscing along 5 longitudinal sutures) or a few-seeded berry. ***Kalmia latifolia in ERICACEAE***

8 Inflorescence axillary, a raceme, panicle, umbel, fascicle, or solitary; fruit drupaceous, fleshy to dry, but not regularly dehiscent along sutures.

12 Inflorescence an axillary raceme (with an elongate central axis, to which all flowers/fruits are attached).

13 Fruit a dry, tan to brown, spherical or winged drupe; stamens 5 or 10; carpels 2-5; leaves oblanceolate (rarely narrowly elliptic), < 2.5 cm wide, the apex obtuse (more rarely acute, retuse, or rounded)..... ***CYRILLACEAE***

13 Fruit a fleshy, black, spherical drupe; stamens 10; carpels 1; leaves elliptic, the apex acute to short-acuminate..... ***Prunus caroliniana in ROSACEAE***

12 Inflorescence either an axillary umbel or fascicle (or reduced to solitary) or an axillary compound inflorescence (panicle or compound cyme), with 2-3 orders of branching.

14 Fruit a fleshy and oily 1-seeded drupe; flowers 3-merous, with separate and undifferentiated perianth segments; fresh plants strongly aromatic; inflorescence compound, a panicle or compound cyme (with 2-3 orders of branching); [Basal Angiosperms]..... ***LAURACEAE***

14 Fruit a fleshy but not oily 1-8-seeded drupe or berry; flowers 4-8-merous, with differentiated sepals and petals, the petals usually basally fused; fresh plants not strongly aromatic; inflorescence an axillary umbel or fascicle (or reduced to solitary), a central axis absent or < 1 cm long; [Eudicots].

15 Plants unarmed (or with marginal leaf prickles or spines); stamens 4-7, not epipetalous; fruit a drupe with 4-8 pyrenes;flowers 4-7-merous..... ***Ilex in AQUIFOLIACEAE***

15 Plants armed with nodal thorns; stamens 5 and staminodia 5, epipetalous; fruit a berry or drupe with 1 seed;flowers 5-merous..... ***Sideroxylon in SAPOTACEAE***

1 Leaves deciduous.

16 Leaf base deeply to shallowly cordate, with 3-7 palmate veins from the base; leaf blade about as wide as long or a little longer, mostly 0.9-1.3× as long as wide.

17 Juncture of petiole and leaf blade with 2 red glands; corolla radially symmetrical, with 5-8 petals, white with red veins towards the base of the petals; flowers unisexual; fruit globose, 4-8 cm in diameter; main palmate leaf veins 3 (-5)..... ***Vernicia in EUPHORBIACEAE***

17 Juncture of petiole and leaf blade eglandular, but the uppermost 1-3 mm of the petiole swollen into a prominent upper pulvinus; corolla bilaterally symmetrical, with 5 petals, pink to purple (rarely white in some cultivars); flowers bisexual; fruit an oblong, flat legume, 6-10 cm long; main palmate leaf veins 5-7 (-9)..... ***Cercis in FABACEAE***

16 Leaf base cuneate, rounded, truncate, subcordate, or auriculate (with 2 small "earlobe-like" lobes at the base of the leaf blade), with 1 (mid) vein from the base (3 veins from the base in *Celtis* in CANNABACEAE); leaf blade about as wide as long, or somewhat to much longer, 0.9-10× as long as wide.

18 Leaves 0.9-1.4× as long as wide (some taxa keyed in both leads).

19 Stipule scars circumferential, forming a line around the twig; flowers and aggregate fruits solitary, terminal; [Basal Angiosperms]..... ***Magnolia in MAGNOLIACEAE***

19 Stipule scars not circumferential (or not apparent); flowers and simple fruits in inflorescences of 1-many flowers, axillary or terminal, but not simultaneously solitary and terminal; [Eudicots].

20 Leaf blade 3-6 cm long, 1-1.5× as long as the flexuous petiole..... ***Triadica in EUPHORBIACEAE***

20 Leaf blade 4-30 cm long, > 3× as long as the stiff petiole.

21 Petioles 1-5 (or more) cm long; leaves broadly orbicular, rounded at the base, usually rounded (rarely obtuse or nearly acute) at the apex, entire; hairs on foliage simple or absent; fruit a fleshy drupe..... ***Cotinus in ANACARDIACEAE***

21 Petioles < 1 cm long; leaves various in shape, often acuminate at the apex and/or cuneate at the base, often with some tendency to toothing; hairs on foliage stellate (use at least 10× magnification), at least in part; fruit either a nut borne in a cup (acorn) or a dry, subglobose 3-valved capsule, with 1 seed.

22 Fruit a dry, subglobose 3-valved capsule, with 1 seed; flowers bisexual, white, conspicuous..... ***Styrax in STYRACACEAE***

22 Fruit a nut in a cupule (an acorn); flowers unisexual, greenish or brownish, individually inconspicuous, the male flowers borne in catkins..... ***Quercus in FAGACEAE***

18 Leaves > 1.4× as long as wide.

23 Leaves densely covered with silvery peltate scales (use 10× or greater magnification), giving the leaf blade surface a metallic appearance..... ***Elaeagnus angustifolia in ELAEAGNACEAE***

23 Leaves glabrous, glabrescent or variously pubescent (including densely and silkily so, giving the leaf surface a shiny appearance), but not as above.

24 Plants bearing nodal thorns; leaves elliptic to obovate, 3-9 cm long, 1-4 cm wide, 1.5-4× as long as wide. ***Sideroxylon in SAPOTACEAE***

24 Plants unarmed (except spiny in *Maclura* in MORACEAE); leaves various in shape, from broadest towards the base, near the middle, or towards the apex, 3-80 cm long, 1-30 cm wide, 1.5-10× as long as wide.

26 Leaves distinctly widest near the base (at a point < 0.3× of the way from the base of the leaf blade to its apex), gradually long-tapering to an acuminate apex.

27 Fruit a spherical, dry drupe, 4-8 mm in diameter, with a single seed; leaf 1.5-6 cm wide..... ***Celtis laevigata in CANNABACEAE***

27 Fruit a spherical, fleshy multiple, 80-120 mm in diameter; leaf 5-8 cm wide..... ***Maclura in MORACEAE***

26 Leaves widest near the middle or towards the tip of the leaf blade (at a point > 0.4× of the way from the base of the leaf blade to its apex).

28 Pubescence of the foliage stellate (at least in part; simple hairs sometimes present as well); flowers unisexual, the individual flowers inconspicuous, male flowers in catkins; fruit a nut in a cupule (an acorn)..... ***Quercus in FAGACEAE***

28 Pubescence of the foliage simple or absent (except stellate in STYRACACEAE); flowers bisexual, conspicuous, borne variously, but not in catkins (except in *Leitneria*); fruit various.

29 Leaf undersurface strongly whitened..... ***Magnolia in MAGNOLIACEAE***

29 Leaf surface green (often somewhat paler green than the upper surface, but not whitened).

31 Flowers solitary; ovary superior; perianth either 3-merous and whorled or many-merous and spiraled; leaves mostly > 20 cm long and > 8 cm wide, distinctly broadest towards the apex (> 0.6× of the way from the leaf blade base to apex) (except *Magnolia acuminata*, which is sometimes both shorter, narrower, and broadest near the middle or towards the base); [Basal Angiosperms].
32 Flowers axillary, < 2 cm across, brown or maroon; perianth 3-merous, whorled; fresh foliage with a strong musky odor; fruit a fleshy berry; leaves cuneate at the base; twigs lacking circumferential stipule scars at each node ..... ***Asimina triloba in ANNONACEAE***
32 Flowers terminal, > 4 cm across, white, pale yellow, or pink; perianth many-merous, spiraled; fresh foliage not noticeably aromatic; fruit an aggregate of follicles; leaves cuneate or auriculate at the base; twigs with circumferential stipule scars at each node ..... ***MAGNOLIACEAE***
31 Flowers in inflorescences of several to many; ovary inferior (or superior in *Diospyros* in EBENACEAE and *Cyrilla* in CYRILLACEAE); perianth 4-5-merous; leaves mostly < 20 cm long and < 10 cm wide, broadest near the middle or towards the apex; [Eudicots].
33 Leaves with prominently parallel-arcing secondary veins; inflorescence a terminal corymb; leaves clustered at the tips of the twigs, agusoften appearing pseudo-whorled; trichomes of the leaf undersurface predominantly 2-branched (some simple) (use at least 10× magnification); flowers 4-merous; fruit a blue drupe; small tree..... ***Swida alternifolia in CORNACEAE***
33 Leaves with secondary veins more obscure and complexly branching into tertiary veins; inflorescence axillary (often on the previous year's wood), solitary to variously fascicled, clustered, or in racemes; leaves arrayed distichously along horizontal or arching twigs, not prominently clustered or pseudo-whorled (except often in *Cyrilla* in CYRILLACEAE, *Symplocos* in SYMPLOCACEAE, and *Nyssa* in NYSSACEAE); trichomes of the leaf undersurface either simple or stellate (or absent); flowers 4-5-merous; fruit a green, blue, or black drupe, an orange berry, or a green to brownish indehiscent capsule; small to large tree.
34 Pubescence of foliage and other parts stellate (use at least 10× magnification); petals 4-5, white, 10-25 mm long; fruit dryish, indehiscent, either longitudinally 2-4-winged or not winged..... ***STYRACACEAE***
34 Pubescence of foliage and other parts simple; petals either 0, or 4-5 and pink, white, or greenish-yellow, or 10 and greenish-yellow; fruit either a somewhat to very fleshy drupe or berry or a dry, brownish, spherical drupe, 2-2.5 mm in diameter.
35 Leaves < 2.5 cm wide, dark green above, somewhat thickened, and tardily deciduous or semi-evergreen; fruit a dry, brownish, spherical drupe, 2-2.5 mm in diameter; inflorescence a narrowly cylindrical raceme with > 40 flowers..... ***Cyrilla in CYRILLACEAE***
35 Leaves > 2.5 cm wide, usually medium-green above, herbaceous in texture, promptly seasonally deciduous; fruit a somewhat to very fleshy drupe or berry, > 5 mm in diameter; inflorescence a solitary flower or cluster, head, or irregular raceme of < 15 flowers.
36 Fruit a drupe (green when ripe), cylindrical to barrel-shaped, 8-12 mm long; leaves rather thick and leathery in texture, persistent into the winter, dropping tardily or at latest the following spring; flowers bisexual; stamens 30-50, in 5 fascicles..... ***Symplocos in SYMPLOCACEAE***
36 Fruit a berry (orange when ripe) or a drupe (blue-black, yellow, orange, or red when ripe), 8-50 mm long, spherical or ovoid to ellipsoid; leaves thin in texture, promptly deciduous in the autumn; flowers functionally unisexual; stamens 5-16, separate.
37 Fruit a spherical berry, 15-50 mm long, orange when ripe, subtended by the enlarged and persistent woody or leathery calyx; vascular bundles 1 per leaf scar; leaves never toothed; leaves whitish-green beneath; leaf midrib and upper petiole with tiny glands on their upper surfaces (reddish initially, then darkening) (use at least 10× magnification); leaves glabrate to tomentose with curly hairs beneath; female and male flowers on separate trees (dioecious); stamens 16; widest point of the leaf usually at the middle or below, the apex acute to acuminate ..... ***Diospyros in EBENACEAE***
37 Fruit an ovoid or ellipsoid drupe, 8-30 -40 mm long, blue-black, yellow, orange, or red when ripe; vascular bundles 3 per leaf scar; leaves sometimes bearing a few irregular teeth; leaves pale to medium green beneath; leaf midrib and upper petiole lacking reddish to dark glands on their upper surfaces; leaves glabrous or glabrate beneath; female and male flowers on the same tree (monoecious); stamens 5-12; widest point of the leaf usually beyond or at the middle, the apex obtuse to strikingly and abruptly acuminate..... ***Nyssa in NYSSACEAE***

Key G7 - trees with alternate, simple, unlobed, toothed leaves

1 Leaves evergreen.
2 Petiole flanged or winged, constricted at the base of the blade; fruit a hesperidium..... ***Citrus in RUTACEAE***
2 Petiole linear (not flanged or winged with leafy tissue); fruit various. {add to 2b: [*Sapium*] EUPHORBIACEAE, [*Photinia*] ROSACEAE, [*Prunus (caroliniana)*] ROSACEAE, [*Ilex (cassine, myrtifolia)*] AQUIFOLIACEAE}
3 Leaves 7-20 cm long, usually at least some on a branch > 12 cm long, thick in texture but readily flexible when fresh; inflorescence of a solitary flower, axillary, 5-7cm across; fruit a capsule, ca. 1 cm in diameter..... ***Gordonia lasianthus in THEACEAE***
3 Leaves 3-12 cm long, thick in texture and also noticeably stiff; inflorescence of 1-several flowers in axillary clusters or cymes, or in catkins, the individual flowers < 1 cm across; fruit either a drupe with 4 pyrenes or a nut (acorn).
4 Leaf with a spinose margin, the marginal spines well-developed, generally arrayed along most of the leaf margin and borne at nearly a right angle to the midvein..... ***Ilex in AQUIFOLIACEAE***
4 Leaf margins serrate with one or a few stiff teeth (sometimes sharpish, but not spines), these usually towards the apex of the leaf and oriented towards the leaf apex ..... ***FAGACEAE***
1 Leaves deciduous.
5 Secondary veins neatly pinnate, the veins on each side of the midrib evenly spaced, parallel to one another, and extending nearly or actually to the leaf margin; fruit either a 1-seeded nut (dry, with or without samaroid wings, bracts, a subtending cupule, or an enclosing and valvate involucre) or a fleshy drupe with 2-4 stones.
6 Leaves doubly-serrate, the number of teeth greater than the number of the pinnate secondary veins (sometimes obscurely so in *Planera* in ULMACEAE); fruit a nut or samaroid nut, lacking a cupule or valvate involucre, though sometimes associated with green, leaf-like bracts.
7 Flowers unisexual, in catkins, the tree monoecious; leaf base symmetrical..... ***BETULACEAE***
7 Flowers bisexual, in axillary fascicles, the tree androgynous; leaf base strongly asymmetrical (oblique) or nearly or quite symmetrical. ..... ***ULMACEAE***
6 Leaves singly serrate or crenate, the teeth the same number as the secondary veins; fruit either a fleshy drupe with 2-4 stones, or a nut with a cupule (acorn) or enclosed by a valvate involucre that splits at maturity.
8 Fruit a fleshy drupe with 2-4 stones..... ***RHAMNACEAE***
8 Fruit dry, single-seeded (or with 1-4 nuts in *Castanea*).
9 Fruit > 9 mm long or wide, either a nut with a cupule (acorn) or 1-4 nuts enclosed by a valvate involucre that splits at maturity..... ***FAGACEAE***
9 Fruit < 9 mm long and wide, leathery, indehiscent, winged or not..... ***ULMACEAE***
5 Secondary veins not as above, usually arching and/or branching or reticulating well before reaching the leaf margin; fruit various.

10 Leaves strongly 3-5-veined from the base; leaf blade cordate or truncate, often oblique.
12 Flowers unisexual, plants monoecious; pith of mature twigs chambered with hollow sections between soft partitions..... ***Celtis in CANNABACEAE***
12 Flowers bisexual; plants hermaphroditic; pith of mature twigs continuous without hollow sections between partitions.
13 Flowers bisexual; inflorescence an axillary cyme; fresh leaves and stems lacking white latex; fruit simple, a 1-seeded nut; main leaf veins splitting several times towards the leaf margin and leading into the teeth without rejoining and forming a marginal vein; basal veins 5, palmate, all joining together at the summit of the petiole; main lateral leaf veins (above the basal veins) often opposite; winter buds with 3 entire bud scales (1 much smaller than the other 2)..... ***Tilia in MALVACEAE***
13 Flowers unisexual, the pistillate inflorescence a head, the staminate inflorescence a catkin, borne on the same tree (monoecious) or on separate trees (dioecious); fresh leaves and stems with white latex; fruit a multiple of fleshy achenes; main leaf veins splitting towards the margin but then rejoining to form a prominent, looping (scalloped) marginal vein; basal veins 3, palmate, sometimes an additional prominent vein on each side joining the lateral vein above its divergence from the petiole end; main lateral leaf veins (above the basal veins) mainly alternate; winter buds with 5 ciliate-margined bud scales..... ***MORACEAE***
10 Leaves pinnately veined; leaf blade base cordate, subcordate, truncate, rounded, or cuneate base, not oblique.
14 Inflorescence a terminal raceme of racemes, with more than 50 flowers; petals connate, urceolate; fruit a 5-valved capsule, < 6 mm in diameter; fresh leaves with a sour taste..... ***Oxydendrum arboreum in ERICACEAE***
14 Inflorescence various, either with < 30 flowers or if with > 50 flowers a catkin (with a single axis); corolla with separate petals (or petals absent); fruit various, fleshy or dry, if a 5-valved capsule (*Franklinia* in THEACEAE), then 15-20 mm in diameter; fresh leaves without a sour taste.
15 Pubescence stellate (look especially in vein axils on the undersurface of the leaf)..... ***STYRACACEAE***
15 Pubescence simple (or absent).
17 Flowers unisexual, borne in axillary catkins; trees dioecious; fruit dehiscent, a lanceolate or ovoid capsule..... ***SALICACEAE***
17 flowers bisexual (unisexual in *Ilex* in AQUIFOLIACEAE), borne variously in terminal or axillary clusters, cymes, racemes, or umbels, but not at all catkin-like; trees hermaphroditic (dioecious in AQUIFOLIACEAE); fruit indehiscent, a fleshy drupe or pome with 1-many seeds.
18 Pith of twigs with transverse diaphragms and also continuous between the diaphragms (make a longitudinal section of twig and use at least 10× magnification; look for translucent diaphragms spaced at < 1 mm apart, with whiter pith tissue between them); fruit distinctly longer than broad, a 1-seeded drupe..... ***Nyssa in NYSSACEAE***
18 Pith of twigs lacking diaphragms, continuous and homogeneous; fruit either suborbicular to spherical or pear-shaped, either a several- to many-seeded pome, or a berry-like drupe with 4-8 seeds, or a 1-seeded drupe.
19 Vascular bundle scars 1 in each leaf scar; fruit a berrylike drupe with 4-8 bony pyrenes; ovary superior, the calyx persistent at the base of the fruit..... ***Ilex in AQUIFOLIACEAE***
19 Vascular bundle scars (2-) 3 in each leaf scar; fruit a pome or 1-seeded drupe; ovary either inferior and the calyx persistent at the summit of the fruit (*Amelanchier*, *Crataegus*, *Malus*, *Pyrus*) or superior and the calyx not at all persistent at the base of the fruit (*Prunus*) ..... ***ROSACEAE***

Key H - woody plants with whorled leaves

1 Leaves tiny, bract-like, triangular, 6-14 (-17) per node..... ***Casuarina in CASUARINACEAE***
1 Leaves either needle-like, scale-like, or flattened and large, (2-) 3-4 (-6) per node.
2 Leaves needle-like or scale-like, terete, angled, or flat in ×-section, < 2 cm long; leaves (2-) 3-4 (-6) per node..... ***ERICACEAE***
2 Leaves flat, > 3 cm long; leaves (2-) 3 per node; [Eudicots].
3 Plant a subshrub, < 3 dm tall, with < 10 leaves per stem.
..... ***Chimaphila in ERICACEAE***
3 Plant a shrub or tree, > 3 dm tall, with many > 10 leaves per stem.
5 Leaves toothed, and most leaves also lobed..... ***Broussonetia papyrifera in MORACEAE***
5 Leaves entire, not lobed.
6 Leaves cordate at base; leaves about as long as wide; medium to large tree.
7 Flowers white to yellow; capsules linear, >10× as long as wide; leaf undersurface with curly simple hairs; nectar glands present in the main vein axils on the undersurface of the leaf (visible from the underside or the upperside in fresh leaves and herbarium specimens as a triangle 1-4 mm on a side)..... ***Catalpa in BIGNONIACEAE***
7 Flowers lavender; capsules ellipsoid, < 2× as long as wide; leaf undersurface with branched (dendritic or stellate) hairs; nectar glands absent..... ***Paulownia tomentosa in PAULOWNIACEAE***
6 Leaves cuneate to rounded at base; leaves > 1.5× as long as wide; shrub to small tree.
8 Leaves rounded at the tip..... ***Kalmia in ERICACEAE***
8 Leaves acute to acuminate at the tip.
9 Leaves lanceolate (> 2.5× as long as wide), the secondary venation not prominent; inflorescences axillary or terminal; flowers pink or white.
10 Inflorescences terminal; flowers pink or white; leaves thick and leathery; [alien plants of uplands, persistent or weakly naturalized]..... ***Nerium oleander in APOCYNACEAE***
10 Inflorescences axillary; flowers pink; leaves thin and herbaceous; [native plants of wetlands]..... ***Decodon verticillatus in LYTHRACEAE***
9 Leaves ovate (< 2× as long as wide), the secondary venation prominent and arching-parallel; inflorescences terminal; flowers white, greenish-yellow, red, or orange.
..... ***Cephalanthus occidentalis in RUBIACEAE***

Key I - woody plants with opposite, compound leaves

1 Leaves 2-3-foliolate.
2 Leaves 2-foliolate, with a branched tendril in the terminal position (this sometimes not developed, or withered); liana..... ***BIGNONIACEAE***
2 Leaves 3-foliolate, lacking tendrils; shrub, liana, or tree.
3 Upright shrub or tree.
5 Leaflets 3-5 (-7), coarsely and jaggedly serrate, with < 5 teeth per leaflet side; fruit a schizocarp of 2 samaroid mericarps (maple “keys”)..... ***Acer in ACERACEAE***
5 Leaflets 3, evenly serrulate, with > 10 teeth per leaflet side; fruit an inflated capsule..... ***Staphylea trifolia in STAPHYLEACEAE***
3 Liana or sprawling shrub.
6 Flowers yellow with fused petals; stems stiff, green..... ***Jasminum in OLEACEAE***
6 Flowers either white, radially symmetrical, with separate petaloid sepals (*Clematis*), or blue, bilaterally symmetrical, with fused petals (*Vitex*).

7 Leaves 3-more-foliolate; flowers white, radially symmetrical, uniseriate, with white petaloid sepals and no petals ..... ***Clematis in RANUNCULACEAE***
7 Leaves 1 (-3) foliolate; flowers blue, bilaterally symmetrical, biseriate, with green calyx and blue corolla ..... ***Vitex in LAMIACEAE***

1 Leaves 4-15-foliolate.
8 Leaves palmately compound.
9 Leaflets serrate; flowers white, yellow, or red; fruit a leathery capsule, irregularly spheroidal, 2-9 cm in diameter, with 1-3 (-6) large seeds, each with a large pale hilum contrasting with the dark brown color of the rest of the seed..... ***Aesculus in HIPPOCASTANACEAE***
9 Leaflets entire; flowers blue, pink, or purple; fruit either a 4-seeded drupe, < 0.5 cm in diameter, or an elongated capsule, 8-10 cm long and ca. 0.7 cm in diameter.
..... ***Vitex in LAMIACEAE***
8 Leaves pinnately compound, bipinnately compound, or more complexly compound.
11 Plant a liana (woody vine).
12 Leaves pinnately compound, with 7-15 coarsely serrate leaflets; perianth biseriate, with a green synsepalous calyx and an orange sympetalous corolla; fruit an elongate capsule, with many winged seeds; stems to 20 cm in diameter, with tan bark ..... ***Campsis radicans in BIGNONIACEAE***
12 Leaves either pinnately compound, the leaflets 3-7 and coarsely serrate, or more complexly compound, the leaflets 5-many, not serrate though often lobed; perianth uniseriate, with a white, pink, or purplish aposepalous calyx and no corolla; fruit an aggregate of plumose achenes; stems to 1 cm in diameter, brown or green..... ***Clematis in RANUNCULACEAE***
11 Plant a tree or shrub, with stiff branches.
13 Leaves 3-7-foliolate and strictly 1-pinnate; leaflets with a few very coarse teeth; 1st year stems green; fruit a pair of winged, asymmetrical samaroid mericarps ..... ***Acer in ACERACEAE***
13 Leaves 3-15-foliolate, 1-pinnate or partially 2-pinnate; leaflets evenly serrate with many teeth or entire; 1st year stems tan to brown (very new growth may be green); fruit either a symmetrical (winged) samara (*Fraxinus*) or a purplish-black, many-seeded berry (*Sambucus*).
14 Fruit a purplish-black or red, 4-seeded berry (*Sambucus*); plant a shrub or small tree; stems hollow or pithy; petiole prominently grooved on the upper side; fresh leaves somewhat fleshy in texture..... ***Sambucus in VIBURNACEAE***
14 Fruit either a green or tan, symmetrical (winged) samara or a blackish 5-seeded dryish drupe; plant a small to large tree; stems solid and woody; petiole nearly round in ×-section (not grooved); fresh leaves membranaceous or coriaceous in texture.
..... ***Fraxinus in OLEACEAE***

Key J - woody plants with opposite, simple leaves

1 Leaves palmately or pinnately lobed..... ***Key J1***
1 Leaves not lobed.
2 Leaves serrate, serrulate, crenate, or spinose-serrate ..... ***Key J2***
2 Leaves entire.
3 Plants with obvious adaptations for climbing..... ***Key J3***
3 Plants without adaptations for climbing.
4 Shrubs and subshrubs ..... ***Key J4***
4 Trees..... ***Key J5***

Key J1 - woody plants with opposite, simple, palmately or pinnately lobed leaves

1 Leaves pinnately lobed.
2 Leaves harshly scabrous on the upper surface; leaves typically a mix of alternate, opposite, and whorled ..... ***Broussonetia in MORACEAE***
2 Leaves glabrous or glabrescent on the upper surface; leaves strictly opposite..... ***Hydrangea quercifolia in HYDRANGEACEAE***
1 Leaves palmately lobed.
3 Plants climbing by twining; stems with retrorse prickles; foliage scabrous..... ***Humulus in CANNABACEAE***
3 Plants erect trees or shrubs; stems not prickly; foliage smooth or pubescent, but not scabrous.
4 Leaves 3-9-lobed, the margins generally serrate or sublobed; fruit either a drupe or a schizocarp of 2 samaroid mericarps (maple "keys").
5 Fruit a schizocarp of 2 samaroid mericarps (maple "keys"); stamens (4-) 8 (-12); small to large trees; petioles >1× as long as the leaf blade.....
..... ***Acer in ACERACEAE***
5 Fruit a drupe; stamens 5; shrubs; petioles < ¾× as long as the leaf blade ..... ***Viburnum acerifolium in VIBURNACEAE***
4 Leaves 3-lobed, the margins entire; fruit a capsule.
6 Flowers white to yellow; capsules linear, >10× as long as wide; leaf undersurface with curly simple hairs; nectar glands present in the main vein axils on the undersurface of the leaf (visible from the underside or the upperside in fresh leaves and herbarium specimens) ..... ***Catalpa in BIGNONIACEAE***
6 Flowers lavender; pods ellipsoid, < 2× as long as wide; leaf undersurface with branched (dendritic) stellate hairs; nectar glands absent.....
..... ***Paulownia in PAULOWNIACEAE***

Key J2 - woody angiosperms with opposite, simple leaves with toothed margins {add [*Abelia*] CAPRIFOLIACEAE}

1 Leaves evergreen.
2 Plant a shrub, erect, not requiring support.
4 Leaves slightly to strongly fleshy; inflorescence a head; [maritime situations]..... ***Iva in ASTERACEAE***
4 Leaves not fleshy; inflorescence either a head or otherwise; [collectively widespread].
7 {XXXX}..... ***Euonymus in CELASTRACEAE***
7 {YYYY}
8 {ZZZZ}..... ***Abelia ×grandiflora in LINNAEACEAE***
8 {AAAA} ..... ***Sageretia minutiflora in RHAMNACEAE***
2 Plant a subshrub, creeping shrub, or liana.
10 Leaves slightly to strongly fleshy; inflorescence a head; [maritime situations]..... ***Iva in ASTERACEAE***
10 Leaves not fleshy; inflorescence otherwise; [collectively widespread].
11 Leaves on vigorous shoots with a few coarse rounded teeth towards the base (most leaves entire)..... ***Lonicera in CAPRIFOLIACEAE***
11 Leaves serrulate to serrate, the teeth uniformly around the margin or concentrated towards the tip; fruit dry, either indehiscent and 1-seeded or capsular and with several seeds.
..... ***CELASTRACEAE***

KEY TO FAMILIES AND GENERA

1 Leaves deciduous.
- 13 Leaves slightly to strongly fleshy; inflorescence a head, subtended by an involucre of phyllaries; [maritime situations] ..... ***Iva in ASTERACEAE***
- 13 Leaves not fleshy; inflorescence, flower, and fruit structure various, but not with the combination of features as above (sometimes the flowers in a head subtended by bracts, but then with other features differing, such as stamens 4, or green calyx present, or petals separate, or fruit a schizocarp of mericarps, etc.); [collectively widespread].
  - 14 Lianas climbing by twining or by adventitious roots.
    - 15 Stems with retrorse prickles; foliage scabrous ..... ***Humulus in CANNABACEAE***
    - 15 Stems not prickly; foliage smooth to variously hairy, but not scabrous.
      - 16 Leaves on vigorous shoots with a few coarse rounded teeth towards the base (most leaves entire), the larger leaves < 3 cm wide; lianas climbing by twining; fruit a fleshy berry; flowers 5-merous, with a fused, tubular corolla ..... ***Lonicera in CAPRIFOLIACEAE***
      - 16 Leaves serrate, the teeth towards the leaf apex, the larger leaves > 4 cm wide; lianas climbing by adventitious roots; fruit a capsule; flowers 7-10-merous, with separate petals ..... ***HYDRANGEACEAE***
  - 14 Upright shrubs or trees, lacking any adaptations for climbing.
    - 17 Trees; leaves often a mix of alternate and opposite.
      - 18 Leaves harshly scabrous on the upper surface; fruit a multiple of achenes; leaf venation pinnate but irregular ..... ***Broussonetia in MORACEAE***
      - 18 Leaves not scabrous; fruit a 2-4-seeded drupe; leaf venation neatly pinnate, the lateral veins nearly straight and parallel to one another ..... ***RHAMNACEAE***
    - 17 Shrubs or trees; leaves strictly opposite (or often a mix of alternate and opposite in RHAMNACEAE).
      - 20 Leaves strongly triple-veined from at or near the base of the blade, the 2 lateral veins arching towards the tip and rejoining the midvein or nearly so (becoming diffuse before rejoining); petals 4, white; stamens 15-90 ..... ***Philadelphus in HYDRANGEACEAE***
      - 20 Leaves pinnate-veined; petals various, not both 4 and white (except sometimes in *Hydrangea*); stamens 1-15 (except 15-30 in *Exochorda* in ROSACEAE).
        - 21 Inflorescence head-like; flowers sympetalous and 4-lobed; fruit 2 seeded ..... ***Lantana in VERBENACEAE***
        - 21 Inflorescence more diffuse, with internal axes and pedicels; flowers not both sympetalous and 4-lobed (except in *Forsythia* and *Buddleja*); fruit 1-seeded, 2-4-seeded, or 4-many-seeded.
          - 22 Plants in flower.
            - 23 Corolla absent; flowers inconspicuous and small, in axillary fascicles or catkins. ..... ***Forestiera in OLEACEAE***
            - 23 Corolla present; flowers larger, in terminal cymes, corymbs, racemes, panicles, or in axillary cymes or fascicles.
              - 25 Petals separate; stamens 8-10 (-60) (or 4-6 in RHAMNACEAE and *Euonymus* in CELASTRACEAE).
                - 26 Flowers 1-few, in axillary cymes; stamens 4-6; stems brown, tan, gray, or green.
                  - 27 Leaf venation pinnate, but irregular and reticulated; stems green ..... ***Euonymus in CELASTRACEAE***
                  - 27 Leaf venation neatly pinnate, the lateral veins nearly straight and parallel to one another; stems brown, tan, or gray ..... ***RHAMNACEAE***
                - 26 Flowers 1 and terminal, or many, in terminal panicles or corymbs; stamens 8-10 (-60); stems brown, tan or gray.
                  - 28 Inflorescence a solitary, terminal flower; stamens 30-60 ..... ***Rhodotypos in ROSACEAE***
                  - 28 Inflorescence a terminal panicle or corymb; stamens 8-15 ..... ***HYDRANGEACEAE***
              - 25 Petals fused, at least basally, and often strongly tubular; stamens 2, 4, or 5.
                - 29 Stamens 5.
                  - 30 Petals white, fused basally only, the lobes spreading ..... ***Viburnum in VIBURNACEAE***
                  - 30 Petals pink, yellow, or reddish, fused for most of their length ..... ***Lonicera in CAPRIFOLIACEAE***
                - 29 Stamens 2 or 4.
                  - 31 Stamens 2; petals yellow; flowers radially symmetrical; inflorescence an axillary fascicle ..... ***Forsythia in OLEACEAE***
                  - 31 Stamens 4; petals white, pink, or lavender; flowers bilabiate; inflorescence a terminal thyrse or panicle or an axillary cyme.
                    - 32 Petals 4; inflorescence a terminal thyrse ..... ***Buddleja in SCROPHULARIACEAE***
                    - 32 Petals 5; inflorescence a terminal panicle or an axillary cyme.
                      - 33 Inflorescence an axillary cyme ..... ***Callicarpa in LAMIACEAE***
                      - 33 Inflorescence a terminal panicle ..... ***Kolkwitzia in LINNAEACEAE***
          - 22 Plants in fruit.
            - 34 Fruit a drupe or achene, indehiscent, fleshy at maturity (or dry in *Kolkwitzia*).
              - 35 Fruit an achene (1-seeded), dry at maturity ..... ***Kolkwitzia in LINNAEACEAE***
              - 35 Fruit a drupe (1-4 seeded), fleshy at maturity.
                - 36 Inflorescence a terminal corymb ..... ***Viburnum in VIBURNACEAE***
                - 36 Inflorescence axillary, fascicled or a cyme.
                  - 37 Foliage with stellate hairs; fruit a pink-purple 4-seeded drupe ..... ***Callicarpa in LAMIACEAE***
                  - 37 Foliage glabrous or with simple hairs; fruit a dark red, black, or blue 1-4-seeded drupe.
                    - 38 Fruit a 1-seeded drupe; [NC southwards and westwards] ..... ***Forestiera in OLEACEAE***
                    - 38 Fruit a 2-4-seeded drupe; [widespread in our region] ..... ***RHAMNACEAE***
            - 34 Fruit a capsule, dehiscent, dry at maturity.
              - 39 Inflorescence a catkin, the flowers small (< 5 mm in diameter) and tightly arranged on the inflorescence axis (>5 per cm of the axis) ..... ***Salix in SALICACEAE***
              - 39 Inflorescence various, but more diffuse, the flowers larger (> 5 mm in diameter, except for some flowers in *Hydrangea* in HYDRANGEACEAE) and loosely arranged (< 5 per cm of axis).
                - 40 Capsule prominently 5-angled (star-shaped in ×-section) ..... ***Exochorda in ROSACEAE***
                - 40 Capsule not angled.
                  - 41 Inflorescence axillary, fascicled.
                    - 42 Capsule pink to red; fruits solitary or in axillary cymes ..... ***Euonymus in CELASTRACEAE***
                    - 42 Capsule brown; fruits in axillary fascicles ..... ***Forsythia in OLEACEAE***
                  - 41 Inflorescence terminal, a raceme, panicle, corymb, or compound cyme.
                    - 43 Inflorescence a flat-topped corymb or rounded compound cyme, as wide as or wider than long ***Hydrangea in HYDRANGEACEAE***
                    - 43 Inflorescence elongated, a raceme or panicle, longer than wide.
                      - 44 Capsule elongate (>3× as long as wide), 8-25 mm long ..... ***DIERVILLACEAE***
                      - 44 Capsule about as long as wide, 3-6 mm long.
                        - 45 {XXXX} ..... ***Deutzia in HYDRANGEACEAE***
                        - 45 {YYYY} ..... ***Buddleja in SCROPHULARIACEAE***

Key J3 - lianas with opposite simple leaves with entire margins {add *Paederia* in RUBIACEAE}

1 Fresh plants with white, milky juice; pistils 2, united only by the style and stigma; fruit a pair of linear follicles, > 8× as long as thick ..... ***APOCYNACEAE***
1 Fresh plants with clear juice; pistil 1; fruit either a capsule (< 3× as long as wide), or paired berries, or an accessory fruit of a utricle embedded in a leathery expanded calyx.
3 Flowers white, pale yellow, orange, or red, distinctly to obscurely bilaterally symmetrical; leaves widest slightly below, at, or above the middle, the apex rounded, obtuse, to broadly acute ..... ***Lonicera in CAPRIFOLIACEAE***
3 Flowers bright yellow, radially symmetrical; leaves widest well below the middle, the apex acuminate ..... ***Gelsemium in GELSEMIACEAE***

Key J4 - shrubs and subshrubs with opposite simple leaves with entire margins

1 Aerial and epiphytic, hemiparasitic shrub ..... ***Phoradendron in VISCACEAE***
1 Terrestrial, autotrophic or hemiparasitic shrub or subshrub.
2 Leaves succulent, nearly as thick as wide; [brackish to saline situations] ..... ***Batis in BATACEAE***
2 Leaves herbaceous (succulent in *Borrichia*), much wider than thick; [various habitats].
3 Creeping or short subshrubs, the stems primarily prostrate, < 2 dm tall.
5 Flowers yellow; leaves with pellucid or dark punctate glands (use at least 10× magnification) ..... ***Hypericum in HYPERICACEAE***
5 Flowers white, pale pink, or deep pink; leaves lacking sessile, punctate glands.
6 Leaves linear; flowers pale to deep pink, 5-merous ..... ***Phlox in POLEMONIACEAE***
6 Leaves orbicular or elliptic; flowers white to pale pink, 4-merous or 5-merous ..... ***Mitchella in RUBIACEAE***
3 Upright or scrambling shrubs, > 3 dm tall
9 Inflorescence a terminal head of many flowers.
10 Head spherical, lacking an involucre of conspicuous bracts or phyllaries ..... ***Cephalanthus in RUBIACEAE***
10 Head flattened, either subtended by 4 large white bracts or by an involucre with >5 green phyllaries.
11 Head subtended by 4 large white bracts; leaves with prominently parallel-arcing secondary veins; flowers 4-merous ..... ***CORNACEAE***
11 Head subtended by an involucre of >5 green phyllaries; leaves with venation otherwise; flowers 5-merous ..... ***ASTERACEAE***
9 Inflorescence otherwise, either of a solitary flower, or one of a wide variety of inflorescences with flowers attached at different points along branched or unbranched axes. {add: [*Lagerstroemia*] LYTHRACEAE; [*Rosmarinus*] LAMIACEAE; [*Laguncularia*] COMBRETACEAE; [*Buxus*] BUXACEAE; [*Exochorda*] ROSACEAE; various other [see spreadsheet]}
12 Inflorescence flat-topped (broader than long), terminal, a compound cyme or corymb.
13 Flowers bright yellow; stamens many; leaves < 1.5 cm wide; fruit a capsule; leaves with pellucid or dark punctate glands (use at least 10× magnification) ..... ***Hypericum in HYPERICACEAE***
13 Flowers white or creamy; stamens 4-5; leaves > 1.5 cm wide; fruit a drupe; leaves lacking sessile, punctate glands. ..... ***Viburnum in VIBURNACEAE***
12 Inflorescence either terminal and not flat-topped, or axillary and variously shaped, or terminal and solitary, or leaf-opposed.
15 Carpels many (> 9), either separate or fused; stamens many; perianth segments either many and undifferentiated into calyx and corolla, maroon, brown, or yellow (in CALYCANTHACEAE), or differentiated into a fleshy and persistent calyx of 5-9 sepals, and a deciduous corolla of 5-9 red (or white) petals (*Punica* in LYTHRACEAE).
16 Fruit a wrinkled, 3-7 cm long, brown to black, elliptical aggregate of nearly spherical, large achenes; flowers solitary in axils; perianth segments many and undifferentiated into calyx and corolla, maroon, brown, or yellowish; ovary superior; branches unarmed ..... ***CALYCANTHACEAE***
16 Fruit a leathery, 4-15 cm in diameter, reddish, spherical berry with obpyramidal seeds surrounded by a juicy sarcotesta (pomegranate); perianth differentiated, the sepals fleshy and persistent on the fruit, the petals deciduous, 5-9, bright red to white; ovary inferior; branches typically armed with axillary spines ..... ***Punica in LYTHRACEAE***
15 Carpels 1-5, fused; stamens either 1-5 or 8-10; perianth segments 4-5 or 8, variously colored; fruit a simple capsule, drupe, or berry; flowers 2-many, in axillary or terminal inflorescences (pistillate flowers sometimes solitary in SANTALACEAE and THESIACEAE); [Eudicots].
17 Ovary inferior; corolla absent, radially symmetrical, or bilaterally symmetrical; fruit either a berry or a 1-seeded drupe.
18 Flowers unisexual and plants dioecious; corolla absent; pistillate flowers solitary, staminate flowers in pedunculate umbels or cymes, either terminal or axillary; fruit a 1-seeded drupe; leaves acute to acuminate at the apex ..... ***Nestronia in SANTALACEAE***
18 Flowers bisexual and plants hermaphroditic; corolla present; flowers paired, terminal or axillary, or in axillary spikes; fruit a berry; leaves rounded, obtuse, to acute (or acuminate in *Lonicera maackii*) at the apex ..... ***CAPRIFOLIACEAE***
17 Ovary superior; corolla radially symmetrical (absent in *Forestiera* in OLEACEAE); fruit either a 1-4-seeded drupe, or a many-seeded berry, or a capsule.
20 Stamens 8-10, of 2 different lengths in each flower; petals separate, 4-5 (-7), pink purple, 10-15 mm long; stems strongly arching, rooting at the tips; [plants of flooded to saturated wetlands] ..... ***Decodon in LYTHRACEAE***
20 Stamens either (1-) 2 (-4), or 4-5, or 10, all of the same length; petals fused (separate in RHAMNACEAE and BUXACEAE, but then < 5 mm long and white or cream), white, bright-yellow, lilac, or pink; stems erect (or at least not arching and rooting at the tips); [plants of various habitats].
21 Petals separate, 4-5, white or cream; stamens 4-5.
22 Fruit a loculicidal capsule, dehiscing into 3 valves; branches square in ×-section; leaves < 2 cm long; [alien, cultivated and weakly established, of temperate areas] ..... ***Buxus in BUXACEAE***
22 Fruit a drupe with 2-4 pyrenes; branches round or nearly so in ×-section; leaves > 2 cm long; [natives, of peninsular FL] ..... ***RHAMNACEAE***
21 Petals fused, 4-5, white, bright yellow, lilac, or pink; stamens either (1-) 2 (-4) or 10; fruit either a capsule or a 1-seeded drupe.
23 Perianth 5-merous; corolla pink; stamens 10; fruit a 5-locular capsule ..... ***ERICACEAE***
23 Perianth 4-merous; corolla white, bright yellow, or lilac; stamens (1-) 2 (-4); fruit either a 1-seeded drupe or a 2-locular capsule ..... ***OLEACEAE***

Key J5 - trees with opposite simple leaves with entire margins

1 Leaves deciduous (medium to pale green, thin in texture); leaves strictly opposite.

2 Leaves 10-70 cm wide, cordate or subcordate at the base; flowers 5-merous, bilaterally symmetrical, large (20-70 mm long), the petals connate into a tube; fruit a capsule.
3 Flowers white to yellow; capsules linear, >10× as long as wide; leaf undersurface with curly simple hairs; nectar glands present in the main vein axils on the undersurface of the leaf (visible from the underside or the upperside in fresh leaves and herbarium specimens as a triangle 1-4 mm on a side) ..... ***Catalpa in BIGNONIACEAE***
3 Flowers lavender; capsules ellipsoid, < 2× as long as wide; leaf undersurface with branched (dendritic or stellate) hairs; nectar glands absent ..... ***Paulownia in PAULOWNIACEAE***
2 Leaves 1-12 cm wide, cuneate to rounded at the base; flowers 4-6-merous, radially symmetrical, small to medium (< 25 mm long), the petals either connate into a tube or separate and clawed; fruit a drupe or capsule. ..... ***Lagerstroemia in LYTHRACEAE***
1 Leaves evergreen (dark green or gray-green, thick in texture); leaves opposite or subopposite (offset by < 2mm from the opposing leaf). ..... ***OLEACEAE***

Key K - holoparasites and holomycotrophs

1 Stems thin, flexible, twining, yellow to bright orange; plants parasitic on the stems of other vascular plants via above-ground haustoria. ..... ***Cuscuta in CONVOLVULACEAE***
1 Stems erect, stiff, straight, variously colored (tan, red, violet, brown, white, pink); plants mycotrophic (or indirectly parasitic via a fungal intermediary), attached to fungi underground.
3 Flowers radially symmetrical. ..... ***ERICACEAE***
3 Flowers bilaterally symmetrical.
5 Petals 3, separate; stamen 1; capsule 1-locular, pendent when mature, opening by 3 slits; [Monocots] ..... ***ORCHIDACEAE***
5 Petals fused into a tube, with 4-5 lobes; stamens 4; capsule 2-locular, ascending or spreading when mature, opening by 2 valves; [Eudicots] ..... ***OROBANCHACEAE***

Key L - epiphytic angiosperms {Note that epiphytic Pteridophytes are not re-keyed here; seek them in Keys A4 and A6}

1 Stems yellow to bright orange, lacking leaves ..... ***Cuscuta in CONVOLVULACEAE***
1 Stems green or brown, with leaves (scale-like or larger).
2 Leaves opposite, orbicular or oblanceolate, rounded at the apex; [Eudicots] ..... ***Phoradendron in VISCACEAE***
2 Leaves alternate, either orbicular or oblanceolate (rounded at the apex), or scale-like, or elongate and tapering, or lanceolate-elliptic.
3 Leaves orbicular, rounded at the apex; [Basal Angiosperms] ..... ***Peperomia in PIPERACEAE***
3 Leaves either scale-like, or elongate and tapering, or lanceolate-elliptic; [Monocots].
4 Leaves either scale-like or elongate and tapering; flowers radially symmetrical ..... ***Tillandsia in BROMELIACEAE***
4 Leaves lanceolate-elliptic; flowers bilaterally symmetrical ..... ***ORCHIDACEAE***

Key M - monocots {Note that strictly aquatic monocots are not additionally keyed here; seek them in Key C. Some amphibious monocots are keyed both here and in Key C}

1 Leaves lacking a differentiated petiole, either with essentially parallel margins for most of the leaf's length, or tapering from base to apex, or scale like (< 15 mm long, often clasping the stem), or with lanceolate leaves slightly dilated above the base and > 6× as long as broad, or a grass (the leaf consisting of a sheath, with a ligule and/or constriction at the summit, diverging from the stem into a blade, this sometimes no more than 3× as long as wide, but more often lanceolate to linear); leaves simple and unlobed ..... ***Key M1***
1 Leaves with a differentiated petiole and blade, the blade > 10 mm long, and the leaf < 6× as long as broad; leaves either simple and unlobed, or compound, or palmately divided ..... ***Key M2***

Key M1 - monocots with linear, scale, or narrow leaves (or grasses)

1 Primary inflorescences of spikelets, these consisting of 1-2-many reduced florets, each subtended by 1-2 scales (and also enclosed in a sac or perigynium in *Carex* in CYPERACEAE), arrayed spirally or distichously, the spikelets then themselves arrayed in various dense or diffuse secondary or tertiary inflorescences; perianth absent, or reduced to chaff, scales, paddles, or bristles.
2 Leaf sheaths continuous, lacking a split or only irregularly split in age; leaves usually 3-ranked (sometimes reduced to a sheath with a small scale at the summit; stems triangular in ×-section (or roundish), usually with a pith; flowers spirally arrayed in the spikelet (or distichously arrayed, in e.g. *Cyperus, Dulichium, Kyllinga*); anthers basifixed ..... ***CYPERACEAE***
2 Leaf sheaths generally split lengthwise on the side opposite the leaf blade; leaves usually 2-ranked; stems round or flattened in ×-section, usually hollow; flowers distichously arrayed in the spikelet; anthers versatile ..... ***POACEAE***
1 Primary inflorescences of dense spikes, spadices, heads, glomerules, or a compound corymb of helicoid cymes; perianth present, often very small and variously colored.
3 Leaves equitant (the leaves distichous, in a fan-like array, e.g. *Iris*, each leaf clasping the next above in a basal fold, this uniting above so that the main leaf blade, above the basal fold, has only the lower [abaxial] leaf surface visible because of fusion of the 'upper' surfaces).
4 Inflorescence a very densely flowered spike (spadix), appearing lateral, 1 per plant; fresh plant strongly aromatic ..... ***Acorus in ACORACEAE***
4 Inflorescence either more diffuse, 1 or several per plant, or terminal and cone-like; fresh plant not aromatic.
5 Inflorescence brownish or tan, spherical, ovoid, or cylindrical, with numerous scale-like bracts arrayed in a cone; flowers individually conspicuous, a single yellow (to white) flower at a time emerging from each of the scales ..... ***Xyris in XYRIDACEAE***
5 Inflorescence more diffuse.
7 Inflorescence or flower groups subtended by well-developed, green or scarious spathaceous bracts; inflorescence either a fan-shaped pair of cymes, or seemingly racemose, or solitary ..... ***IRIDACEAE***
7 Inflorescence or flower groups not subtended by spathes (though individual flowers may be subtended by small green bracts); inflorescence a raceme, panicle, or corymb.
8 Inflorescence a corymb of helicoid cymes; corolla yellow, densely tomentose; roots bright red (*Lachnanthes*) or white to brown (*Lophiola*).

9 Stamens 3, longer than the (ascending) tepals inner 3 tepals > 2 mm longer than the outer 3 tepals; rhizomes and roots of fresh plants bright red ..... ***Lachnanthes caroliniana in HAEMODORACEAE***

9 Stamens 6, shorter than the (recurved) tepals; inner 3 and outer 3 tepals equal in length; rhizomes at roots of fresh plants white to brown..... ***Lophiola aurea in NARTHECIACEAE***

8 Inflorescence a terminal raceme (the flowers attached to the rachis in groups of 3 or more in *Triantha* in TOFIELDIACEAE); corolla white, cream, or yellow, glabrous; roots white or brown. ***TOFIELDIACEAE***

3 Leaves not equitant, sometimes distichous, upper and lower surfaces both present.

11 Inflorescence either a linear spike, terminal, the thicker female portion below, the thinner male portion above, or an ovoid, hemispheric, spherical head or glomerule, 1 or several per plant

12 Inflorescence a linear spike, terminal, the thicker female portion below, the thinner male portion above ***Typha in TYPHACEAE***

12 Inflorescence an ovoid, hemispheric, or spherical head or glomerule, 1 or several per plant.

13 Flowers in a single head terminating an elongate scape; leaves basal (often with 1-2 much smaller leaves or bladeless sheaths on the lower part of the scape); inflorescence white, tan, pale yellow, gray, or blackish, the head usually as broad as or broader than long, involucrate ***ERIOCAULACEAE***

13 Flowers in multiple heads, not scapose; leaves basal and usually also prominently cauline; inflorescence green, tan, brown, or reddish, the head spherical, not involucrate.

14 Flowers bisexual, the flowers in various arrays ***JUNCACEAE***

14 Flowers unisexual, the male flowers in a terminal head, the female flowers in heads below the male along a usually zigzag stem..... ***Sparganium in TYPHACEAE***

11 Individual flowers solitary or in more diffuse inflorescences; perianth present, at least one whorl petal-like in size, color, and texture.

15 Flowers bilaterally symmetrical; stamen 1 or 2; tepals 6; perianth often differentiated into a lip and 5 petaloid tepals ***ORCHIDACEAE***

15 Flowers radially symmetrical (sometimes weakly bilaterally symmetrical); stamens 6 (rarely 3); tepals usually 6 (rarely 3), when 6, either undifferentiated (6 tepals) or differentiated into 3 petals and 3 sepals.

16 Leaves < 15 mm long, scale-like or linear; leaves cauline.

17 Leaves (actually cladophylls) clustered, in whorls of (1-) 2-20 (-25); fruit a berry; perianth undifferentiated, of 6 yellow, white, or green tepals..... ***Asparagus in ASPARAGACEAE***

17 Leaves alternate; fruit a capsule; perianth either differentiated, the 3 petals yellowish-green or maroon, or undifferentiated, the 6 tepals white, blue, or purplish.

18 Plants terrestrial, erect; stems and leaves lacking a scaly indumentum; flower solitary, or several to many in heads or racemose cymes; perianth undifferentiated, the 6 tepals white, blue, or purplish ***BURMANNIACEAE***

18 Plants either epiphytic and pendulous in festoons, or terrestrial, wetland, or aquatic and sprawling; stems and leaves with or without a scaly indumentum; flowers solitary and axillary; perianth differentiated, the 3 petals either yellowish-green or maroon.

19 Plants epiphytic, pendulous in festoons; stems and leaves densely covered by silvery scales; peatls yellowish-green..... ***Tillandsia in BROMELIACEAE***

19 Plants of moist to wet habitats, sprawling or aquatic; stems and leaves not covered by silvery scales; petals maroon ..... ***Mayaca in MAYACACEAE***

16 Leaves (at least the larger) > 25 mm long, linear or narrowly lanceolate; leaves basal, basally disposed (or rarely mostly or entirely cauline).

20 Ovary inferior (or partly inferior; ambiguous taxa keyed both ways).

21 Inflorescence axillary, a raceme or umbel (or reduced to a single flower); petaloid tepals yellow ***Hypoxis in HYPOXIDACEAE***

21 Inflorescence terminal; petaloid tepals various (including yellow).

22 Inflorescence or flower groups subtended by well-developed, green or scarious spathaceous bracts; inflorescence either an umbel, or fan-shaped pair of cymes, or seemingly racemose, or solitary.

23 Stamens 6; inflorescence an umbel (or sometimes solitary) ***AMARYLLIDACEAE***

23 Stamens 3; inflorescence either a fan-shaped pair of cymes or seemingly racemose (or rarely solitary (e.g. *Crocus*) ***IRIDACEAE***

22 Inflorescence or flower groups not subtended by spathes (though individual flowers may be subtended by small green bracts; inflorescence a raceme or panicle.

24 Leaves fleshy; anthers 12-15 mm long ***AGAVACEAE***

24 Leaves herbaceous; anthers < 5 mm long.

25 Tepals connate into a tube; perianth tube exterior farinose; flowers bisexual, white to bright yellow; inflorescence a raceme..... ***Aletris in NARTHECIACEAE***

25 Tepals distinct; perianth not farinose; flowers unisexual or bisexual, white, greenish, or creamy; inflorescence a raceme or panicle (raceme of racemes) ***MELANTHIACEAE***

20 Ovary superior (or partly inferior; ambiguous taxa keyed both ways).

26 Gynoecium of 2 or more pistils, each pistil consisting of 1 carpel and with 1 stigma; [wetland plants].

27 Inflorescence a terminal raceme, the flowers (fruits) in whorls of 3; perianth differentiated into showy petals and green sepals, the petals white; leaf not differentiated into a sheath and blade separated by a ligule; fruit an aggregate of achenes ***ALISMATACEAE***

27 Inflorescence a terminal raceme or spike, the flowers (fruits) alternate; perianth not differentiated, consisting of 3 or 6 green or yellow-green tepals; leaf differentiated into an open sheath and blade, with a ligule separating them; fruit an aggregate of achenes or follicles. ***Triglochin in JUNCAGINACEAE***

26 Gynoecium of 1 pistil, with 2-6 stigmas; [wetland and upland plants].

29 Leaves strictly or primarily cauline.

30 Leaves linear, > 15 cm long, hollow or flat; inflorescence an umbel; fresh plants with an oniony odor ***ALLIACEAE***

30 Leaves linear to lanceolate, < 15 (-30) cm long, flat; inflorescence various, not an umbel; fresh plants without oniony odor.

31 Petals < 2 cm long, white, blue, or pink; leaves alternate ***COMMELINACEAE***

31 Petals > 5 cm long, yellow, orange, or red; leaves alternate or whorled ***Lilium in LILIACEAE***

29 Leaves strictly or primarily basal (the basal leaves persistent, and larger than any stem leaves).

32 Perianth differentiated into 3 bright pink petals and 3 green sepals ***Cuthbertia in COMMELINACEAE***

32 Perianth not differentiated, the 6 segments similar in color, shape, and size, of various colors (sometimes pink).

33 Tepals brown or green, not at all yellow, white, or otherwise more brightly colored; inflorescence branched and complex ..... ***JUNCACEAE***

33 Tepals white, cream, pink, greenish-yellow, yellow, orange, pink, blue, or blue-brown; inflorescence either a terminal umbel, subtended by spathes or bracts, or a terminal raceme or panicle (or a terminal corymb in *Ornithogalum* in HYACINTHACEAE), not subtended by spathes or bracts.

34 Inflorescence a terminal umbel, subtended by spathes or bracts; fresh plants with or without an oniony odor ***ALLIACEAE***

34 Inflorescence a terminal raceme or panicle (or a terminal corymb in *Ornithogalum* in HYACINTHACEAE), not subtended by spathes or bracts.
35 Tepals evidently connate, fused at least basally and sometimes nearly their entire length; filaments adnate to the tepals.
36 Tepals 5-8.5 cm long, yellow to orange; anthers dorsifixed (attached near the middle) ..... ***Hemerocallis in HEMEROCALLIDACEAE***
36 Tepals 0.2-1.0 0.2-1.2 (-2.0) cm long, white, cream, yellow, blue, or blue-brown; anthers basifixed (attached at the base) or dorsifixed (attached at the back).
38 Perianth blue or blue-brown, not farinose; leaves 2-7, erect, ascending, or the tips spreading; anthers dorsifixed (attached at the back) ..... ***HYACINTHACEAE***
38 Perianth white, cream, or yellow, farinose-roughened on the outer surface; leaves typically > 8, spreading to slightly ascending (often forming a flattish rosette); anthers basifixed (attached at the bottom)..... ***Aletris in NARTHECIACEAE***
35 Tepals completely distinct; filaments free (rarely epitepalous).
39 Styles 1, lobed only in the upper portion if at all; fruit either loculicidal capsules or berry-like; tepals blue, pink, or white with a broad green central stripe.
40 Tepals white, with a broad green stripe; inflorescence an umbel or raceme..... ***Ornithogalum in HYACINTHACEAE***
40 Tepals blue or pink; inflorescence a raceme
41 Tepals blue, 7-17 mm long; inflorescence a true raceme..... ***Camassia in AGAVACEAE***
41 Tepals pink, 3-10 mm long; inflorescence a raceme-like dibotrya..... ***Liriope in RUSCACEAE***
39 Styles 3, separate to the base; fruit a septicidal capsules (sometimes then also secondarily loculicidal); tepals white, greenish, yellowish, or pink.
42 Inflorescence ebracteate, lacking bracts subtending pedicels; tepals pink (*Helonias*) or white to cream (*Chamaelirium*). ..... ***Chamaelirium luteum in CHIONOGRAPHIDACEAE***
42 Inflorescences bracteate, with bracts subtending individual pedicels and (if they are present) branches of the inflorescence; tepals white, greenish-white, or cream.
44 Leaves narrowly linear, 1-2.5 mm wide, rigid, keeled, and serrulate; stems and leaves strictly glabrous ..... ***Xerophyllum asphodeloides in XEROPHYLLACEAE***
44 Leaves linear or oblanceolate (rarely narrowly linear), > 2 mm wide, flexible, unkeeled, and with entire margins; stems and leaves pubescent with hairs or scales (except *Amianthium*) ..... ***MELANTHIACEAE***

Key M2 - monocots with broad leaves

1 Leaves compound.
2 Plants herbaceous; leaves palmately 3-foliolate or pedately compound ..... ***ARACEAE***
2 Plants woody; leaves either palmately divided or pinnately compound into > 20 segments..... ***ARECACEAE***
1 Leaves simple.
3 Leaves opposite or whorled, cauline.
5 Plant with 2 or more leaf-bearing nodes (all nodes whorled or some alternate).
6 Leaves broad, < 2× as long as wide, cordate at the base; flowers unisexual and plants dioecious ..... ***Dioscorea in DIOSCOREACEAE***
6 Leaves lanceolate, oblanceolate or narrowly elliptic, > 4× as long as wide, cuneate at the base; flowers bisexual and plants hermaphroditic ..... ***LILIACEAE***
5 Plant with a single leaf-bearing node.
7 Leaves in whorls of 3 leaves..... ***TRILLIACEAE***
7 Leaves in whorls of 5 or more leaves.
8 Stem floccose, wiry (and at maturity with a second smaller whorl with usually 3 leaves subtending the flowers); flowers radially symmetrical..... ***Medeola in LILIACEAE***
8 Stem glabrous, fleshy, never with a second whorl; flowers bilaterally symmetrical..... ***Isotria in ORCHIDACEAE***
3 Leaves alternate, either cauline or basal.
9 Inflorescence a spadix (a dense spike of hundreds of flowers, the rachis thickened and somewhat fleshy) subtended by a spathe (a green, white, orange, yellowish-green, or maroon bract) (spathe missing in *Orontium*) ..... ***ARACEAE***
9 Inflorescence otherwise, a raceme, panicle, cyme, umbel, spike, etc., the flowers arrayed in a more diffuse manner, the central rachis not thickened, the inflorescence subtended or not by green or scarious spathes.
10 Flowers bilaterally symmetrical or asymmetrical; fertile stamens 1 or 2 (or 5 in MUSACEAE), often with several staminodes present as well; tepals 6.
11 Leaf venation parallel; leaves various in size and shape, if > 3 dm long, then < 1 dm wide; perianth often differentiated into a lip and 5 petaloid tepals... ***ORCHIDACEAE***
11 Leaf venation prominently penni-parallel; leaves large, at least some on a plant with blade > 2 dm long.
12 Fertile stamens 5-6; leaf blades 6-30 dm long..... ***Musa in MUSACEAE***
12 Fertile stamen 1; leaf blades 0.5-7 dm long.
13 Leaves spirally arranged. ..... ***Canna in CANNACEAE***
13 Leaves 2-ranked.
15 Leaves jointed and swollen at the summit of the petiole..... ***Thalia in MARANTACEAE***
15 Leaves neither jointed not swollen at the summit of the petiole..... ***ZINGIBERACEAE***
10 Flowers radially symmetrical (weakly to strongly bilaterally symmetrical in PONTEDERIACEAE); stamens 6 (rarely 3, 4, 5, 9, 12, 15, or 18); tepals usually 6 (rarely 3 or 4), when 6, either undifferentiated (6 or 4 tepals) or differentiated into 3 petals and 3 sepals.
16 Inflorescence subtended by spathes (well-developed green or scarious bracts).
17 Perianth not differentiated, consisting of 6 similarly colored and shaped tepals; flowers strongly to slightly bilaterally symmetrical; inflorescence lacking well-developed spathaceous bracts..... ***PONTEDERIACEAE***
17 Perianth differentiated into green sepals and more brightly colored petals; flowers radially symmetrical (or weakly bilaterally symmetrical, as in some *Commelina*).
18 Ovary superior; fruit a capsule; stamens 6; [plants mainly of uplands (*Murdannia* and sometimes *Commelina* of wetlands)] ***COMMELINACEAE***
18 Ovary inferior; fruit a berry; stamens 3, 6, 9, 12, 15, or 18; [plants of wetlands]..... ***HYDROCHARITACEAE***
16 Inflorescence not subtended by spathes, though individual small green bracts sometimes subtending individual flowers.
19 Perianth differentiated into green sepals and white petals; gynoecium of 2 or more pistils, each pistil consisting of 1 carpel and with 1 stigma; fruit an aggregate of achenes or follicles; inflorescence a raceme or panicle with branching in whorls of 3; [wetland plants] ..... ***ALISMATACEAE***

19 Perianth not differentiated into strikingly different whorls (at most, with only subtle variation in the size or shape of the outer and inner whorls of the perianth); gynoecium of 1 pistil, with 2-6 stigmas; fruit simple, a capsule or berry; inflorescence various, terminal or axillary, but if a raceme or panicle, not with branching in whorls of 3; [upland (or very rarely wetland) plants].
20 Leaves basal or basally disposed.
21 Leaves 2 (rarely 3 in *Convallaria* in RUSCACEAE).
22 Inflorescence a raceme; fruit a berry; tepals united, the perianth urceolate ..... ***Convallaria in RUSCACEAE***
22 Inflorescence an umbel or a solitary flower; fruit a capsule; tepals separate or basally fused.
23 Flowers in an umbel, white; fresh plants with oniony odor ..... ***ALLIACEAE***
23 Flowers solitary, white or yellow; fresh plants without strong odor ..... ***Erythronium in LILIACEAE***
21 Leaves 4 or more.
..... ***Chamaelirium in CHIONOGRAPHIDACEAE***
20 Leaves cauline.
27 Leaves both cordate/subcordate (rarely merely rounded at the base) and obviously petiolate.
28 Inflorescence an axillary many-flowered umbel; fruit a berry; axillary tendrils often present (absent in some species) ..... ***Smilax in SMILACACEAE***
28 Inflorescence an axillary solitary flower, a few-flowered cyme, or a panicle; fruit a capsule (winged in *Dioscorea*, unwinged in *Croomia*); axillary tendrils never present (plant not climbing, or climbing by twining).
29 Tepals 6; stamens 6; flowers unisexual (and generally on separate plants, therefore dioecious); inflorescence of a solitary flowers or a panicle; ovary inferior; [widespread in our area] ..... ***Dioscorea in DIOSCOREACEAE***
29 Tepals 4 (-5); stamens 4 (-5); flowers bisexual; ovary superior; [AL and adjacent GA, FL, and perhaps LA] ..... ***Croomia in STEMONACEAE***
27 Leaves not both cordate/subcordate and petiolate (some with cordate clasping or perfoliate leaf bases). {add [*Smilax*] SMILACACEAE below}
30 Leaves alternate and in whorls at some nodes; flowers orange; tepals > 5 cm long; inflorescence a terminal umbel or single flower ..... ***Lilium in LILIACEAE***
30 Leaves strictly alternate; flowers yellow, white, pink, greenish, or maroon; tepals < 5 cm long; inflorescence either a terminal cluster, raceme, panicle or umbel, or an axillary raceme, cluster or solitary flower.
31 Inflorescence a terminal umbel; flowers slightly zygomorphic, reddish, the tepals 3.5-4.5 cm long ..... ***Alstroemeria in ALSTROEMERIACEAE***
31 Inflorescence either a terminal cluster, raceme, or panicle, or an axillary raceme, cluster or solitary flower; flowers actinomorphic, variously colored (most white or yellow), the tepals < 3.5 cm long (except *Uvularia grandiflora*).
32 Leaves arrayed spirally around an erect, unbranched stem; fruit a septicidal capsule; flowers a mixture of bisexual and unisexual (staminate) on a plant; perianth greenish white
..... ***Melanthium in MELANTHIACEAE***
32 Leaves arrayed distichously (2 ranked) along an arching, unbranched or dichotomously (Y-forking) branched stem; fruit a berry or loculicidal capsule; flowers all bisexual; perianth white, pink, or yellow.
34 Stems of fertile individuals simple (never branched); inflorescence a terminal raceme or panicle (*Maianthemum*) or axillary racemes or clusters of 1-9 flowers (*Polygonatum*); fruit a berry.
35 Inflorescence terminal, a raceme or panicle; tepals separate; leaves with 3 main parallel veins, acute to acuminate at the apex; foliage green, not glaucous ..... ***Maianthemum in RUSCACEAE***
35 Inflorescence of 1-several axillary flowers; tepals fused; leaves with > 7 main parallel veins, obtuse to acute at the apex; foliage blue-green, glaucous ..... ***Polygonatum in RUSCACEAE***
34 Stems of fertile individuals branched (always at least bifurcate); inflorescence either of 1 (-2) flower(s) borne in a leaf axil (*Uvularia*, *Streptopus*), or of (1) 2 (-3) flowers borne terminally opposite the last leaf; fruit a berry or capsule.
36 Leaves perfoliate; fruit a capsule ..... ***Uvularia in COLCHICACEAE***
36 Leaves sessile (though sometimes slightly to strongly clasping); fruit a berry or capsule.
37 Stem brown, wiry, puberulent; distalmost 2 leaves on each branch approximate to one another (sometimes subopposite) and with noticeably oblique bases; flowers and fruits terminal on the branches ..... ***Prosartes in LILIACEAE***
37 Stem green, not wiry, glabrous; distalmost 2 leaves on each branch no closer together than other leaves, with symmetrical bases; flowers (and fruits) either terminal on the branches or solitary and axillary to most leaves.
..... ***Uvularia in COLCHICACEAE***

Key N - herbaceous dicots with mainly basal leaves

1 Leaves compound ..... ***Key N1***
1 Leaves simple ..... ***Key N2***

Key N1 - herbaceous dicots with mainly basal, compound leaves

1 Leaves either 2-3-foliolate or palmately 4-11-foliolate (all the leaflets attached at a common point).
2 Leaves 2-foliolate; fruit a capsule, opening by a circumscissile lid ..... ***Jeffersonia in BERBERIDACEAE***
2 Leaves either 3-foliolate or palmately or pedately 4-11-foliolate.
3 Inflorescence an involucrate head subtended by phyllaries, the heads solitary or many and variously arrayed in secondary inflorescences, the ovary inferior, the corolla connate and tubular at least basally, the calyx absent, the stamens 5, the fruit a cypsela ..... ***ASTERACEAE***
3 Inflorescence, flower, and fruit structure various, but not with the combination of features as above.
4 Inflorescence an umbel; ovary inferior; fruit a mericarp of 2 schizocarps ..... ***APIACEAE***
4 Inflorescence various, usually not an umbel (sometimes an umbel in *Oxalis* in OXALIDACEAE); ovary superior; fruit an aggregate, legume, berry, or 2-valved capsule.
5 Leaflets either entire or barely and very shallowly crenulate or notched at the tip (but otherwise entire).
6 Inflorescence a spadix, surrounded by a spathe; fruit a berry; [Monocots {illogically keyed here because of the likelihood of being mistaken for a dicot}] ..... ***Arisaema in ARACEAE***
6 Inflorescence a raceme or umbel, not surrounded by a spathe; fruit a capsule or legume; [Eudicots].
7 Flowers bilaterally symmetrical; fruit a legume; [plant of uplands] ..... ***FABACEAE***
7 Flowers radially symmetrical; fruit a 2-valved or 5-valved capsule; [plant of uplands or wetlands]

..... ***Oxalis in OXALIDACEAE***

5 Leaflets serrate, serrulate, or cleft.
9 Petals 4; stamens 6; fruit a silique ..... ***Cardamine in BRASSICACEAE***
9 Petals 5 or more; stamens 10 or more; fruit either a legume or an aggregate of achenes or follicles
10 Stamens many, fused into a staminal tube; carpels 10-20, in a ring; pubescence stellate (sometimes mixed with simple hairs) ..... ***Callirhoe in MALVACEAE***
10 Stamens 10-many, separate, or fused but not all into a staminal tube; carpel either 1 (FABACEAE), or 3-7 in a ring (RANUNCULACEAE), or many and spirally arranged on a conical receptacle (RANUNCULACEAE or ROSACEAE)
11 Leaflets serrulate; flowers bilaterally symmetrical; fruit a legume; corolla variously colored, including white ..... ***FABACEAE***
11 Leaflets serrate; flowers radially symmetrical; fruit an aggregate of achenes or of follicles; corolla white or yellowish or greenish.
12 Fruit an aggregate of follicles ..... ***RANUNCULACEAE***
12 Fruit an aggregate of achenes (borne on a fleshy, expanded receptacle in *Fragaria* and some *Potentilla*)
13 Flowers lacking a hypanthium ..... ***Ranunculus in RANUNCULACEAE***
13 Flowers with a hypanthium ..... ***ROSACEAE***

1 Leaves 1-pinnately compound (all leaflets attached to a central rachis) or more complexly compound (with several orders of branching, some leaflets at least attached to second-order branches from the rachis).
14 Leaves 1-pinnately compound (all leaflets attached to a central rachis).
15 Inflorescence an involucrate head subtended by phyllaries, the heads solitary or many and variously arrayed in secondary inflorescences, the ovary inferior, the corolla connate and tubular at least basally, the calyx absent, the stamens 5, the fruit a cypsela ..... ***ASTERACEAE***
15 Inflorescence, flower, and fruit structure various, but not with the combination of features as above.
16 Flowers bilaterally symmetrical; fruit a legume ..... ***FABACEAE***
16 Flowers radially symmetrical; fruit a silique/silicle, or a schizocarp of mericarps, or an achene.
17 Petals 4; stamens 6; fruit a silique/silicle ..... ***BRASSICACEAE***
17 Petals 0 or 5 (if 0, the sepals petaloid); stamens 2, 4, 5, or many.
18 Stamens 5; fruit a schizocarp of 2 mericarps ..... ***APIACEAE***
18 Stamens 2, 4, or many; fruit an achene ..... ***ROSACEAE***
14 Leaves more complexly compound (with 2 or more orders of branching, some leaflets at least attached to second-order branches from the rachis).
19 Inflorescence an involucrate head subtended by phyllaries, the heads solitary or many and variously arrayed in secondary inflorescences, the ovary inferior, the corolla connate and tubular at least basally, the calyx absent, the stamens 5, the fruit a cypsela ..... ***ASTERACEAE***
19 Inflorescence, flower, and fruit structure various, but not with the combination of features as above (sometimes the flowers in a head subtended by bracts, but then with other features differing, such as stamens 4, or green calyx present, or petals separate, or fruit a schizocarp of mericarps, etc.).
20 Leaf segments or ultimate lobes linear or lanceolate, > 2× as long as wide, < 4 mm wide.
21 Inflorescence an umbel; ovary inferior; fruit a mericarp of 2 schizocarps ..... ***APIACEAE***
21 Inflorescence various, but not an umbel; ovary superior; fruit an aggregate of follicles or an elongate capsule.
22 Carpels 2, fused; fruit an elongate capsule; flowers bilaterally symmetrical ..... ***FUMARIACEAE***
22 Carpels 5-10 or many, separate; fruit an aggregate; flower radially symmetrical ..... ***RANUNCULACEAE***
20 Leaf segments or ultimate lobes ovate or elliptic, < 3× as long as wide, > 5 mm wide.
23 Inflorescence an umbel; ovary inferior; fruit a mericarp of 2 schizocarps or a 5-seeded drupe.
24 Fruit a schizocarp of 2 mericarps ..... ***APIACEAE***
24 Fruit a 5-seeded drupe ..... ***Aralia in ARALIACEAE***
23 Inflorescence various, but not an umbel; fruit an aggregate of follicles or achenes, an elongate capsule, or a naked seed resembling a drupe.
25 Leaflets with < 10 ultimate 'points' (lobe or tooth terminations), these rounded to broadly acute, often large in comparison to the leaflet and appearing as "sublobes"; pistil 1 or 4-many.
27 Leaflets 5-8 cm long, obviously longer than broad; pistil 1; fruit a naked blue seed resembling a drupe; flowers mainly 3-merous ..... ***Caulophyllum in BERBERIDACEAE***
27 Leaflets 1-6 cm long, about as long as broad if > 4 cm long; pistils 4-many; fruit an aggregate of follicles or achenes; flowers mainly 4-5-merous ..... ***RANUNCULACEAE***
25 Leaflets with >11 ultimate 'points' (lobe or tooth terminations), these acuminate to acute; pistils 1-8.
28 Pubescence of the stem and lower leaf surface glandular; flowers unisexual, on the same plant (monoecious); stamens 10; pistils 2, partly fused; fruit an aggregate of follicles ..... ***Astilbe in SAXIFRAGACEAE***
28 Pubescence of the stem and lower leaf surface non-glandular (or absent); flowers either bisexual (the plants hermaphroditic), or unisexual and the male and female flowers on separate plants (the plants dioecious); stamens 15 or more; pistils 1-8, separate; fruit an aggregate of follicles, a follicle, or a red or white berry.
29 Flowers bisexual (plants hermaphroditic); carpels 1-8 per flower; inflorescence a raceme, or a panicle of racemes with just a few branches; fruit an aggregate of follicles, a follicle, or a red or white berry ..... ***Actaea in RANUNCULACEAE***
29 Flowers unisexual (plants dioecious); carpels 3-4 per pistillate flower; inflorescence a panicle of racemes, with numerous branches; fruit an aggregate of follicles ..... ***Aruncus in ROSACEAE***

Key N2 - herbaceous dicots with mainly basal, simple leaves

1 Inflorescence an involucrate head subtended by phyllaries, the heads solitary or many and variously arrayed in secondary inflorescences, the ovary inferior, the corolla connate and tubular at least basally, the calyx absent, the stamens 5, the fruit a cypsela ..... ***ASTERACEAE***
1 Inflorescence, flower, and fruit structure various, but not with the combination of features as above (sometimes the flowers in a head subtended by bracts, e.g. *Eryngium* in APIACEAE, but then with other features differing, such as stamens 4, or green calyx present, or petals separate, or fruit a schizocarp of mericarps, etc.).
2 Basal leaves 2-lobed, pinnately lobed, or palmately lobed (not considering cordate, hastate, or auriculate leaf bases as "lobed").
3 Basal leaves 2-lobed, hinged between the lobes, each lobe with stiff, marginal, eyelash-like bristles; [Coastal Plain of NC and SC, rarely planted and weakly naturalized elsewhere] ..... ***Dionaea in DROSERACEAE***
3 Basal leaves 3-many-lobed, palmately or pinnately; [collectively widespread].
4 Leaf lobing pinnate.
5 Gynoecium of separate pistils (each with a single carpel); fruit an aggregate ..... ***Geum in ROSACEAE***
5 Gynoecium of a single pistil (with 2, rarely more, carpels); fruit simple.
6 Stamens many; sepals 2, petals 4; fresh plants with yellow, orange, or white milky juice ..... ***PAPAVERACEAE***
6 Stamens 4, 5, or 6; sepals 4 or 5; petals 4 or 5.
7 Petals 4, distinct; stamens 6 ..... ***BRASSICACEAE***
7 Petals 5, fused; stamens 2, 4, or 5.

8 Corolla radially symmetrical; stamens 5 ..... ***BORAGINACEAE***
8 Corolla 2-lipped, bilaterally symmetrical or asymmetrical; stamens 2 or 4.
9 Corolla lobes not twisted, the flower bilaterally symmestrical; stamens 2 ..... ***Salvia in LAMIACEAE***
9 Corolla lobes twisted so as to make the flower asymmetrical; stamens 4 ..... ***Pedicularis in OROBANCHACEAE***

4 Leaf lobing palmate.
10 Petiole attachment peltate.
11 Leaves < 10 cm in diameter ..... ***Hydrocotyle in ARALIACEAE***
11 Leaves > 15 cm in diameter ..... ***BERBERIDACEAE***
10 Petiole attachment marginal.
12 Ovary inferior.
13 Petals 4; stamens 8; fruit a capsule ..... ***Oenothera in ONAGRACEAE***
13 Petals 5; stamens 5; fruit a schizocarp of 2 mericarps.
14 Fruit tuberculate; leaves 3-lobed ..... ***Eryngium prostratum in APIACEAE***
14 Fruit smooth; leaves with 5 or more lobes ..... ***Hydrocotyle in ARALIACEAE***
12 Ovary superior, or half-inferior by fusion of a hypanthium a part of the way up the ovary wall.
15 Gynoecium of separate pistils (each with a single carpel); fruit an aggregate.
16 Perianth of 5 green sepals and 5 colored petals.
17 Carpels partly fused, arrayed in a ring of 10-20 ..... ***MALVACEAE***
17 Carpels separate, spiral, many ..... ***RANUNCULACEAE***
16 Perianth of a single whorl of 3-12 petaloid sepals (the petals absent or small and rudimentary).
18 Leaves 2, the single flower terminal and associated with the upper leaf; fruit an aggregate of berries ..... ***Hydrastis in HYDRASTIDACEAE***
18 Leaves normally > 2, flowers not as above; fruit an aggregate of achenes, utricles, or follicles ..... ***RANUNCULACEAE***
15 Gynoecium of a single pistil (with 1-5 carpels); fruit simple.
19 Hypanthium present, partially fused or not fused to the pistil; ovary partially inferior to superior ..... ***SAXIFRAGACEAE***
19 Hypanthium absent; ovary superior.
20 Petals connate at base; leaves sharply toothed ..... ***Hydrophyllum in HYDROPHYLLACEAE***
20 Petals distinct; leaves with rounded lobes or teeth.
21 Corolla radially symmetrical; petals 8-12; capsule fusiform, narrowed to both ends, > 5× as long as wide ..... ***Sanguinaria in PAPAVERACEAE***
21 Corolla bilaterally symmetrical; petals 5; capsule ovoid, < 2× as long as wide ..... ***Viola in VIOLACEAE***

2 Basal leaves not lobed, at most serrate or crenate (and sometimes also cordate, hastate, auriculate, or peltate at the base).
22 Basal leaves petiolate, the blade with a cordate, hastate, auriculate, or peltate base.
23 Leaf margins entire.
24 Inflorescence a terminal and/or axillary raceme, panicle, or cyme of many small flowers; fruit an achene; perianth uniseriate, of 0, 4-5, or 6 tepals. ..... ***POLYGONACEAE***
24 Inflorescence either a terminal spike, or a 1-7-flowered terminal cyme, or of a solitary axillary or terminal flower; fruit various; perianth biseriate (of differentiated sepals and petals (except uniseriate, of 3 fused sepals in ARISTOLOCHIACEAE).
26 Flowers bilaterally symmetrical; inflorescence a terminal spike (with > 20 flowers); petals 4, usually scarious, transparent; sepals 4, green; stamens 4 ..... ***Plantago in PLANTAGINACEAE***
26 Flowers radially symmetrical; inflorescence either of a solitary flower or of a 1-7-flowered terminal cyme; petals 5, 8-12, or 0; sepals 5 (green), 3 (brown), or 5-9 (yellow); stamens 5, 12, or many.
27 Gynoecium of separate pistils (each with a single carpel); fruit an aggregate of achenes or follicles; flowers bright yellow, either of 5-9 distinct petaloid sepals, or of 8-12 distinct petals subtended by 3-4 green distinct sepals ..... ***RANUNCULACEAE***
27 Gynoecium either of a single pistil with 6 carpels or of a single pistil with 4 carpels or of 2 nearly separate carpels; fruit a simple capsule (or deeply 2-lobed); flowers white, brown, or greenish, either of 5 fused or distinct white petals and 5 fused or distinct green sepals, or of 3 fused brown or greenish petaloid sepals.
28 Flowers brown or green, of 3 fused brown or greenish petaloid sepals (and 0 petals); carpels 6; stamens 12; leaves 4-10 cm wide ..... ***ARISTOLOCHIACEAE***
28 Flowers white, of 5 white or whitish petals and 5 green sepals; carpels 2; stamens 5; leaves 1-12 (-15) cm wide
29 Petals separate; sepals separate; plant glabrous ..... ***Parnassia in PARNASSIACEAE***
29 Petals fused; sepals fused; carpels 2; plant pubescent. ..... ***Dichondra in CONVOLVULACEAE***
23 Leaf margins crenate, serrate, or incised.
31 Gynoecium of separate pistils (each with a single carpel); fruit an aggregate; perianth of 5 green sepals and 5 colored petals.
32 Carpels 10-20, partly fused, arrayed in a ring; petals white, pink, red, or purplish ..... ***MALVACEAE***
32 Carpels many, separate, spiral; petals yellow or white.
33 Flowers lacking a hypanthium; fruit an aggregate of achenes or aggregate of follicles ..... ***RANUNCULACEAE***
33 Flowers with a hypanthium; fruit an aggregate of drupelets or aggregate of achenes ..... ***ROSACEAE***
31 Gynoecium of a single pistil (with 1-5 carpels); fruit simple.
34 Flowers bilaterally symmetrical; inflorescence of a solitary flower; fruit a 3-locular capsule ..... ***Viola in VIOLACEAE***
34 Flowers radially symmetrical; inflorescence an umbel (or composite of umbelliform units, or a terminal panicle.
35 Ovary superior; inflorescence a terminal panicle or terminal raceme. ..... ***BRASSICACEAE***
35 Ovary inferior; inflorescence an umbel (or a composite of umbellate units); fruit a schizocarp of mericarps.
37 Petiole attachment peltate ..... ***Hydrocotyle in ARALIACEAE***
37 Petiole attachment marginal (the blade cleft to the petiole.
38 Leaf blades longer than wide, sharply V-cleft at the base and otherwise shallowly denticulate ..... ***Centella in APIACEAE***
38 Leaf blades as broad or broader than long, cleft at the base and also irregularly serrate or crenate around the margin ..... ***Hydrocotyle in ARALIACEAE***
22 Basal leaves petiolate or not, with a truncate, rounded, or cuneate leaf base.
39 Leaves tubular, with a sutured ventral flange, erect or reclining, adapted as a pitfall for insects (flat, phyllodial leaves sometimes present as well, common in the winter in some species, such as *S. oreophila*) ..... ***Sarracenia in SARRACENIACEAE***
39 Leaves flat, not sutured into a tubular shape.

40 Stem leaves opposite; perianth 5-merous, at least the corolla bilaterally symmetrical (barely so in VALERIANACEAE), or the parts curved so as to be asymmetrical (*Pedicularis* in OROBANCHACEAE); stamens 2, 3, or 4.
41 Ovary inferior; stamens 3 ..... ***VALERIANACEAE***
41 Ovary superior; stamens 2 or 4.
42 Corolla narrowly tubular, the five lobes flaring at nearly 90 degrees and nearly radially symmetrical ..... ***Buchnera in OROBANCHACEAE***
42 Corolla distinctly 2-lipped (with prominently large upper and lower corolla lobes) or hooded (the upper lip hood-like), distinctly bilaterally symmetrical, or the lobes twisted so as to make the corolla asymmetrical.
43 Corolla yellow, the upper lip often slightly to strongly maroon, hooded but the corolla lobes twisted so as to make the flower asymmetrical .... ***Pedicularis in OROBANCHACEAE***
43 Corolla white, lavender, or blue, 2-lipped and bilaterally symmetrical.
44 Sepals separate to the base or nearly so, not forming a tube ..... ***Lindernia in LINDERNIACEAE***
44 Sepals connate for at least 0.3× their length to form a tube ..... ***Mazus in MAZACEAE***
40 Stem leaves alternate; perianth radially symmetrical (less commonly bilaterally symmetrical); stamens 5, 6-8, 9, 10 (rarely 4).
45 Ovary inferior (or half-inferior in *Samolus*).
46 Perianth 4-merous; stamens 8 ..... ***Oenothera in ONAGRACEAE***
46 Perianth 5-merous; stamens 5.
47 Inflorescence an umbel; fruit a schizocarp of 2 mericarps ..... ***APIACEAE***
47 Inflorescence an axillary or terminal raceme; fruit a capsule ..... ***Samolus in PRIMULACEAE***
45 Ovary superior.
48 Pistils many, each with a single carpel; fruit an aggregate of achenes ..... ***Myosurus in RANUNCULACEAE***
48 Pistil 1, with 1-5 carpels; fruit simple (a legume, silique/silicle, capsule, utricle, or schizocarp of 4 nutlets).
49 Corolla bilaterally symmetrical (barely so in *Limosella* in SCROPHULARIACEAE); stamens 2, 4, 6, 8, or 10.
50 Stamens 6-8 or 10.
51 Petals separate; stamens 10 ..... ***Micranthes in SAXIFRAGACEAE***
51 Petals fused; stamens 10 or 6-8.
52 Stamens 10, monadelphous ..... ***FABACEAE***
52 Stamens 6-8, epipetalous ..... ***Polygala in POLYGALACEAE***
50 Stamens 2 or 4.
53 Stamens 2 ..... ***LENTIBULARIACEAE***
53 Stamens 4.
55 Flowers (and subtending bracts) red or yellow ..... ***Castilleja in OROBANCHACEAE***
55 Flowers purple, blue, or lavender ..... ***Mazus in MAZACEAE***
49 Corolla radially symmetrical; stamens 5, 10, 4-6, or 9.
56 Perianth of 6 tepals; stamens 4-6 or 9; carpels 3 ..... ***POLYGONACEAE***
56 Perianth of green sepals and more brightly colored petals; stamens 5 or 10; carpels 2, 3, 4, or 5.
57 Leaves covered with sticky, gland-tipped hairs (often red), as flypaper traps for insects ..... ***Drosera in DROSERACEAE***
57 Leaves lacking sticky gland-tipped hairs.
58 Fruit a schizocarp of 4 nutlets (ovary obviously 4-lobed in flower) ..... ***BORAGINACEAE***
58 Fruit a capsule or silique/silicle (or utricle in *Limonium* in PLUMBAGINACEAE).
59 Inflorescence of a solitary, terminal flower; carpels 2-3 (-4).
60 Corolla with a long tube and flaring corolla lobes (united > ½ its length) ..... ***Jaborosa in SOLANACEAE***
60 Corolla of separate petals or united only for a short length (< ¼ its length).
61 Leaves serrate ..... ***Shortia in DIAPENSIACEAE***
61 Leaves entire ..... ***PARNASSIACEAE***
59 Inflorescence of several to many flowers; carpels 5 (3 in *Galax* in DIAPENSIACEAE).
62 Inflorescence an umbel; petals recurved, pink to almost white ..... ***Primula in PRIMULACEAE***
62 Inflorescence a raceme or panicle.
63 Fruit a silique/silicle; petals 4; stamens 6 ..... ***BRASSICACEAE***
63 Fruit either a capsule or a utricle; petals 5; stamens 5 or 10.
64 Inflorescence a somewhat to very diffuse panicle, with 3 or more orders of branching, not giving at all the impression that the overall inflorescence is made of racemose units.
65 Leaves entire; stamens 5; [plants of tidal marshes] ..... ***Limonium in PLUMBAGINACEAE***
65 Leaves serrate or crenate; stamens 10; [plants of various habitats, especially rock outcrops and bottomland forests and streambanks, never in tidal marshes] ..... ***Micranthes in SAXIFRAGACEAE***
64 Inflorescence either a single terminal raceme (sometimes spike-like), or of 1 to several terminal and axillary racemes (these sometimes combined into a diffuse panicle, but one whose structure is clearly made up of many racemes).
66 Inflorescence of 1-several terminal and axillary racemes, the plant typically well-branched, especially from the base; stamens 5 ..... ***Samolus in PRIMULACEAE***
66 Inflorescence of a single, terminal raceme, the plant unbranched; stamens 10 (or 5, with 5 staminodes)
67 Inflorescence spike-like, the flowers many (> 40), barely pedicelled; capsule 3-locular ..... ***Galax in DIAPENSIACEAE***
67 Inflorescence a raceme, the flowers fewer (< 20) and distinctly pedicelled; capsule 5-locular ..... ***ERICACEAE***

Key O - herbaceous dicots with alternate, compound leaves on the stem

1 Leaves either 3-foliolate or palmately 4-11-foliolate (all the leaflets attached at a common point, or the leaflets slightly pedate in *Helleborus* in RANUNCULACEAE).
2 Inflorescence an involucrate head subtended by phyllaries, the heads solitary or many and variously arrayed in secondary inflorescences, the ovary inferior, the corolla connate and tubular at least basally, the calyx absent, the stamens 5, the fruit a cypsela ..... ***Nabalus in ASTERACEAE***
2 Inflorescence, flower, and fruit structure various, but not with the combination of features as above. {add under 2b [*Cynosciadium*] APIACEAE; [*Cannabis*] CANNABACEAE}
3 Leaflets obviously and sharply serrate; pistils 5-many; fruit an aggregate of achenes, drupelets, or follicles. ..... ***ROSACEAE***

KEY TO FAMILIES AND GENERA

3 Leaflets entire, finely denticulate, or very obscurely toothed (or irregularly serrate or lobed in *Cardamine* in BRASSICACEAE); pistil 1; fruit simple, a legume, capsule, silique, or berry.
5 Corolla bilaterally symmetrical; petals 5; fruit a legume; carpel 1 ..... ***FABACEAE***
5 Corolla radially symmetrical; petals 4 or 5; fruit either an elongate capsule or a berry; carpels 1, 2, or 5.
6 Leaflets radially arranged at the summit of the petiole, not differentiated in size or placement into a terminal leaflet and 2 lateral leaflets; leaflets prominently notched at the apex; petals 5, yellow; inflorescence axillary, cymose or umbelliform; carpels 5 ..... ***Oxalis in OXALIDACEAE***
6 Leaflets differentiated in size and placement into a terminal leaflet and 2 or more lateral leaflets; leaflets not regularly notched at the apex (a few may be slightly retuse); petals 4, white, pink, or yellow; inflorescence terminal and racemose; carpels 1 or 2.
7 Carpels 2; fruit a red berry; petals connate, purplish-blue ..... ***Solanum dulcamara in SOLANACEAE***
7 Carpel 1; fruit a capsule; petals separate, white, pink, or yellow.
8 Stem leaves 1-3, alternate [or whorled or opposite]; leaflets 3, irregularly serrate, lacerate, or additionally divided or lobed; fruit a silique; carpels 2 ..... ***Cardamine in BRASSICACEAE***
8 Stem leaves >3, alternate; leaflets (1-) 3-7, each entire or obscurely toothed; fruit a capsule; carpel 1 ..... ***CLEOMACEAE***

1 Leaves either 1-pinnately compound (all leaflets attached to a central rachis) or more complexly compound (with several orders of branching, some leaflets at least attached to second-order branches from the rachis).
9 Inflorescence an involucrate head subtended by phyllaries, heads solitary or many, variously arrayed in secondary inflorescences; fruit a cypsela; ovary inferior ..... ***ASTERACEAE***
9 Inflorescence various, but not as above; fruit various, not as above; ovary superior.
10 Leaves 1-pinnately compound (all leaflets attached to a central rachis).
11 Flowers bilaterally symmetrical, papilionaceous; fruit a legume; leaves even-pinnately or odd-pinnately compound, the terminal leaflet sometimes replaced by a tendril; leaflets entire or at most minutely denticulate ..... ***FABACEAE***
11 Flowers radially symmetrical (or barely bilaterally symmetrical in *Erodium* in GERANIACEAE); fruit a capsule, capsular but of 5 mericarps, or an aggregate of achenes, nutlets, or follicles (in some cases the # of pistils from many down to 2 or even 1); leaves odd-pinnately compound, never with tendrils; leaflets serrate (or entire to shallowly lobed in *Polemonium* in POLEMONIACEAE, *Cardamine* in BRASSICACEAE, and *Floerkea* in LIMNANTHACEAE).
12 Pistils many (only 1-2 in *Agrimonia*, *Poteridium*, *Poterium*, and *Sanguisorba*); fruit an aggregate of achenes, nutlets, or follicles; hypanthium present; stamens 5-many (only 4 in *Poteridium* and *Sanguisorba*) ..... ***ROSACEAE***
12 Pistil 1 (or deeply 2-3-lobed in *Floerkea* in LIMNANTHACEAE); fruit a silique, capsule, schizocarp of 2-3 mericarps, or a capsular schizocarp of 5 mericarps (*Erodium* in GERANIACEAE); hypanthium absent; stamens 3-6.
14 Petals 4, distinct; stamens 6; inflorescence a terminal raceme; fruit a silique/silicle ..... ***BRASSICACEAE***
14 Petals 5, fused (distinct in *Erodium* in GERANIACEAE); stamens 5; inflorescence axillary or terminal, cymose, consisting of subcapitate, umbel-like, or helicoid cymes; fruit either a capsule, or a capsular schizocarp of 5 mericarps (*Erodium* in GERANIACEAE).
15 Flowers slightly bilaterally symmetrical (2 of the petals of different size than the other 3); fruit a capsular schizocarp of 5 mericarps; carpels 5 ..... ***Erodium in GERANIACEAE***
15 Flowers radially symmetrical; fruit either a loculicidal capsule or a berry; carpels 2 or 3.
16 Fruit a berry; fresh plant rankly fragrant ..... ***SOLANACEAE***
16 Fruit a capsule; fresh plant not aromatic.
17 Capsule 2-valvate; carpels 2; leaflets prominently serrate or with some tooth-like sublobes ..... ***HYDROPHYLLACEAE***
17 Capsule 3-valvate; carpels 3; leaflets with entire margins ..... ***Polemonium in POLEMONIACEAE***
10 Leaves more complexly compound (with 2 or more orders of branching, some leaflets at least attached to second-order branches from the rachis).
18 Leaves 2× even-pinnate; flowers in spikes or spherical heads; {XXXX} ..... ***FABACEAE***
18 Leaves either 2× odd-pinnate or more complexly 2-4× ternately or ternately-pinnately compound; {YYYY}.
19 Leaf segments linear, less than 2 mm wide.
20 Inflorescence an umbel; ovary inferior, of 2 fused carpels; fruit a schizocarp of 2 mericarps ..... ***APIACEAE***
20 Inflorescence either a terminal solitary flower or terminal raceme or panicle; ovary superior, either of 2 fused carpels or of 1-5or many distinct 1-carpellate pistils; fruit either a capsule or an aggregate of follicles or achenes.
21 Ovary of 2 fused carpels; fruit a capsule (1-seeded and indehiscent in *Fumaria*) ..... ***FUMARIACEAE***
21 Ovary of 1-5or many distinct 1-carpellate pistils; fruit an aggregate of follicles or achenes ..... ***RANUNCULACEAE***
19 Leaf segments broader, lanceolate, ovate, or elliptic, > 5 mm wide.
22 Herbaceous vine climbing by axillary tendrils; stamens 8 ..... ***Cardiospermum in SAPINDACEAE***
22 Erect or sprawling herb; stamens 5-6 or >15.
23 Leaflets sharply serrate, with usually many teeth on each leaflet side, the total number of "points" per leaflet > 10.
24 Inflorescence an umbel; ovary inferior, of 2 fused carpels; fruit a schizocarp of 2 mericarps; inflorescence an umbel ..... ***APIACEAE***
24 Inflorescence a panicle or raceme; ovary superior, of 1-8 carpels; fruit an aggregate of follicles, a single follicle, or an indeshiscent berry-like fruit.
25 Flowers bisexual; carpels 1-8; fruit an aggregate of follicles, a single follicle, or an indeshiscent berry-like fruit ..... ***Actaea in RANUNCULACEAE***
25 Flowers unisexual; carpels (in pistillate flowers) of 3 (-5) carpels; fruit an aggregate of follicles ..... ***Aruncus in ROSACEAE***
23 Leaflets entire, or with 1-several, broad, obtuse, rounded, or broadly acute "sublobes", especially towards the tip of the leaflet, the total number of "points" per leaflet < 10.
26 Inflorescence an umbel; ovary inferior, of 2 fused carpels; fruit a schizocarp of 2 mericarps ..... ***APIACEAE***
26 Inflorescence a raceme, panicle, or cyme; ovary superior, of either 1-2 fused carpels or of many separate 1-carpellate pistils.
27 Perianth bilaterally symmetrical, the corolla of 4 fused petals; plant a scandent vine or erect or sprawling herb ..... ***FUMARIACEAE***
27 Perianth radially symmetrical, of 1-5 whorls of separate perianth parts; plant an erect herb.
28 Perianth of 4-5 whorls of 3 parts each (some of the whorls modified into nectaries); pistil 1, 1-carpellate; fruit a drupelike, blue, naked seed; largest leaflets > 6 cm long, obviously longer than wide ..... ***Caulophyllum in BERBERIDACEAE***
28 Perianth of 1 whorl; of 4-5 parts; pistils many, each 1-carpellate; fruit an aggregate of achenes or an aggregate of follicles; largest leaflets either < 6 cm long, or if longer than 6 cm, also about as wide as long ..... ***RANUNCULACEAE***

Key P - herbaceous dicots with alternate, simple leaves on the stem

1 Leaves unlobed (the leaf base sometimes cordate, sagittate, or hastate) ..... ***Key P1***
1 Leaves palmately or pinnately lobed (leaves with cordate, sagittate, or hastate leaf bases and otherwise unlobed are treated as unlobed), the lobes in some cases not prominent (much broader than long), but strongly associated with the primary veins
2 Leaves palmately lobed ..... ***Key P2***

2 Leaves pinnately lobed ..... ***Key P3***

Key P1 - herbaceous dicots with alternate, simple, and unlobed leaves on the stem

1 Inflorescence an involucrate head subtended by phyllaries, the heads solitary or many and variously arrayed in secondary inflorescences, the ovary inferior, the corolla connate and tubular at least basally, the calyx absent, the stamens 5, the fruit a cypsela ..... ***ASTERACEAE***

1 Inflorescence, flower, and fruit structure various, but not with the combination of features as above (sometimes the flowers in a head, e.g. *Eryngium* in APIACEAE, but then with other features differing, such as stamens 4, or green calyx present, or fruit a schizocarp of mericarps, etc.).

2 Perianth uniseriate (represented only by undifferentiated tepals or sepals) or completely absent; flowers usually unisexual, less commonly bisexual).

3 Inflorescence a cyathium, consisting of a single pistillate flower (reduced to a single 3-carpellate pistil) and 2 or more staminate flowers (each reduced to 1 stamen), borne in a cup-like involucre, the involucre bearing pointed or rounded glands, these sometimes brightly colored and petaloid, mimicking an individual flower (the cyathia then secondarily arranged in terminal cymes, or solitary and axillary, etc.); fresh plants with milky juice; fruit a 3-lobed, 3-locular capsule ..... ***Euphorbia in EUPHORBIACEAE***

3 Inflorescence not a cyathium (and staminate or bisexual flowers with > 1 stamen; fresh plants lacking milky juice (except *Stillingia* in EUPHORBIACEAE); fruit various, not as above.

4 Leaf margins toothed in some manner (serrate, dentate, crenate, etc.)

5 Leaf teeth rounded to subacute, resembling shallow lobes, irregular, few (mostly < 6 per leaf side).

6 Fruit a single-seeded achene or utricle; [plants of various disturbed or saline, usually sunny habitats] ..... ***CHENOPODIACEAE***

6 Fruit a 3-lobed, circumscissilely dehiscent capsule; [plants native of rich moist shaded forests or aliens in suburban woodlands] ..... ***Pachysandra in BUXACEAE***

5 Leaf teeth sharp to crenate, not lobe-like, regular, many (mostly > 10 per leaf side).

7 Leaf bases cuneate ..... ***EUPHORBIACEAE***

7 Leaf bases cordate to rounded.

8 Styles 3; fruit a 3-lobed, 3-carpellate capsule (1 carpel sometimes aborting); inflorescence either a terminal or leaf opposed raceme, or a dense axillary condensed cyme with conspicuous toothed bracts subtending the flowers ..... ***EUPHORBIACEAE***

8 Styles 1 or 2; fruit either an achene or a multiple of achenes; inflorescence either an axillary dense cyme (almost a head), or an axillary spike with glomerules, or a terminal or axillary panicle.

9 Styles 2; inflorescence a dense axillary cyme (almost a head); fruit a multiple of achenes; plant lacking stinging hairs; [alien plant of weedy situations] ..... ***Fatoua in MORACEAE***

9 Style 1; inflorescence an axillary spikes with glomerules, or a terminal or axillary panicle; plant either with stinging hairs or not; [plant a rare alien (*Boehmeria nivea*) or a native of moist forests (*Boehmeria cylindrica, Laportea*)] ..... ***URTICACEAE***

4 Leaf margins entire.

10 Ovary inferior or half-inferior.

11 Leaf base cordate; calyx 3-lobed, fused into a bilaterally symmetrical, curved brown or yellowish tube; fruit a capsule ..... ***ARISTOLOCHIACEAE***

11 Leaf base cuneate, rounded, or truncate; calyx of 3-4-5 distinct sepals, radially symmetrical, white or yellow; fruit a dry, nutlike drupe or an achene. ..... ***Comandra in COMANDRACEAE***

10 Ovary superior.

14 Inflorescence a leaf-opposed (sometimes apparently terminal) spike or raceme; flowers visually white from white petaloid sepals, white bracts, or white stamens.

15 Sepals present, 4 or 5; petaloid, white; carpels 1 to many (-12); stamens 4 to many (-25); fruit a berry or an apically 2-lobed achene (as in *Petiveria*); leaf bases cuneate or rounded (but not cordate); [Eudicots]. ..... ***Phytolacca in PHYTOLACCACEAE***

15 Sepals absent; carpels 3-4; stamens 2-6 (-8); fruit a capsule, a 1-seeded drupe, or a schizocarp of 3-4 mericarps; leaf bases cordate or subcordate; [Basal Angiosperms].

17 Fruit a 1-seeded drupe; stamens 2; plants terrestrial or epiphytic ..... ***Peperomia in PIPERACEAE***

17 Fruit a capsule or schizocarp with 3-4 mericarps; stamens 3 or 6-8; plants terrestrial ..... ***SAURURACEAE***

14 Inflorescence not leaf-opposed, either simpler (single axillary or glomerules of flowers) or more complexly branched (axillary or terminal panicles or complex cymes); flowers white, reddish, scarious, or greenish.

18 Stipules tubular, sheathing (= ocreae); flowers subtended by tubular, sheathing bracteoles (= ocreolae); nodes usually prominently swollen; perianth usually of 5-6 white to pink tepals ..... ***POLYGONACEAE***

18 Stipules not tubular or sheathing; flowers not subtended by ocreolae; nodes not swollen; perianth absent or of 3-5 sepals.

19 Inflorescence an terminal involucrate cluster; flowers bisexual; stamens 9 ..... ***Eriogonum in POLYGONACEAE***

19 Inflorescence axillary, or a terminal panicle or raceme that is not involucrate; stamens 3-6.

20 Ovary 3-locular; styles 3, each bifid; fruit a capsule, with 6 seeds ..... ***Phyllanthus in PHYLLANTHACEAE***

20 Ovary 1-locular; styles 1-3, not bifid; fruit a utricle or achene (1-seeded).

21 Styles 1, stigma 1; flowers unisexual ..... ***Parietaria in URTICACEAE***

21 Styles 1-3, if style 1, then stigmas 3; flowers bisexual or unisexual.

22 Tepals acute, scarious ..... ***AMARANTHACEAE***

22 Tepals usually blunt, herbaceous ..... ***CHENOPODIACEAE***

2 Perianth biseriate (represented by differentiated whorls of sepals and petals, the sepals usually green or drab in color, the petals often brightly colored); flowers nearly always bisexual (there are exceptions).

23 Ovary inferior or half-inferior.

24 Petals connate.

25 Inflorescence leaf-opposed, a dense, cylindrical spike ..... ***Sphenoclea in SPHENOCLEACEAE***

25 Inflorescence various, either a terminal head, or axillary and solitary, or variously axillary or terminal and more diffuse.

26 Leaves toothed; flowers blue to white ..... ***CAMPANULACEAE***

26 Leaves entire; flowers white ..... ***Samolus in PRIMULACEAE***

24 Petals distinct.

27 Petals 5; stamens 5; inflorescence a head; fruit a schizocarp of 2 mericarps ..... ***Eryngium in APIACEAE***

27 Petals 4 7; stamens 6 or more; inflorescence various, not a head; fruit a capsule.

28 Petals 4-7; stamens 1× or 2× as many as the petals, 4-7, 8, 10, 12, or14; leaves herbaceous in texture ..... ***ONAGRACEAE***

28 Petals 5 (or sometimes doubled in horticultural forms); stamens 6-40 (or more); leaves fleshy in texture ..... ***Portulaca in PORTULACACEAE***

23 Ovary superior.

29 Corolla bilaterally symmetrical, petals connate (except distinct in VIOLACEAE); fruit a capsule or legume (except a 1-seeded indehiscent pod in *Krameria* in KRAMERIACEAE).

30 Petals distinct, 5; carpels 3; fruit a 3-loculed capsule ..... ***VIOLACEAE***
30 Petals connate (at least basally), 4, 5, 6, 7, or 8; carpels 1, 2, 4, 5, or 6 (rarely 3 in *Reseda* in RESEDACEAE); fruit a legume or 1-, 2-, or 5-loculed capsule (except a 1-seeded indehiscent pod in *Krameria* in KRAMERIACEAE).
31 Stamens 6-10 (-25), more than the number (4 or 5) of petals and the number (4 or 5) of the sepals; fruit a legume or a 1-6-carpellate capsule.
32 Stamens fused, monadelphous or diadelphous.
33 Stamens 10, monadelphous or diadelphous; fruit a legume ..... ***FABACEAE***
33 Stamens 6-8, monadelphous; fruit a capsule ..... ***POLYGALACEAE***
32 Stamens distinct.
34 Carpel 1; fruit a legume ..... ***Baptisia in FABACEAE***
34 Carpels 3-6; fruit a capsule ..... ***Reseda in RESEDACEAE***
31 Stamens 4-5, less than the number (5) of the petals; fruit a 2-5-carpellate capsule.
35 Pistil 5-carpellate; capsule 5-locular, explosively dehiscent; inflorescence axillary, small clusters of flowers ..... ***Impatiens in BALSAMINACEAE***
35 Pistil 2-carpellate; capsule 2 locular, opening gradually or not at all; inflorescence a terminal spike, raceme or panicle (or solitary, axillary flowers in *Chaenorrhinum* in PLANTAGINACEAE and *Krameria* in KRAMERIACEAE).
37 Stamens 5; corolla not spurred; capsule septicidal; pubescence of the stem and leaves either gland-tipped or dendritically branched..... ***Verbascum in SCROPHULARIACEAE***
37 Stamens 4; corolla with a distinct spur or sac at the base between the the 2 lower calyx lobes (except not spurred in *Digitalis* and *Schwalbea*); capsule loculicidal (only at the summit in *Antirrhinum* and *Chaenorrhinum*, and septicidal in *Schwalbea*); pubescence of the stem and leaves neither gland-tipped (except in *Antirrhinum* and *Chaenorrhinum*) nor dendritically branched.
38 Capsule septicidal; corolla not spurred ..... ***OROBANCHACEAE***
38 Capsule loculicidal; corolla spurred (except *Digitalis*) ..... ***PLANTAGINACEAE***
29 Corolla radially symmetrical, petals connate or distinct; fruit various (including a capsule).
39 Petals distinct; stamens 5-many.
40 Pistils 4-10 (each 1-carpellate) in a ring, these sometimes fused basally, each with its own style/stigma; fruit either an aggregate of achenes or follicles or a 5 (-7) locular capsule.
41 Pistils 5 (-7); inflorescence a compound terminal cyme.
42 Fruit an aggregate of follicles; leaves fleshy in texture; inflorescence; leaves entire of sparesly and coarsely serrate, with < 12 points per leaf; [plants primarily of dry habitats] ..... ***CRASSULACEAE***
42 Fruit a 5 (-7) locular capsule; leaves membranaceous in texture; leaves serrate, with > 20 points per leaf; [plants of wet habitats]..... ***Penthorum in PENTHORACEAE***
41 Pistils many; inflorescence of solitary flowers, or diffuse.
43 Leaves cuneate at the base; flowers in a diffuse inflorescence ..... ***Ranunculus in RANUNCULACEAE***
43 Leaves cordate at the base; flowers solitary, on long pedicels ..... ***Rubus in ROSACEAE***
40 Pistil 1, with 1-to many carpels (in many MALVACEAE, the carpels loosely united in a ring [of more than 5] around the single style/stigma); fruit either a 1-, 2-, 3-, 5-, 6-, or 10-locular capsule, or a silique/silicle, or a ring of mericarps.
44 Petals 4; sepals 4; stamens 6; fruit a silique/silicle ..... ***BRASSICACEAE***
44 Petals 5 (rarely 4 or 6); sepals 5 (rarely 4 or 6); stamens 5 (or multiples of 5), 6, or 12; fruit a capsule or a ring of mericarps.
45 Stamens many, connate into a staminal tube; carpels 5-many; fruit a capsule or ring of mericarps; leaves usually serrate ..... ***MALVACEAE***
45 Stamens 5-many, distinct; carpels 2-5; fruit a capsule; leaves entire (serrate in *Croton* in EUPHORBIACEAE).
46 Flowers unisexual; leaf vestiture of peltate scales and/or stellate hairs ..... ***Croton in EUPHORBIACEAE***
46 Flowers bisexual; leaf vestiture simple or stellate.
47 Flowers 6-merous (the petals and sepals 6, the stamens 6 or 12); corolla pink or purplish (rarely white); fruit a septicidal capsule..... ***Lythrum in LYTHRACEAE***
47 Flowers 5-merous (the petals and sepals 5, stamens 5 or various multiples of 5); corolla yellow, reddish, or blue; fruit a loculicidal or septicidal capsule.
48 Stamens 5; corolla yellow or blue; capsule either 10-locular and septicidal or 1-locular (with 3 carpels) and loculicidal.
49 Capsule 10-locular (with 5 carpels) and septicidal ..... ***Linum in LINACEAE***
49 Capsule 1-locular (with 3 carpels) and loculicidal ..... ***TURNERACEAE***
48 Stamens (5-) 10, 15, 20, 30 (-many); corolla white, pink, yellow, or reddish; capsule 3-, 5- (-10)-locular, loculicidal.
50 Stamens (5-) 10, 15, 20, 30 (-many); corolla yellow or reddish; capsule 3 (-10)-locular, loculicidal ..... ***CISTACEAE***
50 Stamens 10; corolla white or pink; capsule 5-locular ..... ***Chimaphila in ERICACEAE***
39 Petals fused; stamens (4-) 5 (-7).
51 Pistils 2, united only by the style and stigma; fruit a schizocarp of 2 follicles (often single by abortion); plant with milky juice when fresh; leaves entire; inflorescence an umbel ..... ***APOCYNACEAE***
51 Pistil 1 (of 2 or 3 fused carpels); fruit a capsule; plant lacking milky juice; leaves entire or serrate; inflorescence various (but not an umbel).
52 Ovary slightly to deeply 2-4-lobed; fruit a schizocarp of 4 mericarps or a drupe.
53 Ovary deeply 4-parted; style gynobasic; fruit a schizocarp of 4 mericarps ..... ***BORAGINACEAE***
53 Ovary slightly 2-4-lobed, or not at all lobed; style terminal or reduced to a sessile terminal stigma; fruit a schizocarp of 4 mericarps, or a drupe ..... ***HELIOTROPIACEAE***
52 Ovary not lobed; fruit a capsule or berry.
54 Leaves scale-like, 1-4.5 mm long, appressed to the stem; petals 4; stamens 4 ..... ***Bartonia in GENTIANACEAE***
54 Leaves larger (or only 2-8 mm long in *Pyxidanthera* in DIAPENSIACEAE, but then spreading); petals 5-7; stamens 5-7.
55 Plant a creeping subshrub (keyed here as a failsafe); leaves either 0.2-0.8 cm long and acicular, or 2-10 cm long and broadly ovate or elliptic. ..... ***Epigaea in ERICACEAE***
55 Plant an herb, erect or sprawling; leaves > 1.5 cm long.
57 Leaves cordate at the base; plant a twining vine ..... ***CONVOLVULACEAE***
57 Leaves cuneate to rounded at the base; plant an erect, sprawling, or reclining herb (twining in *Solanum dulcamara* in SOLANACEAE).
58 Inflorescences (solitary or of several flowers) terminal on the stem.
59 Corolla lobes longer than the fused corolla cup, blue, pink, or white; styles 2; herbage lacking stipitate glands; fresh plants not aromatic.
60 Flowers in axillary cymes; capsule subglobose; leaves 2-12 cm long ..... ***Hydrolea in HYDROLEACEAE***

60 Flowers solitary or paired in the leaf axils; capsule cylindrical; leaves 0.5-8 cm long ..... ***Nama in NAMACEAE***
59 Corolla lobes very short, much shorter than the corolla cup or tube, sometimes barely perceptible and represented only by teeth on the edge of the corolla limb, white or pink; style 1; herbage often with stipitate glands; fresh plants often rankly aromatic..... ***SOLANACEAE***
58 Inflorescences (of solitary or several flowers) axillary or lateral on the stem.
61 Flowers sessile or very-short pedicelled, solitary in the leaf axils.
62 Stamens alternate with the corolla lobes; flower ca. 10 mm in diameter ..... ***Evolvulus in CONVOLVULACEAE***
62 Stamens opposite the corolla lobes; flower ca. 1 mm in diameter ..... ***Lysimachia in PRIMULACEAE***
61 Flowers either solitary and obviously pedicelled, or several in an axillary or lateral inflorescence.
63 Corolla lobes longer than the fused corolla cup, blue ..... ***Hydrolea in HYDROLEACEAE***
63 Corolla lobes very short, much shorter than the corolla cup or tube, sometimes barely perceptible and represented only by teeth on the edge of the corolla limb, white, yellow, pink, various other colors (rarely including blue).
64 Fruit a capsule, 4-seeded ..... ***CONVOLVULACEAE***
64 Fruit a berry or capsule, many-seeded ..... ***SOLANACEAE***

Key P2 - herbaceous dicots with alternate, simple, and palmately lobed leaves on the stem

1 Inflorescence an involucrate head subtended by phyllaries, the heads solitary or many and variously arrayed in secondary inflorescences, the ovary inferior, the corolla connate and tubular at least basally, the calyx absent, the stamens 5, the fruit a cypsela ..... ***ASTERACEAE***
1 Inflorescence, flower, and fruit structure various, but not with the combination of features as above (sometimes the flowers in a head, e.g. *Eryngium* in APIACEAE, but then with other features differing, such as stamens 4, or green calyx present, or fruit a schizocarp of mericarps, etc.).
2 Plant a vine, climbing by tendrils or twining.
3 Vine climbing by twining.
4 Leaf margins entire; flowers bisexual; plants hermaphroditic; petals connate, large and showy ..... ***CONVOLVULACEAE***
4 Leaf margins serrate; flowers unisexual; plants dioecious; petals absent ..... ***Humulus in CANNABACEAE***
3 Vine climbing by tendrils.
5 Ovary inferior; petals connate; flowers unisexual ..... ***CUCURBITACEAE***
5 Ovary superior; petals distinct; flowers bisexual ..... ***Passiflora in PASSIFLORACEAE***
2 Plant an herb, sometimes sprawling, reclining (e.g. *Cymbalaria* in PLANTAGINACEAE, *Aconitum* in RANUNCULACEAE), but lacking climbing adaptations such as tendrils or twining stems.
6 Ovary inferior; inflorescence an umbel; fruit a schizocarp of 2 mericarps
7 Involucre well-developed and obvious ..... ***APIACEAE***
7 Involucre absent or minute ..... ***Hydrocotyle in ARALIACEAE***
6 Ovary superior; inflorescence various, not an umbel; fruit various, a capsule, an aggregate of achenes or follicles, a ring of (>2) mericarps.
8 Perianth uniseriate, the corolla absent (the calyx petaloid and white in *Cnidoscolus*); flowers unisexual; plants either with stinging hairs or not..... ***EUPHORBIACEAE***
8 Perianth biseriate (uniseriate in *Aphanes* in ROSACEAE and in *Trautvetteria* in RANUNCULACEAE); flowers bisexual; plants lacking stinging hairs.
9 Pistils many (or 2-3 in *Aphanes* in ROSACEAE), each with 1 carpel, arranged spirally or in a ring (if in a ring, of 2-5); fruit an aggregate of achenes, follicles, or utricles.
10 Perianth bilaterally symmetrical, either hooded or spurred; fruit an aggregate of follicles ..... ***RANUNCULACEAE***
10 Perianth radially symmetrical, not hooded or spurred; fruit an aggregate of utricles or achenes (plumose achenes in *Geum*)
11 Stamens showy, bright white, dilated towards the tip; pistils ca. 15; fruit an aggregate of utricles ..... ***Trautvetteria in RANUNCULACEAE***
11 Stamens not showy, white, or dilated towards the tip; pistils many (> 25); fruit an aggregate of achenes.
12 Flowers lacking a hypanthium; achenes short-beaked ..... ***Ranunculus in RANUNCULACEAE***
12 Flowers with a prominent hypanthium; achenes with an elongate, plumose beak ..... ***ROSACEAE***
9 Pistil 1, with 1-to many carpels (in many MALVACEAE, the carpels loosely united in a ring of more than 5 around the style); fruit a capsule, an achene, a follicle, or a ring of 3 or 5-many 1-seeded mericarps.
13 Perianth uniseriate, the corolla absent ..... ***Aphanes in ROSACEAE***
13 Perianth biseriate, with well-developed and differentiated calyx and corolla
14 Corolla bilaterally symmetrical, the petals connate (except distinct in *Delphinium* in RANUNCULACEAE); fruit a capsule, a follicle, or a schizocarp of 3 1-seeded mericarps.
15 Corolla not spurred; fruit an elongate (10-20 cm) capsule with 2 curved beaks ..... ***MARTYNIACEAE***
15 Corolla with a nectar spur; fruit < 3 cm long.
16 Petals distinct; fruit a follicle ..... ***Delphinium in RANUNCULACEAE***
16 Petals connate; fruit a capsule or a schizocarp of 3 1-seeded mericarps.
..... ***Cymbalaria in PLANTAGINACEAE***
14 Corolla radially symmetrical, the petals distinct (fused and tubular in *Ipomoea*); fruit a capsule or a schizocarp consisting of a ring of 5-many 1-seeded mericarps.
18 Stem trailing; petals fused and tubular ..... ***Ipomoea in CONVOLVULACEAE***
18 Stem erect; petals separate.
19 Stamens many, connate into a stamen tube; carpels 5-many, completely or only loosely fused; fruit a capsule or a schizocarp of 5-many mericarps borne in a ring; calyx often subtended by an epicalyx (an additional calyx-like, green, foliaceous whorl of bracts) .....
..... ***MALVACEAE***
19 Stamens 5 or 10, distinct; carpels 2 or 5, fused; fruit a capsule or a schizocarp of 5 1-seeded mericarps.
20 Fruit a schizocarp of 5 1-seeded mericarps; carpels 5; stamens 10 ..... ***Geranium in GERANIACEAE***
20 Fruit a capsule with 2 locules, loculicidal; carpels 2; stamens 5 ..... ***Hydrophyllum in HYDROPHYLLACEAE***

Key P3 - herbaceous dicots with alternate, simple, and pinnately lobed leaves on the stem

1 Inflorescence an involucrate head subtended by phyllaries, the heads solitary or many and variously arrayed in secondary inflorescences, the ovary inferior, the corolla connate and tubular at least basally, the calyx absent, the stamens 5, the fruit a cypsela ..... ***ASTERACEAE***
1 Inflorescence, flower, and fruit structure various, but not with the combination of features as above (sometimes the flowers in a head, e.g. *Eryngium* in APIACEAE, but then with other features differing, such as stamens 4, or green calyx present, or fruit a schizocarp of mericarps, etc.).

2 Perianth uniseriate, with only undifferentiated tepals; flowers many and small, greenish or brownish, inconspicuous individually; inflorescence of glomerules that are usually further aggregated into racemes or panicles; fruit an achene or utricle ..... ***CHENOPODIACEAE***

2 Perianth biseriate, both sepals and petals present and differentiated (except uniseriate and of 2 white to cream-colored sepals 5-10 mm long in *Macleaya* in PAPAVERACEAE); flowers larger, usually with the petals prominently colored; inflorescence various, but not as above; fruit a capsule, silique/silicle, or a schizocarp of 2 mericarps.

3 Corolla bilaterally symmetrical and the petals connate into a tube (or the corolla 2-lipped but the corolla lobes twisted so as to make the flower asymmetrical); stamens 4; fruit a 2-locular and loculicidal capsule opening by 2 valves ..... ***OROBANCHACEAE***

3 Corolla radially symmetrical and either connate into a tube or distinct (except *Reseda* in RESEDACEAE, with bilateral symmetry but separate petals); stamens 5 or more; fruit a silique/silicle, a schizocarp of 4 mericarps, or a 1-, 3-, or 4-locular capsule (2-locular in *Ipomoea* in CONVOLVULACEAE and *Glaucium* in PAPAVERACEAE), opening variously.

4 Ovary inferior; fruit either a schizocarp of 2 mericarps or a 4-locular capsule.

5 Flowers 5-merous, aggregated into a head; fruit a schizocarp of 2 mericarps ..... ***Eryngium in APIACEAE***

5 Flowers 4-merous, in a diffuse inflorescence; fruit a 4-locular capsule ..... ***Oenothera in ONAGRACEAE***

4 Ovary superior; fruit either a silique/silicle, or a 1-, 2-, or 3-locular capsule, or a berry.

6 Sepals and petals of different numbers, the sepals 2-3, the petals 0, 4, or 6; stamens many ..... ***PAPAVERACEAE***

6 Sepals and petals the same number, 4-8 each; stamens 5 or 6 (10-25 in *Reseda* in RESEDACEAE).

7 Corolla bilaterally symmetrical; stamens 10-25 ..... ***Reseda in RESEDACEAE***

7 Corolla radially symmetrical; stamens 5 or 6.

8 Petals 4, distinct; stamens 6; fruit a silique/silicle ..... ***BRASSICACEAE***

8 Petals 5, connate into a tube; stamens 5; fruit either a capsule or a berry.

9 Plant a twining vine.

10 Corolla with a long tube, much longer than the lobes, scarlet, white, pink, or blue; leaves shallowly to deeply pinnately parted into 3-many lobes ..... ***Ipomoea in CONVOLVULACEAE***

10 Corolla with a short tube, the lobes longer than the tube, purplish; leaves with a single large terminal l lobe, and 2 small basal lobes (these almost separate as leaflets) ..... ***Solanum dulcamara in SOLANACEAE***

9 Plant an erect or sprawling herb.

11 Fruit a capsule, 1-locular; corolla white, pink, lavender, or blue, the tube short (< 4 mm long), the lobes flaring, the corolla < 15 mm long or wide ..... ***HYDROPHYLLACEAE***

11 Fruit either a capsule, 2- or-3 locular, or a berry; corolla scarlet, blue, white, yellow, greenish-yellow, or purple, the tube long (>10 mm long) and cylindrical, the corolla > 10 mm long or wide.

12 Stigmas 3; fruit a capsule with 3 valves; {XXXX} ..... ***POLEMONIACEAE***

12 Stigmas 2; fruit either a capsule with 2 valves or a berry; {YYYY} ..... ***SOLANACEAE***

Key Q - herbaceous dicots with whorled leaves on the stem {add [*Platycodon*] CAMPANULACEAE}

1 Cauline leaves palmately compound.

2 Cauline leaves essentially sessile, and also palmately cleft to the base, and further lacerately divided into linear or oblanceolate segments ..... ***Anemone in RANUNCULACEAE***

2 Cauline leaves petiolate, with 3-5, sessile or petiolulate, ovate, elliptic, or obovate leaflets (these serrate and sometimes with additional lobes).

3 Inflorescence a spherical umbel of many flowers; fruit a drupe with 2-3 seeds; stem leaves 3-5

4 Leaflets 3 (-5), sessile or subsessile, the petiolules 0-3 mm long; larger leaflets 4-8 cm long, 0.5-2.5 cm wide, averaging about 2.5× as long as wide, the apex obtuse to acute; fruit yellow-green when ripe, longitudinally winged and ribbed in ×-section; petals white (rarely tinged with pink); inflorescence nodding in bud; underground storage organ a spherical tuber ..... ***Nanopanax in ARALIACEAE***

4 Leaflets (3-) 5, petiolulate, the petiolules (7-) 10-25 mm long; larger leaflets 6-15 cm long, 3.5-7 cm wide, averaging about 1.8× as long as wide, the apex acuminate; fruit bright red when ripe, smoothly elliptical in ×-section; petals light green; inflorescence erect in bud; underground storage organ an +/- elongate root, this vertical or horizontal, and sometimes branched ..... ***Panax in ARALIACEAE***

3 Inflorescence of single terminal flowers on the 1-several branches; fruit an aggregate of achenes; stem leaves 3 ..... ***Anemone in RANUNCULACEAE***

1 Cauline leaves simple.

5 Inflorescence an involucrate head subtended by phyllaries, heads solitary or many, variously arrayed in secondary inflorescences; fruit a cypsela ..... ***ASTERACEAE***

5 Inflorescence various, but not as above; fruit various, not as above (sometimes the flowers tightly grouped, but then with other features differing, such as stamens 4, or green calyx present, or fruit a schizocarp of mericarps, etc.).

6 Fruit a 3-lobed, 3-locular capsule; inflorescence a cyathium, consisting of a single pistillate flower (reduced to a single 3-carpellate pistil) and 2 or more staminate flowers (each reduced to 1 stamen), borne in a cup-like involucre, the involucre bearing pointed or rounded glands, these sometimes brightly colored and petaloid, mimicking an individual flower (the cyathia then secondarily arranged in terminal cymes, or solitary and axillary, etc.); fresh plants with milky juice ..... ***Euphorbia in EUPHORBIACEAE***

6 Fruit various, not as above; inflorescence not a cyathium (and staminate or bisexual flowers almost always with > 1 stamen); fresh plants lacking milky juice.

7 Leaves succulent, the terminal whorls closely juxtaposed; pistils 4-5; fruit an aggregate of follicles ..... ***Sedum in CRASSULACEAE***

7 Leaves herbaceous, thin in texture, whorls separated; pistil 1, of 2-5 fused carpels; fruit a capsule, achene, or drupe.

8 Larger whorled leaves on a plant < 10 mm wide [some taxa keyed here and under the second lead].

9 Inflorescence a cymule, either axillary, or axillary and terminal; ovary inferior.

10 Leaves markedly variable in shape or size in each whorl; fruit a capsule; petals 5 ..... ***MOLLUGINACEAE***

10 Leaves similar in size and shape in each whorl; fruit dry or fleshy, indehiscent; petals (3-) 4 ..... ***Galium in RUBIACEAE***

9 Inflorescence a terminal raceme, panicle, spike, cyme, corymb, or umbel; ovary superior.

11 Corolla bilaterally symmetrical, the petals connate; carpels 2; stamens 4, 6, or 8.

12 Stamens 4; corolla blue or almost white ..... ***PLANTAGINACEAE***

12 Stamens 6 or 8; corolla pink or yellow ..... ***Polygala in POLYGALACEAE***

11 Corolla radially symmetrical, the petals separate; carpels 2, 3, or 5; stamens 5, 10, or many.

13 Inflorescence an axillary umbel; leaves narrowly linear and more than 10× as long as wide, > 20 mm long and < 2 mm wide; whorls of 3-6 leaves ..... ***Asclepias verticillata in APOCYNACEAE***

13 Inflorescence a terminal cyme, raceme, panicle, or umbel; leaves as above, or broader in shape, narrower, or shorter; whorls of 3-16 leaves.

14 Inflorescence a terminal cyme or umbel; corolla white; carpels 5.

15 Leaves narrowly linear, 12-16 in each whorl; stamens 5 ..... ***Spergula in CARYOPHYLLACEAE***

15 Leaves ovate or obovate, 3 (-4) in each whorl ..... ***Chimaphila in ERICACEAE***

14 Inflorescence a terminal raceme or panicle; corolla reddish, maroon, or yellow.

16 Corolla reddish or maroon ..... ***Lechea in CISTACEAE***
16 Corolla yellow..... ***PRIMULACEAE***
8 Larger whorled leaves on a plant > 10 mm wide.
18 Inflorescence of terminal involucrate clusters; perianth of 6 tepals; fruit an achene; stamens 9; [plants of very dry habitats] ..... ***Eriogonum in POLYGONACEAE***
18 Inflorescence various, but not as above; perianth of 2 whorls (the calyx often obsolete in *Galium* in RUBIACEAE), 3-, 4-, 5-, 6-, or 7-merous; stamens 2-7; [plants of dry-mesic to very wet habitats].
19 Fruit dry or fleshy, indehiscent; petals (3-) 4; ovary inferior..... ***Galium in RUBIACEAE***
19 Fruit a capsule or follicle, dehiscent; petals 4-7; ovary superior.
20 Inflorescence an umbel; fresh plants with milky juice..... ***Asclepias quadrifolia in APOCYNACEAE***
20 Inflorescence not an umbel; fresh plants with clear juice.
21 Corolla pink-purple, 6-merous, the petals separate and borne on the edge of a hypanthium; stamens 8, 10, or 12; [plants of wetlands]..... ***LYTHRACEAE***
21 Corolla white, yellow, or greenish, 4-, 5-, or 7-merous, the petals fused at least basally into a tube (falling as a unit), not on a hypanthium; stamens 2, 4, 5, or 7; [plants of mesic habitats].
22 Stamens 2; corolla bilaterally symmetrical..... ***Veronicastrum in PLANTAGINACEAE***
22 Stamens 4, 5, or 7; corolla radially symmetrical.
23 Petals yellowish-white, with prominent green streaks; biennial or monocarpic plant, 10-30 dm tall when fertile; leaves 15-35 cm long..... ***Frasera in GENTIANACEAE***
23 Petals white or yellow; perennial plants, 1-15 dm tall; leaves 1-15 cm long.
24 Leaves punctate; stem without swollen nodes ..... ***Lysimachia in PRIMULACEAE***
24 Leaves not punctate; stem with swollen nodes ..... ***Silene in CARYOPHYLLACEAE***

Key R - herbaceous dicots with opposite, compound leaves on the stem

1 Inflorescence an involucrate head subtended by phyllaries, heads solitary or many, variously arrayed in secondary inflorescences; fruit a cypsela ..... ***ASTERACEAE***
1 Inflorescence various, but not as above; fruit various, not as above.
2 Leaves pinnately compound.
3 Leaves even-pinnate..... ***ZYGOPHYLLACEAE***
3 Leaves odd-pinnate.
..... ***Valeriana in VALERIANACEAE***
2 Leaves palmately compound.
5 Cauline leaves essentially sessile, and also palmately cleft to the base, and further lacerately divided into linear or oblanceolate segments ..... ***Anemone in RANUNCULACEAE***
5 Cauline leaves petiolate, with 3-5, sessile or petiolulate, ovate, elliptic, or obovate leaflets (these serrate and sometimes with additional lobes).
6 Plants annual; flowers typically unisexual and not showy, green; plants highly resinous and glandular; inflorescences variously arranged ..... ***Cannabis in CANNABACEAE***
6 Plants perrenial; flowers radially symmetric, showy, variously colored; plants typically not strongly resinous or glandular; inflorescences terminal..... ***Anemone in RANUNCULACEAE***

Key S - herbaceous dicots with opposite, simple leaves on the stem

1 Leaves unlobed (though sometimes serrate or crenate)..... ***Key S1***
1 Leaves palmately or pinnately lobed (leaves with cordate, sagittate, or hastate leaf bases and otherwise unlobed are treated as unlobed).
2 Leaves palmately lobed..... ***Key S2***
2 Leaves pinnately lobed..... ***Key S3***

Key S1 - herbaceous dicots with opposite, simple, and unlobed leaves on the stem

1 Inflorescence an involucrate head subtended by phyllaries, the heads solitary or many and variously arrayed in secondary inflorescences, the ovary inferior, the corolla connate and tubular at least basally, the calyx absent, the stamens 5, the fruit a cypsela ..... ***ASTERACEAE***
1 Inflorescence, flower, and fruit structure various, but not with the combination of features as above (sometimes the flowers in a head, e.g. *Pycnanthemum* in LAMIACEAE, but then with other features differing, such as stamens 4, or green calyx present, or fruit a schizocarp of mericarps, etc.).
2 Leaves scale-like, stems fleshy; flowers embedded in the fleshy stem, no perianth present; [saline environments (coastal or rarely inland)]. ..... ***CHENOPODIACEAE***
2 Leaves small to large; stems not fleshy; flowers sessile or on pedicels; [collectively of many habitats, saline and not].
3 Ovary inferior or partially inferior.
4 Perianth of a single whorl (petals absent) (note that in *Mirabilis* in NYCTAGINACEAE the petaloid calyx is subtended by a 5-lobed fused set of involucral bracts).
5 Leaves herbaceous, suborbicular, about as long as wide or wider than long; calyx 3- or 4-merous; stamens 4, 8, or 12.
6 Plant ascending, with a single node (2 leaves); leaves > 6 cm long and wide; calyx 3-merous, brown to yellowish; stamens 12 ..... ***Asarum in ARISTOLOCHIACEAE***
6 Plant creeping, with many nodes; leaves 3-15 mm long and wide; calyx 4-merous, yellow to greenish; stamens 4 or 8 ..... ***Chrysosplenium in SAXIFRAGACEAE***
5 Leaves fleshy, linear, lanceolate, to broadly ovate, at least slightly longer than broad; calyx 5-merous; stamens 3, 5, or 10.
7 Flowers axillary, sessile or nearly so, solitary or a few; petaloid sepals widely spreading, separate; leaves linear to oblanceolate; stamens 5 or 30-50.
..... ***Sesuvium in AIZOACEAE***
7 Flowers in terminal cymose panicles; petaloid sepals connate into a narrow tube (reminiscent of the corolla of *Ipomoea*); leaves lanceolate, elliptic, ovate, or broadly ovate; stamens 3 or 5..... ***NYCTAGINACEAE***
4 Perianth in 2 whorls (sepals and petals both present).
8 Petals distinct; inflorescence diffuse.
9 Leaves distinctly 3-veined from the base, the 3 veins converging again at the leaf apex..... ***Rhexia in MELASTOMATACEAE***

9 Leaves with prominently pinnate venation ..... ***ONAGRACEAE***
8 Petals connate into a tube (at least basally); inflorescence often a head or dense terminal cyme (also axillary, or solitary on long peduncles).
10 Petals 5; stamens 3, 4, or 5
12 Flowers in terminal corymbs; fruit dry ..... ***VALERIANACEAE***
12 Flowers axillary; fruit fleshy ..... ***Triosteum in CAPRIFOLIACEAE***
10 Petals 4 (or 6 or 8 in *Richardia* in RUBIACEAE); stamens 4, 6, or 8.
14 Leaves serrate; corolla bilaterally symmetrical (especially the flowers near the outer edge of the head); inflorescence a head ..... ***DIPSACACEAE***
14 Leaves entire; corolla radially symmetrical; inflorescence a head or more diffuse (see below).
15 Petals acute; flowers in terminal panicles, cymes, or panicles, or axillary; plant habit various, not simultaneously with all the characters below ..... ***RUBIACEAE***
15 Petals broadly rounded; flowers axillary, solitary; plant a diffusely branched herb with linear leaves ..... ***Polypremum in TETRACHONDRACEAE***
3 Ovary superior.
16 Perianth of a single whorl (petals absent) or missing entirely (petals and sepals both absent). {key lead number needs adjusting}
17 Inflorescence a cyathium, consisting of a single pistillate flower (reduced to a single 3-carpellate pistil) and 2 or more staminate flowers (each reduced to 1 stamen), borne in a cup-like involucre, the involucre bearing pointed or rounded glands, these sometimes brightly colored and petaloid, mimicking an individual flower (the cyathia then secondarily arranged in terminal cymes, or solitary and axillary, etc.); fresh plants with milky juice; fruit a 3-lobed, 3-locular capsule ..... ***Euphorbia in EUPHORBIACEAE***
17 Inflorescence not a cyathium (and staminate or bisexual flowers with > 1 stamen, except *Callitriche* in PLANTAGINACEAE); fresh plants lacking milky juice; fruit various, not as above.
18 Flowers 1 (or 2) in leaf axils; leaves entire.
19 Flowers unisexual; sepals 0; flowers (staminate) with 1 stamen ..... ***Callitriche in PLANTAGINACEAE***
19 Flowers bisexual; sepals 4; flowers with 2, 4, or 6 stamens.
20 {XXXX} ..... ***Trianthema in AIZOACEAE***
20 {YYYY} ..... ***LYTHRACEAE***
18 Flowers many, in axillary spikes, cymes, or glomerules, or in terminal spikes, heads, cymes, or panicles; leaves entire or serrate.
21 Fruit a 2-locular capsule; {XXXX} ..... ***Mercurialis in EUPHORBIACEAE***
21 Fruit single-seeded, an achene or utricle; {YYYY}.
22 Leaves serrate, regularly and sharply so; plants with stinging hairs (or not) ..... ***URTICACEAE***
22 Leaves entire, or with a few very obscure crenations (*Iresine*) or basally disposed rounded lobe-like teeth (*Atriplex*); plants without stinging hairs.
23 Leaves of a pair slightly to strongly different in size ..... ***Pilea in URTICACEAE***
23 Leaves of a pair the same size.
24 Styles 1-2 (-3); leaves 2-30 mm long, 0.5-8 mm wide, linear or narrowly elliptic ..... ***CARYOPHYLLACEAE***
24 Style 1; leaves generally either longer than 30 mm, or wider than 8 mm (if linear and smaller than those dimensions, then fleshy).
25 Tepals scarious; inflorescence of heads, spikes, or panicles ..... ***AMARANTHACEAE***
25 Tepals herbaceous; inflorescence of glomerules, these axillary or arrayed in spikes or panicles ..... ***Atriplex in CHENOPODIACEAE***
16 Perianth in 2 whorls (sepals and petals both present).
26 Gynoecium of 4-many pistils, each 1-carpellate.
27 Pistils 4-5, in a single whorl; stamens 4, 5, 8, or 10; fruit an aggregate of follicles ..... ***CRASSULACEAE***
27 Pistils many, spiral; stamens many; fruit an aggregate of plumose achenes ..... ***Clematis in RANUNCULACEAE***
26 Gynoecium either of 1 pistil (with 1 or more carpels), or of 2 pistils, united only by the style and stigma (APOCYNACEAE).
28 Petals not at all connate, not even at their bases.
29 Leaves with pellucid punctate glands (most easily visible with transmitted light); stamens often fascicled into 3, 4, or 5 fascicles; petals yellow or pinkish ..... ***HYPERICACEAE***
29 Leaves lacking pellucid punctate glands; stamens not fascicled; petals variously colored.
30 Sepals 2; stamens opposite the petals ..... ***PORTULACACEAE***
30 Sepals 3-7; stamens opposite the sepals.
31 Petals 3; sepals 5, dimorphic, the 2 outer sepals narrower than the 3 inner and concave sepals; stamens (3-) 5-15 (-25) ..... ***Lechea in CISTACEAE***
31 Petals 4-7; sepals 4-7, normally monomorphic; stamens 4, 5, 6, 8, 10, or 12 (or sometimes rarely 2 or 3).
32 Capsule 2-5 (-6) locular; style 1; perianth 4-7-merous; stamens 4, 6, 8, 10, or 12 ..... ***LYTHRACEAE***
32 Capsule either 1-locular of 10-locular; styles 2-5; perianth 4-5-merous; stamens 4, 5, 8, or 10 (or rarely 2 or 3).
33 Capsule 1-locular, dehiscent apically by teeth or valves; sepals connate into a tube or separate; styles 2-5; perianth 4-5-merous; stamens 4, 5, 8, or 10 (or rarely 2 or 3) ..... ***CARYOPHYLLACEAE***
33 Capsule 10-locular (each of the 5 carpels divided at maturity), septicidal; sepals distinct or nearly so; styles 5, perianth 5-merous; stamens 5 ..... ***Linum in LINACEAE***
28 Petals connate at least for a short distance at their bases.
34 Corolla radially symmetrical (or so slightly bilaterally symmetrical as to be mistakable as radially symmetrical); stamens as many as the corolla lobes (or 1 less in *Ruellia* in ACANTHACEAE, *Buchnera* in OROBANCHACEAE, *Trichostema* in LAMIACEAE, and *Verbena* in VERBENACEAE); carpels 2 or 3.
35 Pistils 2, united only by the style and stigma; fruit a schizocarp of 2 1-carpellate follicles (often single by abortion); plant with milky juice when fresh (except *Catharanthus*); leaves entire ..... ***APOCYNACEAE***
35 Pistil 1 (of 2-5 fused carpels); fruit either a 2-5-carpellate capsule or of 2 or 4 1-seeded nutlets derived from 2 carpels; plant lacking milky juice; leaves entire or serrate.
36 Ovary and capsule 3-5-carpellate; capsule 3- or 1-locular.
37 Sepals 2 ..... ***Montia in MONTIACEAE***
37 Sepals 5.
38 Inflorescence a terminal cyme; corolla salverform, with an elongated and very narrow tube, pink or white; capsule 3-locular ..... ***Phlox in POLEMONIACEAE***
38 Inflorescence various but not cymose, of terminal or axillary racemes or panicles, or of solitary axillary flowers; corolla connate only at the base, the petals appearing nearly separate (not salverform); capsule 1-locular ..... ***Lysimachia in PRIMULACEAE***
36 Ovary and capsule 2-carpellate; fruit either a 2-locular capsule or of 2 or 4 1-seeded nutlets derived from 2 carpels.

39 Stamens 4-12, the same number as the corolla lobes; corolla (and the flower as a whole) strictly radially symmetrical.
40 Capsule septicidal; corolla white, pink, blue, yellowish white, or greenish white; inflorescence either a terminal or axillary cyme, or a terminal panicle or raceme, or a terminal or axillary cyme reduced to 1 or a few flowers ..... ***GENTIANACEAE***
40 Capsule loculicidal and also deeply 2-lobed; corolla white, pink, or scarlet with a yellow interior; inflorescence of cymosely arranged spikes ..... ***LOGANIACEAE***
39 Stamens either 4, 1 fewer than the 5 corolla lobes, or 2 (with 2 staminodes); corolla usually slightly bilaterally symmetrical (the flower as a whole made bilaterally symmetrical by the 2 or 4 stamens).
41 Leaves entire; corolla tube flaring for all of its length
42 Fruit a schizocarp of 4 1-seeded nutlets; inflorescence terminal, of cymes; corolla ca. 5 mm long; leaves prominently 3-veined .. .. ***Trichostema in LAMIACEAE***
42 Fruit a capsule; inflorescence axillary, of cymes or clusters (often reduced to a solitary flower); corolla > 12 mm long; leaves with single primary vein ..... ***ACANTHACEAE***
41 Leaves serrate; corolla salverform, the tube narrow and nearly the same diameter for most of its length; inflorescence a terminal spike, raceme, raceme of racemes, or head.
43 Fruit a 2-locular capsule; stamens inserted near the base of the corolla tube ..... ***Buchnera in OROBANCHACEAE***
43 Fruit a schizocarp of 4 mericarps; stamens inserted near or above the middle of the corolla tube ..... ***VERBENACEAE***
34 Corolla bilaterally symmetrical (or the corolla 2-lipped but the corolla lobes twisted so as to make the flower asymmetrical); fertile stamens fewer than the corolla lobes (except *Plantago* in PLANTAGINACEAE, which is equal, with 4 each; a few genera have a 5th, sterile, stamen which is obviously different in form than the 4 fertile stamens) (note that many corollas are bilabiate and the number of corolla lobes, 4 or 5, may be difficult to interpret); carpels 2.
44 Carpels 2, each carpel slightly to deeply lobed, separating at maturity into 4 half-carpellate units (not separating in *Phyla* in VERBENACEAE); fruit a schizocarp of 4 mericarps (or 2 nutlets in *Phyla* in VERBENACEAE).
45 Inflorescence a thyrse, verticillaster, or terminal cyme, the flowers borne in cymose lateral branches; corolla strongly bilaterally symmetrical (rarely nearly radially symmetrical); stems square in ×-section (or sometimes rounded, especially on older growth); fresh plants often (but not always) aromatic ..... ***LAMIACEAE***
45 Inflorescence of spikes, racemes, or heads, the flowers or fruits single at nodes; corolla often nearly radially symmetrical; stems rounded in X-section (rarely square); fresh plants usually not aromatic ..... ***VERBENACEAE***
44 Carpels 2, unlobed; fruit a capsule (or an achene in *Phryma*).
46 Stamens 2.
47 Corolla 4 lobed, almost radially symmetrical; corolla scarious, white, or bluish ..... ***PLANTAGINACEAE***
47 Corolla 4-5-lobed, either strongly bilabiate or salverform (*Pseuderanthemum* in ACANTHACEAE); white, blue, or yellow.
48 Inflorescence an axillary cluster or spike ..... ***ACANTHACEAE***
48 Inflorescence of solitary (rarely 2) axillary flower. {add [*Hypoestes*] ACANTHACEAE}
49 Sepals 4 ..... ***LINDERNIACEAE***
49 Sepals 5, distinct or nearly so.
50 Corolla barely bilaterally symmetrical, the lobes about as long as the tube; outer sepals ovate, much wider than the inner sepals ..... ***Bacopa in PLANTAGINACEAE***
50 Corolla distinctly bilabiate, the lobes shorter than the tube; sepals of nearly the same width.
51 Sterile stamens (the lower pair) consisting of slender filaments ..... ***Lindernia in LINDERNIACEAE***
51 Sterile stamens minute or completely absent ..... ***Gratiola in PLANTAGINACEAE***
46 Stamens 4.
52 Corolla 4 lobed, nearly radially symmetrical; corolla scarious ..... ***Plantago in PLANTAGINACEAE***
52 Corolla 5-lobed, distinctly bilabiate or in some nearly radially symmetrical; corolla colored.
53 Flowers in terminal racemes, panicles, or spikes, the inflorescence not interspersed with large, leaf-like bracts.
54 Sepals separate to the base or nearly so, not forming a tube ..... ***PLANTAGINACEAE***
54 Sepals connate for at least 0.3× their length to form a tube (this cup-like and flaring in *Scrophularia* in SCROPHULARIACEAE).
55 Inflorescence a diffuse panicle; corolla 5-11 mm long, reddish-brown (sometimes with some yellow); fruit a septicidal capsule ..... ***Scrophularia in SCROPHULARIACEAE***
55 Inflorescence of 1 or more terminal (and sometimes upper axillary) spikes or racemes; corolla 10-50 mm long (6-8 mm long in *Phryma* in PHRYMACEAE), white, pink, blue, purple, or yellow; fruit either a loculicidal capsule (OROBANCHACEAE) or a single seeded achene (*Phryma* in PHRYMACEAE).
56 Corolla 10-50 mm long, pink, blue, purple, or yellow; fruit a loculicidal capsule ..... ***OROBANCHACEAE***
56 Corolla 6-8 mm long, white to pale pink; fruit a 1-seeded achene contained in the accrescent calyx, this "lopping down" against the inflorescence axis ..... ***Phryma in PHRYMACEAE***
53 Flowers axillary and solitary, borne in the axils of normally-sized leaves or somewhat reduced but still large and leaf-like bracts [some taxa keyed here and below].
57 Sepals separate to the base or nearly so, not forming a tube.
58 Corolla distinctly bilabiate ..... ***Lindernia in LINDERNIACEAE***
58 Corolla not bilabiate, only slightly bilaterally symmetrical.
59 Leaves serrate, 2.0-4.5 cm long; plant usually blackening on drying ..... ***Mecardonia in PLANTAGINACEAE***
59 Leaves entire, either mostly larger or smaller [see below]; plant not blackening on drying
60 Leaves 0.6-2.8 cm long, round, obovate, or broadly elliptic, < 1.8× as long as wide; plants creeping, ascending to 3 dm tall; [plants of wet places] ..... ***Bacopa in PLANTAGINACEAE***
60 Leaves 3-30 cm long, narrowly elliptic to lanceolate, > 2× as long as wide; plants erect or the stems sprawling; [plants mostly of uplands] ..... ***ACANTHACEAE***
57 Sepals connate for at least 0.3× their length to form a tube.
61 Corolla yellow, orange, or red. ..... ***Aureolaria in OROBANCHACEAE***
61 Corolla white, pale blue, lavender, or pink (sometimes with some yellow).
64 Corolla pink (sometimes almost white), often lined with yellow inside; leaves narrowly linear, often filiform (except lanceolate in *A. auriculata*); plants usually blackening on drying (some species do not); corolla not strongly bilabiate ..... ***Agalinis in OROBANCHACEAE***
64 Corolla white, blue, or combinations of blue and white (sometimes with some yellow markings); leaves broader, mostly lanceolate; plants not blackening on drying; corolla strongly bilabiate.

66 Corolla blue; lower lip of the corolla arched upwards into the throat; plants perennial from rhizomes or crowns, 3-13 dm tall ..... ***Mimulus in PHRYMACEAE***

66 Corolla bicolored, the upper lip white or very pale blue, the lower lip bright blue; lower lip of the corolla folded downward into a pouch enfolding the anthers; plants annuals, 0.5-4 dm tall..... ***Collinsia in PLANTAGINACEAE***

Key S2 - herbaceous dicots with opposite, simple, and palmately lobed leaves on the stem {add [*Humulus*] CANNABINACEAE}

1 Leaf lobes very narrow, < 3 mm wide; inflorescence an involucrate head subtended by phyllaries, the heads solitary or many and variously arrayed in secondary inflorescences, the ovary inferior, the corolla connate and tubular at least basally, the calyx absent, the stamens 5, the fruit a cypsela..... ***ASTERACEAE***

1 Leaf lobes broad, >20 mm wide; inflorescence, flower, and fruit structure various, but not with the combination of features as above.

2 Leaves >4 per above-ground stem; perianth 5-merous; flowers bilaterally symmetrical, the corolla with connate petals, lavender-white with yellow markings in the throat; fruit a large curved capsule..... ***Proboscidea in MARTYNIACEAE***

2 Leaves 1-2 per above-ground stem; perianth 3-merous; flowers radially symmetrical, the corolla absent or with distinct petals, white; fruit a berry or aggregate of berries.

3 Leaves with peltate petiole attachment; carpel 1; petals present, white..... ***BERBERIDACEAE***

3 Leaves with petiole attached marginally; carpels many, as separate pistils; petals absent..... ***Hydrastis in HYDRASTIDACEAE***

Key S3 - herbaceous dicots with opposite, simple, and pinnately lobed leaves on the stem

1 Inflorescence an involucrate head subtended by phyllaries, the heads solitary or many and variously arrayed in secondary inflorescences, the ovary inferior, the corolla connate and tubular at least basally, the calyx absent, the stamens 5, the fruit a cypsela ..... ***ASTERACEAE***

1 Inflorescence, flower, and fruit structure various, but not with the combination of features as above (sometimes the flowers tightly grouped, but then with other features differing, such as stamens 4, or green calyx present, or fruit a schizocarp of mericarps, etc.).

2 Flowers tiny, individually inconspicuous; perianth absent or vestigial; fruit a utricle ..... ***Atriplex in CHENOPODIACEAE***

2 Flowers larger, individually conspicuous; perianth present, the petals or sepals brightly colored; fruit a capsule (or aggregate of achenes in *Clematis* in RANUNCULACEAE or schizocarp of 4 mericarps in *Glandularia* in VERBENACEAE).

3 Flowers radially symmetrical; stamens 5 or many; fruit a capsule or aggregate of achenes. ..... ***Clematis in RANUNCULACEAE***

3 Flowers bilaterally symmetrical (sometimes only slightly so); stamens 4 (or 2 in *Veronica* in PLANTAGINACEAE); fruit a capsule or schizocarp of mericarps.

5 Inflorescence of cymosely arranged spikes or heads; fruit a schizocarp of 4 nutlets..... ***Glandularia in VERBENACEAE***

5 Inflorescence of solitary axillary flowers or terminal racemes.

6 Corolla yellow, orange, or red; plants often drying black (but not *Striga*); sepals connate into a tube at least 1/3 as long as the corolla lobes; calyx 5-merous..... ***OROBANCHACEAE***

6 Corolla white, pink, lavender, or blue; plants not drying black; sepals distinct or only shortly connate into a short tube, the calyx lobes much longer than the tube; calyx 5- or 4-merous ..... ***PLANTAGINACEAE***

THE FLORA
SECTION 1: LYCOPHYTES or CLUBMOSSES

L01a. HUPERZIACEAE Rothmaler 1962 (FIRMOSS FAMILY) [in LYCOPODIALES]

A family of 3 genera and ca. 300 species, mainly tropical and subtropical. Within the lycophytes, *Huperzia* and related genera (*Phlegmariurus* and *Phylloglossum*) form a clade with "an isolated position", sister to the remainder of the family, and warrant family rank as Huperziaceae (Haines 2003a). See discussion under Lycopodiaceae about family circumscriptions. References: Beitel (1979); Chen et al (2021); Haines (2003a); Lellinger (1985); Mickel (1979); Øllgaard in Kramer & Green (1990); Øllgaard & Windisch (2014); Øllgaard (1987); Øllgaard (1987); Øllgaard, Kessler, & Smith (2018); Snyder & Bruce (1986); Testo, Field, & Barrington (2018); Wagner & Beitel (1992); Wagner & Beitel (1992); Wikström & Kenrick (2000); Wikström & Kenrick (2001).

Identification Notes: The family Huperziaceae is recognized by being lycophytes -- vascular plants (larger than a moss and with a thicker stem), with numerous microphyll leaves, and with solitary sporangia borne in the axils of leaves (or embedded in the base of the leaf). Among lycophytes, the family is recognized by having dichotomously branching stems (Y-forked) borne in clusters, with many microphyll leaves less than 2 cm long, arrayed in an unranked pattern on the stem (not in rows along the length of the stem), and bearing 'large' (> 1 mm wide), kidney-shaped sporangia axillary to normally-sized leaves.

Huperzia Bernhardi 1801 (FIRMOSS, CLUBMOSS)

A genus of about 10-15 (or with an additional 15 or more undescribed) species, north temperate and arctic (and tropical mountains of Asia). References: Björk (2020); Haines (2003a); Øllgaard in Kramer & Green (1990); Testo, Haines, & Gilman (2016); Wagner & Beitel (1993) in FNA2 (1993b); Wikström & Kenrick (2000); Zhang & Iwatsuki in FoC (2013).

Identification Notes: The genus *Huperzia* is recognized by its stiff, upright stems borne in a cluster, the stems usually 2-20 cm tall, with many spreading to ascending leaves 2-11 mm long and the larger leaves > 5× as long as wide and with acute tips, with yellow sporangia in the leaf axils near the top of the stem, and by the usual presence of 3-lobed gemmae (vegetative propagules) also borne in leaf axils. In the Flora region, *Huperzia* is nearly restricted to the inland provinces, only found in the Coastal Plain from NC northwards. Most species are associated with rock outcrops, except *Huperzia lucidula* which typically occurs in moist soils of forests. Several hybrids are known from our area; they usually occur in intermediate habitats (such as in thin soil at the base of cliffs) and generally are found in proximity to both parents, but sometimes occur in the absence of one or both parents. Hybrids can be recognized by their intermediate morphology (and are not keyed).

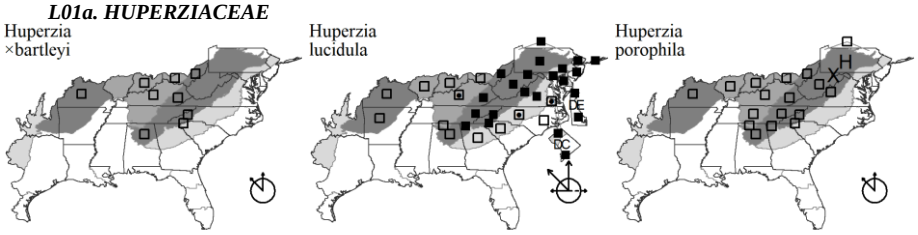
1 Leaves oblanceolate, the apical portion toothed with 1-8 large, irregular teeth; leaves 6-15 mm long, 1.0-2.5 mm wide; stomates on lower leaf surface only (visible at 10×, or preferably 20-40×, magnification); spores 23-29 µm in diameter; [mainly of forest soils]**.....*Huperzia lucidula***
1 Leaves lanceolate (awl-shaped), margins not toothed, or minutely toothed in the apical portion only with 1-3 low teeth; leaves 3-9 mm long, 0.6-1.3 mm wide; stomates on both leaf surfaces (visible at 10×, or preferably 20-40×, magnification); spores 29-38 µm in diameter; [mainly of rock outcrops].
..... *Huperzia porophila*

Huperzia ×bartleyi (Cusick) Kartesz & Gandhi [*Huperzia lucidula* × *porophila*]. BARTLEY'S FIRMOSS. **Hab:** Rock outcrops. **Dist:** Apparently widely distributed from NY west to w. WI, ne. IA, south to w. NC, nw. SC, nw. AL, and e. MO, in a scattered pattern associated with the overlap in distribution between its two parents, but not everywhere associated with both parents. **Phen:** Jun-Sep. **ID Notes:** This hybrid can be told from its parents by the presence of stomates on both surfaces of the leaf (unlike *H. lucidula*), but their marked lower density on the upper surface (unlike *H. porophila*). **Syn:** = Il, K1, K3, K4, Haines (2003a); = *Huperzia lucidula* × *porophila* – NY; = n/a – RAB.

Huperzia lucidula (Michaux) Trevisan. SHINING FIRMOSS, SHINING CLUBMOSS. **Hab:** Moist forests and ravines. **Dist:** NL (Newfoundland) to MB, south to nw. SC, n. GA, n. AL, s. IL, and nw. AR (Peck 2011); disjunct in NM (Santa Fe County); disjunct in China (Jilin) (FoC). **Phen:** Jun-Aug. **ID Notes:** This is the largest *Huperzia* in our region, and the only one likely to be found away from rock in forest soils. **Syn:** = Ar, FNA2, K1, K3, K4, Mo1, NE, NY, Pa, Tn, Va, Björk (2020), Haines (2003a); = *Lycopodium lucidulum* Michaux – C, F, G, Md, RAB, Sf, W, WV; > *Huperzia lucidula* var. *lucidula* – Il. NatureServe G5 (Secure).

Huperzia porophila (F.E. Lloyd & Underwood) Holub. ROCK FIRMOSS, ROCK CLUBMOSS. **Hab:** Rock outcrops and cliffs, especially in the spray of waterfalls, at low to medium elevations, usually on sandstone or felsic metamorphic or metaigneous rocks (acidic schists, gneisses, granitic gneisses), and most characteristically on ledges or in crevices in overhung settings along the cliff face where the plants receive little or no direct sunlight. **Dist:** Centered in the sedimentary Central Appalachians, *H. porophila* ranges from ne. PA, WV, OH, WI, ON, and MN south to w. NC, nw. SC, ne. GA, nw. AL, and e. MO. **Phen:** Jun-Sep. **Tax:** Waterway (1986) clarified the distinctions between *H. porophila* and *H. lucidula*. We do not accept the conclusions of Björk (2020) that *H. porophila* and *H. occidentalis* (of western North America) represent disjunct populations conspecific with the Macaronesian *H. suberecta*. **ID Notes:** *Huperzia porophila* is almost always found in heavy shade, in crevices or ledges on vertical or overhung cliffs, at low to moderate elevations (< 4000 feet). **Syn:** = FNA2, Il, K1, K3, K4, Mo1, Pa, Tn, Va; = *Lycopodium porophilum* Lloyd & Underwood – C, F, RAB, Sf, W, WV; < *Huperzia suberecta* (Lowe) Tardieu – Björk (2020); < *Lycopodium selago* var. *patens* (Palisot de Beauvois) Desvaux – G, misapplied. NatureServe G4 (Apparently Secure).

L01a. HUPERZIACEAE



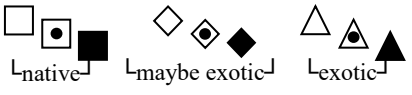
L01b. LYCOPODIACEAE Palisot de Beauvois ex Mirbel 1802 (CLUBMOSS FAMILY) [in LYCOPODIALES]

A family of 10-15 genera and about 400 species. Lycopodiaceae + Huperziaceae, along with Selaginellaceae and Isoetaceae, have now been shown to be only distantly related to other extant pteridophytes and seed plants (Pryer et al. 2001). The division of North American *Lycopodium* into three or more genera has been strongly advocated by Wagner & Beitel (1992), Wagner & Beitel in FNA (1993), Haines (2003a), and nearly all other recent authors. The traditionally broad *Lycopodium* appears to include a number of natural groups which are strikingly different from one another and have constituted separate lineages for tens to hundreds of millions of years. These natural groups are separable by numerous morphological, developmental, and anatomical characters, karyotype, and inability to hybridize. Wagner & Beitel (1992) divide *Lycopodium (sensu latissimo)* of our area into six genera in three subfamilies, as follows: *Huperzia* in Subfamily Huperzioideae, *Lycopodium* and *Diphasiastrum* in Subfamily Lycopodioideae, and *Lycopodiella, Palhinhaea,* and *Pseudolycopodiella* in Subfamily Lycopodielloideae. Haines (2003a) further divides *Lycopodium (sensu lato)* into three genera: *Dendrolycopodium, Spinulum,* and *Lycopodium (sensu stricto).* The reasoning behind this division is very strong, and it is here followed. Profound differences in anatomy, morphology, reproduction, gametophyte morphology, and karyotype support this separation, in addition to the very great age of these lineages. The chromosome numbers of our genera: *Dendrolycopodium* (x=34), *Diphasiastrum* (x=23), *Huperzia* (x=67, 68), *Lycopodiella* (x=78), *Lycopodium* (x=34), *Palhinhaea* (x=55), *Pseudolycopodiella* (x=35), and *Spinulum* (x=34). Øllgaard in Kramer & Green (1990) and Wikström & Kenrick (2000) follow a somewhat broader coarse, recognizing three genera for our species (corresponding to the subfamilies of Wagner & Beitel 1992), and recognizing as sections the genera of Wagner & Beitel (1992). Øllgaard states that the "genera are very distinct, and also the sections within *Lycopodiella* and *Lycopodium* seem to represent ancient, independent evolutionary lines"; later, Øllgaard has elevated the sections to generic rank (Øllgaard & Windisch 2014). Wikström & Kenrick (2000, 2001) suggest that the phylogenetic separation of *Lycopodium* (including *Diphasiastrum*) and *Lycopodiella* (including *Pseudolycopodiella* and *Palhinhaea*) occurred at least as long ago as the early Jurassic (208 million years before present), and the divergence of *Huperzia* from *Lycopodium* and *Lycopodiella* still longer ago. Based on this deep division between *Huperzia* and the other genera, some authors additionally advocate the recognition of *Huperzia* in a separate family, Huperziaceae, an opinion followed here. The generic taxonomy used here follows PPG I (2016).
References: Beitel (1979); Chen et al (2021); Haines (2003a); Lellinger (1985); Mickel (1979); Øllgaard in Kramer & Green (1990); Øllgaard (1987); Øllgaard, Kessler, & Smith (2018); PPG I (2016); Snyder & Bruce (1986); Testo, Field, & Barrington (2018); Wagner & Beitel (1992); Wagner & Beitel (1993) in FNA2 (1993b); Wikström & Kenrick (2000); Wikström & Kenrick (2001).

1 Leafy stems erect or pendant, simple or dichotomously branched, the ultimate branches vertically oriented; sporophylls like the sterile leaves or only slightly reduced, in annual bands along the stem; vegetative reproduction absent or by leafy gemmae near the stem apex ..... ***Huperziaceae***
1 Leafy stems prostrate or erect, if erect then generally branched, the ultimate branches spreading (horizontal) or ascending; sporophylls differing from sterile leaves, either broader and shorter, or more spreading, and aggregated into strobili (cone-like structures) borne terminally on the stems or branches; lacking vegetative reproduction by gemmae.
  2 Leaves herbaceous, pale or yellow-green, dull, deciduous; principal leafy stems creeping (except erect and repeatedly branched in *Palhinhaea*); rhizome dying back annually to an underground vegetative tuber at apex; spores rugulate; erect fertile shoots in a single dorsal rank; [wetlands, mostly on moist or wet sands or peats]; [subfamily *Lycopodielloideae*].
    3 Upright shoots repeatedly branched; strobili nodding at the ends of the branches, 4-8 mm long; [known to occur from se. SC southward] ..... ***Palhinhaea cernua***
    3 Upright shoots not branched; strobili erect on upright shoots, 1.5-80 mm long; [widespread in our area].
      4 Leaves of the prostrate stems 0.5-1.2 mm wide, ciliate-toothed or not toothed; leaves of the erect stem many, overlapping, spiral; leaves of the strobilus (sporophylls) resembling leaves of the prostrate and upright stems in size and shape; strobilis 10-80 mm long; upright stems 1.5-15 mm in diameter (including the leaves) ..... ***Lycopodiella***
      4 Leaves of the prostrate stems 1.3-2.1 mm wide, not toothed; leaves of the erect stem few, not overlapping, whorled; leaves of the strobilus (sporophylls) much reduced relative to leaves of the prostrate and upright stems, their margins entire to minutely denticulate-fimbriate; strobilis 1.5-9 mm long; upright stems 1.5-3 mm in diameter (including the leaves) ..... ***Pseudolycopodiella***
  2 Leaves rigid, bright to dark green, shiny, evergreen; principal leafy stems mainly erect, treelike, fanlike, or creeping (if creeping, then the leaves with elongate, hyaline hair-tips); rhizome perennial, elongate, surficial or subterranean; spores reticulate; erect fertile shoots in 2 dorsolateral ranks; [mostly uplands, in moist to dry soils]; [subfamily *Lycopodioideae*].
    5 Branches 1-5 mm wide (including the leaves), compressed to quadrangular, with 4 ranks of leaves; branching of strobilus stalks dichotomous ..... ***Diphasiastrum***
    5 Branches 4-12 mm wide, terete (to somewhat compressed in *Dendrolycopodium obscurum*), with 6 or more ranks of leaves; branching of strobilus stalks (when present), pseudomonopodial (falsely appearing to have a main axis from which branches arise).
      6 Strobili borne on elongate, sparsely leafy peduncles borne at the tips of leafy, ascending branches; leaves with attenuate, hyaline hair-tips ..... ***Lycopodium***
      6 Strobili sessile, borne directly above densely leafy portions of upright branches; leaves acuminate to acute. ..... ***Dendrolycopodium***

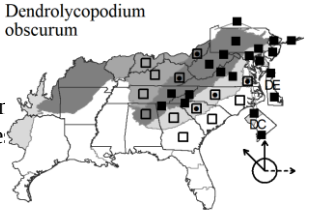
Dendrolycopodium A. Haines 2003 (GROUNDPINE, TREE-CLUBMOSS)

Key to Map Symbology:



* : waif
EN : endemic
H : historic

N : no
P : plar
? : que



L01b. LYCOPODIACEAE

A genus of 4 species, temperate and subarctic. Haines (2003a) made the case for this genus as distinct from *Lycopodium* s.s. and other relatives. Later phylogenetic studies have corroborated this decision (e.g., Testo, Field, & Barrington 2018). References: Haines (2003a); Hickey (1977); Øllgaard in Kramer & Green (1990); Petlewski (2020); Wagner & Beitel (1993) in FNA2 (1993b); Wagner, Beitel, & Moran (1989); Zhang & Iwatsuki in FoC (2013).

Identification Notes: *Dendrolycopodium* is similar in overall appearance to *Diphasiastrum*. Both genera have horizontal rhizomes (on or below the ground surface), bearing vertical stems at intervals, and each vertical stem bears sterile branchlets and fertile branchlets. The sterile branchlets are horizontal to ascending, and branch dichotomously (in Ys), while the fertile branchlets are erect and terminate in narrow strobili (cone-like structures) which bear the sporangia. At all seasons, *Dendrolycopodium* is easily distinguished from *Diphasiastrum* by its leaves, which are needle-like (but only slightly stiff), and which spread away from the branches at acute to right angles, giving the plant a slightly prickly appearance and feel, as opposed to the leaves of *Diphasiastrum*, which are scale-like and tightly appressed to the branches, giving the plant a smooth texture.

Dendrolycopodium obscurum (Linnaeus) A. Haines. COMMON GROUNDPINE, FLAT-BRANCHED TREE-CLUBMOSS. **Hab:** Acidic forests. **Dist:** NS and NB west to MI and WI, south to n. GA, ne. AL, s. IN, n. IL (?), and c. MN; China, Japan, Korea, e. Russia. **Phen:** Jul-Sep. **Syn:** = K3, K4, NE, NY, Tn, Va, Haines (2003a), Petlewski (2020); = *Lycopodium obscurum* Linnaeus – FNA2, K1, Pa; = *Lycopodium obscurum* var. *obscurum* – F, G, Md, RAB, W, WV; < *Lycopodium obscurum* Linnaeus – C, Sf.

Diphasiastrum Holub 1975 (FLAT-BRANCHED CLUBMOSS, RUNNING CEDAR)

A genus of about 15-20 species, mostly north temperate and subarctic. This group has often in the past been treated as *Lycopodium* section *Complanata* (Øllgaard in Kramer & Green 1990, Øllgaard 1987, Wikström & Kenrick 2000). References: Haines (2003a); Øllgaard in Kramer & Green (1990); Wagner & Beitel (1993) in FNA2 (1993b); Wikström & Kenrick (2000).

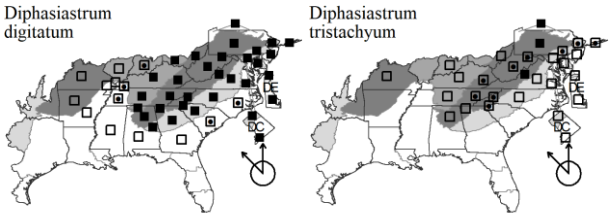
Identification Notes: *Diphasiastrum* is similar in overall appearance to *Dendrolycopodium*. Both genera have horizontal rhizomes (on or below the ground surface), bearing vertical stems at intervals, and each vertical stem bears sterile branchlets and fertile branchlets. The sterile branchlets are horizontal to ascending, and branch dichotomously (in Ys), while the fertile branchlets are erect and terminate in narrow strobili (cone-like structures) which bear the sporangia. At all seasons, *Diphasiastrum* is easily distinguished from *Dendrolycopodium* by its leaves, which are scale-like and tightly appressed to the branches, giving the plant a smooth texture, as opposed to the leaves of *Dendrolycopodium*, which are needle-like (but only slightly stiff), and which spread away from the branches at acute to right angles, giving the plant a slightly prickly appearance and feel.

2 Foliage dark green, not glaucous; sterile branchlets 2-4 mm wide (including the leaves); sterile branchlets without conspicuous annual constrictions; rhizomes 0-1 cm deep (which can be determined by pulling up a single upright shoot – the depth to rhizome is approximately the length of the white portion of the vertical stem); abaxial rank of leaves on horizontal branchlets shorter than the lateral ranks (thus the branchlets flattened in cross-section)..... ***Diphasiastrum digitatum***

2 Foliage blue-green, glaucous; horizontal branchlets 1-2 mm wide (including the leaves); branchlets with conspicuous annual constrictions; rhizomes (1-) 5-12 cm deep; abaxial rank of leaves on horizontal branchlets as long as the lateral ranks (thus the branchlets more-or-less square in cross-section)..... ***Diphasiastrum tristachyum***

Diphasiastrum digitatum (Dillenius ex A. Braun) Holub. SOUTHERN RUNNING-CEDAR, COMMON RUNNING-CEDAR, FAN GROUND-PINE, TURKEYFOOT, SILVER-PINE. **Hab:** Dry to mesic, usually acid forests and openings, especially common in disturbed sites, such as successional pine forests. **Dist:** NL (Newfoundland) west to MN, south to SC, GA, AL, MS, and AR. **Phen:** Jul-Sep. **Tax:** Hickey & Beitel (1979) and Holub (1975a, 1975b) explain the nomenclatural reasons for accepting the epithet *'digitatum'* over *'flabelliforme'*. **Syn:** = Ar, FNA2, Il, K3, K4, NE, NY, Pa, Tn, Va, Haines (2003a); = *Lycopodium complanatum* Linnaeus var. *flabelliforme* Fernald – F, G; = *Lycopodium digitatum* Dillenius ex A. Braun – C, K1, Mo1, W; = *Lycopodium flabelliforme* (Fernald) Blanch – Md, RAB, Sf, WV.

Diphasiastrum tristachyum (Pursh) Holub. BLUE RUNNING-CEDAR, GROUND-CEDAR. **Hab:** Dry forests, glades, balds, barrens, forest openings. **Dist:** NL (Labrador) west to AB, south to nw. SC, ne. GA, ne. AL, MO, MN, and e. ND. **Phen:** Jul-Sep. **Syn:** = FNA2, K3, K4, NE, NY, Pa, Tn, Va, Haines (2003a); = *Lycopodium tristachyum* Pursh – C, F, G, K1, Md, Mo1, RAB, Sf, W, WV. NatureServe G5 (Secure).



Lycopodiella Holub 1964 (BOG-CLUBMOSS)

A genus of about 15-20 species, temperate and tropical. Additional research on this genus in our area is needed. Two fertile tetraploid species were named from MI (Bruce, Wagner, & Beitel 1991), and additional cryptic or semicryptic species may be found in the Southeastern Coastal Plain. This group has been variously treated as genus *Lycopodiella*, or as *Lycopodiella* section *Lycopodiella* (Øllgaard in Kramer & Green 1990, Wikström & Kenrick 2000), with a strong trend towards generic rank. References: Haines (2002a); Haines (2003a); Haines (2003b); Haines (2007a); Øllgaard in Kramer & Green (1990); Øllgaard (2012a); Wagner & Beitel (1993) in FNA2 (1993b); Wikström & Kenrick (2000); Zhang & Iwatsuki in FoC (2013).

Identification Notes: Species of this genus are difficult to identify. They often grow together; it is not uncommon to find two or more species at a single site in the southeastern Coastal Plain. Hybrids occur. Juvenile plants, resprouting in spring or after fire, are especially difficult to identify. In contrast to most *Lycopodiella*

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

species, *Pseudolycopodiella caroliniana* and, to a lesser degree, *L. prostrata*, are dorsiventrally flattened (or "pseudodistichous"), but it seems that juvenile sprouts of all species are somewhat flattened.

2 Fertile leaves (sporophylls) 2.9-5.0 (-5.2) mm long, appressed at maturity, entire or with short teeth < 0.3 mm long; strobili 3-6 mm in diameter at maturity ..... ***Lycopodiella appressa***

2 Fertile leaves (sporophylls) 5.5-9 mm long, spreading, with 1-8 teeth per margin, some or all of the teeth exceeding 0.3 mm in length; strobili 10-20 mm in diameter at maturity.

3 Prostrate stems arching, not in contact with the ground (and rooting) all along their length, 8-11 mm wide (including leaves), the stem (stripped of leaves) 2-4 mm in diameter; leaves of the prostrate stem of one size and shape, spreading to ascending, 5-7 mm long, 0.5-0.7 mm wide; erect stems many, equally spaced along the prostrate stems, progressively shorter and sterile toward the apex of the prostrate stems ..... ***Lycopodiella alopecuroides***

3 Prostrate stems creeping, in contact with the ground (and rooting) all along their length, 12-19 mm wide (including leaves), the stem (stripped of leaves) 1-2.2 mm in diameter; leaves of the prostrate stems dimorphic, spreading to reflexed, the upper leaves smaller (4-5 mm long, 0.4-0.6 mm wide) than the lateral leaves (7-8 mm long, 0.7-1.8 mm wide); erect stems few, clustered well behind the apex of the prostrate stems, mostly fertile and subequal in length ..... ***Lycopodiella prostrata***

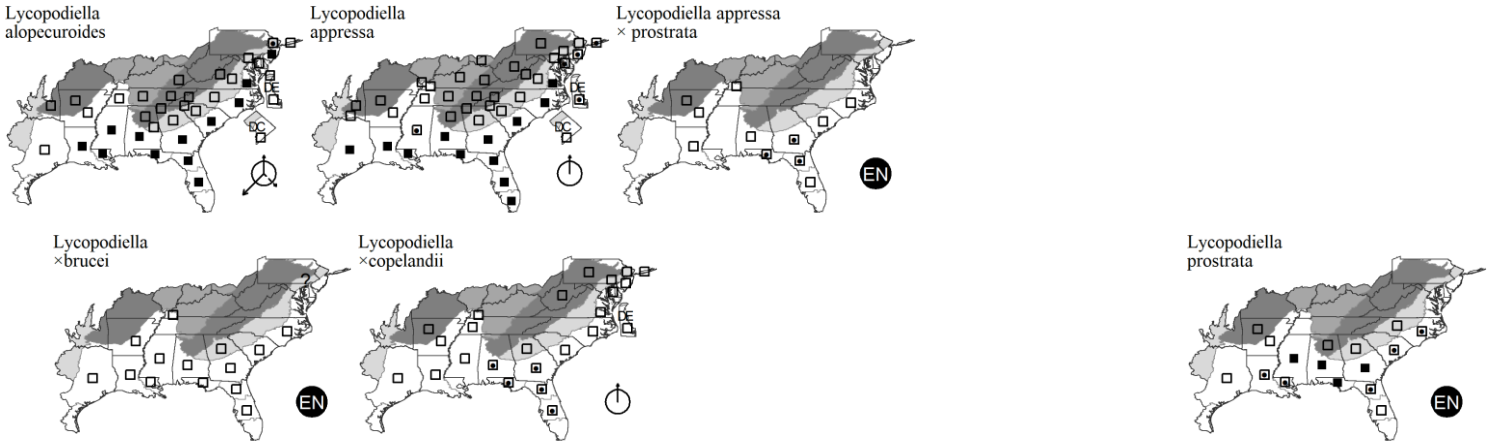
Lycopodiella alopecuroides (Linnaeus) Cranfill. FOXTAIL BOG-CLUBMOSS. **Hab:** Pine savannas, seepages, wet pine flatwoods, wet prairies, bogs, ditches, and other wet, sandy sites. **Dist:** Primarily Southeastern Coastal Plain: se. MA south to FL and west to e. TX, and disjunct in the Cumberland Plateau of KY, TN, and VA, the Allegheny Mountains of WV (Morton et al. 2004), the e. Highland Rim of TN, and in ME (Haines 2001); s. Mexico south through Central America to n. South America; Cuba. **Phen:** Jul-Sep. **Comm:** The tropical portions of the distribution may be considered presumptive at this time; for instance, Øllgaard (2012a) elevates two taxa previously treated as varieties of *Lycopodiella alopecuroides* to species rank. **Syn:** = Ar, ETx1, Fl1, FNA2, K1, K3, K4, Meso1, NE, NY, Pa, Tn, TxFerns, Va, WH3, Haines (2002a); = *Lycopodium alopecuroides* Linnaeus – C, F, G, Md, Sf, W; = *Lycopodium alopecuroides* var. *alopecuroides* – Tx; < *Lycopodium alopecuroides* Linnaeus – RAB. NatureServe G5 (Secure).

Lycopodiella appressa (Chapman) Cranfill. SOUTHERN BOG-CLUBMOSS. **Hab:** Pine savannas, wet pine flatwoods, seepages, bogs, wet prairies. **Dist:** Primarily Southeastern Coastal Plain: se. NL (Newfoundland) and MA, south to FL, west to OK, AR, and TX, and disjunct inland in KY, TN, NC, w. SC, and WV, s. OH. **Phen:** Jul-Sep. **Syn:** = Ar, ETx1, Fl1, FNA2, Il, K1, K3, K4, NE, NY, Pa, Tn, TxFerns, Va, WH3, Haines (2002a), Haines (2007a); = *Lycopodium adpressum* (Chapman) Lloyd & Underwood – Tx; = *Lycopodium appressum* (Chapman) Lloyd & Underwood – C, RAB, Sf, W; = *Lycopodium inundatum* Linnaeus var. *bigelovii* Tuckerman – F, G. NatureServe G5 (Secure).

Lycopodiella appressa* × *prostrata [*Lycopodiella appressa* × *prostrata*]. **Syn:** = n/a – RAB.

Lycopodiella ×brucei Cranfill [*Lycopodiella alopecuroides* × *prostrata*]. **Syn:** = K1, K3, K4, WH3; = n/a – RAB.

Lycopodiella ×copelandii (Eiger) Cranfill [*Lycopodiella alopecuroides* × *appressa*]. **Syn:** = Ar, K1, K3, K4, NE, WH3, Haines (2002a), Haines (2007a); = *Lycopodiella alopecuroides* × *appressa* – NY; = n/a – RAB.



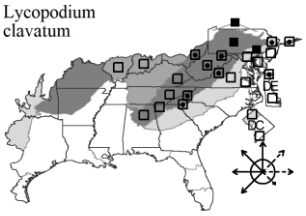
Lycopodiella prostrata (R.M. Harper) Cranfill. FEATHERSTEM CLUBMOSS, PROSTRATE BOG-CLUBMOSS. **Hab:** Pine savannas, wet pine flatwoods, seepages, bogs, wet prairies. **Dist:** A Southeastern Coastal Plain endemic: se. NC south to c. FL and west to AR and e. TX, with scattered occurrences disjunct inland (as in n. GA, n. AL, and c. AR). **Phen:** Jul-Sep. **Syn:** = Ar, ETx1, Fl1, FNA2, K1, K3, K4, TxFerns, WH3; = *Lycopodium alopecuroides* Linnaeus var. *pinnatum* Chapman – Tx; = *Lycopodium prostratum* R.M. Harper – C, Sf; < *Lycopodium alopecuroides* Linnaeus – RAB.

Lycopodium Linnaeus 1753 (RUNNING CLUBMOSS)

A genus of 5-10 species, mainly temperate and subarctic (but *L. clavatum* on nearly all continents). The fractionation of *Lycopodium* has resulted in the creation of more natural genera, more comparable to those in other groups of plants. References: Haines (2002b); Haines (2003a); Hickey (1977); Øllgaard in Kramer & Green (1990); Øllgaard & Windisch (2014); Rumsey (2007); Wagner & Beitel (1993) in FNA2 (1993b); Wagner, Beitel, & Moran (1989); Zhang & Iwatsuki in FoC (2013).

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

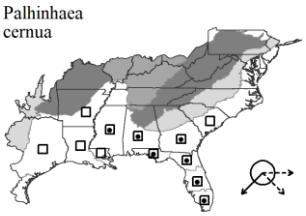
L01b. LYCOPODIACEAE



Lycopodium clavatum Linnaeus. RUNNING CLUBMOSS. **Hab:** Openings, balds, roadbanks, open forests. **Dist:** Circumboreal, south in e. North America along the Appalachians to NC, n. GA, and ne. AL (Clay Co.; Diamond 2020); also c. Mexico south through Central America to n. South America (Brazil); West Indies. **Phen:** Jul-Sep. **Tax:** Additional taxonomic study is needed of what may prove a complex of species. **Syn:** = FNA2, Il, K1, K3, K4, Md, NE, NY, RAB, Sf, Tn, Va, W, Haines (2002b), Rumsey (2007); = *Lycopodium clavatum* ssp. *clavatum* – Meso1, Øllgaard, Kessler, & Smith (2018); = *Lycopodium clavatum* var. *clavatum* – F, G, Md; < *Lycopodium clavatum* Linnaeus – C, Pa, WV. NatureServe G5 (Secure).

Palhinhaea Vasconcellos & Franco 1967 (NODDING CLUBMOSS)

A genus of about 25 species, tropical and subtropical. This group has been variously treated as the genus *Palhinhaea* (Øllgaard 2015; Wagner & Beitel in FNA 1993b; PPG 2016; Øllgaard, Kessler, & Smith 2018) or as *Lycopodiella* section *Campylostachys* (Øllgaard in Kramer & Green 1990; Wikström & Kenrick (2000). References: Øllgaard in Kramer & Green (1990); Øllgaard (2015); Wagner & Beitel (1993) in FNA2 (1993b); Wikström & Kenrick (2000); Zhang & Iwatsuki in FoC (2013).



Palhinhaea cernua (Linnaeus) Vasconcellos & Franco. NODDING CLUBMOSS, STAGHORN CLUBMOSS. **Hab:** Wet savannas, ditches and other disturbed moist areas. **Dist:** E. SC south to s. FL, west to s. AR and e. TX; Neotropics; Paleotropics. **Phen:** Jun-Nov. **Tax:** As circumscribed broadly, *Palhinhaea cernua* has a very wide distribution, but there are indications that it is likely a complex of semicryptic species. **Comm:** Some of the occurrences in our area may be adventive and of short duration. MacRoberts et al. (2018) report on occurrences of this species in LA, e. TX, and s. AR. **Syn:** = Ar, ETx1, FNA2, TxFerns, Øllgaard, Kessler, & Smith (2018); = *Lycopodiella cernua* (Linnaeus) Pichi Sermolli – Fl1, Meso1, WH3; = *Lycopodium cernuum* Linnaeus – Sf; > *Lycopodiella cernua* (Linnaeus) Pichi Sermolli var. *cernua* – K1; > *Palhinhaea cernua* var. *cernua* – K3, K4. NatureServe G5T5 (Secure).

Pseudolycopodiella Holub 1983 (CAROLINA BOG CLUBMOSS)

A genus of about 12 or more species, sub-cosmopolitan, but especially tropical and subtropical. This group has often been treated as section of *Lycopodium* (or of *Lycopodiella*); it appears to warrant status as a genus separate from *Lycopodiella* (Øllgaard, Kessler, & Smith 2018). In addition to the morphologic distinctions, the "*Pseudolycopodiella* group" has considerable anatomical differences, a different base chromosome number than *Lycopodiella* (x = 35 vs. x = 78), and does not hybridize with *Lycopodiella* (Wagner & Beitel 1992). Øllgaard in Kramer & Green (1990) and Wikström & Kenrick (2000) retained it as *Lycopodiella* section *Carolinianae*. References: Cook (2015); Haines (2003a); Øllgaard in Kramer & Green (1990); Wagner & Beitel (1993) in FNA2 (1993b); Wikström & Kenrick (2000); Zhang & Iwatsuki in FoC (2013).

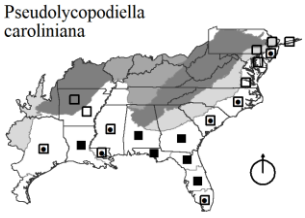
Identification Notes: In contrast to most *Lycopodiella* species, *Pseudolycopodiella caroliniana* and, to a lesser degree, *L. prostrata*, are dorsiventrally flattened (or "pseudodistichous"), but it seems that juvenile sprouts of all species are somewhat flattened.

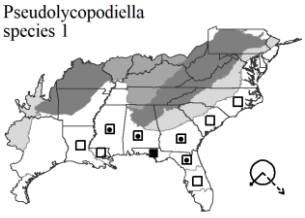
1 Peduncle leaves and sporophylls < 3.0 mm long; peduncle < 1.0 mm wide; strobili < 6.0 mm wide; spores (35.37-) mean 40.72 (-49.82) µm long; ..... ***Pseudolycopodiella caroliniana***

1 Peduncle leaves and sporophylls > 3.0 mm long; peduncle > 1.0 mm wide; strobili > 6.0 mm wide; spores (33.75-) 45.61 (-54.81) µm long..... ***Pseudolycopodiella species 1***

Pseudolycopodiella caroliniana (Linnaeus) Holub. CAROLINA BOG CLUBMOSS, SLENDER CLUBMOSS. **Hab:** Pine savannas, seepages. **Dist:** MA south to s. FL and west to e. TX. Attributions of a wider distribution of this species (West Indies, Mexico, Central and South America, Asia, Africa) are based on a much broader circumscription of the species than that adopted by Cook (2015). **Phen:** Jul-Sep. **Tax:** A diploid species (Cook 2015). **Syn:** = Cook (2015); < *Lycopodiella caroliniana* (Linnaeus) Pichi Sermolli – WH3; < *Lycopodiella caroliniana* (Linnaeus) Pichi Sermolli var. *caroliniana* – Fl1, K1; < *Lycopodium carolinianum* Linnaeus – C, F, G, Md, RAB, Sf, Tx; < *Pseudolycopodiella caroliniana* (Linnaeus) Holub – Ar, ETx1, FNA2, K3, NE, NY, TxFerns, Va, Haines (2003a); < *Pseudolycopodiella caroliniana* var. *caroliniana* – K4. NatureServe G5T4 (Apparently Secure).

Pseudolycopodiella species 1. FLORIDA BOG CLUBMOSS. **Hab:** Wet pine savannas, bogs. **Dist:** Se. NC south to c. FL, west to w. LA; West Indies; s. Mexico and Central America. **Phen:** Jul-Sep. **Tax:** A tetraploid species (Cook 2015). **Syn:** < *Lycopodiella caroliniana* (Linnaeus) Pichi Sermolli – WH3; < *Lycopodiella caroliniana* var. *meridionalis* (Underwood & F.E. Lloyd) Øllgaard & P.G. Windisch – Meso1; < *Lycopodium carolinianum* Linnaeus – RAB, Sf; < *Pseudolycopodiella caroliniana* (Linnaeus) Holub – Ar, ETx1, FNA2, K3, Va, Haines (2003a); < *Pseudolycopodiella caroliniana* var. *caroliniana* – K4. NatureServe G5TNR (Not Yet Ranked).





Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

L02. ISOETACEAE Dumortier 1829 (QUILLWORT FAMILY, MERLIN'S-GRASS FAMILY) [in ISOETALES]

A family of a single genus and about 250-300 species. References: Jermy in Kramer & Green (1990); Taylor et al (1993a) in FNA2 (1993b).

Isoetes Linnaeus 1753 (QUILLWORT, MERLIN'S-GRASS)

Contributed by P.W. Schafran, L.J. Musselman, and A.S. Weakley

A genus of about 250-300 species, cosmopolitan in distribution. Allopolyploids, derived from crossing between parental species and genome duplication, represent roughly half of the named taxa in eastern North America. Molecular data suggest that many of the southeastern polyploid species contain complexes of morphologically similar but genetically unique taxa. These complexes represent independent polyploidy events between different sets of parental species. The appropriate systematic treatment of these complexes would recognize approximately twice as many species. At present, many polyploid species should be treated only as taxonomic, not evolutionary, entities. References: Boom (1982); Bray, Schafran, & Musselman (2018); Brunton & Britton (1996a); Brunton & Britton (1996b); Brunton & Britton (1997); Brunton & Britton (1998); Brunton & Britton (1999); Brunton & McNeill (2015); Brunton (2015); Brunton (2016); Caplen & Werth (2000a); Caplen & Werth (2000b); Hoot, Napier, & Taylor (2004); Jermy in Kramer & Green (1990); Kott & Britton (1983); Luebke & Budke (2003); Musselman & Knepper (1994); Musselman (2001); Musselman et al (1995); Musselman, Bray, & Knepper (1996); Musselman, Bray, & Knepper (1997); Musselman, Taylor, & Bray (2001); Schafran (2019); Schafran et al (2016); Schafran et al (2018); Singhurst et al (2011); Taylor et al (1993a) in FNA2 (1993b); Wood et al (2020a).

Identification Notes: Hybrids are possible between many combinations of species. Hybrids are readily recognized by having megaspores of variable size, shape, and ornamentation (aborted). Leaf width measurements are at midpoint of the leaf length, well above the flared base. Leaf lengths are of undamaged leaves from leaf tip to the top of the rootstock.

1 Plants with narrow (0.5-1.0 mm wide), stiff leaves 3-20 cm long; leaves ± erect; emergent in sand and fine gravel of shallow, ephemeral bedrock pools and seeps in woodland glades or on open outcrops.
  2 Leaves grass-green; megaspore surface granular or unornamented, > 525 µm in diameter; [in basic (limestone) substrates]; [2*n*: n. AL, nw. GA and northward] .... ***Isoetes butleri***
  2 Leaves gray-green to bright-green; megaspore surface ridged or tuberculate, < 525 µm in diameter; [in acidic substrates].
    4 Megaspores typically 440-510 µm in diameter; ornamentation pattern wrinkled to low tuberculate; [plants on granite outcrops]; [4*n*: Piedmont of e. AL (and w. GA?)] ..... ***Isoetes graniticola***
    4 Megaspores typically < 450 µm in diameter, ornamentation pattern sparsely wrinkled, short-ridged (some with pseudo-reticulate configuration) or densely tuberculate; [plants on granite or sandstone outcrops]; [2X: Piedmont of e. AL to s. VA; 4*n* populations reported in s. GA and se. VA] ..... ***Isoetes piedmontana***
1 Plants with broad (1.25-2.25 mm wide), ± flaccid leaves > 15 cm long; submerged or emergent in mineral or organic substrate of swamps, marshes, ponds, rivers, shores or open graminoid swales.
  7 Megaspores > 575 µm in diameter, with reticulate ornamentation. ..... ***Isoetes boomii***
  7 Megaspores < 575 µm in diameter; with reticulate to almost spiny or low tuberculate and/or vermiform ornamentation.
    11 Velum coverage > 40% (uncommonly to ± 30% in *Isoetes valida*).
      12 Plants with broad (1.25-2.25 mm wide), light yellow-green, ± firm, reflexed leaves; velum coverage 45-70% (uncommonly only 30%); megaspores with tall, uneven, thin muri in ragged-reticulate pattern; [2*n*: found in woodland seepages (less commonly in pools); [primarily Mountains, uncommonly of Piedmont and Coastal Plain, PA to s. AL; also ne. MS] ..... ***Isoetes valida***
      12 Plants with narrow (1.0-1.5 mm wide), dark-green, straggly to widely reflexed leaves; velum coverage 80-100%; megaspores with low tubercles or broad ridges (mounds) of even height in broken to evenly reticulate pattern; [Coastal Plain]. ..... ***Isoetes flaccida***
    11 Velum coverage < 40%.
      15 Megaspore ornamentation of low vermiform muri in semi-reticulate pattern or with low tubercles.
        20 Broad (± 1.3 mm wide) light green leaves, bases never becoming black-brown and hardened; megaspores ± 410 (to 440) µm in diameter in diameter; conspicuously ornamented with numerous low tubercles or ridges; [2*n*: woodland pools of Piedmont of VA to AL and se. MS ..... ***Isoetes melanopoda ssp. silvatica***
        20 Narrow (± 1 mm wide) gray-green leaves with shiny, black-brown bases when spores are mature; megaspores ± 380 µm in diameter in diameter; typically with plain and mealy surface or obscurely ornamented with scattered tubercles and ridges; [2*n*: wet prairies and open graminoid swales of s. MS, w. AL and westward ..... ***Isoetes melanopoda ssp. melanopoda***
      15 Megaspore ornamentation in distinctly reticulate ('honeycomb') pattern or with dense pattern of tall, short-crested, almost echinate muri.
        21 Plants emergent or aquatic; megaspores ± 460 (occasionally to 500) µm in diameter; evenly-reticulate ornamentation pattern of even-topped muri continuous to the equatorial ridge without an equatorial band; [2*n*: Atlantic Coastal Plain, Appalachian Mts and irregularly northward, south to c GA, ne AL] ..... ***Isoetes engelmannii***
        21 Plants primarily emergent or amphibious; megaspores > 520 (rarely to over 600) µm in diameter; unevenly-reticulate and interrupted ornamentation pattern of ragged-topped muri, with an equatorial band of few to numerous spines; [4*n* or 6*n*].
          22 Leaves narrow (< 2.0 mm wide), blackish-green to olive green; megaspore ornamentation broken-reticulate to almost spiny with numerous tubercles often with short, mostly stand-alone muri or with broken ridges, usually with an equatorial band of numerous spines. ..... ***Isoetes hyemalis***
          22 Leaves broad (> 2.0 mm wide), dark green to bright green; megaspore ornamentation moderately to evenly reticulate with few or no standalone short muri or tubercles, usually with equatorial band absent or a plain band with few spines.
            25 Irregularly reticulate megaspore ornamentation pattern of both interconnected, longer muri and short, stand-alone muri; velum coverage ± 30% (occasionally less); plants usually deeply rooted (> 20% of leaf length) in clay or clayey-sand; [4*n*: Coastal Plain; LA, MS, AL] ..... ***Isoetes louisianensis***

Key to Map Symbology: □ native; ◇ maybe exotic; △ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

25 Regularly reticulate megaspore ornamentation pattern of interconnected muri with few or no stand-alone muri; velum coverage 10-25%; plants usually shallowly rooted (10-20% of leaf length) in sand or silty-sand substrate.
.....***Isoetes appalachiana***

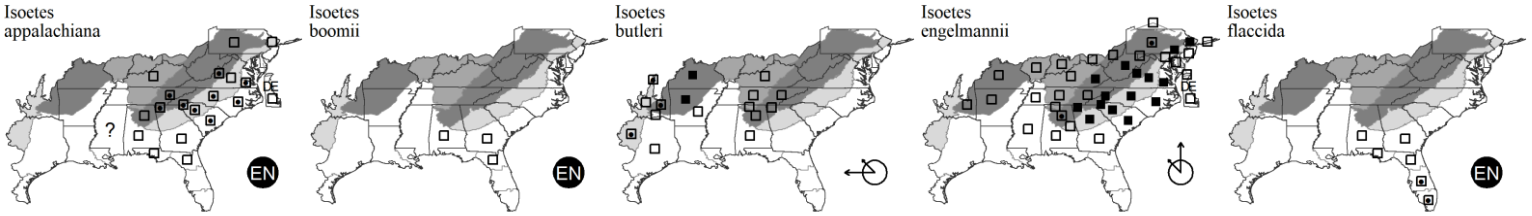
Isoetes appalachiana D.F. Brunton & D.M. Britton. APPALACHIAN QUILLWORT. **Hab:** Seepages, small woodland streams, ephemeral wetlands, backwaters. **Dist:** N. NJ and PA south to ne. FL, s. AL, and ne. MS. See McAVoy (2021) for its occurrence in DE. **Tax:** A tetraploid species (2*n*=44), apparently derived from a northern *I. engelmannii* entity and *I. valida* (Hoot, Napier, & Turner 2004), genotype=NNVV. A southern variant is derived from a southern *I. engelmannii* entity and *I. valida*, genotype=SSVV. See Brunton & Britton (1997) for additional information. **Syn:** = Fl1, K1, K4, Tn, Va, WH3, Musselman (2001); < *Isoetes engelmannii* A. Braun – C, FNA2, Pa, RAB, W, WV; < *Isoetes engelmannii* var. *engelmannii* – F, Sf.

Isoetes boomii N. Luebke. BOOM'S QUILLWORT. **Hab:** Shallow water of slow-moving streams. **Dist:** Known from Laurens County, GA, AL, and FL. **Comm:** A hexaploid species (2*n*=66). **Syn:** = FNA2, K1, K4, WH3; < *Isoetes boomii* N. Luebke – Musselman (2001), (also see I. georgiana).

Isoetes butleri Engelmann. BUTLER'S QUILLWORT. **Hab:** Seepage areas on calcareous glades, sometimes also in seepage on non-calcareous rocks. **Dist:** KY, IL, MO and e. KS south to e. TX and c. and nc. TX; disjunct eastwards in sc. KY, c. TN, n. GA and n. and c. AL. **Phen:** May-Jun. **Tax:** A diploid species (2*n*=22), genotype=BB. **Comm:** See Taylor, O'Kennon, & Rehman (2012) for detailed information o this species in Texas. **Syn:** = Ar, C, ETx1, F, FNA2, G, GrPl, Il, K1, K3, K4, Mo1, Sf, Tn, TxFerns, Musselman (2001), Singhurst et al (2011). NatureServe G4 (Apparently Secure).

Isoetes engelmannii A. Braun. **Hab:** Usually in permanent water bodies with active current. **Phen:** May-Oct. **Comm:** A diploid species (2*n*=22). Apparently there are two cryptic taxa currently combined under the name *I. engelmannii* (Hoot, Napier, & Taylor 2004), genotype NN and genotype SS. **Syn:** = Ar, Il, K1, K3, K4, NE, NY, Tn, Va, Musselman (2001); < *Isoetes engelmannii* A. Braun – C, FNA2, G, Pa, RAB, W, WV, (also see I. appalachiana; < *Isoetes engelmannii* var. *engelmannii* – F, Mo1, Sf.

Isoetes flaccida Shuttleworth ex A. Braun. WINGED FLORIDA QUILLWORT. **Hab:** Springs, stream bottoms, strand swamps, river bottoms, ditches. **Dist:** S. GA and se. AL south to s. FL. **Comm:** A diploid species (2n=22). **Syn:** = *Isoetes flaccida* A. Braun var. *flaccida* – K4, Brunton (2015); < *Isoetes flaccida* Shuttleworth ex A. Braun – Fl1, FNA2, K3, WH3, Musselman (2001), Singhurst et al (2011); > *Isoetes flaccida* A. Braun var. *flaccida* – K1, Sf.



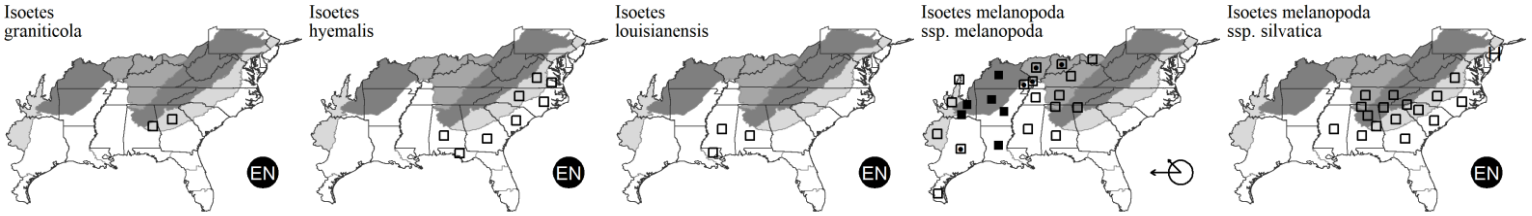
Isoetes graniticola D.F. Brunton. **Hab:** Granite flatrocks. **Dist:** Endemic to ec. AL and adjacent GA. A tetraploid species (2*n*=44). **Phen:** Mar-Jun. **Tax:** See Brunton (2016) for detailed information. **Syn:** = K4, Brunton (2016). NatureServe G2 (Imperiled).

Isoetes hyemalis D.F. Brunton. WINTERGREEN QUILLWORT. **Hab:** Blackwater streams and sandy streambanks. **Dist:** E. VA (Accomack County; McAvoy 2021) and sc. VA south through e. and c. NC to GA, AL, and FL Panhandle (Nelson 2000), in the Coastal Plain and lower Piedmont. **Comm:** A tetraploid species (2*n*=44), apparently derived from 2 unknown or extinct species, X and Y (Hoot, Napier, & Taylor 2004). See Brunton, Britton, & Taylor (1994) and Brunton & Britton (1996a) for additional information on this species. **Syn:** = Fl1, K1, K4, Va, WH3, Musselman (2001); < *Isoetes engelmannii* A. Braun – C, G, RAB; < *Isoetes engelmannii* var. *engelmannii* – F, Sf.

Isoetes louisianensis Thieret. LOUISIANA QUILLWORT. **Hab:** Small streams, braided swamps, seepage areas. **Dist:** S. AL, MS, and LA. Reported for GA by Duncan & Kartesz (1981); this species is extremely unlikely in GA and is treated as rejected for that state. **Tax:** A tetraploid species (2*n*=44). **Syn:** = FNA2, K1, K3, K4. NatureServe G2G3 (Imperiled); USESA E.

Isoetes melanopoda Gay & Durieu ex Durieu *ssp.* ***melanopoda***. BLACKFOOT QUILLWORT. **Hab:** Floodplains. **Dist:** S. IN, IL, and MO south to ne. LA; probably represented eastward to c. TN and s. MS (the available material ambiguous) (Brunton & Britton 2006). **Phen:** May-Sep. **Tax:** A diploid species (2*n*=22). (Brunton & Britton 2006). This taxon should be treated at species rank relative to *I. melanopoda* ssp. *silvatica*, based on the polyphyly of *Isoetes melanopoda* s.l. (Schafran et al. 2018). **Syn:** = K3, K4, Tn, TxFerns; < *Isoetes melanopoda* Gay & Durieu ex Durieu – Ar, C, ETx1, FNA2, G, GrPl, Il, K1, Mo1, Tx, Musselman (2001). NatureServe G5TNR (Not Yet Ranked).

Isoetes melanopoda Gay & Durieu ex Durieu *ssp.* ***silvatica*** D.F. Brunton & D.M. Britton. EASTERN BLACKFOOT QUILLWORT. **Hab:** Clay soils in low woods, seeps on sandstone or granitic rocks, in NJ in clay-based depressions on Cape May. **Dist:** VA south (in the Piedmont and Coastal Plain) to sw. GA, sc. AL, and s. MS; disjunct in s. NJ. **Tax:** A diploid species (2*n*=22), genotype= PP. This taxon should be raised to species rank based on the polyphyly of *Isoetes melanopoda* s.l. (Schafran et al. 2018). **Syn:** = K3, K4; < *Isoetes melanopoda* Gay & Durieu ex Durieu – C, FNA2, G, K1, RAB, Va, Musselman (2001). NatureServe G5TNR (Not Yet Ranked).

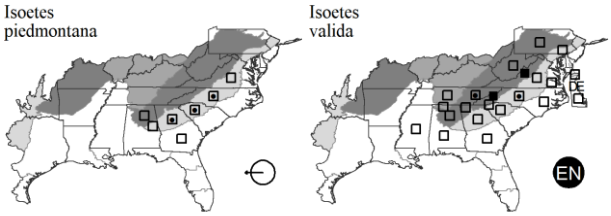


Isoetes piedmontana (N.E. Pfeiffer) C.F. Reed. PIEDMONT QUILLWORT. **Hab:** In seepage on or near granitic flatrocks, rarely on sandstone (Altamaha grit and Ridge and Valley). **Dist:** VA south and west to ec. and n. AL; material in c. TX has been placed here, but is likely to warrant description as a separate taxon. **Syn:** = K1, K3, Va, Musselman (2001), Singhurst et al (2011); < *Isoetes melanopoda* Gay & Durieu ex Durieu – RAB; < *Isoetes virginica* N.E. Pfeiffer – C, F, FNA2, G.

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

L02. ISOETACEAE

Isoetes valida (Engelmann) Clute. MOUNTAIN QUILLWORT, CAROLINA QUILLWORT. **Hab:** Bogs (growing in *Sphagnum*), pools, ponds, and seeps. **Dist:** C. PA to s. AL. **Comm:** A diploid species (2*n*=22). Genotype=VV. **Syn:** = K1, K3, K4, Tn, Va, Musselman (2001); = *Isoetes caroliniana* (A.A. Eaton) N. Luebke – FNA2; = *Isoetes engelmannii* A. Braun var. *caroliniana* A.A. Eaton – F, Sf; < *Isoetes engelmannii* A. Braun – C, Pa, RAB, W, WV.



L03. SELAGINELLACEAE Willkomm 1854 (SPIKEMOSS FAMILY) [in SELAGINELLALES]

A family of 1-several genera (the generic circumscriptions still somewhat unclear), and about 700 (or more) species. Selaginellaceae, along with Lycopodiaceae and Isoetaceae, now appear to be only distantly related to other extant pteridophytes and seed plants (Pryer et al. 2001). There has been some recent tendency to split *Selaginella* based on groups that represent very old clades (comparable to the recognition of multiple genera in Lycopodiaceae), though this remains controversial (Soják 1992; Škoda 1997; Korall, Kenrick, & Therrien 1999; Korall & Kenrick 2002). By a moderate approach to generic segregation, we have two to four genera, in which case *Selaginella* itself (sensu stricto) is restricted to the type species and a close relative. PPG I (2016) and Weststrand & Korall (20161, 2016b) retained *Selaginella* as a single, broadly defined genus including all members of the family, with recognition of seven major clades worldwide at subgeneric rank. References: Buck (1977); Jermy in Kramer & Green (1990); Lellinger (1985); Somers & Buck (1975); Tryon (1955); Valdespino (1993) in FNA2 (1993b); Weststrand & Korall (2016a); Weststrand & Korall (2016b).

1 Vegetative leaves monomorphic, spirally arranged around the stems; leaves acuminate and with a white or translucent apical hair-tip (the hair-tip rarely lost); fertile branch tip only slightly differentiated from the sterile portions of the stems ..... ***Bryodesma***
1 Sterile leaves dimorphic, in 4 ranks, the ventral pair spreading laterally, the dorsal pair ascending, the pairs different in shape and/or size (anisophyllous); leaves acute, mucronate, lacking a white or translucent apical hair-tip; fertile branch tips strongly differentiated (into strobili) from the sterile portions of the stem ..... ***Lycopodioides***

Bryodesma Soják 1992 (SPIKEMOSS)

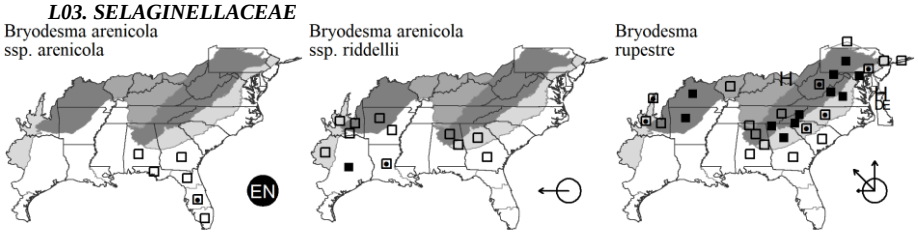
A genus of about 100 species, widespread in distribution, but with highest diversity in the Americas. References: Buck (1977); Jermy in Kramer & Green (1990); Lellinger (1985); Tryon (1955); Valdespino (1993) in FNA2 (1993b).

3 Stems mostly creeping or turned up at the apex, forming mats 1.5-4 cm high; rhizome or rhizomatous stem absent; aerial roots present all along the stems; budlike "arrested" branches absent ..... ***Bryodesma rupestre***
3 Stems mostly erect or ascending, forming compact clumps usually > 4 cm high; rhizome or rhizomatous stem present; aerial roots present only at or near the base of the erect stems; budlike "arrested" branches present.
5 Leaves mostly tightly appressed; base conspicuously pubescent; strobili distinctly larger in diameter than the subtending stem; sporophyll apex often recurved ..... ***Bryodesma arenicola ssp. arenicola***
5 Leaves mostly loosely appressed; base usually glabrescent; strobili not distinctly larger in diameter than the subtending stem; sporophyll apex usually straight ..... ***Bryodesma arenicola ssp. riddellii***

Bryodesma arenicola (Underwood) Soják *ssp.* ***arenicola***. SAND SPIKEMOSS. **Hab:** Florida scrub, longleaf pine sandhills. **Dist:** E. GA south to s. FL, se. GA, and e. Panhandle FL. **Phen:** Jun-Aug. **Syn:** = *Selaginella arenicola* Underwood – K3, Sf; = *Selaginella arenicola* Underwood ssp. *arenicola* – FNA2, K1; < *Selaginella arenicola* Underwood – Fl1, K4, WH3. NatureServe G4TNR (Not Yet Ranked).

Bryodesma arenicola (Underwood) Soják *ssp.* ***riddellii*** (Van Eseltine) Škoda. RIDDELL'S SPIKEMOSS. **Hab:** Dry sands (longleaf pine sandhills, etc.), granite outcrops, sandstone outcrops, Altamaha grit glades. **Dist:** E. and c. GA west to AR, s. OK, and c. TX. **Phen:** Jan-Dec. **Tax:** See Wilbur & Whitson (2005) for an explanation of the nomenclatural change at species rank. Probably warranting specific rank (a combination at that rank not yet available in *Bryodesma*). **Syn:** = *Selaginella arenicola* Underwood ssp. *riddellii* (Van Eseltine) R.M. Tryon – Ar, ETx1, FNA2, K1; = *Selaginella corallina* (Riddell) Wilbur & Whitson – K3, K4, TxFerns; = *Selaginella riddellii* Van Eseltine – Tx. NatureServe G4T4 (Apparently Secure).

Bryodesma rupestre (Linnaeus) Soják. ROCK SPIKEMOSS. **Hab:** Granite flatrocks, other, mostly acidic, rock outcrops, occasionally on greenstone or calcareous shales. **Dist:** S. Greenland and NS west to BC, south to GA, AL, AR, OK, and WY. **Phen:** Jun-Sep. **Comm:** Valdespino in FNA (1993b) suggests that two or more cryptic or semicryptic species are present within what is currently called *S. rupestris*; additional study is needed. Reports for KY are unconfirmed. **Syn:** = Va; = *Selaginella rupestris* (Linnaeus) Spring – Ar, C, F, FNA2, G, GrPl, Il, K1, K3, K4, Ky, Md, Mo1, NE, NY, Pa, RAB, Sf, Tn, W, WV. NatureServe G5 (Secure).



Lycopodioides Boehmer 1760 (SPIKEMOSS)

A genus of ca. 650 species, primarily tropical and subtropical. References: Buck (1977); Jermy in Kramer & Green (1990); Lellinger (1985); Somers & Buck (1975); Tryon (1955); Valdespino (1993) in FNA2 (1993b); Zhang, Nooteboom, & Kato in FoC (2013).

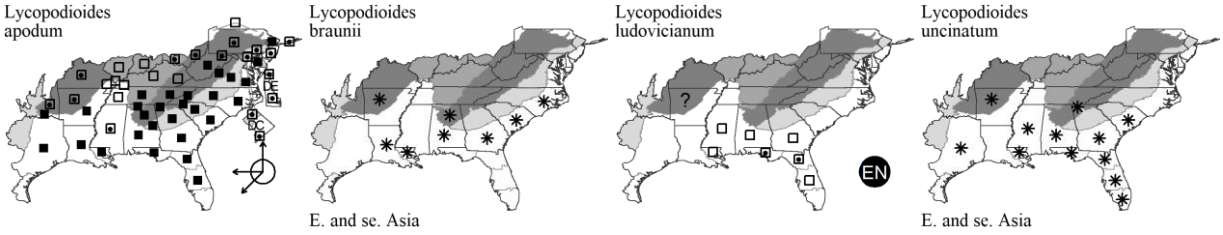
1 Main stems erect, the plants to 5 dm tall.
..... ***Lycopodioides braunii***
1 Main stems creeping or ascending.
3 Margins of lateral leaves entire; lateral branches of the stems further branching 2-3 times..... ***Lycopodioides uncinatum***
3 Margins of lateral leaves dentate-serrate; lateral branches of the stems further branching 1-2 times
5 Leaves with margins of 3-5 rows of transparent (hyaline) cells; stomates of lateral leaves confined to near the midrib on the upper surface .....
..... ***Lycopodioides ludovicianum***
5 Leaves with margins undifferentiated or with 1-2 rows of slightly paler cells; stomates distributed over entire leaf surface
..... ***Lycopodioides apodum***

Lycopodioides apodum (Linnaeus) Palisot de Beauvois. MEADOW SPIKEMOSS. **Hab:** Seepages, bogs, spray cliffs, stream margins, wet meadows, marsh edges, wet spots in lawns, other moist habitats. **Dist:** S. ME, NY, OH, s. IN, AR, and e. OK south to FL, GA, AL, MS, LA, and e. TX; c. Mexico south to Guatemala. **Phen:** Jun-Oct. **Comm:** Often overlooked by vascular plant botanists as a moss or liverwort. *L. ludovicianum* of the Gulf Coast east to GA, and *S. eclipes* W.R. Buck, more northern/midwestern, are superficially very similar (see key). **Syn:** = Va; = *Diplostachyum apodum* – Sf; = *Selaginella apoda* (Linnaeus) Fernald – Ar, FNA2, Il, K1, K3, K4, Ky, Md, Mo1, NE, NY, Pa, RAB, Tn, W, WV; = *Selaginella apoda* var. *apoda* – ETx1, Fl1, TxFerns, WH3; < *Selaginella apoda* (Linnaeus) Fernald – C, F, G, Meso1, Tx.

* ***Lycopodioides braunii*** (Baker) Kuntze. TREELET SPIKEMOSS, BRAUN'S SPIKEMOSS. **Hab:** Naturalized around graveyards or gardens; rare, introduced. **Dist:** Native of China. **Syn:** = *Selaginella braunii* Baker – FNA2, K1, K3, K4. NatureServe GNR (Not Yet Ranked).

Lycopodioides ludovicianum (A. Braun) Small. GULF SPIKEMOSS, LOUISIANA SPIKEMOSS. **Hab:** Limestone outcrops, ravine slopes, calcareous swamps, seeps, and hammocks. **Dist:** Gulf Coastal Plain from ne. FL and sw. GA west to e. LA. **Phen:** Jul-Oct. **Syn:** = *Diplostachyum ludovicianum* – Sf; = *Selaginella apoda* var. *ludoviciana* (A. Braun) B.F. Hansen & Wunderlin – Fl1, WH3; = *Selaginella ludoviciana* (A. Braun) A. Braun – FNA2, K1, K3, K4. NatureServe G3G4 (Vulnerable).

* ***Lycopodioides uncinatum*** (Desvaux ex Poiret) Kuntze. BLUE SPIKEMOSS. **Hab:** Moist forests, disturbed hammocks. **Dist:** Native of China. Introduced in sw. GA and other places in the Southeastern United States. **Syn:** = *Selaginella uncinata* (Desvaux ex Poiret) Baker – Fl1, FNA2, K1, K3, K4, WH3. NatureServe GNR (Not Yet Ranked).



Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more)

* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable

X : extirpated

SECTION 2a: HORSETAILS

F04. EQUISETACEAE Michaux ex A.P. de Candolle 1804 (HORSETAIL FAMILY) [in EQUISETALES]

A family with a single genus and about 15-20 species. Equisetaceae is an evolutionarily isolated group, which has been interpreted variably over time. The current consensus is that Equisetaceae be included as "ferns", but the basalmost group to be so considered. The profound morphological differences and ancient age of the lineage make its treatment as a separate class from the ferns equally or more compelling. References: Christenhusz et al (2019); Des Marais et al (2003); Hauke in Kramer & Green (1990); Hauke (1993) in FNA2 (1993b); Lellinger (1985); Mickel (1979); PPG I (2016).

Equisetum Linnaeus 1753 (HORSETAIL, SCOURING RUSH)

A genus of 15-20 species, nearly cosmopolitan in distribution. This treatment follows Christenhusz et al. (2019) in recognizing 3 subgenera, the monotypic subgenus *Paramochaete* Chistenhusz & Husby (of n. South America), basal to the two main subgenera (and the ones in our flora -- see key): subgenus *Equisetum* and subgenus *Hippochaete* (Milde) Baker. References: Christenhusz et al (2019); Des Marais et al (2003); Guillon (2004); Hauke in Kramer & Green (1990); Hauke (1993) in FNA2 (1993b); Lellinger (1985); Mickel (1979); Zhang & Turland in FoC (2013).

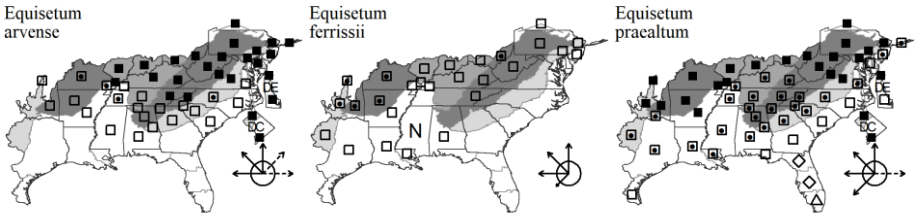
1 Stems annual, deciduous, the sterile stems flexible; sterile and fertile stems dimorphic or monomorphic, usually branched (often copiously so) but sometimes unbranched or sparsely and irregularly branched; [subgenus *Equisetum*].
..... ***Equisetum arvense***

1 Stems perennial (or annual in *E. laevigatum*), evergreen, stiff; sterile and fertile stems monomorphic and either unbranched or with 2-3 short and unequal branches per node; [subgenus *Hippochaete*].
8 Spores not produced, or white and misshapen; most stem sheaths lacking a blackish band well below the teeth..... ***Equisetum ferrissii***
8 Spores green, spherical; most stem sheaths with a narrow to broad blackish band well below the teeth ..... ***Equisetum praealtum***

Equisetum arvense Linnaeus. FIELD HORSETAIL, BOTTLEBRUSH HORSETAIL. **Hab:** Moist streambanks, bottomlands, moist disturbed sites, road banks, railroad banks. **Dist:** A circumboreal species, in North America south to c. GA, c. AL, c. MS, n. AR, n. TX, NM, AZ, and south into Mexico. **Phen:** Mar-May. **Syn:** = Ar, C, FNA2, G, GrPl, Il, K1, K3, K4, Md, Mo1, NE, NY, Pa, RAB, Sf, Tn, Tx, TxFerns, Va, W, WV, Christenhusz et al (2019); > *Equisetum arvense* var. *arvense* – F. NatureServe G5 (Secure).

Equisetum ferrissii Clute [*E. laevigatum* × *praealtum*]. FERRISS'S HORSETAIL. **Hab:** Riverbanks, wet forests. **Dist:** There are old reports, repeated in RAB, S, and FNA, of the occurrence of *E.* ×*ferrissii* in NC and SC; documentation of these reports is not known; it is reported for Prince George's County, MD (Shetler & Orli 2000), for KY (Campbell & Medley 2007), and for all 75 counties of AR (Peck 2011). **Phen:** May-Aug. **Tax:** This is the hybrid of *E. laevigatum* and *E. praealtum* (= *E. hyemale* ssp. *affine*). It behaves as a species, often occurring independent of one or both parents. **Syn:** = G; = *Equisetum ferrissii* Clute (pro sp.) – Ar, C, FNA2, GrPl, Il, K1, K3, NE, Pa, TxFerns, Christenhusz et al (2019).

Equisetum praealtum Rafinesque. TALL SCOURING-RUSH, RIVER SCOURING-RUSH. **Hab:** Riverbanks, alluvial floodplains. **Dist:** Widespread in North America south to s. Mexico and El Salvador. **Phen:** May-Sep. **Tax:** As interpreted by Christenhusz et al. (2019), American material often treated as synonymous or varietally or subspecifically distinct from Eurasian *E. hyemale* warrants specific recognition, based on morphology and molecular phylogeny. **Syn:** = Sf, Christenhusz et al (2019); = *Equisetum hyemale* Linnaeus ssp. *affine* (Engelmann) Calder & R.L. Taylor – Ar, ETx1, FNA2, Il, Meso1, NE, NY, Tn, TxFerns, Va; = *Equisetum hyemale* var. *affine* (Engelmann) A.A. Eaton – C, Fl1, GrPl, K1, K3, K4, Md, Mo1, Pa, RAB, Tx, W, WH3; > *Equisetum hyemale* var. *affine* (Engelmann) A.A. Eaton – F, WV; > *Equisetum hyemale* var. *elatum* (Engelmann) Morton – G, WV; > *Equisetum hyemale* var. *pseudohyemale* (Farwell) Morton – G; > *Equisetum hyemale* var. *robustum* (A. Braun) A.A. Eaton – F. NatureServe G5T5 (Secure).



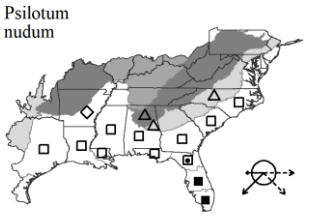
Key to Map Symbology: □ native; ◇ maybe exotic; △ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

SECTION 2b: FERNS

F05. PSILOTACEAE J.W. Griffith & Henfrey 1855 (WHISKFERN FAMILY) [in PSILOTALES]

A family of 2 genera and about 17 species, pantropical and warm temperate. References: Kramer & Green (1990); Lellinger (1985); PPG I (2016); Thieret (1993) in FNA2 (1993b).

Psilotum Swartz 1800 (WHISKFERN)



A genus of 2 species, tropical and warm temperate. *Psilotum* lacks roots and true leaves. Other than the Australasian genus *Tmesipteris*, *Psilotum* has no close living relatives, and the 2 genera have sometimes been considered to comprise a distinct class (Wagner 1977), though PPG I (2016) treats the family in Order Psilotales in Subclass Ophioglossidae. The stem is chlorophyllose. Fungal cells interspersed in the outer layers of the rhizome aid in the absorption of nutrients. References: Kramer & Green (1990); Lellinger (1985); Thieret (1993) in FNA2 (1993b); Zhang & Yatskievych in FoC (2013).

Identification Notes: The stiff, dichotomously-branched habit of *Psilotum* is unmistakable.

Psilotum nudum (Linnaeus) Palisot de Beauvois. WHISKFERN. **Hab:** Moist bottomland forests, strand swamps, maritime forests, rockland hammocks, wet hammocks, on soil, stumps, and tree bases, along building foundations (where introduced). **Dist:** S. SC south to s. FL, west to s. AR and e. TX, disjunct (and apparently native) in ne. NC (Perry & Musselman 1994), rarely naturalized around buildings in c. NC, c. SC, and elsewhere; also in sw. United States and in the tropics and subtropics of Central and South America, Africa, and Asia. **Phen:** Apr-Sep. **Syn:** = Ar, Bah, ETx1, Fl2, FNA2, K1, K3, K4, Meso1, RAB, Sf, Tx, TxFerns, WH3. NatureServe G5 (Secure).

F06. OPHIOGLOSSACEAE Martinov 1820 (ADDER'S-TONGUE FAMILY) [in OPHIOGLOSSALES]

A family of 10 genera and about 115 species (as treated by PPG I 2016). The Ophioglossaceae is only distantly related to the leptosporangiate ferns; Kuo et al. (2011), Pryer et al. (2004), and PPG I (2016) indicate that it is most closely related to Psilotaceae. There is an increasing consensus that *Botrychium* as often very broadly circumscribed should be separated into four or five genera, of which three are native in our area: *Botrypus*, *Botrychium*, and *Sceptridium* (Shinohara et al. 2013; Dauphin, Vieu, & Grant 2014; Hauk, Parks, & Chase 2003; Hauk 1996; PPG I 2016; Zhang et al. 2020). References: PPG I (2016); Wagner in Kramer & Green (1990); Wagner & Wagner (1993) in FNA2 (1993b); Zhang et al (2020).

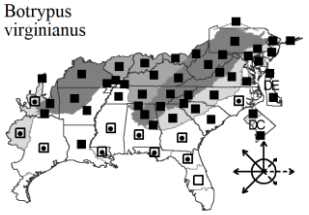
Identification Notes: The family Ophioglossaceae is characterized by bearing spores on a specialized and modified "leaf", the sporophore. The sterile leaf (the trophophore) characteristically has a rather fleshy or rubbery texture (when alive).

1 Sterile portion of the leaf simple, unlobed or palmately few-lobed; veins anastamosing; fertile stalks unbranched, the sporangia embedded in a linear spike; [subfamily *Ophioglossoideae*].
..... ***Ophioglossum***

1 Sterile leaf blade pinnatifid, pinnate, or more divided; veins free; fertile stalks branched, the sporangia sessile or stalked; [subfamily *Botrychioideae*].
4 Fertile stalk joined to the stalk of the sterile leaf blade near the rhizome, far below the base of the leaf blade, and usually at or below the surface of the ground; leaves evergreen, appearing in spring, summer, or fall, and withering the following spring; sterile leaf blades triangular (or pentagonal) in general outline .....
..... ***Sceptridium***

4 Fertile stalk joined to the stalk of the sterile leaf blade near the base of the leaf blade, far above the rhizome, and usually well above the surface of the ground; leaves deciduous, appearing in spring and withering the same summer or fall; sterile leaf blades either triangular (or pentagonal) or elongate in general outline.
..... ***Botrypus***

Botrypus Richard 1801 (RATTLESNAKE FERN)



A genus of 1 (as currently recognized), or more likely, several species, perennial herb(s), of Eurasia, the Americas, and Australia. Zhang et al. (2020) removed *Sahashia* Li Bing Zhang & Liang Zhang (a monotypic genus of e. Asia) from *Botrypus*, rendering *Botrypus* monophyletic (for now). There is increasing evidence, morphological and molecular, that additional species should be recognized (Zhang et al. 2020). References: Hauk, Parks, & Chase (2003); PPG I (2016); Wagner & Wagner (1993) in FNA2 (1993b); Zhang & Sahashi in FoC (2013); Zhang et al (2020).

Identification Notes: *Botrypus* has a large, very finely divided sterile leaf blade distinguishing it from all other Ophioglossaceae except perhaps the more dissected forms of *Sceptridium dissectum*. *Botrypus* has a bright green color, unlike *Sceptridium* species, with their dark green, grayish, purple, or bronze colors, and thinner leaf texture than the thick and rubbery leaves of *Sceptridium*.

Botrypus virginianus (Linnaeus) Michaux. RATTLESNAKE FERN, SANG-FIND. **Hab:** In a wide range of fairly dry, mesic, and wet forests, cove forests, especially in nutrient-rich, moist bottomlands and slopes. **Dist:** NL (Newfoundland) and BC south to n. peninsular FL and CA, and Mexico south through Central America and n. South America; West Indies; Asia; Australia; scattered in Europe. **Phen:** Apr-Jun. **Tax:** *Botrypus virginianus*

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated

as currently defined (with a semicosmopolitan distribution in Eurasia, North America, Central America, South America, West Indies, and Australia) is a complex of semi-cryptic species, not yet well-understood or recognized. **Syn:** = Il, K3, K4, Tn, Va, Zhang et al (2020); = *Botrychium virginianum* (Linnaeus) Swartz – Ar, C, ETx1, Fl1, FNA2, G, GrPl, K1, Meso1, NE, NY, Pa, RAB, Tx, TxFerns, W, WH3, WV; = *Osmundopteris virginiana* (Linnaeus) Small – Sf; > *Botrychium virginianum* var. *europaeum* Ångström – F; > *Botrychium virginianum* var. *virginianum* – F, Mo1.

Ophioglossum Linnaeus 1753 (ADDER'S-TONGUE)

A genus of about 41 species, nearly cosmopolitan, primarily tropical. CircumscIption follows PPG I (2016). References: Lellinger (1985); Liu & Sahashi in FoC (2013); PPG I (2016); Wagner in Kramer & Green (1990); Wagner & Wagner (1993) in FNA2 (1993b).

Identification Notes: *Ophioglossum* is distinctly "unfernlike", with a single elliptical or ovate leaf blade (the trophophore) and a narrow, tonguelike sporangium-bearing sporophore branching from near the base of the trophophore blade. The sporophore bears the large sporangia in two rows. The netlike (interconnecting and anastomosing) venation requires strong backlight or chemical 'clearing' of the leaf to see well.

1 Underground stem globose, nearly spherical, 3-11 mm in diameter; fertile spikes commonly with a conspicuous, acute or attenuate sterile portion (apiculum) at its apex; sterile blade 1-4 cm long, 0.5-2.5 cm wide, borne horizontally near the ground ..... ***Ophioglossum crotalophoroides***
1 Underground stem narrowly cylindrical or irregularly elongate, 2-4 mm in diameter; fertile spikes without a sterile portion at the apex or the sterile portion inconspicuous; sterile blade 0.5-10 cm long, 0.2-5.5 cm wide, borne horizontally, ascending, or vertically.
  2 Sterile blade 0.2-1 cm wide, the polygonal venation areoles usually lacking both smaller areoles and free included veinlets ..... ***Ophioglossum nudicaule***
  2 Sterile blade (0.5-) 1.2-5 cm wide, the polygonal venation areoles either with smaller areoles or with free included veinlets.
    3 Large areoles of the of the sterile blade subdivided into smaller areoles, these further subdivided into smaller areoles and free veinlets; sterile blade apiculate .. .. ***Ophioglossum engelmannii***
    3 Large areoles of the sterile blade lacking smaller areoles, wut with free included veinlets in some areoles; sterile blade obtuse or acute.
      4 Sterile blade ovate-lanceolate, the base obtuse to nearly truncate, broadest < ¼ of the way from the base to the apex; primary areoles mostly > 2 mm wide, without included veinlets ..... ***Ophioglossum petiolatum***
      4 Sterile blade ovate to elliptic, the base cuneate to obtuse, broadest between one quarter and one half of the way from the base to the tip; primary areoles mostly < 2 mm wide, with included veinlets. ..... ***Ophioglossum pycnostichum***

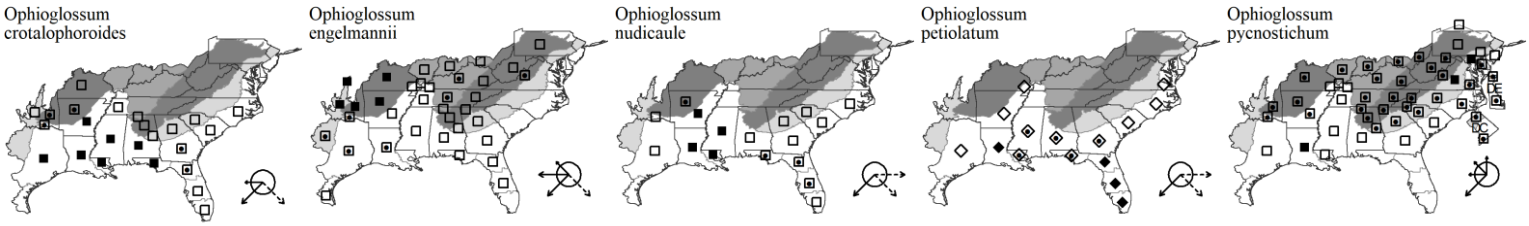
Ophioglossum crotalophoroides Walter. BULBOUS ADDER'S-TONGUE. **Hab:** Moist ditch banks, grassy roadside flats, lawns, cemeteries, moist pine woodlands. **Dist:** E. NC (Dare County) south to FL and west to c. TX; also in Mexico, the West Indies, Central America, and South America. **Phen:** Mar-May (-Sep). **Syn:** = Ar, ETx1, Fl1, FNA2, K3, K4, Meso1, Mo1, RAB, Sf, Tn, Tx, TxFerns, WH3; > *Ophioglossum crotalophoroides* var. *crotalophoroides* – K1; > *Ophioglossum crotalophoroides* var. *nanum* Osten ex de Lichtenstein – K1.

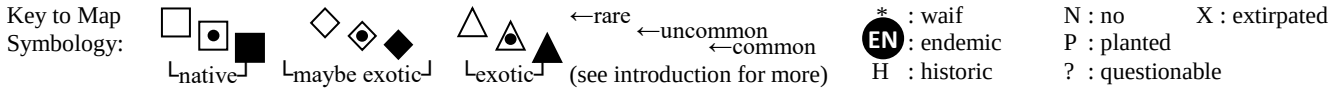
Ophioglossum engelmannii Prantl. ENGELMANN'S ADDER'S-TONGUE, LIMESTONE ADDER'S-TONGUE. **Hab:** Dry barrens and glades over calcareous rocks, very rarely on granite. **Dist:** W. VA, IN, IL, KS, and AZ south to Panhandle FL and TX; Mexico and Central America. **Phen:** Dec-Jun. **Comm:** Ascribed to NC by Wagner & Wagner in FNA (1993b), the documentation unknown. **Syn:** = Ar, C, ETx1, F, Fl1, FNA2, G, GrPl, Il, K1, K3, K4, Meso1, Mo1, Pa, Sf, Tn, Tx, TxFerns, Va, W, WH3. NatureServe G5 (Secure).

Ophioglossum nudicaule Linnaeus f. SLENDER ADDER'S-TONGUE. **Hab:** Pine flatwoods, lawns, and other moist, grassy areas. **Dist:** E. NC south to s. FL, west to TX; West Indies; Mexico, Central, and South America; Asia; Africa. **Phen:** Mar-Jun. **Comm:** First reported from NC by Thomas & Marx (1979). **Syn:** = Ar, ETx1, Fl1, FNA2, K1, K3, K4, Meso1, RAB, TxFerns, WH3; > *Ophioglossum dendroneuron* E.P. St. John – Sf; > *Ophioglossum mononeuron* E.P. St. John – Sf; > *Ophioglossum nudicaule* var. *tenerum* – Tx; > *Ophioglossum pumilio* E.P. St. John – Sf; > *Ophioglossum tenerum* Mettenius – Sf.

* ***Ophioglossum petiolatum*** Hooker. LONG-STEM ADDER'S-TONGUE. **Hab:** Maritime wet grasslands, wet pine flatwoods, moist ditch banks, and grassy roadside flats. **Dist:** Se. VA south to FL and west to TX and OK; West Indies; Central America to n. South America; Asia. **Phen:** Feb-Jul (-Nov). **Comm:** First reported for NC by Thomas & Marx (1979). Wagner & Wagner in FNA (1993b) and Peck (2011) suggest that this species is likely introduced in North America (from a native distribution in Asia). **Syn:** = Ar, ETx1, Fl1, FNA2, K1, K3, K4, Mo1, RAB, Tx, TxFerns, Va, WH3; > *Ophioglossum floridanum* E. St. John – Sf. NatureServe G5 (Secure).

Ophioglossum pycnostichum (Fernald) Á. Löve & D. Löve. SOUTHERN ADDER'S-TONGUE. **Hab:** Bottomland forests, moist loamy soils of successional forests and old fields. **Dist:** S. NJ, IN, IL, and s. MI south to GA, MS, and e. TX; s. Mexico. **Phen:** Mar-Jul. **Comm:** *O. vulgatum* (defined narrowly) is Eurasian. Fernald (1939) provides a number of characters to separate this taxon from Eurasian *O. vulgatum* s.s. While Wagner in FNA (1993) subsumes "*pycnostichum*" in *O. vulgatum*, he points out that "a distinctive large-spored form with a chromosome number of 2n= ca. 1320" occurs "in the Appalachians", suggesting the possibility of cryptic taxa within "*pycnostichum*" (= southeastern North American *O. vulgatum*). The best treatment of this complex remains uncertain and needs additional study. **Syn:** = Ar, Tn, Va, W; = *Ophioglossum vulgatum* Linnaeus var. *pycnostichum* Fernald – C, F, GrPl, Pa, RAB, WV; < *Ophioglossum vulgatum* Linnaeus – ETx1, FNA2, G, Il, K1, K3, K4, Meso1, Mo1, Sf, Tx, TxFerns.





Sceptridium Lyon 1905 (GRAPE FERN)

A genus of about 25 species, perennial herbs, nearly cosmopolitan. The unusual species *S. lunarioides* has been regarded as belonging to a monotypic section, *Hiemobotrychium* W.H. Wagner. Zhang et al. (2020) found *S. lunarioides* to be basal to the rest of the genus, and ambiguously advocated that it be treated as a monotypic genus, *Holubiella* Škoda. For now, I retain it at sectional rank as *Sceptridium* section *Hiemobotrychium*, but its recognition at generic rank may well be warranted. References: Hauk (1996); Hauk, Parks, & Chase (2003); PPG I (2016); Wagner & Wagner (1993) in FNA2 (1993b); Zhang et al (2020).

Identification Notes: *Sceptridium* has thick, leathery leaves ternately divided, and an overall equilaterally triangular or pentagonal outline. The leaves emerge in the spring, summer, or fall of the year, and overwinter, withering the following spring. The leaves are often purplish or bronze, or green with shades of purple or bronze. Identification of some of the species is problematic or indefinite, based on subtleties of the shapes of the ultimate leaf divisions. The "Grape Fern" common name refers to the fertile leaves and the large sporangia, yellow when mature.

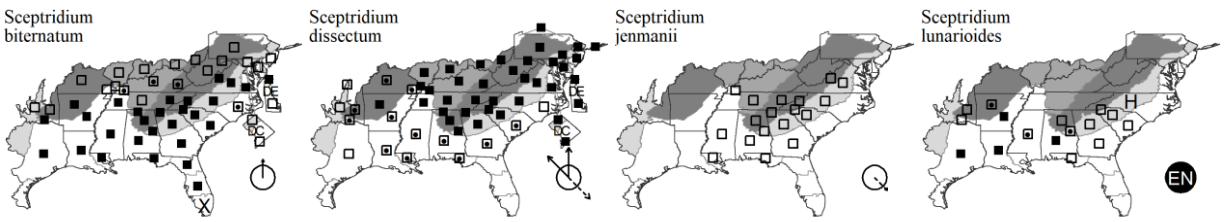
1 Sterile leaves usually 2 per plant, the petioles prostrate and the blades therefore held flat on the ground; roots smooth, yellowish; ultimate leaf segments about as wide as long, subflabellately veined, lacking a midrib; sporulating Jan-Apr; [section *Hiemobotrychium* or genus *Holubiella*] ..... ***Sceptridium lunarioides***
1 Sterile leaf 1 per plant, the petiole erect or ascending and the blade usually held aerially; roots irregularly ribbed, blackish; ultimate leaf segments fan-shaped, obovate, longer than wide, pinnately veined, the midrib weakly developed; sporulating Jul-Oct; [section *Sceptridium* or genus *Sceptridium* s.s.].
  2 Sterile leaf 4-pinnate-pinnatifid, finely divided, the ultimate segments lacerate and linear, < 3 mm wide ..... ***Sceptridium dissectum***
  2 Sterile leaf 2-pinnate to 4-pinnate, not finely divided, the ultimate segments ovate or oblong, most or all of them > 8 mm wide.
    3 Sterile pinnae entirely divided into short, round or acute pinnules; lateral pinnules with an inconspicuous and poorly-developed central vein; plant producing 1 or 2 leaves per season. ..... ***Sceptridium jenmanii***
    3 Sterile pinnae (or their terminal portion) elongate (the sides often nearly parallel), entire to shallowly lobed, not divided into pinnules; lateral pinnules with a conspicuous and well-developed central vein; plant producing 1 leaf per season.
      6 Sterile blade mostly 2(-3)-pinnate, herbaceous in texture; ultimate blade segments mostly oblong to obliquely lanceolate, the margins nearly parallel, the base cuneate, the apex relatively blunt ..... ***Sceptridium biternatum***
      6 Sterile blade mostly 3-pinnate (or more divided, those forms keyed above), leathery in texture; ultimate blade segments trowel-shaped, the margins usually not parallel, the base truncate or obtuse, the apex relatively pointed ..... ***Sceptridium dissectum***

Sceptridium biternatum (Savigny) Lyon. SOUTHERN GRAPEFERN. **Hab:** Moist forests, clearings, old fields. **Dist:** MD, PA, s. IN, s. IL, and c. OK south to s. FL and e. TX. **Phen:** Aug-Oct. **Syn:** = Il, K3, K4, Tn, Va; = *Botrychium biternatum* (Savigny) Underwood – Ar, C, ETx1, FNA2, K1, Mo1, RAB, Sf, TxFerns, W, WH3; = *Botrychium dissectum* var. *tenuifolium* (Underwood) Farwell – F, G; < *Botrychium biternatum* (Savigny) Underwood – Fl1; < *Botrychium dissectum* Sprengel – WH3.

Sceptridium dissectum (Sprengel) Lyon. CUT-LEAF GRAPE FERN, DISSECTED GRAPEFERN. **Hab:** Moist forests, clearings, old fields. **Dist:** NS and QC west to ON and MI, south to Panhandle FL and e. TX; also in the West Indies. **Phen:** Aug-Oct. **Tax:** The two forms have caused much confusion. In our area, forma *obliquum* is much more common and widely distributed, and is easily and often confused with *B. biternatum*. Forma *dissectum* is fairly common in our area only northwards and in the Mountains. The different distributions of the two forms suggest that further research is needed. **ID Notes:** The dissected form of this species is distinctive, with the ultimate segments tending to end in two sharp cusps. The less dissected form is difficult to distinguish from *Sceptridium biternatum* (southwards) and *Sceptridium oneidense* (northwards). **Syn:** = K4, Tn, Va; = *Botrychium dissectum* Sprengel – Ar, C, ETx1, FNA2, K1, Mo1, NE, NY, Pa, RAB, TxFerns, W, WV; < *Botrychium biternatum* (Savigny) Underwood – Fl1; < *Botrychium dissectum* Sprengel – WH3; > *Botrychium dissectum* Sprengel – Sf; < *Botrychium dissectum* var. *dissectum* – F; > *Botrychium dissectum* var. *dissectum* – G, GrPl; > *Botrychium dissectum* var. *obliquum* (Muhlenberg ex Willdenow) Clute – G, GrPl; > *Botrychium dissectum* var. *tenuifolium* (Underwood) Farwell – Tx; > *Botrychium obliquum* Muhlenberg ex Willdenow – Sf; > *Sceptridium dissectum* var. *dissectum* – Il; > *Sceptridium dissectum* var. *obliquum* (Muhlenberg ex Willdenow) Mohlenbrock – Il.

Sceptridium jenmanii (Underwood) Lyon. ALABAMA GRAPEFERN. **Hab:** Moist to dryish forests and disturbed areas. **Dist:** C. and sw. VA and w. KY south to Panhandle FL, s. AL, and e. LA; also in the West Indies. **Phen:** Aug-Oct. **Tax:** This species probably arose as a hybrid between *B. biternatum* and *B. lunarioides* (Michaux) Swartz, followed by polyploidization, resulting in a fertile taxon functioning as a species. **Syn:** = K3, K4, Tn, Va; = *Botrychium alabamense* Maxon – RAB, Sf; = *Botrychium jenmanii* Underwood – C, Fl1, FNA2, K1, Meso1, W, WH3. NatureServe G3G4 (Vulnerable).

Sceptridium lunarioides (Michaux) Holub. WINTER GRAPEFERN. **Hab:** Old fields, pastures, young forests, granitic flatrocks, juniper-oak-blue ash woodlands over limestone, cemeteries. **Dist:** W. NC, c. TN, and s. SC south to n. FL, and west to e. TX and se. OK. **Phen:** Jan-Apr. **Tax:** Wagner (1992) proposed that *Botrychium lunarioides* be treated in a new monotypic section, *Hiemobotrychium*, of *Botrychium*, subgenus *Sceptridium*. Zhang et al. (2020) advocated its placement in a monotypic genus, *Holubiella*. Its apparent involvement in the generation of the allopolyploid species *Sceptridium jenmanii* seems a compelling reason to retain the species in *Sceptridium*. **ID Notes:** The species is hard to spot, and all the more difficult to find because of its phenology; the leaves appear in late fall and die by early spring. **Syn:** = K3, K4; = *Botrychium lunarioides* (Michaux) Swartz – Ar, ETx1, Fl1, FNA2, K1, RAB, TxFerns, WH3; = *Holubiella lunarioides* (Michaux) Škoda – Zhang et al (2020). NatureServe G4? (Apparently Secure).



Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more)
* : waif EN : endemic H : historic
N : no P : planted ? : questionable
X : extirpated

F08. OSMUNDACEAE Martinov 1820 (ROYAL FERN FAMILY) [in OSMUNDALES]

A family of 6 genera and about 18 species. Our three species have traditionally been all placed in *Osmunda*, but PPG I (2016) and others show that *Osmunda* s.l. includes ancient, divergent clades with ages of 100-250 million years, and also with great morphological divergence, warranting generic recognition (Schneider et al. 2015, PPG I 2016). We here follow PPG I (2016) in recognizing three genera in our area: *Osmunda*, *Osmundastrum*, and *Claytosmunda*. References: Bomfleur, Grimm, & McLoughlin (2015); Bomfleur, Grimm, & McLoughlin (2017); Kramer & Green (1990); Lellinger (1985); Metzgar et al (2008); PPG I (2016); Schneider et al (2015); Sylvestre, Costa, & Arana (2022); Whetstone & Atkinson (1993) in FNA2 (1993b); Yatabe, Nishida, & Murakami (1999).

Identification Notes: Osmundaceae are large, coarse, clump-forming ferns from thick rhizomes; the rhizomes, densely clad with old leaf bases, often form large mounds on the ground surface, especially noticeable after fires. *Osmunda spectabilis* is a wetland species and *Osmundastrum cinnamomeum* occurs primarily in wetlands, while *Claytosmunda claytoniana* is usually in moist to dry uplands, but can occur in wetlands.

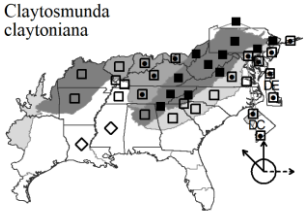
1 Leaves bipinnate, each pinna fully divided into distinct pinnules, the larger pinnules 3-7 cm long and 0.7-2.0 cm wide; spores borne on modified pinnae in the terminal portion of the leaf blade; veins of each pinnule 2× Y-forked (thus each vein reaching the margin as 4 final veinlets), each final veinlet making a fine tooth, thus the pinnule margins finely serrulate ..... ***Osmunda spectabilis***

1 Leaves pinnate-pinnatifid, each pinna additionally pinnatifid but not divided into distinct pinnules; spores borne either on specialized leaves that are normally wholly fertile (lacking flat, blade-like sterile pinnae), or hemidimorphic (juvenile leaves with only sterile pinnae, adult leaves with both sterile and fertile pinnae, the fertile pinnae borne in the middle of the leaf with sterile pinnae above and below; photosynthetic (sterile) pinnae lacking tufts of hairs; veins of each pinna lobe 1× Y-forked (thus each vein reaching the margin as 2 final veinlets), the final veinlets not creating a tooth, thus the pinna lobes entire to obscurely crenulate.

  2 Plants with hemidimorphic leaves (juvenile leaves with only sterile pinnae; adult leaves with both sterile and fertile pinnae, the fertile pinnae borne in the middle of the leaf with sterile pinnae above and below); photosynthetic (sterile) pinnae lacking tufts of hair on the lower side of the junction of the pinna and the rachis; [usually upland] ..... ***Claytosmunda claytoniana***

  2 Plants with dimorphic leaves (each leaf normally either completely photosynthetic or completely fertile); photosynthetic (sterile) pinnae with tufts of reddish hairs near the junction with the rachis; [usually of wetlands, or in mesic soils, or drier soils with seasonal and subterranean seepage] ..... ***Osmundastrum cinnamomeum***

Claytosmunda (Y. Yatabe, N. Murakami, & K. Iwatsuki) Metzgar & Rouhan Rouhan 2016 (INTERRUPTED FERN)

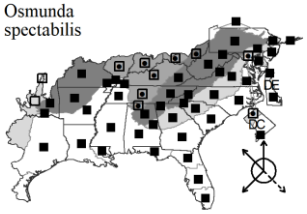


A monotypic genus, a perennial fern, of e. North America and e. Asia. References: Kramer & Green (1990); Lellinger (1985); Metzgar et al (2008); PPG I (2016); Schneider et al (2015); Tsutsumi et al (2011); Whetstone & Atkinson (1993) in FNA2 (1993b); Yatabe, Nishida, & Murakami (1999); Zhang, Iwatsuki, & Kadokawa in FoC (2013).

Identification Notes: *Claytosmunda* is the most "upland" and least robust of our Osmundaceae species. Fertile leaves of *Claytosmunda* are unique in the placement of brown (later shriveled) spore-bearing pinnae in the middle of the blade, with sterile, green pinnae above and below the fertile pinnae. Sterile plants (which are frequent, and entire populations sometimes lack fertile plants) can closely resemble sterile plants of *Osmundastrum cinnamomeum*, but can be told by the lack of a tuft of hairs on the lower side of the junction of each pinna to the rachis. Additionally, *Claytosmunda claytoniana* has a smoother gestalt and overall rounder pinna and pinna lobe tips, while *Osmundastrum cinnamomeum* has a hairier gestalt and overall more pointed pinna tips and pinna lobe tips.

Claytosmunda claytoniana (Linnaeus) Metzgar & Rouhan. INTERRUPTED FERN. **Hab:** Upland forests, woodlands, and balds, moist to rather dry. **Dist:** NL (Newfoundland) west to MN, south to n. GA, n. AL, TN, and AR; disjunct in e. and sc. Asia (the Asian plants sometimes separated as a variety). **Phen:** Mar-Jun. **Comm:** A fossil from the Triassic is seemingly indistinguishable from this species and suggests "that *O. claytoniana* has perhaps been in morphological stasis for at least 200 million years and also that the genus *Osmunda* is at least this old" (Metzgar et al. 2008). **Syn:** = Bomfleur, Grimm, & McLoughlin (2015), Bomfleur, Grimm, & McLoughlin (2017), Metzgar et al (2008), PPG I (2016); = *Osmunda claytoniana* – Ar, FNA2, G, Il, K1, K3, Mo1, NE, NY, Pa, RAB, Sf, Tn, W, WV; = *Osmundastrum claytonianum* (Linnaeus) Tagawa – K4; > *Osmunda claytoniana* var. *claytoniana* – C, F, Va. NatureServe G5TNR (Not Yet Ranked).

Osmunda Linnaeus 1753 (ROYAL FERN)



A genus of ca. 4 species, if circumscribed (as here) to exclude *Todea*, *Leptopteris*, *Osmundastrum*, *Plenasium*, and *Claytosmunda*, following PPG I (2016) and (in part) Metzgar et al. (2008). References: Arana & Ponce (2015); Kramer & Green (1990); Lellinger (1985); Metzgar et al (2008); PPG I (2016); Tsutsumi et al (2011); Tsutsumi et al (2021); Whetstone & Atkinson (1993) in FNA2 (1993b); Yatabe, Nishida, & Murakami (1999); Zhang, Iwatsuki, & Kadokawa in FoC (2013).

Identification Notes: An obligate wetland species, *Osmunda spectabilis* looks less like *Claytosmunda claytoniana* and *Osmundastrum cinnamomeum* than they look like one another, with larger and more widely spaced (diffuse) ultimate leaf segments

Osmunda spectabilis Willdenow. AMERICAN ROYAL FERN. **Hab:** Bogs, marshes (including tidal), moist forests, floodplains, swamp forests, and other wetlands. **Dist:** NL (Newfoundland) west to MB, south to s. FL, e. TX; Mexico south through Central America to s. South America; West Indies. **Phen:** Mar-Jun. **Tax:** American *O. spectabilis* is more closely related to Asian *O. japonica* (=*O. regalis* var. *japonica*) and *O. lancea* than to European, African, and sw. Asian (typic) *O. regalis* (Metzgar et al. 2008; Tsutsumi et al. (2011); Arana & Ponce (2015); Tsutsumi et al. 2021). Specific rank therefore appears fully warranted for American royal ferns. **Syn:** = Il, K4, Va, Arana & Ponce (2015), Sylvestre, Costa, & Arana (2022); =

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated

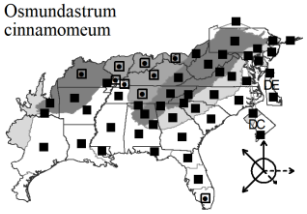
F08. OSMUNDACEAE

Osmunda regalis Linnaeus var. *spectabilis* (Willdenow) A. Gray – Ar, Bah, C, ETx1, F, Fl1, FNA2, G, GrPl, K1, K3, Mo1, NE, NY, Pa, RAB, Tn, Tx, TxFerns, W, WH3, WV; < *Osmunda regalis* – Meso1, Sf. NatureServe G5T5 (Secure).

Osmundastrum C. Presl 1847 (CINNAMON FERN)

A monotypic genus, of the Americas and e. Asia. "When the *rbcL* trees, the fossil and morphological evidences are all taken into account, it can be concluded that the extant *Osmunda cinnamomea* has no closely related living species in Osmundaceae, and it has evolutionarily very static morphology with no significant modification for more than 200 million years. Thus we can call extant *Osmunda cinnamomea* a 'living fossil' " (Yatabe, Nishida, & Murakami 1999); Metzgar et al. (2008) confirmed the opinion that cinnamon fern is an outlier and warrants generic status. References: Arana & Ponce (2015); Kramer & Green (1990); Lellinger (1985); McAvoy (2011); Metzgar et al (2008); Whetstone & Atkinson (1993) in FNA2 (1993b); Yatabe, Nishida, & Murakami (1999); Zhang, Iwatsuki, & Kadokawa in FoC (2013).

Identification Notes: Sterile plants of *Osmundastrum cinnamomeum* are sometimes confused with *Anchistea virginica*, which also has rather coarse, pinnate-pinnatifid leaves and grows in similar wet, acid places. *Osmundastrum* is coarser (to 2 m tall, vs. to 1 m tall), has cinnamon tufts of tomentum present in the axils of the pinnae (vs. absent), has the rachis greenish and rather fleshy in texture (vs. brown and wiry), and bears fronds clumped or tufted from a massive, woody, ascending rhizome covered with old petiole bases (vs. fronds borne scattered along a thick, horizontal, creeping rhizome). See *Claytosmunda* for discussion of distinctions from *Osmundastrum*.



Osmundastrum cinnamomeum (Linnaeus) C. Presl. CINNAMON FERN. **Hab:** Bogs, peatlands, pocosins, wet savannas, floodplains, blackwater stream swamps, marshes, and other wetlands, less typically in merely mesic or even dry-mesic forests, especially if seasonally sub-irrigated. **Dist:** NL (Labrador) west to MN, south to s. FL, c. TX; Mexico south through Central America to Uruguay and Argentina in South America; West Indies; e. Asia. **Phen:** Mar-May. **Tax:** The species also occurs in e. Asia, where sometimes treated as a separate variety (but the combination is not available in *Osmundastrum*); these disjunct populations are genetically distinct (Metzgar et al. 2008). The taxonomic significance of the densely glandular pubescent *Osmundastrum cinnamomeum* var. *glandulosum* (Waters) McAvoy needs additional evaluation; it is reported from scattered locations in e. North America, including SC and VA. Because of its geographic incoherence it is here regarded as a form. **Syn:** = Ar, NE, Tn, TxFerns, Va, Bomfleur, Grimm, & McLoughlin (2015), Bomfleur, Grimm, & McLoughlin (2017), Metzgar et al (2008), Sylvestre, Costa, & Arana (2022); = *Osmunda cinnamomea* Linnaeus – ETx1, Fl1, FNA2, G, Il, Meso1, Mo1, Pa, RAB, Sf, Tx, W, WH3, WV; > *Osmunda cinnamomea* var. *cinnamomea* – C, F, K1; > *Osmunda cinnamomea* Linnaeus var. *glandulosa* Waters – F, K1; > *Osmundastrum cinnamomeum* var. *cinnamomeum* – K3, K4, NY, Arana & Ponce (2015), McAvoy (2011); > *Osmundastrum cinnamomeum* var. *glandulosum* (Waters) McAvoy – K3, K4, McAvoy (2011).

F09. HYMENOPHYLLACEAE Martius 1835 (FILMY FERN FAMILY) [in HYMENOPHYLLALES]

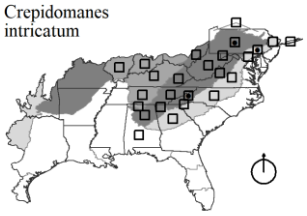
A family of 9 genera and about 430 species. This treatment follows the generic interpretation of Ebihara et al. (2006) and PPG I (2016), which split *Trichomanes* (as both polyphyletic and morphologically diverse) and retain a broad and monophyletic *Hymenophyllum*. See Moran (1998) for an interesting discussion and overview of independent fern gametophytes in e. North America. References: Ebihara et al (2006); Ebihara et al (2007); Farrar (1993b) in FNA2 (1993b); Iwatsuki in Kramer & Green (1990); Morton (1968).

1 Gametophytes only present, not in association with or in close proximity to filmy-fern sporophytes.
  2 Gametophytes thalloid, ribbonlike, flattened ..... ***Hymenophyllum***
  2 Gametophytes filamentous in part or in whole, forming felt-like mats.
    ..... ***Crepidomanes***
1 Sporophytes present.
  4 Leaves simple to slightly lobed, < 2 cm long; rhizomes filiform, <0.5 mm in diameter.
    5 Leaves glabrous or with simple hairs; rhizomes densely covered with dark-colored hairs ..... ***Didymoglossum***
    5 Leaves stellate pubescent; rhizomes glabrous or with sparse light-colored hairs ..... ***Hymenophyllum tayloriae***
  4 Leaves pinnatifid to pinnate-pinnatifid, > 2.5 cm long; rhizomes filiform or moderately stout.
    ..... ***Vandenboschia boschiana***

Crepidomanes C. Presl 1851 (FILMY FERN)

A genus of 30-40 species, tropical and extending to north temperate areas of high humidity; strictly Old World, except for our species. References: Dubuisson et al (2003); Ebihara et al (2006); Ebihara et al (2007); Ebihara, Farrar, & Ito (2008); Farrar (1993b) in FNA2 (1993b); Iwatsuki in Kramer & Green (1990); Morton (1968); Weakley et al (2011).

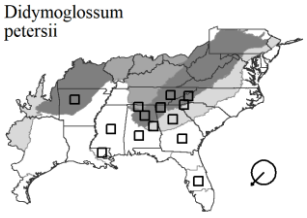
Crepidomanes intricatum (Farrar) Ebihara & Weakley. GROTTO-FELT, APPALACHIAN TRICHOMANES, WEFT FERN. **Hab:** On ceilings or back walls of grottoes, especially in humid gorges or near or behind waterfalls. **Dist:** Rather widespread in e. North America, from NH, VT, w. NY, OH, IN, and IL south to NC, nw. SC, n. GA, and n. AL. **Tax:** While *Crepidomanes intricatum* is difficult to morphologically distinguish from gametophytes of *Vandenboschia boschiana* or *Didymoglossum petersii*; the electrophoretic and phytogeographic evidence of Farrar (1992) leave little question that it should be considered a distinct species. Although Farrar (1992) found that 30 of 30 populations of *Trichomanes (s.l.)* gametophytes "east of the Mississippi River that were not within or adjacent to sporophyte populations of *T. boschianum* or *T. petersii*" were "*C. intricatum*," the absence of sporophytes should be considered to provide only a presumptive or likely identification of gametophytes. Farrar (1992) also showed that independent gametophytes in AR were those of *Vandenboschia boschiana* and *Didymoglossum petersii*. Farrar (1992) points out the "intriguing possibility that somewhere in the Appalachian Mountains sporophytes of this species may yet exist." Probably the most likely area in



which to search for the sporophyte generation of *Crepidomanes intricatum* is the escarpment gorge region of NC, SC, and GA near Highlands, NC, where topography, waterfalls, and the highest rainfall east of the Cascade Mountains combine to create microclimatic conditions that have favored the relict survival of numerous species of mosses, liverworts, and ferns. Any filmy-fern sporophyte which differs from known eastern North America species of Hymenophyllaceae should be investigated carefully. *Vittaria appalachiana* and *Hymenophyllum tayloriae* gametophytes differ from *Crepidomanes intricatum* in being thallose rather than filamentous. Ebihara, Farrar, & Ito (2008) reported that *Crepidomanes intricatum* shares its chloroplast genome with the Asian triploid *Crepidomanes schmidtianum* (Zenker ex Taschner) K. Iwatsuki var. *schmidtianum*, widely distributed in temperate e. Asia (China, Japan, Nepal, Bhutan, n. India). Further studies are underway to determine the relationship of the two. Given the probable different ploidy and apparent long-term separation of the Appalachian plant from the east Asian, it seems best to treat them as specifically distinct. **Syn:** = Il, K3, K4, NY, Va, Weakley et al (2011); = *filamentous gametophyte* – RAB; = *Trichomanes intricatum* Farrar – FNA2, K1, NE, Pa, Tn; = *Vandenboschia species 1* – Ebihara et al (2006). NatureServe G4G5 (Apparently Secure).

Didymoglossum Desvaux 1827 (FILMY FERN)

A genus of 30-40 species, primarily tropical. All five of our species belong to subgenus *Didymoglossum* (Ebihara et al. 2006). References: Dubuisson et al (2003); Ebihara et al (2006); Ebihara et al (2007); Farrar (1993b) in FNA2 (1993b); Gann & Weakley (2017) in Weakley et al (2017); Iwatsuki in Kramer & Green (1990); Morton (1968); Wessels Boer (1962).

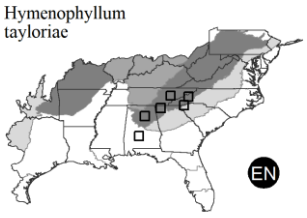


Didymoglossum petersii (A. Gray) Copeland. DWARF FILMY FERN. **Hab:** On vertical faces of acidic rock outcrops in humid gorges (in sw. NC, nw. SC, and ne. GA, primarily of the Savannah River drainage), in the context of the very humid escarpment gorges on relatively dry rocks, not on rocks receiving substantial seepage or spray from waterfalls, also on outcrops of Altamaha Grit in the Coastal Plain, on tree bark (especially *Magnolia grandiflora* and *Fagus grandifolia*) in swamps and hammocks (in FL, LA, and MS), and on chert around limestone sinkholes (in FL). **Dist:** W. NC, nw. SC, sw. and sc. TN, south to n. peninsular FL, c. AL, s. MS, and e. LA; disjunct in the Ozarks and Ouachitas of AR; disjunct in Mexico (CHP, VER, and PUE), Guatemala, Costa Rica, and El Salvador. **Phen:** Jun-Aug. **Comm:** This diminutive species is often overlooked, except by bryologists and hepaticologists; superficially, it does resemble a moss or liverwort more than a fern. **Syn:** = K3, K4, Ebihara et al (2006); = *Trichomanes petersii* A. Gray – Ar, Fl1, FNA2, K1, Meso1, RAB, Sf, Tn, W, WH3, Wessels Boer (1962). NatureServe G4G5 (Apparently Secure).

Hymenophyllum J.E. Smith 1793 (FILMY FERN)

As here broadly circumscribed, a genus of about 250-330 species, almost strictly tropical in distribution, but very rarely expending into humid north temperate regions. *Sphaerocionium* C. Presl and other segregates are often recognized; these segregates may well be warranted. Iwatsuki in Kramer & Green (1990) takes a broad view of the genus, recognizing only *Sphaerocionium* among the potential segregates. Ebihara et al. (2006) does not recognize any segregates, a course followed here. If *Sphaerocionium* were recognized at generic rank, *H. tunbrigense* is in *Hymenophyllum* and *H. tayloriae* in *Sphaerocionium* (the combination has not been made). References: Davison (1997); Ebihara et al (2006); Farrar (1993b) in FNA2 (1993b); Iwatsuki in Kramer & Green (1990); Larsen et al (2017); Morton (1968); Raine, Farrar, & Sheffield (1991a).

1 Sporophytes present.
.....***Hymenophyllum tayloriae***
1 Gametophytes only present.
.....***Hymenophyllum tayloriae***



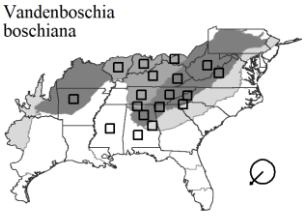
Hymenophyllum tayloriae Farrar & Raine. GORGE FILMY FERN. **Hab:** Spray cliffs near waterfalls, permanently moist ceilings of grottoes in escarpment gorges with high rainfall. **Dist:** This species is endemic to the southern end of the Southern Appalachians (Transylvania, Jackson, and Macon counties, NC, Pickens and Oconee counties, SC, Rabun County, GA, Fentress, Scott, and Sevier counties, TN, and Lawrence, Franklin, and Lamar counties, AL). **Comm:** *H. tayloriae* was named (in honor of the first collector), following the demonstration that it represented a gametophyte distinct from the gametophytes of any (sporophytically) known species (Raine, Farrar, & Sheffield 1991), including *H. tunbrigense*, present in the close vicinity. Raine, Farrar, & Sheffield (1991) point out that "*H. tayloriae* is distinguished from the independent gametophytes of *Vittaria appalachiana* Farrar & Mickel by its 2-dimensional spathulate gemmae (those of *V. appalachiana* are uniseriate), rhizoid attachment only to marginal cells, yellow-green color, and glossy texture. Thalloid liverworts of similar size are generally more than one cell thick or have a distinct midrib, have notched apical meristems, and do not produce spathulate gemmae." An immature sporophyte, collected by Mary S. Taylor in 1936, has stalked stellate hairs on the margins and midrib of the leaf and was the only sporophytic collection of the species until the recent discovery of additional juvenile sporophytes in AL (FNA 1993b). **Syn:** = FNA2, K1, K3, K4, Tn, Ebihara et al (2006); = "a *branching ribbon-like gametophyte with marginal rhizoids small ovate plate-like gemmae several cells* wide, of the genus Hymenophyllum" – RAB. NatureServe G2 (Imperiled).

Vandenboschia Copeland 1938 (FILMY FERN)

A genus of 15-20 species, of the tropics and extending to north temperate areas of high humidity. References: Dubuisson et al (2003); Ebihara et al (2006); Ebihara et al (2007); Farrar (1993b) in FNA2 (1993b); Iwatsuki in Kramer & Green (1990); Morton (1968).

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated

F09. HYMENOPHYLLACEAE



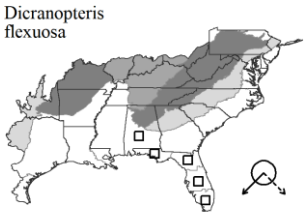
Vandenboschia boschiana (Sturm) Ebihara & K. Iwatsuki. APPALACHIAN FILMY FERN. **Hab:** On rock outcrops, usually vertical or overhanging, usually in deeply shaded grottoes receiving seepage or spray from waterfalls. **Dist:** W. VA, s. OH, s. IN, s. IL south to w. NC and nw. SC, n. GA, n. AL, and ne. MS (Menapace, Davison, & Webb 1998); disjunct in the Ozarks of nw. AR; disjunct in Chihuahua, Mexico. See Belden et al. (2004) for more details on the first documented Virginia occurrence. **Phen:** Jun-Sep. **Syn:** = Il, K3, K4, Va, Ebihara et al (2006); = *Trichomanes boschianum* Sturm – Ar, C, F, FNA2, G, K1, RAB, Sf, Tn, W, WV.

F12. GLEICHENIACEAE C. Presl 1825 (FORKING-FERN FAMILY) [in GLEICHENIALES]

A family of about 6 genera and about 157 species, pan-tropical and -subtropical. References: Nauman (1993a) in FNA2 (1993b); PPG I (2016).

Dicranopteris Bernhardi 1805 (FORKING-FERN)

A genus of about 20 species, pan-tropical and -subtropical. Wei et al. (2021) found that *Dicranopteris linearis* probably represents a complex of species. References: Nauman (1993a) in FNA2 (1993b); Wei et al (2021).



Dicranopteris flexuosa (Schrader) Underwood. DROOPING FORKED-FERN. **Hab:** Wet pine flatwoods, moist disturbed areas; apparently a native waif or adventive in our area, individual occurrences often not persisting for long. **Dist:** FL Panhandle (Bay and Franklin counties) and FL peninsula, s. AL (Mon Louis Island, Mobile County); West Indies; Mexico, Central America, and South America. **Phen:** Jan-Dec. **Syn:** = Fl2, FNA2, K1, K3, K4, Meso1, Sf, WH3. NatureServe G4 (Apparently Secure).

F13. LYGODIACEAE M. Roemer 1840 (CLIMBING FERN FAMILY) [in SCHIZAEALES]

A family with a single genus and about 40 species, of tropical and temperate regions, particularly equatorial and south temperate. Sometimes included in the Schizaeaceae, but the relationship is remote and unclear. References: Nauman (1993b) in FNA2 (1993b); PPG I (2016).

Lygodium Swartz 1800 (CLIMBING FERN)

A genus of about 40 species, mostly tropical, with a few temperate species. References: Nauman (1993b) in FNA2 (1993b); Zhang & Hanks in FoC (2013).

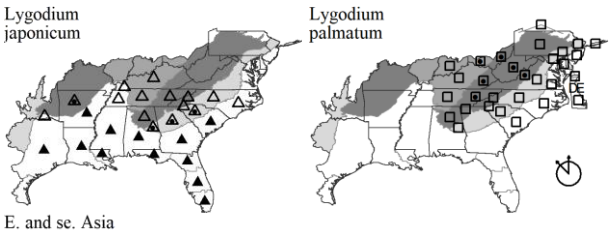
Identification Notes: *Lygodium* in our region consists of two non-native and invasive species and an uncommon native. All species have underground rhizomes and very long leaves with wiry petioles and rachises that can climb into shrubs and trees or sprawl over the ground and lower vegetation. These "leaves with pinnae" are often mistaken for "stems with leaves" because of their surprising length and the distancing between the pinnae.

1 Sterile pinnae palmately lobed into 4-8 entire-margined to undulate lobes; [native, mainly inland provinces but also Coatal Plain from SC northwards along the coast] ..... ***Lygodium palmatum***

1 Sterile pinnae pinnately divided into numerous serrate pinnules; [non-native, mainly Coastal Plain, but also inland]. ..... ***Lygodium japonicum***

* ***Lygodium japonicum*** (Thunberg) Swartz. JAPANESE CLIMBING FERN. **Hab:** Disturbed areas. **Dist:** Native of e. Asia. **Phen:** Jun-Dec. **Comm:** The leaves (up to 30 m in length!) climb into the canopy of trees in swamp forests and other wet habitats. **Syn:** = Ar, ETx1, Fl1, FNA2, K1, K3, K4, RAB, Sf, Tx, TxFerns. NatureServe GNR (Not Yet Ranked).

Lygodium palmatum (Bernhardi) Swartz. AMERICAN CLIMBING FERN, HARTFORD FERN. **Hab:** Bogs, moist thickets, swamp forests, sandstone outcrops, roadside ditches and roadbanks, in strongly acid soils. **Dist:** NH, VT, NY, and MI south to SC, n. GA, and n. AL, widely scattered except in the Cumberland Plateau of KY, TN, and AL, where it is most common. **Phen:** Jul-Sep. **Comm:** Garrison (1992) discusses two forms of the species, "one with long appressed hairs scattered over the lower (abaxial) side of the sterile leaflets and the other relatively hair-free". The two forms appear to be geographically differentiated, the pubescent form predominating south and west of Maryland, the glabrous form occurring primarily in the Northeast. Both forms are present in our area. Further research is needed to determine the taxonomic significance of this variation in pubescence. **Syn:** = C, F, Fl1, FNA2, G, K1, K3, K4, NE, NY, Pa, RAB, Sf, Tn, Va, W, WV. NatureServe G4 (Apparently Secure).



Key to Map Symbology: □ native; ◇ maybe exotic; △ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

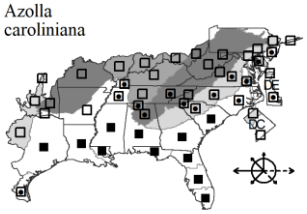
F16. SALVINIACEAE Martinov 1820 (FLOATING FERN FAMILY) [in SALVINIALES]

A family of 2 genera and about 21 species, all floating aquatics. *Azolla* is sometimes separated as a separate family, Azollaceae, a reasonable alternate approach. References: Lumpkin (1993) in FNA2 (1993b); Nagalingum, Nowak, & Pryer (2008); Nauman (1993j) in FNA2 (1993b); Schneller in Kramer & Green (1990).

Identification Notes: Salviniaceae includes two genera of small, floating aquatics.

1 Leaves < 1 mm long, reddish or green, without hairs on the upper surface ..... ***Azolla***
1 Leaves 5-50 mm long, bright green, with obvious hairs on the upper surface ..... ***Salvinia***

Azolla Lamarck 1783 (MOSQUITO FERN)



A small genus of about 6-9 species, floating aquatics, in tropical and warm temperate regions. The taxonomy and nomenclature of *Azolla* has been highly disputed and remains unsettled, with complex issues of taxon entitation and also great uncertainty about application of names with priority to the uncertainly entitated taxa. Sections shown in the key follow Metzgar, Schneider, & Pryer (2007). *Azolla* has a symbiotic, nitrogen-fixing cyanobacterium, *Anabaena azollae* Strasburger; the nitrogen-fixing capabilities of *Azolla* (through its symbiont) have resulted in its use as a fertilizer, green manure, and livestock feed, much promoted in recent years, but used historically in Asian rice paddies for centuries (Lumpkin in FNA 1993b). References: Bates & Browne (1981); Bunch & Hayden (2020); Evrard & Van Hove (2004); Lumpkin (1993) in FNA2 (1993b); Metzgar, Schneider, & Pryer (2007); Reid, Plunkett, & Peters (2006); Saunders & Fowler (1992).

Identification Notes: Very unfernlike, *Azolla* is a floating aquatic that looks superficially more like an aquatic liverwort, because of its very small (< 2 mm wide), bilobed leaves, borne in two ranks on either side of the stem. In some years and some places it occurs in great abundance, covering the surface of the water with a green or red mass of vegetation.

Azolla caroliniana Willdenow. EASTERN MOSQUITO FERN, WATER FERN. **Hab:** Stagnant waters of interdune ponds, limesink ponds, old millponds, beaver ponds, floodplain sloughs, often locally abundant. **Dist:** Widespread in the se. United States, extending irregularly north (partly from introductions) into s. New England and MN, and south into the tropics. **Phen:** Jun-Sep. **Syn:** = Ar, C, ETx1, F, FNA2, G, Il, K1, Meso1, Mo1, NE, Pa, RAB, Sf, Tn, Tx, TxFerns, Va, Bates & Browne (1981), Bunch & Hayden (2020), Reid, Plunkett, & Peters (2006); < *Azolla cristata* Kaulfuss – K4, NY; < *Azolla filiculoides* Lamarck – WH3, Evrard & Van Hove (2004); < *Azolla microphylla* Kaulfuss – K3.

Salvinia Séguier 1754 (WATER SPANGLES)

A genus of about 12 species, mostly tropical. References: Jacono (1999); Lellinger (1985); Nauman (1993j) in FNA2 (1993b); PPG I (2016); Schneller in Kramer & Green (1990).

Identification Notes: *Salvinia* is a floating aquatic, with leaves borne in whorls of three, two of which are the conspicuous floating leaves, to 5 cm long, and round or elliptical; the third leaf is dissected and pendant into the water.

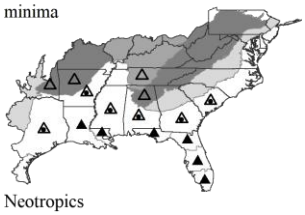
1 Floating leaves 5-15 mm long; multicellular hairs of the upper leaf surface with 4 free, spreading branches (use 10× magnification) ..... ***Salvinia minima***
1 Floating leaves to 50 mm long; multicellular hairs of the upper leaf surface with 4 branches joined at their tips, forming a cage-like structure (use 10× magnification) ..... ***Salvinia molesta***

* ***Salvinia minima*** Baker. WATER SPANGLES. **Hab:** Quiet waters. **Dist:** Native of the Neotropics. **Phen:** Jan-Dec. **Syn:** = Ar, ETx1, Fl1, FNA2, K1, K3, K4, Meso1, NE, TxFerns, Lellinger (1985); *Salvinia auriculata* – Sf, misapplied.

* ***Salvinia molesta*** D.S. Mitchell. GIANT SALVINIA, KARIBA WEED. **Hab:** Still waters of farm ponds, calcareous seepage ponds, and other situations. **Dist:** Native of Brazil. *S. molesta* has been found at scattered sites in GA (Gwinnett and Lamar counties) (Carter, Baker, & Morris 2009), NC (Brunswick, Carteret, Craven, Cumberland, Duplin, Durham, Johnston, Jones, Lenoir, Mecklenburg, New Hanover, Onslow, Orange, Person, Pitt, Sampson, and Wake counties), SC (Colleton County), and VA (Shenandoah County), where it has been subjected to extermination efforts; it will likely be reintroduced (Anonymous 1999, D. Patterson, pers. comm.). **Phen:** Jan-Dec. **Tax:** Moran & Smith (1999) support the continued use of the name *S. molesta* for this species, as opposed to the ambiguous name *S. adnata* Desvaux. **Comm:** This species is considered a noxious aquatic weed and has been reported from other southeastern states, such as TX and LA (Jacono 1999). **Syn:** = ETx1, Fl1, FNA2, K1, K3, TxFerns, WH3, Lellinger (1985); = *Salvinia* ×*molesta* – K4. NatureServe GNR (Not Yet Ranked).

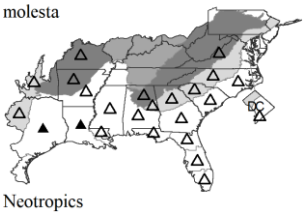
Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Salvinia minima



Neotropics

Salvinia molesta



Neotropics

F17. MARSILEACEAE Mirbel 1802 (WATER-CLOVER FAMILY) [in SALVINIALES]

A family of 3 genera and about 61 species, nearly cosmopolitan. References: Johnson (1993c) in FNA2 (1993b); Kramer & Green (1990); Nagalingum, Nowak, & Pryer (2008).

Identification Notes: Marsileaceae has two genera in our region, both small "unfernlike" plants of amphibious or aquatic situations.

1 Leaves clover-like, the 4 cuneate, obovate or wedge-shaped leaflets borne at the summit of the petiole; sporocarps ovoid..... ***Marsilea***
1 Leaves grass-like, linear, the leaf blade absent, the petiole narrowly winged; sporocarps spherical..... ***Pilularia***

Marsilea Linnaeus 1753 (WATERCLOVER)

A genus of about 55 species, nearly cosmopolitan. References: Jacono & Johnson (2006); Johnson (1993a) in FNA2 (1993b); Knepper, Johnson, & Musselman (2002); Kramer & Green (1990); Lin & Johnson in FoC (2013); Schaefer, Carine, & Rumsey (2011).

Identification Notes: *Marsilea* superficially resembles an aquatic four-leaf clover, with four leaflets (pinnae) palmately arrayed at the petiole summit. Species determination is difficult and relies on features of the sporocarp, a hard pea-like structure than contains the sori, and is borne on short stalks from near or at the base of the petioles. The raphe is the portion of the peduncle adnate to the sporocarp. The peduncle ends in a blunt tooth, the proximal tooth. Further up on the sporocarp is a second tooth, the distal tooth.

1 Leaves strongly bicolored (pale green toward the base of each of the 4 leaflets, darker green toward the tip); aquatic forms with a swollen air bladder just below the leaf..... ***Marsilea mutica***
1 Leaves unicolored.
  2 Roots present (1-3) between the nodes, as well as at the nodes. ..... ***Marsilea minuta***
  2 Roots present only at the nodes.
    4 Distal tooth absent or a very low bump (< 0.2 mm long); leaf lower surface densely spreading pubescent..... ***Marsilea macropoda***
    4 Distal tooth 0.4-1.2 mm long, sharply acute to pointed, often hooked; leaf lower surface glabrate to sparsely appressed pubescent..... ***Marsilea vestita***

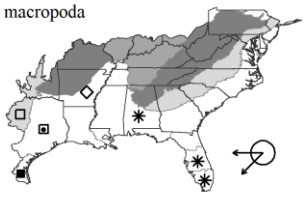
Marsilea macropoda Engelmann ex A. Braun. GOLDEN WATERCLOVER, BIG-FOOTED WATERCLOVER. **Hab:** Shallow water, wet ditches. **Dist:** C. and e. TX south to Mexico; reported as introduced eastward in AL and c. and s. peninsular FL. **Phen:** Jan-Dec. **Syn:** = ETx1, Fl1, FNA2, K1, K3, K4, Tx, TxFerns, WH3, Jacono & Johnson (2006). NatureServe G4 (Apparently Secure).

* ***Marsilea minuta*** Linnaeus. SMALL WATERCLOVER. **Hab:** Lakes and streams. **Dist:** Native of the Old World. Known in North America from AL, FL, GA, TN, and SC. **Syn:** = Fl1, FNA2, K1, K4, Tn, WH3, Jacono & Johnson (2006); > *Marsilea crenata* C. Presl – K3; > *Marsilea minuta* Linnaeus – K3. NatureServe GNR (Not Yet Ranked).

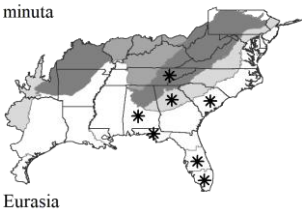
* ***Marsilea mutica*** Mettenius. NARDOO, AUSTRALIAN WATERCLOVER. **Hab:** Ditches, ponds. **Dist:** Native of Australasia. Apparently spreading rapidly in VA. **Syn:** = K1, K3, K4, WH3, Jacono & Johnson (2006).

Marsilea vestita Hooker & Greville. HAIRY WATERCLOVER. **Hab:** Ponds, wet depressions, streamsides, wet ditches, old fields. **Dist:** MN and BC south to MS, LA, TX, NM, AZ, CA, and Mexico. **Phen:** Jan-Dec. **Syn:** = Ar, Bah, ETx1, Fl1, FNA2, K1, K3, K4, TxFerns, WH3, Jacono & Johnson (2006); > *Marsilea mexicana* A. Braun – Tx, misidentification; > *Marsilea mucronata* – Tx; > *Marsilea tenuifolia* – Tx; > *Marsilea uncinata* A. Braun – GrPl, Sf, Tx; > *Marsilea vestita* Hooker & Greville – GrPl, Sf.

Marsilea macropoda

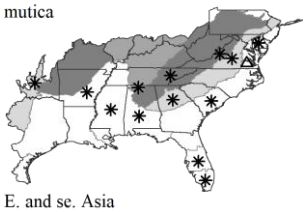


Marsilea minuta



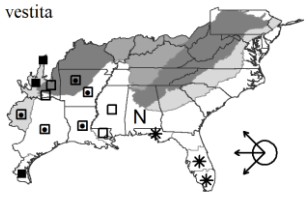
Eurasia

Marsilea mutica



E. and se. Asia

Marsilea vestita



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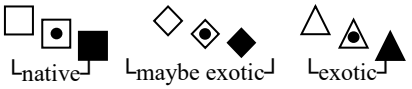

←rare ←uncommon ←common (see introduction for more)

* : waif
EN : endemic
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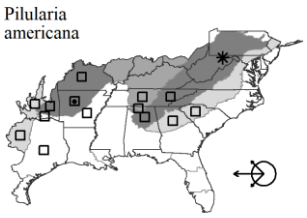


Pilularia Linnaeus 1753 (PILLWORT)

A genus of about 5 species, nearly cosmopolitan. References: Dennis & Webb (1981); Johnson (1993c) in FNA2 (1993b); Kramer & Green (1990); Nagalingum, Nowak, & Pryer (2008).

Identification Notes: *Pilularia* lacks a leaf-blade, the 1-8 cm long petiole is narrowly winged, and looks a bit like an *Isoetes* or *Juncus* leaf. In vegetative condition, it may be recognized as a "fern" by the typical coiled ("fiddlehead") development of young leaves. The primary rhizome produces individual "fronds" at nodes, a short rhizome branch at each node also produces "fronds."

Pilularia americana A. Braun. AMERICAN PILLWORT. **Hab:** Vernal pools and seepage areas on granitic flatrocks, other ponds, drawdown shores of lakes. **Dist:** This peculiar plant has a puzzling distribution, being known from several disjunct regions: WA to s. CA; NE and MO south to e. and c. TX; SC, GA, TN, AL, and Mexico (Durango and Baja California Norte); similar plants, perhaps conspecific, occur in South America and Africa. The apparently fragmented distribution may be partly explainable by the inconspicuous nature of the plant. First reported for SC in 1993 (J. Allison, pers. comm.). **Phen:** Apr-Oct. **Syn:** = Ar, ETx1, FNA2, GrPl, K1, K3, K4, Mo1, Sf, Tn, Tx, TxFerns. NatureServe G5 (Secure).

F30. PTERIDACEAE E.D.M. Kirchner 1831 (MAIDENHAIR FERN FAMILY) [in POLYPODIALES]

A family of about 53 genera and about 1211 species. Here circumscribed to include Vittariaceae (see PPG 2016; Smith et al. 2006b). Following PPG 1 (PPG 2016), the family is divided into five subfamilies, which may ultimately be elevated to five families: family Adiantaceae or subfamily Vittarioideae (*Adiantum*, *Vittaria*), family Sinopteridaceae or subfamily Cheilanthoideae (*Astrolepis*, *Argyrochosma*, *Bommeria*, *Myriopteris*, *Notholaena*, *Pellaea*), family Cryptogrammaceae or subfamily Cryptogrammoideae (*Cryptogramma*), family Pteridaceae or subfamily Pteridoideae (*Pityrogramma*, *Pteris*), and family Parkeriaceae or subfamily Parkerioideae (*Acrostichum*, *Ceratopteris*). References: Christenhusz, Fay, & Byng (2018); Crane (1997); Grusz & Windham (2013); Kramer & Green (1990); Lellinger (1985); Lloyd (1993a) in FNA2 (1993b); Tryon, Tryon, & Kramer in Kramer & Green (1990); Windham (1993a) in FNA2 (1993b).

Identification Notes: Pteridaceae is an important and diverse fern family in our region, especially southwards and westwards. The five subfamilial lineages and some of the genera within them are disparate in their gestalt, making it difficult to provide useful identification characterizations of the family as a whole (see the individual genera).

1 Gametophytes only present; [subfamily *Vittarioideae*]..... ***Vittaria***
1 Sporophytes present.
  2 Leaves undissected and unlobed, linear, 10-60 cm long and 1-3 mm wide; [subfamily *Vittarioideae*] ..... ***Vittaria***
  2 Leaves dissected, not linear, > 20 mm wide.
    3 Sori round or oblong, distinct and separate along the pinnule margins; leaves bright-green, glabrous, herbaceous, delicate, and flexible (darker green, thicker, and hairy in *A. hispidulum*); [subfamily Vittarioideae] ..... ***Adiantum***
    3 Sori continuous along the pinnule margins (or across the blade in *Acrostichum*); leaves mostly dark-green or glaucous, often pubescent, coriaceous, tough, and stiff (except *Ceratopteris*).
      4 Plant aquatic or subaquatic, pale green, delicate; [subfamily *Ceratopteridoideae*]..... ***Ceratopteris***
      4 Plant epipetric or terrestrial (except *Acrostichum*), usually dark or bluish green and coriaceous.
        7 Petioles with alternating longitudinal grooves (2 or 3) and ridges on the upper surface; [subfamily *Pteridoideae*].
        ..... ***Pteris***
        7 Petioles rounded, flattened, or with a single groove on the upper surface; [subfamily *Cheilanthoideae*].
          9 Leaves 1-pinnate or 1-pinnate-pinnatifid; lower leaf blade surfaces densely covered with stellate and ciliate-fringed scales; petiole with 2 vascular bundles..... ***Astrolepis***
          9 Leaves 1-pinnate-pinnatifid or more divided (to 5-pinnate); lower leaf blade surfaces glabrous to pubescent and/or farinose; petiole with 1 vascular bundle.
            13 Leaves 1-3-pinnate, the ultimate leaf-segments 8-100 mm long, glabrous or sparsely and inconspicuously hairy
            ..... ***Pellaea***
            13 Leaves 2-5-pinnate, the ultimate leaf-segments 1-4 (-8) mm long, more-or-less densely hairy (glabrous or glabrescent in *Myriopteris alabamensis* and *M. microphylla*).
            ..... ***Myriopteris***

Adiantum Linnaeus 1753 (MAIDENHAIR FERN)

A genus of about 225 species, perennial herbs, nearly cosmopolitan. References: Lin, Prado, & Gilbert in FoC (2013); Lu et al (2011); Paris (1993) in FNA2 (1993b); Tryon, Tryon, & Kramer in Kramer & Green (1990); Williams, Theis, & Hoess (2016); Zhao et al (2021).

Identification Notes: *Adiantum* has sporangia borne marginally on the lower surface of the ultimate leaf segments, under a narrow false indusium (an often scarious flap). A distinctive feature is the black, dark purple or dark brown petiole and rachises, contrasting strongly with the pale green leaf segments. Most species of *Adiantum* in our region grow on or associated with rock outcrops, with the most widespread and northern species in the region, *Adiantum pedatum*, an exception, as it grows on rock outcrops or talus but also in mesic terrestrial situations away from exposed rock.

1 Petiole and rachises pubescent; [of the Coastal Plain of FL, GA, AL, and LA].
..... ***Adiantum hispidulum***
1 Petiole and rachises glabrous; [collectively widespread].

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

F30. PTERIDACEAE

4 Leaves broader than long, dichotomously divided at the summit of the petiole, the two main branches pedately branched, fanlike; ultimate segments oblong, > 2× as long as broad ..... ***Adiantum pedatum***

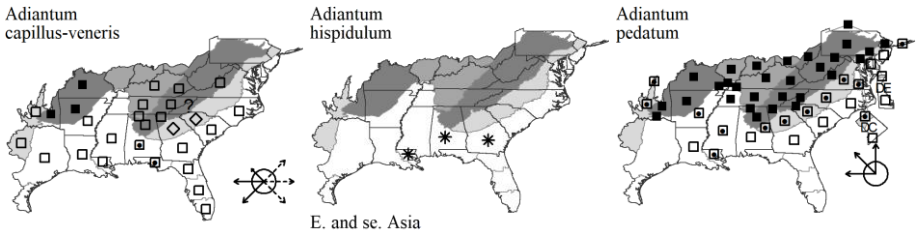
4 Leaves longer than broad, pinnately divided, with a main central axis, not fanlike; ultimate segments rhombic, about as long as broad (usually 0.7-1.3× as long as broad).

..... ***Adiantum capillus-veneris***

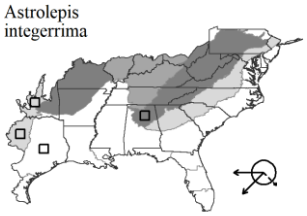
Adiantum capillus-veneris Linnaeus. VENUS'-HAIR FERN, SOUTHERN MAIDENHAIR, CULANTRILLO. **Hab:** Moist calcareous substrates, in the Coastal Plain on 'marl' (coquina limestone) (NC and SC), on calcareous clay bluffs (GA), and adventive on lime mortar of old buildings and walls (as in Wilmington and Fayetteville, NC); in the Mountains and Interior Low Plateau on limestone or other calcareous sedimentary rocks. **Dist:** Widespread on several continents, in e. North America largely southern in distribution, from e. NC, w. VA, MO, CO, UT, and CO south; also disjunct in SD and BC, and in Mexico, the West Indies, tropical and warm temperate portions of Central and South America, Eurasia, and Africa. A rather implausible record for the NC Mountains (Buncombe County, Montreat, mountain ravines, rare, 1923, J.H. Davis, Herbarium UNCC) is mapped as questionable. **Phen:** Jun-Oct. **Tax:** There is some question whether North American plants are conspecific with those in the Old World (Paris in FNA 1993b). **Syn:** = Ar, Bah, C, ETx1, F, Fl1, FNA2, G, GrPl, K1, K3, K4, Meso1, Mo1, NY, RAB, Sf, Tn, TxFerns, Va, W, WH3. NatureServe G5 (Secure).

* ***Adiantum hispidulum*** Swartz. ROUGH MAIDENHAIR, GARDEN MAIDENHAIR. **Hab:** Stone walls, old wells. **Dist:** Native of Asia and Africa. Reported for GA (Harper 1903). **Syn:** = FNA2, K1, K3, K4, Sf. NatureServe GNR (Not Yet Ranked).

Adiantum pedatum Linnaeus. NORTHERN MAIDENHAIR. **Hab:** Moist forests and cliffs, especially over calcareous or mafic rocks, sometimes in seasonal seepage. **Dist:** NS and NB west to ON and MN, south to GA, AL, MS, LA, and OK. Sometimes interpreted to also be present in e. Asia; Lu et al. (2011) make clear that Asian material should be treated as two species distinct from *Adiantum pedatum*; *Adiantum japonicum* was named in 2021 (Zhao et al. 2021). **Phen:** Jun-Aug. **Tax:** Plants growing on serpentine in MD and se. PA have sometimes been interpreted as being *A. aleuticum*, but recent molecular studies show that they are "stunted forms" or "sun forms" of *A. pedatum* (Williams, Theis, & Hoess 2016). **Syn:** = Ar, G, GrPl, Il, K4, NE, NY, RAB, Sf, Tn, Va, W, WV, Lu et al (2011), Zhao et al (2021); = *Adiantum pedatum* var. *pedatum* – F, Mo1; > *Adiantum aleuticum* (Ruprecht) Paris – FNA2, Pa, misapplied to MD and PA material; > *Adiantum aleuticum* var. *aleuticum* – K3, misapplied to MD and PA material; > *Adiantum pedatum* Linnaeus – FNA2, K3, Pa; > *Adiantum pedatum* Linnaeus ssp. *calderi* Cody – C, misapplied to MD and PA material; > *Adiantum pedatum* ssp. *pedatum* – C.



Astrolepis D.M. Benham & Windham 1992 (STAR-SCALED CLOAK FERN)

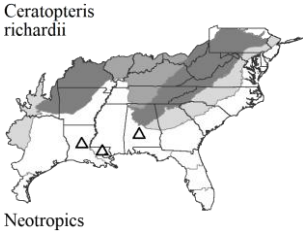


A genus of about 8 species, of s. North America, Central America, South America, and the West Indies. This group of species has traditionally been placed either in *Notholaena* or *Cheilanthes*, but is best recognized as a separate genus, more closely related to *Argyrochosma*, *Pellaea*, and *Cheilanthes* than to *Notholaena* (Gastony & Rollo 1998; PPG I 2016). References: Benham & Windham (1993) in FNA2 (1993b); Gastony & Rollo (1998); Tryon, Tryon, & Kramer in Kramer & Green (1990).

Identification Notes: *Astrolepis* has grayish or bluish pinnate leaves (the pinnae sometimes lobed), with tiny, whitish, star-shaped scales on the upper leaf surface and white to brown, lanceolate, and shaggily fringed scales on the lower surface. *Astrolepis* occurs in dry, usually rock outcrop associated situations in our region.

Astrolepis integerrima (Hooker) D.M. Benham & Windham. SOUTHWESTERN CLOAK FERN. **Hab:** On outcrops of calcareous rocks (such as Ketona dolostone in Bibb County, AL). **Dist:** TX, OK, NM, AZ, and NV south into Mexico; disjunct in c. AL (Bibb County); also disjunct in Hispaniola. **Phen:** Jun-Oct. **Tax:** This taxon is apparently an apogamous triploid derived from *Astrolepis cochisensis* (Goodding) D.M. Benham & Windham and an unknown taxon. **Syn:** = ETx1, FNA2, K3, K4, TxFerns; = *Astrolepis* ×*integerrima* – K1; = *Hemionitis integerrima* (Hooker) Christenhusz – Christenhusz, Fay, & Byng (2018); = *Notholaena sinuata* (Lagasca y Segura ex Swartz) Benham & Windham var. *integerrima* Hooker – GrPl. NatureServe G5 (Secure).

Ceratopteris Brongniart 1821 (ANTLER FERN)



A genus of 3-6 species, widespread in tropical, subtropical, and warm temperate areas. References: Kinosian, Pearse, & Wolf (2020a); Kinosian, Pearse, & Wolf (2020b); Lin & Masuyama in FoC (2013); Lloyd (1993a) in FNA2 (1993b).

Identification Notes: *Ceratopteris* are aquatic and semi-aquatic (amphibious) ferns with irregularly and lacerately divided leaves.

* ***Ceratopteris richardii*** Brongniart. **Hab:** Lakes and ponds; probably only introduced in the southeastern United States. **Dist:** West Indies; Central and South America; Africa. **Syn:** = FNA2, K1, K3, K4. NatureServe G5? (Secure).

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Myriopteris Fée 1852 (LIPFERN)

A genus of about 45 species, 44 in the Western Hemisphere and 1 in Africa. As outlined in Grusz & Windham (2013), *Myriopteris* is not closely related to *Cheilanthes* sensu stricto. References: Christenhusz, Fay, & Byng (2018); Gastony & Rollo (1998); Grusz & Windham (2013); Grusz et al (2014); Lellinger (1985); Tryon, Tryon, & Kramer in Kramer & Green (1990); Windham & Rabe (1993) in FNA2 (1993b).

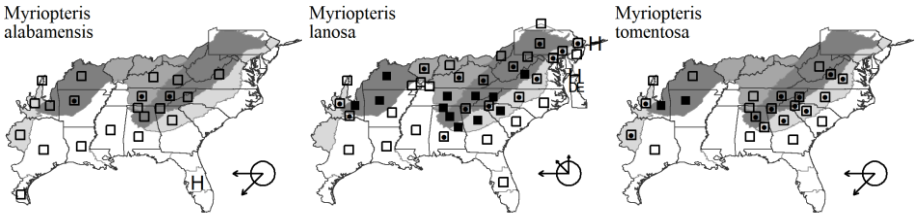
Identification Notes: *Myriopteris* includes a diversity of small, rock outcrop ferns with (in our region) lance-shaped leaves that are 2-4 pinnate-pinnatifid, the ultimate segments or lobes often < 2 mm wide. While many are conspicuously hairy and appear grayish or bluish from a distance, some are smooth (see key).

1 Lower leaf surfaces with a few obscure hairs or glabrescent.
..... ***Myriopteris alabamensis***
1 Lower leaf surfaces obviously pubescent (tomentose, villous, or lanose).
4 Petiole and rachis with hairs only (as seen at 10× magnification), the hairs segmented by prominent cell walls; margins of leaf segments more-or-less under-rolled but not modified into a scarious flap, the sori often exposed at maturity.
..... ***Myriopteris lanosa***
4 Petiole and rachis with a mixture of flattened scales (in *M. tomentosa* these very narrow and superficially mistakable for hairs) and hairs (as seen at 10× magnification); margins of leaf segments modified into a scarious flap (false indusium) partially to fully covering the sori.
..... ***Myriopteris tomentosa***

Myriopteris alabamensis (Buckley) Grusz & Windham. ALABAMA LIPFERN, SMOOTH LIPFERN. **Hab:** Dry outcrops of limestone. **Dist:** VA, w. NC, s. MO, and OK south and west to n. GA, AL, peninsular FL (historically), TX, NM, se. AZ, and Mexico (south to OAX). **Phen:** Mar-Nov (-Feb). **Tax:** Our plants are apparently apogamous triploids. **Syn:** = K3, K4, Grusz & Windham (2013); = *Cheilanthes alabamensis* (Buckley) Kunze – Ar, C, ETx1, F, Fl1, FNA2, G, GrPl, K1, Mo1, RAB, Sf, Tn, Tx, TxFerns, Va, W, WH3, Lellinger (1985); = *Hemionitis alabamensis* (Buckley) Christenhusz – Christenhusz, Fay, & Byng (2018). NatureServe G4G5 (Apparently Secure).

Myriopteris lanosa (Michaux) Grusz & Windham. HAIRY LIPFERN. **Hab:** Dry outcrops of felsic or intermediate-composition metamorphic, igneous, and sedimentary rocks. **Dist:** CT, NY, PA, s. OH (pers.comm. 2021), s. IL, MO, and KS south to FL, AL, MS, LA, and e. TX, and disjunct in WI and MN. **Phen:** Jun-Oct. **ID Notes:** Much the commonest and most widespread lipfern in our area, a sexual diploid, and the most eastern of a predominantly "southwestern" genus. **Syn:** = K3, K4, NY, Grusz & Windham (2013); = *Cheilanthes lanosa* (Michaux) D.C. Eaton – Ar, C, ETx1, Fl1, FNA2, G, GrPl, Il, K1, Mo1, NE, Pa, RAB, Sf, Tn, Tx, TxFerns, Va, W, WH3, WV, Lellinger (1985); = *Cheilanthes vestita* (Sprengel) Swartz – F; = *Hemionitis lanosa* (Michaux) Christenhusz – Christenhusz, Fay, & Byng (2018).

Myriopteris tomentosa (Link) Fée. WOOLLY LIPFERN. **Hab:** Dry outcrops of intermediate or calcareous metamorphic, igneous, or sedimentary rocks (including sandstone outcrops in the Coastal Plain of GA and SC). **Dist:** Primarily Appalachian, from n. VA and n. WV south to KY, GA, and AL, also at scattered localities from AR, OK, and KS south and west to NM, AZ, and Mexico (south to Veracruz). **Phen:** Jun-Sep. **Tax:** The species is an apogamous triploid. **Syn:** = K3, K4, Grusz & Windham (2013); = *Cheilanthes lanosa* (Michaux) D.C. Eaton – F, misapplied; = *Cheilanthes tomentosa* Link – Ar, C, ETx1, FNA2, G, GrPl, K1, Meso1, Mo1, RAB, Sf, Tn, Tx, TxFerns, Va, W, Lellinger (1985); = *Hemionitis bradburii* (Hooker) Christenhusz – Christenhusz, Fay, & Byng (2018).



Pellaea Link 1841 (CLIFF-BRAKE)

A genus of about 40 species, mostly in the Western Hemisphere. As here circumscribed broadly, following PPG I (PPG 2016), *Pellaea* is not monophyletic and will likely be additionally split in the future (Kessler, Smith, & Prado 2017). References: Gastony & Rollo (1998); Gastony (1988); Gastony, Yatskievych, & Dixon (1992); Heafner (2001); Tryon, Tryon, & Kramer in Kramer & Green (1990); Windham (1993c) in FNA2 (1993b).

Identification Notes: *Pellaea* are small rock ferns with dark and lustrous petioles and rachises, and at least some of the pinnae grouped into 3s (except *P. ovata*, which has tannish petioles and rachises and pinnae all well-separated).

3 Petioles and rachises sparsely to densely pubescent, dull; pinnae long-stalked, those toward the base of the leaf on stalks 5-15 mm long; [of a variety of substrates, including non-calcareous]..... ***Pellaea atropurpurea***
3 Petioles and rachises glabrous to very sparsely pubescent, shiny; pinnae sessile or short-stalked, those toward the base of the leaf on stalks 0-4 (-6) mm long; [strictly of calcareous substrates]
..... ***Pellaea glabella ssp. glabella***

Pellaea atropurpurea (Linnaeus) Link. PURPLE CLIFF-BRAKE. **Hab:** Outcrops of limestone and other rocks (usually either calcareous, subcalcareous, or mafic), rarely on masonry walls (Wieboldt 1995). **Dist:** Widespread in e. North America, from NH, VT, NY, MN, SD, SK, and AB south to Panhandle FL, AL, TN, AR, TX, NM, AZ, Mexico, and Guatemala. **Phen:** Mar-Nov. **Tax:** This species is an apogamously-reproducing triploid, either an allopolyploid derived from the hybridization of a sexually-reproducing diploid species and sexually-reproducing tetraploid, or an autopolyploid of an undiscovered or extinct species. Gastony, Yatskievych, & Dixon (1992) provide convincing evidence that modern *P. glabella* is

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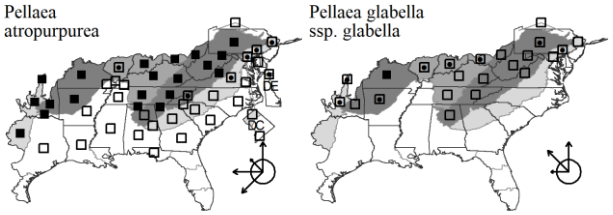
not one of the parental taxa, contrary to the suggestion by Lellinger (1985). **Syn:** = Ar, C, ETx1, F, Fl1, FNA2, GrPl, Il, K1, K3, K4, Meso1, Mo1, NE, NY, Pa, RAB, Sf, Tn, Tx, TxFerns, Va, W, WH3, WV; = *Hemionitis atropurpurea* (Linnaeus) Christenhusz – Christenhusz, Fay, & Byng (2018); = *Pellaea atropurpurea* var. *atropurpurea* – G. NatureServe G5 (Secure).

Pellaea glabella Mettenius ex Kuhn *ssp.* ***glabella***. SMOOTH CLIFF-BRAKE. **Hab:** Dry, exposed outcrops of calcareous rocks (limestone, dolostone), rarely on masonry walls (Wieboldt 1995). **Dist:** The diploid, sexually-reproducing *P. glabella* ssp. *missouriensis* (Gastony) Windham is (so far as is known) restricted to MO; the apogamously-reproducing autotetraploid derivative, ssp. *glabella*, is more widespread, ranging from VT, ONT, and MN, south to VA, TN, ne. AL (Barger et al. (2019), KY, AR, OK, and n. TX. **Phen:** May-Sep. **Tax:** Two additional taxa (both western) have been variously treated as additional subspecies of *P. glabella* or as two subspecies of *P. occidentalis* (E.E. Nelson) Rydberg. **Syn:** = Ar, FNA2, K1, K3, K4, NE, NY, TxFerns, Va; = *Pellaea atropurpurea* var. *bushii* Mackenzie – G; = *Pellaea glabella* var. *glabella* – C, Mo1, Pa; < *Hemionitis glabella* (Mettenius ex Kuhn) Christenhusz – Christenhusz, Fay, & Byng (2018); < *Pellaea glabella* – F, Il, Sf, Tn, Tx, W, WV; < *Pellaea glabella* var. *glabella* – GrPl. NatureServe G5T5 (Secure).



Pteris Linnaeus 1753 (BRAKE)

A genus of about 250 species, warm temperate and tropical, as broadly circumscribed by Zhang et al. (2015). Infrageneric taxonomy (subgenera and sections) follow Zhang & Zhang (2018). References: Liao et al. (2013); Nauman (1993b) in FNA2 (1993b); Picard et al (2021); Tryon, Tryon, & Kramer in Kramer & Green (1990); Wyatt (2020); Zhang & Zhang (2018); Zhang et al (2015).

Identification Notes: *Pteris* is a diverse genus, making it difficult to characterize. Most of the *Pteris* in our region (excepting *Pteris tripartita* and *Pteris plumula* of Florida) are small to medium ferns of rock outcrops or the faux rock of walls, with 1-2-pinnate leaves.

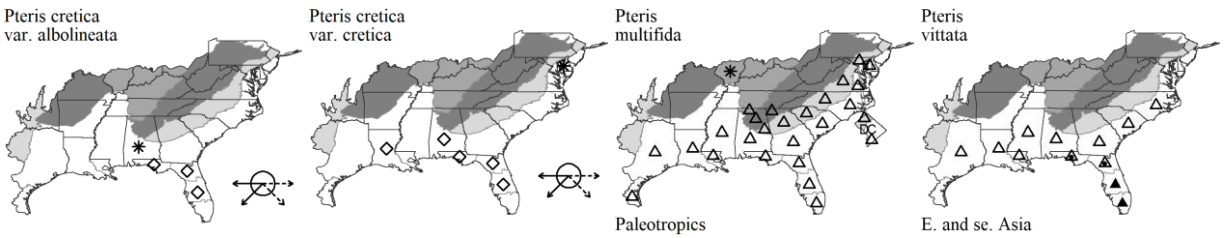
2 Pinnae strictly simple, without lobes or pinnules; outline of leaf blade lanceolate, typically > 3× as long as wide; [subgenus *Pteris*; section *Pteris*] ..... ***Pteris vittata***
2 Pinnae (at least the basal ones) with at least 1-several lobes or pinnules (many lobes or pinnules in *P. plumula*); outline of leaf blade ovate to orbicular, typically nearly as wide as long (or to 4× as long as wide in *P. plumula*); [subgenus *Campteria*; section *Creticae*].
  4 Pinnae of mature leaves decurrent in the upper half of the leaf onto the rachis; [subgenus *Campteria*; section *Creticae*] ..... ***Pteris multifida***
  4 Pinnae of mature leaves not decurrent or only the terminal pinnae decurrent.
    6 Pinnae with broad white central stripe ..... ***Pteris cretica var. albolineata***
    6 Pinnae solid green ..... ***Pteris cretica var. cretica***

* ***Pteris cretica*** Linnaeus *var.* ***albolineata*** Hooker. WHITE-LINED CRETAN BRAKE, VARIEGATED TABLE FERN. **Hab:** Limey rocks and soils. **Dist:** Pantropical, the original range unclear. **Comm:** Jaruwattanaphan, Matsumoto, & Watano (2013) provide evidence that var. *albolineata* (a 3x agamosporous taxon) is derived from hybridization of an ancestral diploid of *P. ryukyuensis* and a 2x agamosporous population of *P. cretica* var. *cretica*. As a triploid allotetraploid, it should not be treated as an infrataxon of *P. cretica*. **Syn:** = FNA2, K1, K3, K4; < *Pteris cretica* – Meso1; < *Pycnodoria cretica* – Fl2, Sf, WH3. NatureServe G5TNR (Not Yet Ranked).

* ***Pteris cretica*** Linnaeus *var.* ***cretica***. CRETAN BRAKE, TABLE FERN. **Hab:** Limey rocks and soils. **Dist:** Pantropical, the original range unclear. **Syn:** = FNA2, K1, K3, K4; < *Pteris cretica* – Meso1; < *Pycnodoria cretica* – Fl2, Sf, WH3. NatureServe G5TNR (Not Yet Ranked).

* ***Pteris multifida*** Poiret. SPIDER BRAKE, HUGUENOT FERN. **Hab:** Old walls with lime mortar, dams. **Dist:** Native of the Paleotropics. See Wyatt (2020) for discussion of spread and naturalization in our region. **Phen:** Apr-Dec. **Syn:** = Ar, ETx1, Fl1, FNA2, K1, K3, K4, RAB, Tx, TxFerns, WH3; = *Pteretis multifida* Poiret – Il, orthographic error; = *Pycnodoria multifida* (Poiret) Small – Sf. NatureServe G5 (Secure).

* ***Pteris vittata*** Linnaeus. LADDER BRAKE. **Hab:** Old walls with lime mortar. **Dist:** Native of e. Asia. **Syn:** = Bah, ETx1, FNA2, K1, K3, K4, Meso1, RAB, TxFerns, WH3; = *Pycnodoria vittata* (Linnaeus) Small – Sf. NatureServe GNR (Not Yet Ranked).



Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more)

* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable

X : extirpated

Vittaria J.E. Smith 1793 (SHOESTRING FERN)

A genus of about 7 species, mainly epiphytic and epipetric perennial herbs, of the tropics and subtropics. The circumscription of *Vittaria* has been significantly narrowed (PPG I; Kessler, Smith, & Prado 2017). References: Farrar & Mickel (1991); Farrar (1993a) in FNA2 (1993b); Kramer & Green (1990); Pinson, Chambers, & Sessa (2017).

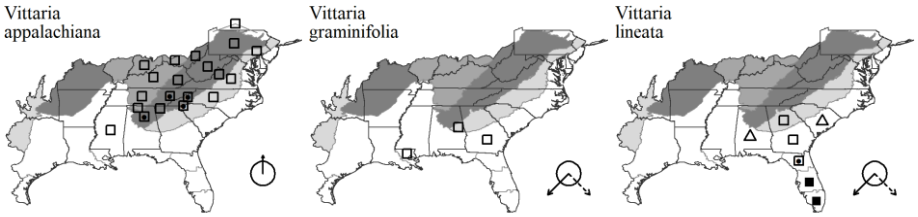
Identification Notes: Vittaria in its sporophytic form is readily recognized by its epiphytic or epipetric habit (usually epiphytic on Sabal palmetto), and narrow (< 4 mm wide), linear, pendent leaves. It might be mistaken for *Campyloneurum*, which has broader leaves and separate sori on the lower surface (as opposed to sori sunk in submarginal grooves in *Vittaria*). The gametophytic species, *Vittaria appalachiana*, is mistakable only for a non-fascular plant.

1 Sporophytes present, the leaves linear, 10-60 cm long and 1-3 mm wide
  2 Spores tetrahedral; paraphyses with an enlarged terminal cell, medium to dark brown; leaf blades 1.5-2 mm wide at the widest point; rhizome scales 4-6 mm long, lacking an elongated hair tip ..... ***Vittaria graminifolia***
  2 Spores bilateral; paraphyses filiform, light brown; leaf blades 2-3 mm wide at the widest point; rhizome scales 6-7 mm long with long hair tips 1/3 to 1/2 the scale length ..... ***Vittaria lineata***
1 Gametophytes only present.
  3 Gemmae of uniform length, each with 4 body cells; epiphytic on tree bark; [known in our region from se. LA] ..... ***Vittaria graminifolia***
  3 Gemmae of variable length, with 2-16 body cells; epiphytic or epipetric; [relatively widespread in our region].
    4 Gemmae with 2-12 body cells (with at least some present with 2-3 body cells); end cells of gemmae often swollen and larger than the medial cells; rhizoid primordia often absent on 1 or both end cells, seldom present on medial cells; sporophytes apparently not produced; [epipetric on moist rocks, usually on grotto ceilings in humid gorges or near waterfalls] ..... ***Vittaria appalachiana***
    4 Gemmae with 4-16 body cells; end cells of gemmae equal to or smaller than the medial cells; rhizoid primordia regularly present on the end cells, as well as on some medial cells; sporophytes frequently produced (and small sporophytes often present in largely gametophytic colonies); [usually epiphytic, rarely on rocks] ..... ***Vittaria lineata***

Vittaria appalachiana Farrar & Mickel. APPALACHIAN SHOESTRING FERN, "APPALACHIAN GAMETOPHYTE". **Hab:** Shaded grottoes, undersides of overhanging rock outcrops, especially in moist gorges or on spray cliffs in the vicinity of waterfalls, usually on felsic metamorphic rocks, such as mica schist, mica gneiss, granite gneiss, or metaquartzite, or on sandstone. **Dist:** Southern and Central Appalachians, mostly but not entirely south of the glacial boundary, from se. PA, sw. NY, and ne. OH south through c. TN and c. KY to n. GA, n. AL, and n. MS (Menapace, Davison, & Webb 1998). **Comm:** The species is often overlooked or mistaken for a liverwort; it is most often collected by bryologists and hepaticologists, and was first noted in 1824 by von Schweinitz, who considered it a *Jungermannia*. Although this species has been known for some time (often referred to as the 'Appalachian Gametophyte'), it was only named formally relatively recently (Farrar & Mickel 1991). A range of evidence (morphologic, electrophoretic, and developmental) indicates that it is not the gametophyte of any known *Vittaria* sporophyte; instead, it is a distinct taxon, reproducing vegetatively by gemmae, having lost the capability of producing sporophytes. For additional information, see Farrar (1974), Farrar (1978), Gastony (1977), Farrar, Parks, & McAlpin (1983), and Pittillo et al. (1975). **ID Notes:** This reduced species consists of "a branched, ribbon-like thallus one cell in thickness, usually differentiated into basal and upright branches; basal branches attached to the substrate by numerous short, brown rhizoids emanating from marginal and interior cells; upright branches terminating in the production of gemmae" (Farrar & Mickel 1991). **Syn:** = FNA2, K3, K4, NY, Pa, Tn, Va, Pinson, Chambers, & Sessa (2017); = "a branching, ribbon-like gametophyte, with diffuse rhizoids and linear-shaped gemmae only one cell wide, of the genus Vittaria" – RAB; = "irregularly *shaped gametophytes a species"* – C; < *Vittaria lineata* (Linnaeus) Smith – WV.

Vittaria graminifolia Kaulfuss. GRASS FERN. **Hab:** Epiphytic on trunk base of beech (*Fagus grandifolia*), in crevices of Altamaha Grit sandstone in the Coastal Plain of GA, and XXX (in AL). **Dist:** LA (St. Helena Parish); GA (Broxton Rocks, Coffee County) (Pinson, Chambers, & Sessa 2017); AL (Elmore County); West Indies; Mexico, Central America, and South America. **Comm:** "Louisiana plants, known only from St. Helena Parish, are identical to gametophytes grown from sporophyte plants from Central America both morphologically and in starch gel enzyme electrophoresis patterns. Gametophyte colonies and possibly sporophytes of *Vittaria graminifolia* should be expected in similar habitats at additional sites along the Gulf Coast and in peninsular Florida. Sporophytes of *V. graminifolia* differ from those of *V. lineata* in having trilete spores, dilated terminal cells of the soral paraphyses, stem scales with acute (not long filiform) apices, and a chromosome number of 2 n = 60. Earlier reports of sporophytes of *V. graminifolia* in Florida (as *V. filifolia*) have been shown to refer to aberrant forms of *V. lineata* (G. J. Gastony 1980)." (Farrar in FNA 1991). **Syn:** = FNA2, K3, K4, Meso1, Pinson, Chambers, & Sessa (2017). NatureServe G5 (Secure).

Vittaria lineata (Linnaeus) Smith. SHOESTRING FERN. **Hab:** Epiphyte on the bark of trees, especially *Sabal palmetto* and *Quercus virginiana*, but the northernmost native site (in Lincoln County, GA) was on rock. **Dist:** Se. GA and formerly ec. GA south to s. FL; West Indies; c. Mexico south through Central America to n. South America; introduced in e. SC (Beaufort and Jasper counties) and s. AL on landscaping plants. **Comm:** Sporophytic plants have pendant linear leaves, 1-3 mm wide and up to 1 m long, hence the common name. **Syn:** = Bah, Fl1, FNA2, K1, K3, K4, Meso1, Sf, WH3, Pinson, Chambers, & Sessa (2017); = n/a – RAB.



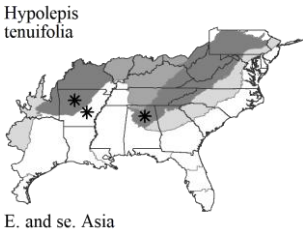
Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

F31. DENNSTAEDTIACEAE Lotsy 1909 (BRACKEN FAMILY) [in POLYPODIALES]

A family of about 10 (or more) genera and about 265 species, of cosmopolitan distribution; the circumscriptions of the family and some of its component genera remain uncertain and controversial, however. References: Cranfill (1993a) in FNA2 (1993b); Kramer & Green (1990); Lellinger (1985); Perrie, Shepherd, & Brownsey (2015); PPG I (2016); Schwartsburd et al (2020).

1 Leaf blades broadly triangular in outline, about as broad as long, subcoriaceous; sori linear, confluent ..... ***Pteridium***
1 Leaf blades elongate in outline, at least 2× as long as broad, membranaceous; sori globular, separate
  2 Leaves 3-4-pinnate-pinnatifid; indusium flap-like..... ***Hypolepis***
  2 Leaves 2-pinnate-pinnatifid to 3-pinnate; indusium tubular or cuplike
  ..... ***Sitobolium punctilobulum***

Hypolepis Bernhardi 1806 (BRAMBLE FERN)



A genus of about 45 species, pantropical. References: Nauman (1993d) in FNA2 (1993b); Schwartsburd (2018); Xing et al. (2013).

* ***Hypolepis tenuifolia*** (G. Forster) Bernhardi. SPINELESS BRAMBLE FERN, SOFT GROUND-FERN. **Hab:** Moist disturbed areas. **Dist:** Native of tropical e. Asia and South Pacific islands. Rather commonly cultivated, and escaping and establishing vegetatively by rhizome. **Syn:** = FoC, K4.

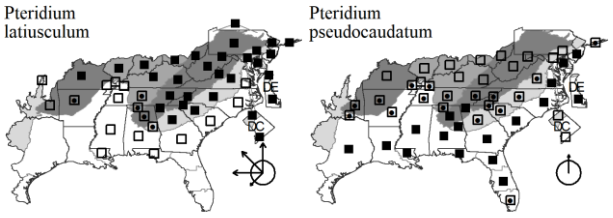
Pteridium Gleditsch ex Scopoli 1760 (BRACKEN)

A genus of 2-11 species, cosmopolitan in distribution. Bracken taxonomy remains provisional; the molecular work of Der et al. (2009) and Zhou et al. (2014) outlines a probable taxonomic structure for the genus, though rank decisions will remain controversial. It is my perception that all evidence supports the recognition of three taxa in eastern North America, at specific rank. *Pteridium* is a notorious and nearly worldwide weed (though less consequential in our area than in many parts of the world), nearly impossible to eradicate because of its deeply subterranean rhizomes. Bracken fiddleheads are sometimes eaten, but they are poisonous and highly carcinogenic. Bracken is not favored by grazing animals, and increases its abundance under grazing pressure. In overgrazed pastures, however, cattle will graze on bracken, the carcinogenic compound (shikimic acid) then transmittable to humans through milk. References: Christenhusz, Fay, & Byng (2018); Der et al (2009); Jacobs & Peck (1993) in FNA2 (1993b); Liao et al. (2013); Speer & Hilu (1998); Speer, Werth, & Hilu (1998); Thomson (2000); Thomson (2004); Thomson, Mickel, & Mehltreter (2008); Tryon (1941); Zhou et al (2014).

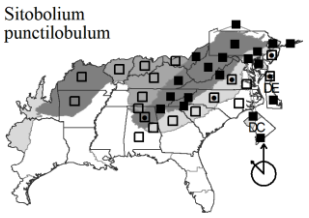
2 Leaf segment margins slightly to moderately pubescent (with 1-12 hairs per mm); terminal (caudate) tip of the basalmost pinnule of the basal pinna (3-) avg. 12 (-28)% as long as the entire pinnule; terminal segments of well-developed pinnules generally 2-4× as long as broad, about 3-8 mm wide..... ***Pteridium latiusculum***
2 Leaf segment margins glabrous (rarely sparsely pilose with as many as 4 hairs per mm); terminal (caudate) tip of the basalmost pinnule of the basal pinna (16-) avg. 25 (-45)% as long as the entire pinnule; terminal segments of well-developed pinnules generally 6-15× as long as broad, about 2-5 mm wide.....
  ..... ***Pteridium pseudocaudatum***

Pteridium latiusculum (Desvaux) Hieronymus. EASTERN BRACKEN. **Hab:** Mainly in dry woodlands, forests, and heath balds, up to 1600 m in elevation. **Dist:** NL (Newfoundland) west to MB, south to Panhandle FL, TX, and n. Mexico. **Phen:** Jul-Sep. **Tax:** The circumscription of the "*latiusculum* entity" follows Thomson, Mickel, & Mehltreter (2008) in excluding Old World material included by many earlier authors. The relationship of the '*latiusculum*' and '*pseudocaudatum*' entities is discussed in detail by Speer & Hilu (1999) and Speer, Werth, & Hilu (1999). **Syn:** = *Pteridium aquilinum* (Linnaeus) Kuhn ssp. *latiusculum* (Desvaux) Hultén – NE, NY, Va, Thomson, Mickel, & Mehltreter (2008), Zhou et al (2014); = *Pteris latiuscula* Desvaux var. *latiuscula* – Sf; < *Pteridium aquilinum* (Linnaeus) Kuhn var. *latiusculum* (Desvaux) Underwood ex Heller – Ar, C, F, Fl1, FNA2, G, GrPl, Il, K1, K3, K4, Mo1, Pa, RAB, W, WH3, WV, Speer & Hilu (1998); < *Pteris aquilinum* – Tn. NatureServe G5T5 (Secure).

Pteridium pseudocaudatum (Clute) Christenhusz. SOUTHERN BRACKEN. **Hab:** Mainly in dry sandy or rocky woodlands, often locally abundant in longleaf pine sandhills and pine flatwoods. **Dist:** The "*pseudocaudatum* entity" is primarily distributed in the Southeastern Coastal Plain (where it is ubiquitous and abundant), but is reported north to MA, OH, IN, IL, s. MI, and MO. **Phen:** Jul-Sep. **Syn:** = Christenhusz, Fay, & Byng (2018); = *Pteridium aquilinum* (Linnaeus) Kuhn ssp. *pseudocaudatum* (Clute) Hultén – NE, NY, TxFerns, Va, Thomson, Mickel, & Mehltreter (2008), Zhou et al (2014); = *Pteridium aquilinum* (Linnaeus) Kuhn var. *pseudocaudatum* (Clute) Heller – Ar, C, ETx1, F, Fl1, FNA2, G, GrPl, Il, K1, K3, K4, Mo1, RAB, Tx, W, WH3, WV, Speer & Hilu (1998); = *Pteris latiuscula* Desvaux var. *pseudocaudata* (Clute) Maxon – Sf; < *Pteridium aquilinum* – Tn. NatureServe G5T5 (Secure).



Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



Sitobolium Desvaux 1827 (HAY-SCENTED FERN)

A genus of 10 or more species, of e. Asia and e. North America. Phylogenetic studies show that *Dennstaedtia* as traditionally interpreted is polyphyletic; our temperate, eastern North American species is related to Asian, temperate species, and should be placed in *Sitobolium*. References: Schwartsburd et al (2020).

Identification Notes: *Sitobolium punctilobulum* can be distinguished from other woodland ferns with deciduous fronds of generally similar size and shape (such as *Athyrium*, *Dryopteris*, and *Parathelypteris*) by the following characteristics: leaves yellow-green or pale-green in color, with whitish-gray glandular trichomes, petioles silvery-pilose and lacking any scales, leaves borne scattered (as clonal patches) from long-creeping rhizomes, sori tiny (< 0.5 mm in diameter), with a whitish cup-like indusium, and borne near the margin of the leaf segments.

Sitobolium punctilobulum (Michaux) Desvaux. HAY-SCENTED FERN, PASTURE FERN, BOULDER FERN. **Hab:** Rocky or dry woodlands and forests, rock outcrops, pastures, clearings, roadbanks. **Dist:** NS and QC west to MI, south to NC, n. GA, n. AL, and AR, progressively more montane southward. **Phen:** Jun-Sep. **Syn:** = *Dennstaedtia punctilobula* (Michaux) T. Moore – Ar, C, F, FNA2, G, Il, K1, K3, K4, Mo1, NE, NY, Pa, RAB, Sf, Tn, Va, W, WV. NatureServe G5 (Secure).

F32. CYSTOPTERIDACEAE Shmakov 2001 (BRITTLE FERN FAMILY) [in POLYPODIALES]

A family of 3 genera and about 37 species, perennials, sub-cosmopolitan in distribution, primarily of temperate regions but also in montane to alpine settings in tropical regions. References: Christenhusz, Zhang, & Schneider (2011); Rothfels et al (2014).

Cystopteris Bernhardi 1806 (BLADDER FERN, BRITTLE FERN)

A genus of about 30-35 species, sub-cosmopolitan in distribution, primarily of temperate regions but also in montane to alpine settings in tropical regions. References: Ekrt et al (2022); Haufler, Moran, & Windham (1993) in FNA2 (1993b); Haufler, Windham, & Ranker (1990); Kramer & Green (1990); Rothfels et al (2014); Shmakov, Batkin, & Vaganov (2018); Wang & Haufler in FoC (2013).

Identification Notes: See *Woodsia* for suggestions on distinguishing between *Cystopteris* and *Woodsia*, somewhat similar ferns often confused. Hybrids frequently occur where two or more species of *Cystopteris* grow in proximity. The following hybrids may be anticipated in our area: *Cystopteris bulbifera* × *tennesseensis*, *Cystopteris bulbifera* × *tenuis* [= *C.* ×*illinoensis* R.C. Moran], *Cystopteris fragilis* × *tenuis*, *Cystopteris protrusa* × *tennesseensis*, *Cystopteris protrusa* × *tenuis*, *Cystopteris tennesseensis* × *tenuis* [= *C.* ×*wagneri* R.C. Moran].

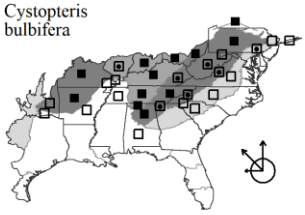
1 Indusia, rachises, and veins with stalked glands (these sometimes sparse in *C. tennesseensis* and *C. laurentiana*); bulblets often present on the rachis.
  2 Leaf blade 10-55 cm long, usually 2-3× as long as the reddish to tan petiole, lowest pair of pinnae the longest, thus the leaf widest at the base; bulblets usually present, smooth, green, 2-3 mm in diameter, usually on the rachis and the midrib; spores 20-38 µ long ..... ***Cystopteris bulbifera***
  2 Leaf blade 6-25 cm long, usually about 1× as long as the dark brown petiole, thus the leaf widest above the base; bulblets present or absent, deformed and scaly, dark, < 1.5 mm in diameter, on the rachis only; spores 25-60 µ long.
    ..... ***Cystopteris tennesseensis***
1 Indusia, rachises, and veins eglandular; bulblets never present.
  ..... ***Cystopteris protrusa***

Cystopteris bulbifera (Linnaeus) Bernhardi. BULBLET FERN, BULBLET BLADDER FERN. **Hab:** Moist outcrops and talus of calcareous rocks, rarely up to 1500 m elevation. **Dist:** NL (Newfoundland) west to MN, south to NC, nw. SC (Oconee County), nw. GA, AL, and AR; also disjunct in UT, AZ, NM, and w. TX. **Phen:** May-Sep. **Comm:** This species is a diploid involved in the reticulate evolution of *Cystopteris* in e. North America; it is one parent of *C. tennesseensis*. Its genome can be symbolized BB. **Syn:** = Ar, C, F, FNA2, G, GrPl, Il, K1, K3, K4, Mo1, NE, NY, Pa, RAB, Sf, Tn, Tx, TxFerns, Va, W, WV, Shmakov, Batkin, & Vaganov (2018). NatureServe G5 (Secure).

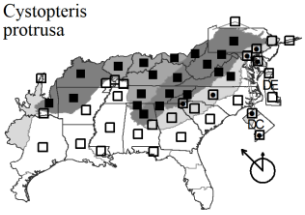
Cystopteris protrusa (Weatherby) Blasdell. LOWLAND BLADDER FERN. **Hab:** Rich woods or on moss- and soil-covered talus in boulderfields, occasionally on ledges of rock outcrops. **Dist:** NY and ON west to MN, south to GA, Panhandle FL (Washington and Gadsden counties) (Wunderlin & Hansen 2006; L. Byrd, pers.comm., 2020), AL, MS, LA, e. TX, and OK. **Phen:** Apr-Jun. **Tax:** This species is a diploid involved in the reticulate evolution of *Cystopteris* in e. North America. It is one parent of *C. tennesseensis* and *C. tenuis*. Its genome can be symbolized PP. **Syn:** = Ar, C, ETx1, Fl1, FNA2, GrPl, Il, K1, K3, K4, Mo1, NE, NY, Pa, RAB, Tn, TxFerns, Va, W, WH3, WV, Shmakov, Batkin, & Vaganov (2018); = *Cystopteris fragilis* var. *protrusa* Weatherby – F, G, Sf; < *Cystopteris fragilis* (Linnaeus) Bernhardi – Tx.

Cystopteris tennesseensis Shaver. TENNESSEE BLADDER FERN. **Hab:** Moist to dry outcrops of calcareous rocks, including coquina limestone ('marl') in the outer Coastal Plain. **Dist:** PA, KY, IL, WI, and IA south to NC, nw. GA, n. AL, AR, and OK. **Phen:** Apr-Jun. **Comm:** This species is a fertile allotetraploid derived from hybridization between *C. bulbifera* and *C. protrusa*. Its genome can be symbolized BBPP. Haufler, Windham, & Ranker (1990) consider this a "successfully fledged and vigorous young species", adapted to a hybrid niche not successfully utilized by either parent. **Syn:** = Ar, C, FNA2, GrPl, Il, K1, K3, K4, Mo1, Pa, RAB, Tn, Va, W; = *Cystopteris* ×*tennesseensis* – WV, Shmakov, Batkin, & Vaganov (2018). NatureServe G5 (Secure).

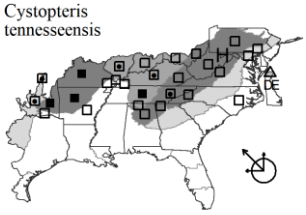
Cystopteris bulbifera



Cystopteris protrusa



Cystopteris tennesseensis

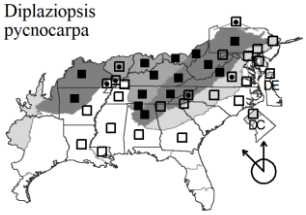


F34. DIPLAZIOPSIDACEAE X.C. Zhang & Christenhusz 2011 (GLADE FERN FAMILY) [in POLYPODIALES]

A family of a single genus and 4 species, perennials, of e. Asia and e. North America. References: Christenhusz & Schneider (2011); Christenhusz, Zhang, & Schneider (2011); PPG I (2016); Price (1990b).

Diplaziopsis C. Christensen 1905 (GLADE FERN)

Diplaziopsis pycnocarpa



A genus of 4 species, perennial herbs, of e. Asia and e. North America. Alternatively, our single North American species is sometimes placed in the monotypic genus, *Homalosorus* Small ex Pichi Sermolli. References: Christenhusz, Zhang, & Schneider (2011); Kato (1993a) in FNA2 (1993b); Kramer & Green (1990); Price (1990b).

Diplaziopsis pycnocarpa (Sprengel) M.G. Price. GLADE FERN. **Hab:** Very nutrient-rich, loamy or seepy forests, over calcareous sedimentary (such as limestone or dolostone) or mafic metamorphic or igneous rocks (such as greenstone or amphibolite). **Dist:** QC, ON, and MN south to GA and LA (much more common in sedimentary rock areas of the Appalachians than in the primarily acid-soil Blue Ridge and Piedmont). **Phen:** Jul-Sep. **Syn:** = Price (1990b); = *Athyrium pycnocarpon* Sprengel – C, F, G, GrPl, RAB, WV; = *Diplazium pycnocarpon* (Sprengel) M. Broun – Ar, FNA2, Il, K1, Mo1, NE, Pa, Tn; = *Homalosorus pycnocarpos* (Sprengel) Pichi-Sermolli – K3, K4, NY, Sf, Va, W, Christenhusz, Zhang, & Schneider (2011). NatureServe G5 (Secure).

F37. ASPLENIACEAE Newman 1840 (SPLEENWORT FAMILY) [in POLYPODIALES]

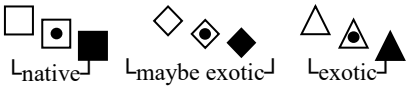
A family of a single genus and about 750 species, of nearly cosmopolitan distribution. Murakami et al. (1999) conducted a molecular phylogenetic analysis of the Aspleniaceae, which confirmed that *Camptosorus* should be included in *Asplenium*, but suggested that *Phyllitis* is better separated from *Asplenium*. A later and more comprehensive study shows *Phyllitis* and *Camptosorus* to be deeply embedded in *Asplenium* (Schneider et al. 2004a), a conclusion followed here. References: Kessler & Smith (2018); Kramer & Viane in Kramer & Green (1990); PPG I (2016); Schneider et al (2004a); Wagner, Moran, & Werth (1993) in FNA2 (1993b); Xu et al (2019).

Asplenium Linnaeus 1753 (SPLEENWORT)

A genus of about 750 species, perennials, nearly cosmopolitan. The southeastern North American flora is not especially rich in number of species, but includes a large number of the clades in the genus (Xu et al. 2019). References: Keener & Davenport (2007); Kessler & Smith (2018); Kramer & Viane in Kramer & Green (1990); Lin & Viane in FoC (2013); Moran (1982); Morzenti & Wagner (1962); Murakami et al (1999); Taylor, Mohlenbrock, & Burton (1976); Wagner, Moran, & Werth (1993) in FNA2 (1993b); Xu et al (2019).

Identification Notes: Several of the more frequently encountered sterile (to partly fertile) hybrids are included in the key and treated fully below. Rarer and solely sterile hybrids may be recognized by intermediate morphology and usual co-occurrence with both parents.

1 Leaves simple, unlobed (or with a few, irregular forkings in *A. septentrionale*); veins free or anastamosing-areolate.
  3 Leaf apex long-attenuate and characteristically producing plantlets at the tip; veins anastomosing; [V. *Schaffneria* clade; *A. cordatum* subclade] ..... ***Asplenium rhizophyllum***
  3 Leaf apex acuminate to obtuse, not producing plantlets at the tip; veins free. ..... ***Asplenium scolopendrium var. americanum***
1 Leaves pinnatifid (at least in the lower half of the leaf), pinnate, pinnate-pinnatifid, bipinnate, or tripinnate, the apex obtuse, acute, acuminate, or attenuate; veins free.
  6 Rachis shiny black or dark brown throughout its length; rachis not grooved on its upper surface; leaves pinnate, the outline of the leaf blade linear, lanceolate, or oblanceolate, with more-or-less parallel sides for much of its length.
    7 Pinnae orbicular to obovate-oblong, 1-2× as long as wide, the base more-or-less symmetrical (if auriculate, only slightly so and on the side of the pinna toward the base of the leaf); old leaf rachises often with persistent projections left from the disarticulation of the pinnae; [VI. *A. trichomane*s clade; *A. trichomanes* subclade]. ..... ***Asplenium trichomanes***
    7 Pinnae oblong-rectangular, 2× or more as long as wide, the base asymmetrical or auricled (more prominently auricled on the side of the pinna toward the tip of the leaf); old leaf rachises lacking persistent projections left from the disarticulation of the pinnae.
      9 Leaves slightly dimorphic, the fertile upright and larger, the sterile spreading and smaller; pinna auricles prominent, often overlapping the rachis; [terrestrial, often not associated with rock outcrops]; [V. *Schaffneria* clade; *A. incisum* subclade] ..... ***Asplenium platyneuron***
      9 Leaves not dimorphic; pinna auricles less prominent, usually not overlapping the rachis; [epipetric, always growing in crevices of rock outcrops or in thin soil immediately adjacent to exposed rock]; [VI. *A. trichomanes* clade; *A. monanthes* subclade].

Key to Map Symbology: 

* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable
X : extirpated

10 Main vein of the pinna running along the basal edge; sori 1 (-3) per pinna, 1.5-3 mm long, borne along the basal edge, the indusium translucent, whitish, opening toward the leaf tip..... ***Asplenium monanthes***

10 Main vein of the pinna running more-or-less medially; sori 4-10 per pinna (on well-developed pinnae), 1.0-1.5 mm long, borne on both sides of the main vein, the indusium opaque, greenish, opening toward the pinna tip.
..... ***Asplenium resiliens***

6 Rachis dull green throughout its length, or at least toward the tip; rachis grooved on the upper surface, at least in the green portion; leaves pinnatifid to tripinnate, the outline of the leaf blade narrowly to broadly triangular, widest at the base (or slightly above the base in *A. abscissum*) (except *A. dentatum*).

13 Petiole shiny black or brown throughout its length (from base to first leaflet).

14 Leaves bipinnate at the base, pinnate-pinnatifid above; spores normal; [XI. *Pleurosorus* clade; *Onopteris* subclade] ..... ***Asplenium bradleyi***

14 Leaves pinnate at the base, pinnatifid above; spores abortive (or normal in *A. tutwilerae*, known only from Hale County, AL); [V. *Schaffneria* clade; reticulation between two subclades].

15 Spores abortive..... ***Asplenium ×ebenoides***

15 Spores normal; [endemic (as far as known) to Hale County, AL] ..... ***Asplenium tutwilerae***

13 Petiole partially or entirely green (darkened or not at its base).

16 Leaves pinnatifid or 1-pinnate through most or all of their lengths (sometimes pinnate-pinnatifid at the base of the leaf).

17 Leaves pinnatifid, sometimes fully pinnate at the base; spores normal..... ***Asplenium pinnatifidum***

17 Leaves pinnate (sometimes pinnate-pinnatifid at the base of the leaf in *A. ×trudellii* and *A. dentatum*); spores normal or abortive.

18 Pinnae 1-8 on each side of the rachis below the merely pinnatifidly lobed upper half of the leaf; blades deltoid to broadly isosceles-triangular, 1-3× as long as wide; [of FL and rarely n. AL].
..... ***Asplenium abscissum var. abscissum***

18 Pinnae 5-35 on each side of the rachis; blades lanceolate or linear, 4-7× as long as wide; [collectively widespread].
..... ***Asplenium trudellii***

16 Leaves 2-pinnate at least basally, to 3-pinnate.

23 Petiole darkened toward the base; pinnules toothed, lacerate, pinnatifid, or pinnate; leaves bipinnate to tripinnate, the leaf blades lanceolate-ovate to lanceolate-oblong; ultimate leaf segments sessile or nearly so; [of acidic rocks] ; [XI. *Pleurosorus* clade; *Onopteris* subclade].....
..... ***Asplenium montanum***

23 Petiole entirely green; pinnules toothed; leaves bipinnate, the leaf blades ovate-triangular; ultimate leaf segments mostly stalked; [of calcareous rocks]; [XI. *Pleurosorus* clade; *Pleurosorus* subclade] ..... ***Asplenium ruta-muraria var. cryptolepis***

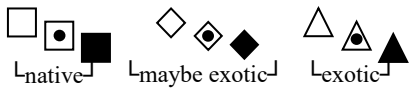
Asplenium abscissum Willdenow *var*. ***abscissum***. CUTLEAF SPLEENWORT. **Hab:** Limestone sinkholes. **Dist:** Mexico, Central America, and n. South America; West Indies; nc. and c. FL peninsula; s. FL; n. AL. **Phen:** Jan-Dec. **Tax:** This species is a diploid, with chromosome complement AA. Kessler & Smith (2018) recognize two varieties; ours is var. *abscissum*. **Comm:** Found disjunct in Jackson County, AL in 2009 (Barger et al. 2010). **Syn:** = Kessler & Smith (2018); < *Asplenium abscissum* Willdenow – Fl1, FNA2, K1, K3, K4, Meso1, Sf, WH3. NatureServe G3G4 (Vulnerable).

Asplenium bradleyi D.C. Eaton. BRADLEY'S SPLEENWORT. **Hab:** Dry outcrops of felsic sedimentary or metasedimentary rocks, such as sandstone, quartzite, or metaquartzite, at low to moderate elevations. **Dist:** Se. NY, PA, MD, OH, KY, s. IL, and MO south to c. NC, c. GA, AL, TN, and AR, reaching its greatest abundance in the Ozarkian highlands. **Phen:** Apr-Oct. **Tax:** This species is a fertile allotetraploid derived from hybridization between *A. montanum* and *A. platyneuron*. Its chromosome complement can be symbolized MMPP. The sterile hybrid has also been found in NC; its chromosome complement is MP. **Syn:** = Ar, C, F, FNA2, G, Il, K1, K3, K4, Mo1, NY, NY, Pa, RAB, Sf, Tn, Va, W, WV. NatureServe G4 (Apparently Secure).

Asplenium ×ebenoides R.R. Scott. SCOTT'S SPLEENWORT. **Hab:** Moist outcrops of calcareous sedimentary rocks, such as limestone, dolostone, and on coquina limestone (shell marl), at low elevations. **Dist:** VT, NJ, c. PA, OH, s. IL, and MO south to e. VA, w. NC, nw. GA, c. AL, TN, and AR. **Phen:** May-Oct. **Tax:** *A. ×ebenoides* is a sterile hybrid (chromosome complement symbolized PR). In AL, however, one population in Hale County has undergone chromosome doubling and is a fertile allotetraploid (PPRR), now treated as *A. tutwilerae*. Populations of "*A. ×ebenoides*", especially if consisting of many individuals, should be checked for fertile spores to be sure they are not *A. tutwilerae*. **Syn:** = Ar, Il, K4, NE, Pa, WV, Keener & Davenport (2007); = ×*Asplenosorus ebenoides* (R.R. Scott) Wherry – F; = *Asplenium ebenoides* R.R. Scott – K3; = *Asplenium platyneuron* × *rhizophyllum* – NY; = *Asplenosorus ebenoides* (R.R. Scott) Wherry – G; < *Asplenium ×ebenoides* R.R. Scott – K1; < *Asplenium ebenoides* R.R. Scott – FNA2, Sf.

Asplenium monanthes Linnaeus. SINGLE-SORUS SPLEENWORT. **Hab:** Moist calcareous situations, in the mountains in moist grottoes of calcareous to semi-calcareous metamorphic rocks (such as mylonite or marble) near waterfalls in humid escarpment gorges with high rainfall, on limestone talus in collapsed sinkhole mouth, or on moist Coastal Plain limestone outcrops. **Dist:** Scattered in highly humid (montane or maritime) parts of the tropics, subtropics, and warm temperate areas, known from se. and sw. North America, the West Indies (Hispaniola and Jamaica), n. South America, Central America, Mexico, South Africa, Hawaii, and the Azores, Madeira Islands, Madagascar, and the Philippines. In the continental United States, it is known from widely scattered sites with humid and calcareous microhabitats: humid escarpment gorges in Transylvania County, NC and Oconee County, SC; moist limestone outcrops in n. peninsular and Panhandle FL (Nelson 2000); limestone talus in the collapsed mouth of a sinkhole in Jackson County, AL; and the Huachuca Mountains, Cochise County, AZ. **Phen:** Apr-Oct. **Tax:** It is becoming increasingly clear that "*A. monanthes*" represents a widespread apomictic complex of two or more species, requiring additional study and taxonomic revision (Dyer, Savolainen, & Schneider 2012); the appropriate taxonomic disposition of our southeastern United States populations is unclear. It is unlikely that they will end up in *A. monanthes*, typified on South African material. **Syn:** = Fl1, FNA2, K1, K3, K4, Meso1, RAB, W, WH3, Kessler & Smith (2018). NatureServe G4 (Apparently Secure).

Asplenium montanum Willdenow. MOUNTAIN SPLEENWORT. **Hab:** Moist to dry outcrops of metamorphic, sedimentary, or igneous rocks, such as gneiss, schist, amphibolite, quartzite, rhyolite, sandstone, mostly at moderate to high elevations (up to over 2000 m), but in the Piedmont to as low as 150 m. **Dist:** Primarily Appalachian: s. VT, MA, NY, OH, and KY south to c. NC, n. GA and AL; disjunct in the Ozarkian highlands of e. MO (Peck 2011). **Phen:** May-Oct. **Comm:** *A. montanum* is one of the diploid progenitors of the reticulately evolved Appalachian *Asplenium* complex; its chromosome complement is symbolized MM. It is one parent of *A. bradleyi*, *A. pinnatifidum*, and *A. ×trudellii* (and of other sterile hybrids). **Syn:** = C, F, FNA2, G, K1, K3, K4, Mo1, NE, NY, Pa, RAB, Sf, Tn, Va, W, WV. NatureServe G5 (Secure).

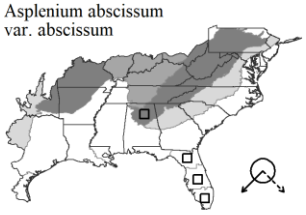
Key to Map Symbology: 

* : waif
EN : endemic
H : historic

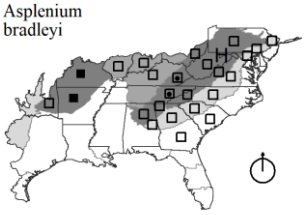
N : no
P : planted
? : questionable

X : extirpated

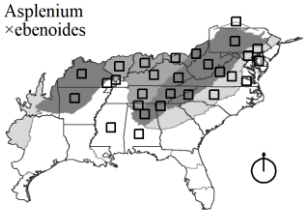
Asplenium abscissum var. abscissum



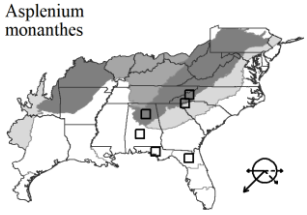
Asplenium bradleyi



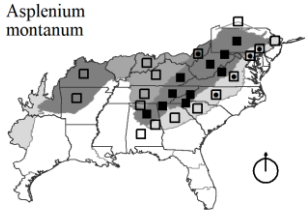
Asplenium ×ebenoides



Asplenium monanthes



Asplenium montanum



Asplenium pinnatifidum Nuttall. LOBED SPLEENWORT. **Hab:** Fairly moist to very dry outcrops of felsic sedimentary or (mostly low-grade) metamorphic rocks, such as sandstone, phyllite, and schist, at low to moderate elevations. **Dist:** NY (historically), NJ, se. PA, wc. PA, s. OH, IN, IL, and MO south to w. NC, c. GA (Jones & Coile 1988), AL, n. MS, AR, and e. OK. **Phen:** May-Oct. **Tax:** This species is a fertile allotetraploid derived from hybridization of *A. montanum* and *A. rhizophyllum*; its chromosome complement is symbolized MMRR. **Syn:** = Ar, C, F, FNA2, Il, K3, Mo1, NY, Pa, RAB, Sf, Tn, Va, W, WV; = *Asplenium ×pinnatifidum* – K1; = *Asplenium pinnatifidum* var. *pinnatifidum* – G. NatureServe G4 (Apparently Secure).

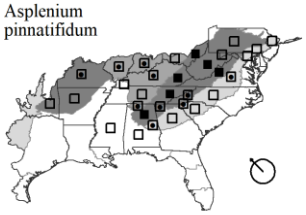
Asplenium platyneuron (Linnaeus) Britton, Sterns, & Poggenburg. EBONY SPLEENWORT. **Hab:** Moist to dry soils of forests, woodlands, old fields; also on outcrops, especially of calcareous rocks and in masonry crevices, at low to moderate elevations. **Dist:** QC, ON, se. MN, IA, and se. CO south to FL, TX, NM, and AZ (and varieties or relatives reported from Central and South America); Slovakia; South Africa. **Phen:** (Jan-) Apr-Oct (-Dec). **Tax:** *A. platyneuron* var. *incisum* does not seem to warrant taxonomic recognition. Strikingly large plants of the outer Atlantic Coastal Plain and Gulf Coastal Plain have been named var. *bacculum-rubrum* (Featherman) Fernald; they are probably not worthy of taxonomic recognition. They can be distinguished as follows: var. *bacculum-rubrum* has the longest pinnae > 3.5-6 cm long, the pinnae often coarsely serrate-incised to pinnatifid and the larger leaves to (30-) 40-70 (-100) cm tall, with 45-70 pairs of pinnae (vs. longest pinnae < 3.5 cm long, pinnae subentire to pinnatifid, larger leaves to 20-45 (-50) cm tall, with 25-50 pairs of pinnae). **Comm:** This species is one of the diploid progenitors involved in the reticulately evolved Appalachian *Asplenium* complex. It is one parent of *A. bradleyi* and *A. ×ebenoides* (as well as other sterile hybrids). *A. platyneuron* in general, and var. *platyneuron* specifically, is by far the most common of our *Asplenium* species, and the only one found characteristically away from rock. **Syn:** = Ar, C, ETx1, Fl1, FNA2, GrPl, K3, K4, Mo1, NE, Pa, RAB, Sf, Tn, Tx, TxFerns, Va, W, WH3, WV, Keener & Davenport (2007); > *Asplenium platyneuron* var. *bacculum-rubrum* (Featherman) Fernald – F, G, K1, Taylor, Mohlenbrock, & Burton (1976); > *Asplenium platyneuron* var. *incisum* (Howe ex Peck) B.L. Robinson – F, Il, Taylor, Mohlenbrock, & Burton (1976); > *Asplenium platyneuron* var. *platyneuron* – F, G, Il, K1, Taylor, Mohlenbrock, & Burton (1976).

Asplenium resiliens Kunze. BLACKSTEM SPLEENWORT. **Hab:** Moist to dry outcrops of calcareous sedimentary or metamorphic rocks, such as limestone, dolostone, coquina, or marble, sometimes on narrow seams of calcareous materials in otherwise acidic rocks, rarely on mortar or concrete, mostly at low to moderate elevations, but remarkably on Grandfather Mountain at over 1800 m. **Dist:** Sc. PA, KY, s. IL, MO, se. KS, OK, TX, CO, and s. NV south to FL, TX, AZ, and Mexico; West Indies; Central America and South America. **Phen:** Apr-Nov. **Comm:** This species is a triploid (EEE), unable to produce viable spores by sexual means, but producing spores apogamously. It is a parent species of the rare *A. heteroresiliens*. **Syn:** = Ar, C, ETx1, F, Fl1, FNA2, G, GrPl, Il, K1, K3, Meso1, Mo1, Pa, RAB, Sf, Tn, Tx, TxFerns, Va, W, WH3, WV, Kessler & Smith (2018). NatureServe G5 (Secure).

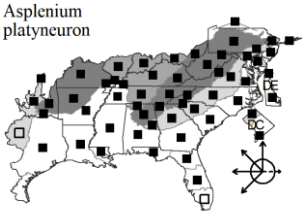
Asplenium rhizophyllum Linnaeus. WALKING FERN. **Hab:** Moist outcrops of calcareous sedimentary, calcareous metamorphic, or mafic metamorphic rocks, such as limestone, dolostone, calcareous siltstone, amphibolite, mostly at low to moderate elevations, rarely to 1500 m or higher. **Dist:** S. QC, ON and se. MN south to c. GA, AL, MS, AR, OK, and IA. **Phen:** May-Oct. **Tax:** This species, sometimes placed in the genus *Camptosorus* because of its strikingly different morphology from (most) other *Asplenium*, is one of the diploid progenitors of the reticulately evolved Appalachian *Asplenium* complex. It is a parent of *A. pinnatifidum* and *A. ×ebenoides* (as well as other sterile hybrids), both of which have inherited a limited ability to produce plantlets at the attenuate leaf-tip. It is closely related to *Asplenium ruprechtii* Kurata of e. Asia. **Syn:** = Ar, C, FNA2, GrPl, Il, K1, K3, K4, Mo1, NE, NY, Pa, RAB, Tn, Va, W, Keener & Davenport (2007); = *Camptosorus rhizophyllus* (Linnaeus) Link – F, G, Sf, WV. NatureServe G5 (Secure).

Asplenium ruta-muraria Linnaeus *var.* ***cryptolepis*** (Fernald) Wherry. AMERICAN WALL-RUE. **Hab:** Moist to dry outcrops of calcareous sedimentary or metamorphic rocks, such as limestone, dolostone, or marble, at low to moderate elevations. **Dist:** *A. ruta-muraria* is a circumboreal species of Europe, Asia, and North America; in North America it ranges as var. *cryptolepis* from VT, s. ON and n. MI south to n. NJ, w. NC, nw. GA (Jones & Coile 1988), n. AL, TN, and AR (Peck 2011). **Phen:** May-Oct. **Comm:** Var. *ohionis* is very likely only a form. The relationship of North American *A. ruta-muraria* (here distinguished as var. *cryptolepis*), a tetraploid, to the diploid and tetraploid taxa of the *A. ruta-muraria* complex present in Europe and e. Asia is uncertain. Given the prevalence of allopolyploidy in *Asplenium* and slight morphologic differences between American and European material, I prefer not to assume its identity to the European plants. In Europe *A. ruta-muraria* is an abundant plant of masonry, such as the defensive walls of towns and cities; it is very rarely seen on walls in North America, presumably because they are not old enough. **Syn:** = Il, Va, WV; > *Asplenium cryptolepis* Fernald var. *cryptolepis* – F, Sf; > *Asplenium cryptolepis* Fernald var. *ohionis* Fernald – F, Sf; < *Asplenium ruta-muraria* – C, FNA2, K4, Mo1, NE, NY, Pa, RAB, Tn, W; > *Asplenium ruta-muraria* Linnaeus var. *cryptolepis* (Fernald) Wherry – G, K1, K3; > *Asplenium ruta-muraria* var. *lanceolum* Christ – K1, K3; > *Asplenium ruta-muraria* var. *ohionis* (Fernald) Wherry – G.

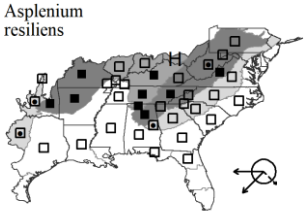
Asplenium pinnatifidum



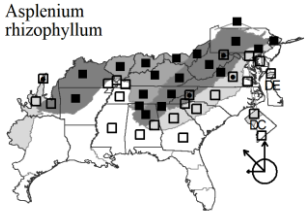
Asplenium platyneuron



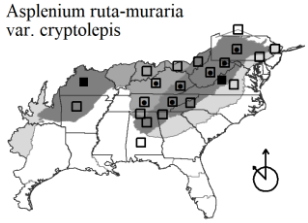
Asplenium resiliens



Asplenium rhizophyllum

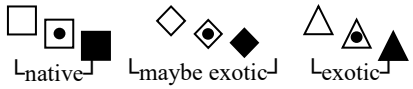


Asplenium ruta-muraria var. cryptolepis



Asplenium scolopendrium Linnaeus *var.* ***americanum*** (Fernald) Kartesz & Gandhi. AMERICAN HART'S-TONGUE FERN. **Hab:** Humid sinkholes. **Dist:** E. TN and n. AL, and in other habitats farther north in c. NY, n. MI, and ON; also in the West Indies (Haiti), s. Mexico (Chiapas, Nuevo León, Oaxaca), and NM (Testo et al. 2021). Plants in s. Mexico are sometimes treated as entity "*lindenii*", at varietal or specific rank. **Phen:** Jul-Sep. **Comm:** Our plants of eastern North America may or may not be the tetraploid from e. Asia, *A. komarovii* Akasawa. *A. scolopendrium* var. *americanum* is also reported as naturalized in MD by Reed (1953). **Syn:** = FNA2, K1, K3, K4, NY, Tn; = *Phyllitis scolopendrium* (Linnaeus) Newman var.

Key to Map Symbology:



←rare ←uncommon ←common (see introduction for more)

* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable

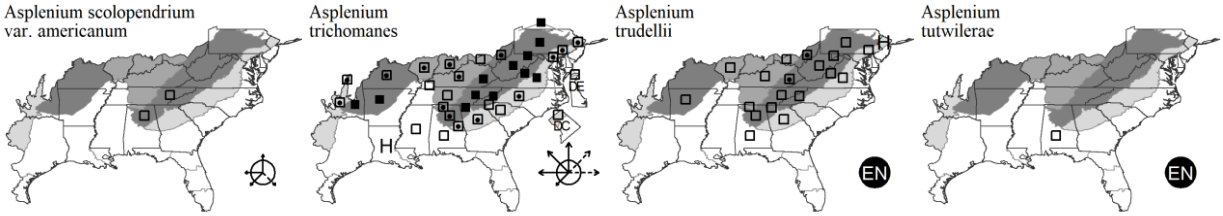
X : extirpated

americana Fernald – C, F, G, Meso1; < *Asplenium komarovii* Akasawa – Lin & Viane in FoC (2013); < *Phyllitis scolopendrium* – Sf. NatureServe G4T3 (Vulnerable); USESA T.

Asplenium trichomanes Linnaeus. MAIDENHAIR SPLEENWORT. **Hab:** Moist outcrops of slightly to strongly calcareous sedimentary or metamorphic rocks and moderately to strongly mafic metamorphic and igneous rocks, such as limestone, dolostone, mafic and intermediate gneisses and schists, amphibolite, most typically in strong shade, as under overhangs. **Dist:** *A. trichomanes* as a whole is a complex, with diploid, tetraploid, and hexaploid elements, occurring in North America, Europe, Australia, New Zealand, and Asia. *A. trichomanes* s.s. is known to occur in Europe and North America (at least); in North America, it ranges from NL (Newfoundland) to BC, south to NC, c. GA (Jones & Coile 1988), c. AL, AR, OK, w. TX, CHI, se. AZ, and w. OR. **Phen:** May-Oct. **Comm:** *A. trichomanes* is a diploid, involved as one parent in the origin of *A. quadrivalens*. **Syn:** = Lin & Viane in FoC (2013); = *Asplenium trichomanes* Linnaeus ssp. *trichomanes* – Ar, FNA2, Il, K1, K3, K4, Mo1, NE, NY, Pa, TxFerns, Va, W; < *Asplenium trichomanes* Linnaeus – C, F, G, GrPl, RAB, Sf, Tn, Tx, WH3, WV. NatureServe G5T5 (Secure).

Asplenium trudellii Wherry. TRUDELL'S SPLEENWORT. **Hab:** Moist outcrops of felsic sedimentary or metamorphic rocks, such as sandstone, phyllite, schist, at low elevations. **Dist:** N. NJ, sw. PA, s. OH, and s. IL south to w. NC, c. GA, n. AL; recently located west of the Mississippi River in Baxter County, n. AR (Peck 2011). **Phen:** May-Oct. **Tax:** This taxon is an (allegedly) sterile triploid hybrid (MMR) of *A. montanum* and *A. pinnatifidum*. However, there is direct evidence that it can produce fertile spores. Moreover, it is additionally considerably more common than most other sterile *Asplenium* hybrids, sometimes occurring without one or both parents, suggesting that it may be able to disperse independently. I therefore treat it as a species of hybrid origin, rather than a sterile hybrid, and omit the "hybrid ×" from its name. **Syn:** = Sf; = *Asplenium ×trudellii* Wherry (pro species) – F, FNA2, Il, K1, K3, Pa, WV; = *Asplenium pinnatifidum* Nuttall var. *trudellii* (Wherry) Clute – G.

Asplenium tutwilerae B.R. Keener & L.J. Davenport. TUTWILER'S SPLEENWORT. **Hab:** Crevices of calcareous conglomerate. **Dist:** So far as is known, *A. tutwilerae*, the fertile allotetraploid of *A. ×ebenoides*, is limited to a single population in Hale County, AL; however Peck (2011) reported a population from Garland County, AR, which produces viable spores, and may prove to be a second station of the fertile tetraploid. **Comm:** The chromosome formula of *A. tutwilerae* is PPRR. See Keener & Davenport (2007). **Syn:** = K3, K4, Keener & Davenport (2007); < *Asplenium ×ebenoides* R.R. Scott – K1; < *Asplenium ebenoides* R.R. Scott – FNA2, Sf.

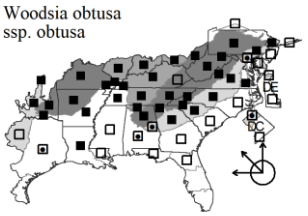


F38. WOODSIACEAE Herter 1949 (WOODSIA FAMILY) [in POLYPODIALES]

A family of about 1 genus and ca. 65 species, cosmopolitan in distribution, but concentrated in temperate and montane areas. Proposals have been made to split *Woodsia* into 7 genera (Shmakov 2015) or 2 genera (Lu et al. 2020). We retain a broad *Woodsia* for now, while additional studies are done. References: Kramer & Green (1990); Lellinger (1985); Lu et al (2020); Shmakov (2015); Smith (1993a) in FNA2 (1993b); Smith et al (2006b).

1 Sori elongate, indusia present and flaplike, attached along a long side.
  2 Leaves 2-pinnate to 3-pinnate (the pinnae at least 1-pinnate); sori elongate, 2-3× as long as wide, the larger sori generally curved and extending across the veins (except *Diplazium esculentum*). ..... ***Athyrium***
  2 Leaves 1-pinnate to 1-pinnate-pinnatifid (the pinnae entire or pinnatifid); sori elongate, 2.5-6× as long as wide, even the larger sori generally straight and not extending across the veins.
    4 Leaves 1-pinnate-pinnatifid, the pinnae pinnatifid ..... ***Deparia***
    4 Leaves 1-pinnate, the pinnae entire ..... ***Diplaziopsis***
1 Sori round, indusia present or absent, if present cuplike or lateral (but not attached along a long side).
  6 Indusium attached under one side of the sorus, hoodlike or pocketlike, arching over the sorus; petioles glabrous or sparsely beset with scales, the petiole bases not persistent ..... ***Cystopteris***
  6 Indusium attached under the sorus, cuplike (divided into 3-6 lanceolate to ovate lobes which surround the sorus from below) or of minute numerous septate hairs, which extend out from under the sorus on all sides; petioles often densely beset with scales, the petiole bases persistent ..... ***Woodsia***

Woodsia R. Brown 1810 (WOODSIA, CLIFF FERN)



A genus of about 65 species, of temperate and cool-temperate regions, widespread in the Northern Hemisphere, in montane tropical South America and Africa. Recent proposals have been made, based on molecular and morphological data, to split *Woodsia* into 2 or more genera (Shmakov 2015; Lu et al. (2020). They have merit, but we hold with a broad circumscription of *Woodsia* until a consensus develops. References: Kramer & Green (1990); FoC; Lu et al (2020); PPG I (2016); Shmakov (2015); Windham (1993d) in FNA2 (1993b).

Identification Notes: *Woodsia* species and *Cystopteris* species are all small ferns with thin-textured leaves, occurring primarily on or near rock outcrops; they frequently occur together or in proximity to one another and are often confused. *Woodsia* has the indusium divided into a series of scale-like or hair-like structures, attached below the sorus; *Cystopteris* has an undivided indusium, pocket-like or hood-like, attached around one side of the sorus. *Woodsia* has persistent dark petiole bases; in *Cystopteris* the petiole bases are deciduous. *Woodsia* has the final veinlets not reaching the margin; *Cystopteris* veins do reach the margin.

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more)

* : waif EN : endemic H : historic

N : no P : planted ? : questionable X : extirpated

F38. WOODSIACEAE

Woodsia obtusa (Sprengel) Torrey *ssp.* ***obtusa***. COMMON WOODSIA, BLUNT-LOBED CLIFF FERN. **Hab:** Rock outcrops of various sorts, moist talus, terrestrial near rock outcrops. **Dist:** ME, QC, MN, and e. NE, south to Panhandle FL and e. TX. **Phen:** May-Oct. **Syn:** = Ar, ETx1, FNA2, K1, K3, K4, Mo1, NE, NY, TxFerns, Va; = *Physematium obtusum* (Sprengel) Hooker ssp. *obtusum* – Lu et al (2020); = *Woodsiopsis obtusa* (Sprengel) Shmakov ssp. *obtusa* – Shmakov (2015); < *Woodsia obtusa* – C, F, Fl1, G, GrPl, Il, Pa, RAB, Sf, Tn, Tx, W, WH3, WV. NatureServe G5T5 (Secure).

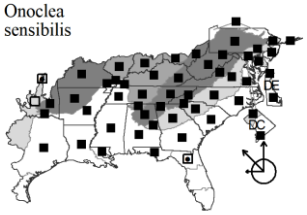
F39. ONOCLEACEAE Pichi Sermolli 1970 (SENSITIVE FERN FAMILY) [in POLYPODIALES]

A family of 4 genera and 5 species (but see below), of north temperate regions (PPG I 2016). The family as here circumscribed is monophyletic and sister to Blechnaceae (Smith et al. 2006b). Christenhusz, Zhang, & Schneider (2011) preferred to combine the 5 species in the family into the single genus (*Onoclea*). References: Christenhusz, Zhang, & Schneider (2011); PPG I (2016); Smith et al (2006b).

Onoclea Linnaeus 1753 (SENSITIVE FERN)

A genus of 2 species, of temperate e. North America and e. Asia. References: Christenhusz, Zhang, & Schneider (2011); Gastony & Ungerer (1997); Johnson (1993b) in FNA2 (1993b); Kramer & Green (1990); Xing, Wang, & Kato in FoC (2013).

Identification Notes: In sterile leaf, *Onoclea sensibilis* is sometimes confused with *Lorinseria areolata*, but *Lorinseria* has the pinnae generally alternate (vs. tending to be opposite), the pinnae generally acute or acuminate (vs. obtuse to less typically acute), and the pinna margin finely serrulate (vs. entire).



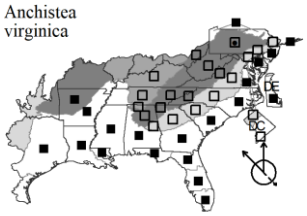
Onoclea sensibilis Linnaeus. SENSITIVE FERN, BEAD FERN. **Hab:** Marshes, swamps, ditches, wet disturbed places. **Dist:** NL (Newfoundland) west to MN and CO, south to FL and TX. *O. interrupta* (also treated as a variety or included in *O. sensibilis* without taxonomic recognition (see synonymy) is e. Asian. **Phen:** May-Jun. **Tax:** Two taxa of *Onoclea*, one in e. North America and one in e. Asia, should be recognized (Gastony & Ungerer 1997); the appropriate rank is not agreed on, though Gastony & Ungerer (1997) demonstrated a similar level of distinction as various disjunct sibling pairs in other fern genera. **Comm:** The specific epithet and common name refer to the fact that the fronds wither at the first touch of frost, not that they respond to touch. The peculiar fertile leaves (with their brown, beadlike, fertile pinnules) are collected for use in dried arrangements. **Syn:** = Gastony & Ungerer (1997); = *Onoclea sensibilis* Linnaeus var. *sensibilis* – TxFerns, Va; < *Onoclea sensibilis* Linnaeus – Ar, C, ETx1, F, Fl1, FNA2, G, GrPl, Il, K1, K4, Mo1, NE, NY, Pa, RAB, Sf, Tx, W, WH3, WV. NatureServe G5TNR (Not Yet Ranked).

F40. BLECHNACEAE Newman 1844 (DEER FERN FAMILY) [in POLYPODIALES]

A family of about 24 genera (Gasper et al. 2016, 2017) and about 265 species, cosmopolitan in distribution. References: Cranfill (1993b) in FNA2 (1993b); Gasper et al (2016); Gasper et al (2017); Kramer, Chambers, & Hennipman in Kramer & Green (1990); Lellinger (1985); Li et al (2016b); Perrie et al (2014); PPG I (2016).

2 Veins of sterile leaves anastomosing; sori distinct from one another, elongate, in end-to-end rows; [subfamily *Woodwardioideae*].
  3 Leaves dimorphic, the sterile leaves pinnatifid, the pinnae 7-10 pairs per leaf, basally not distinct from one another, the rachis therefore winged by leaf tissue throughout its length, the pinnae merely finely serrulate ..... ***Lorinseria areolata***
  3 Leaves monomorphic; the leaves pinnate-pinnatifid, the pinnae 15-20 pairs per leaf, fully distinct, the rachis therefore not winged by leaf tissue, the pinnae themselves pinnatifid.
  ..... ***Anchistea virginica***
2 Veins of sterile leaves free; sori continuous.
  ..... ***Telmatoblechnum serrulatum***

Anchistea C. Presl 1851 (VIRGINIA CHAIN FERN)

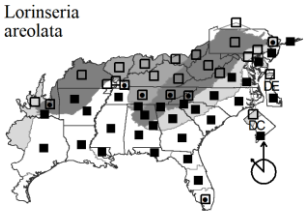


A monotypic genus, perennial herb, of e. North America. *Anchistea* has often been lumped into the Eurasian (mainly e. Asian) *Woodwardia*, but is basal to *Woodwardia*, morphologically distinctive from both *Woodwardia* and *Lorinseria*, and an ancient independent lineage (Gasper et al. 2016, 2017). References: Cranfill & Kato (2003); Cranfill (1993b) in FNA2 (1993b); Gasper et al (2016); Gasper et al (2017); Kramer, Chambers, & Hennipman in Kramer & Green (1990); Li et al (2016b); PPG I (2016).

Identification Notes: Sterile plants of *Osmundastrum cinnamomeum* are sometimes confused with *Anchistea virginica*, which also has rather coarse, pinnate-pinnatifid leaves and grows in similar wet, acid places. *Osmundastrum* is coarser (to 2 m tall, vs. to 1 m tall), has cinnamon tufts of tomentum present in the axils of the pinnae (vs. absent), has the rachis greenish and rather fleshy in texture (vs. brown and wiry), and bears fronds clumped or tufted from a massive, woody, ascending rhizome covered with old petiole bases (vs. fronds borne scattered along a thick, horizontal, creeping rhizome).

Anchistea virginica (Linnaeus) C. Presl. VIRGINIA CHAIN FERN. **Hab:** Moist to wet, acid, organic soils, such as bogs, blackwater bottomlands, pocosins, sometimes in standing water, as in periodically flooded coastal plain depression ponds, wet hammocks. **Dist:** NS west to MI and IL, south to s. FL and e. TX (primarily Coastal Plain); Bermuda. **Phen:** Apr-Dec. **Syn:** = K4, NY, Sf, Cranfill & Kato (2003), Gasper et al (2016), Gasper et al (2017), Perrie et al (2014), PPG I (2016); = *Woodwardia virginica* (Linnaeus) J.E. Smith – Ar, C, ETx1, F, Fl2, FNA2, G, Il, K1, K3, NE, Pa, RAB, Tn, Tx, TxFerns, Va, W, WH3. NatureServe G5 (Secure).

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

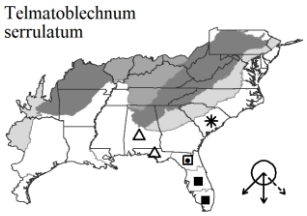


Lorinseria C. Presl 1849 [1851] (NETTED CHAIN FERN)

A monotypic genus, perennial herb, of e. North America. *Lorinseria* has often been lumped into the Eurasian (mainly e. Asian) *Woodwardia*, but is basal to *Anchistea* + *Woodwardia*, morphologically distinctive from both, and an ancient independent lineage (Gasper et al. 2017; Gasper et al. 2016). References: Cranfill & Kato (2003); Cranfill (1993b) in FNA2 (1993b); Gasper et al (2016); Gasper et al (2017); Kramer, Chambers, & Hennipman in Kramer & Green (1990); Li et al (2016b); PPG I (2016).

Identification Notes: In sterile leaf, *Lorinseria areolata* is sometimes confused with *Onoclea sensibilis*, but *Lorinseria* has the pinnae generally alternate (vs. tending to be opposite), the pinnae generally acute or acuminate (vs. obtuse to less typically acute), and the pinna margin finely serrulate (vs. entire).

Lorinseria areolata (Linnaeus) C. Presl. NETTED CHAIN FERN. **Hab:** Moist to wet, acid, organic soils, such as bogs, blackwater bottomlands, pocosins, wet hammocks. **Dist:** NS west to MI and MO, south to s. FL and e. TX, primarily on the Coastal Plain. **Phen:** May-Sep. **Comm:** See Cranfill (1983) for a discussion of the geography and ecology of *L. areolata*. **Syn:** = K4, NY, Sf, Tx, WV, Cranfill & Kato (2003), Gasper et al (2016), Gasper et al (2017), Perrie et al (2014); = *Woodwardia areolata* (Linnaeus) T. Moore – Ar, C, ETx1, F, Fl2, FNA2, G, Il, K1, K3, Mo1, NE, Pa, RAB, Tn, TxFerns, Va, W, WH3. NatureServe G5 (Secure).



Telmatoblechnum Perrie, D.J. Ohlsen, & Brownsey 2014 (DEER FERN)

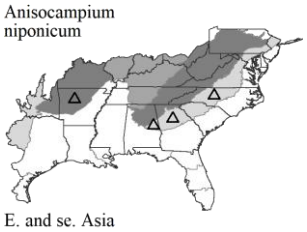
A genus of 2 species, of Asia and tropical and subtropical America. References: Cranfill (1993b) in FNA2 (1993b); Gasper et al (2016); Gasper et al (2017); Kramer, Chambers, & Hennipman in Kramer & Green (1990); Mickel & Smith (2004); Perrie et al (2014); PPG I (2016).

Telmatoblechnum serrulatum (L.C. Richard) Perrie, D.J. Ohlsen, & Brownsey. SWAMP FERN, MARSH FERN. **Hab:** Swamps, marshes, wet prairies, hammocks, bottomlands, vacant lots. **Dist:** Ne. FL south to FL peninsula; Mexico, Central America, south to c. South America; West Indies. **Comm:** Introduced and established in e. SC (Beaufort and Jasper counties) via landscaping plants brought in from FL (P. McMillan, pers. comm., 2005); similarly introduced in s. AL (H. Horne, pers.comm., 2012; W. Barger, pers. comm., 2012). **Syn:** = K4, Gasper et al (2016), Perrie et al (2014); = *Blechnum serrulatum* L.C. Richard – Bah, Fl1, FNA2, K1, K3, Meso1, Sf, WH3, Mickel & Smith (2004); = n/a – RAB. NatureServe G5? (Secure).

F41. ATHYRIACEAE Alston 1956 (LADY FERN FAMILY) [in POLYPODIALES]

A family of 3-5 genera and about 650 species, subcosmopolitan in distribution. References: Christenhusz, Zhang, & Schneider (2011); PPG I (2016); Wang, He, & Kato in FoC (2013); Wei et al (2017).

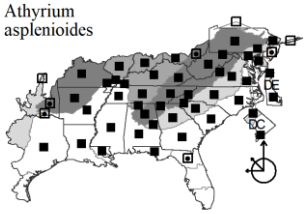
1 Leaves 1-pinnate to 1-pinnate-pinnatifid (the pinnae entire or pinnatifid); sori elongate, 2.5-6× as long as wide, even the larger sori generally straight and not extending across the veins.
  2 Leaves 1-pinnate, the pinnae entire ..... ***Diplaziopsis pycnocarpa***
  2 Leaves 1-pinnate-pinnatifid, the pinnae pinnatifid ..... ***Deparia***
1 Leaves 2-pinnate to 3-pinnate (the pinnae at least 1-pinnate); sori elongate, 2-3× as long as wide, the larger sori generally curved and extending across the veins (except *Diplazium esculentum*).
  4 Rhizomes short-creeping to ascending; leaves variegated, silvery gray and gray-green; [alien, rarely persisting or naturalizing] ..... ***Anisocampium niponicum***
  4 Rhizomes erect; leaves not variegated, bright green; [native and widespread, sometimes cultivated] ..... ***Athyrium***



Anisocampium C. Presl 1849

A genus of 4 species, perennial herbs, of e. and s. Asia. This genus is included in *Athyrium* in PPG I (2016), but Moran, Hanks, & Sundue (2019) and others maintain it. References: Liu, Chiou, & Kato (2011); Moran, Hanks, & Sundue (2019); Wang, He, & Kato in FoC (2013); Wei et al (2017).

* ***Anisocampium niponicum*** (Mettenius) Y.C. Liu, W.L. Chiou, & M. Kato. JAPANESE PAINTED FERN. **Hab:** Suburban woodlands, lawns; commonly planted as an ornamental, rarely naturalizing. This common suburban ornamental (forma *picta*) spreads locally from plantings; it seems only a matter of time before it begins to naturalize more widely. **Dist:** Native of Japan. Reported as naturalizing sparingly in AR (Peck 2011). Reported for Cleburne County, AL (Barger, pers.comm. 2021). **Syn:** = K4, Liu, Chiou, & Kato (2011), Wei et al (2017); = *Athyrium niponicum* (Mettenius) Hance – K3, NE.



Athyrium Roth 1799 (LADY FERN)

A genus of about 225 species, cosmopolitan in distribution, but concentrated in e. and se. Asia. Wei et al. (2017) recognize ten sections in the genus; the species in our area are in section *Athyrium*. For our area, Kelloff et al. (2002) and Kelloff & Werth (1998) support recognition of two taxa at either specific or infraspecific levels, based

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable

F41. ATHYRIACEAE

on morphology, allozymes, and spores. References: Kato (1993c) in FNA2 (1993b); Kelloff et al (2002); Kramer & Green (1990); Moran, Hanks, & Sundue (2019); Wang, He, & Kato in FoC (2013); Wei et al (2017).

Identification Notes: *Athyrium* and *Deparia* superficially resemble *Dryopteris*, and they often grow together. *Athyrium* and *Deparia* have linear, flap-like sori (vs. rounded, reniform sori). Sterile individuals can be distinguished by the number of vascular bundles in the petiole (easily determined by breaking off a leaf and counting the vascular bundles, which will appear as thread-like, but flattened, strands); *Athyrium* and *Deparia* have 2, *Dryopteris* has 4-7.

1 Rhizomes short-creeping to ascending; leaves variegated, silvery gray and gray-green; [alien, rarely persisting or naturalizing]..... ***Anisocampium niponicum***
1 Rhizomes erect; leaves not variegated, bright green; [native and widespread, sometimes cultivated].
..... ***Athyrium asplenioides***

Athyrium asplenioides (Michaux) A.A. Eaton. SOUTHERN LADY FERN. **Hab:** Moist forests. **Dist:** MA, WV, IL, and KS south to n. FL and e. TX. **Phen:** May-Sep. **Tax:** High elevation plants (mainly in spruce-fir and northern hardwoods forests) in the Southern Appalachians need additional taxonomic study. They have much larger leaves than typical lowland forms, and the leaves are more divided. The name Athyrium filix-femina var. subtripinnatum Butters may apply. **Syn:** = K3, K4, NE, NY, RAB, Sf, Va, WV; = *Athyrium filix-femina* ssp. *asplenioides* (Michaux) Hultén – Ar, ETx1, Il, K1, Mo1, Tn, TxFerns, W, WH3; = *Athyrium filix-femina* (Linnaeus) Roth ex Mertens var. *asplenioides* (Michaux) Farwell – C, F, FNA2, G, GrPl, Pa, Tx.

Deparia Hooker & Greville 1829

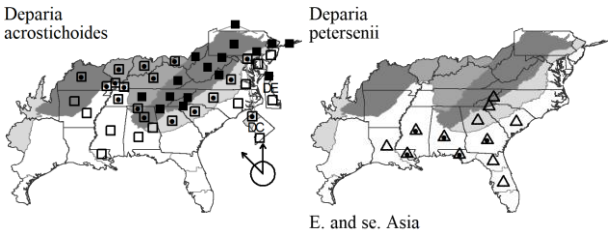
A genus of about 70-90 species, primarily in tropical to warm temperate Asia and Africa. Infrageneric classification follows Kuo et al. (2018). References: Kato (1993b) in FNA2 (1993b); Kramer & Green (1990); Kuo et al (2018); Moran, Hanks, & Sundue (2019); PPG I (2016); Shinohara et al (2006); Wang, He, & Kato in FoC (2013); Wyatt (2020).

Identification Notes: Unlike *Athyrium*, *Deparia acrostichoides* has the costal groove not continuous with the rachis groove. In addition, *Deparia acrostichoides* has multicellular hairs on the leaf blades.

1 Leaf blade narrowed to base; petiole bases swollen, with 2 rows of teeth; [plant a common native species of moist forests]; [section *Lunathyrium*] .....
..... ***Deparia acrostichoides***
1 Leaves widest at the base; petiole bases not markedly swollen, lacking teeth; [plant an exotic species, rarely introduced and naturalized]; [section *Deparia*; subsection *Athyriopsis*]..... ***Deparia petersenii***

Deparia acrostichoides (Swartz) M. Kato. SILVERY SPLEENWORT. **Hab:** Moist forests, cove forests. **Dist:** NS west to MN, south to NC, SC, n. GA, n. AL, and AR. **Phen:** Jun-Sep. **Comm:** *D. acrostichoides* is the only species of *Deparia* native to the New World; it has several very closely related species in e. Asia (in section *Lunathyrium*). It stores starch in the swollen, persistent petiole bases. **Syn:** = Ar, FNA2, Il, K1, K3, K4, Mo1, NE, NY, Pa, Tn, Va, W; = *Athyrium thelypteroides* (Michaux) Desvaux – C, F, G, RAB, WV; = *Diplazium acrostichoides* (Swartz) Butters – Sf. NatureServe G5 (Secure).

* ***Deparia petersenii*** (Kunze) M. Kato. JAPANESE LADY FERN. **Hab:** Swamp forests, wet hammocks, moist banks, disturbed areas. **Dist:** Introduced and naturalized in the Southeast, including in sw. NC (K.A. Bradley, pers.comm., 2021), e. and w. SC (K.A. Bradley, pers.comm., 2021), c. and s. GA, AL, s. MS, e. LA, and FL, from a native distribution in se. Asia. See Wyatt (2020) for discussion of naturalization in our region. **Phen:** Jun-Oct. **Tax:** *Deparia petersenii* as currently broadly circumscribed is a polyploid complex, likely to be interpreted in the future as including several species (Kuo et al. 2018, Shinohara et al. 2006). **ID Notes:** The contrast of stiff silvery hairs against a dark brown petiole (stipe) and rachis is a helpful diagnostic feature. **Syn:** = Fl1, FNA2, K3, K4, WH3, Shinohara et al (2006); = *Deparia petersonii* – K1, orthographic error. NatureServe GNR (Not Yet Ranked).



F42. THELYPTERIDACEAE Ching ex Pichi Sermolli 1970 (MARSH FERN FAMILY) [in POLYPODIALES]

A family of about 37 genera and about 1190 species, nearly cosmopolitan, but especially diverse in the tropics and in e. and se. Asia. (Fawcett & Smith 2021; Fawcett et al. 2021). References: Almeida et al (2016); Fawcett & Smith (2021); Fawcett et al (2021); He & Zhang (2012); Kramer & Green (1990); Kuo et al (2019a); Lellinger (1985); FoC; Mickel (1979); Smith & Cranfill (2002); Smith (1993a) in FNA2 (1993b).

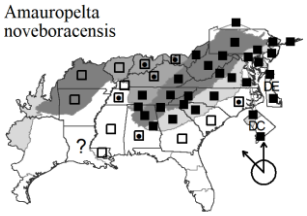
1 Leaf blades 7-25 (-30) cm long, triangular, < 2× as long as wide (or lanceolate and > 4× as long as wide in the rarely naturalized *P. decursive-pinnata*); rachis with adnate wings between the pinnae; sori without indusia; midribs of pinnae lacking an adaxial groove; [subfamily *Phegopteridoideae*]; [Phegopteroid clade] .....
..... ***Phegopteris***

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

F42. THELYPTERIDACEAE

1 Leaf blades (15-) 20-100 cm long, lanceolate, oblong-lanceolate, or triangular, > 2× as long as wide; rachis without adnate wings between the pinnae; sori with reniform indusia; midribs of pinnae with an adaxial groove (adaxial groove lacking in *Macrothelypteris*).
  2 Midribs of the pinnae lacking an adaxial groove; leaf bipinnate to tripinnate; [subfamily *Phegopteridoideae*]; [Phegopteroid clade] ..... ***Macrothelypteris torresiana***
  2 Midribs of the pinnae with an adaxial groove; leaf pinnate to pinnate-pinnatifid; [subfamily *Thelypteridoideae*.
    5 Sori elongate; sporangia with hairs 0.1-0.2 mm long; [endemic to nc. AL]; [Stegnogrammoid clade] ..... ***Leptogramma burksiorum***
    5 Sori round or slightly longer than wide; sporangia glabrous; [collectively widespread].
      6 Basal veins from adjacent lobes of the pinna not meeting at all; lowermost pinnae pinnae of a leaf either as long as the pinnae above (or only slightly smaller), or strongly reduced (with an obvious and strong taper of the blade outline towards the base).
        7 Lowermost pinnae of a leaf strongly reduced, at least 3 or 4 pairs distinctly smaller than the longest pair on a leaf (and therefore with an obvious and strong taper of the blade outline towards the base); [Amauropeltoid clade]. ..... ***Amauropelta***
        7 Lowermost pinnae of a leaf as long as the pinnae above, or only slightly smaller (> 80% as long).
        ..... ***Thelypteris palustris var. pubescens***
      6 Basal veins from adjacent lobes of the pinna either uniting either below the sinus (between the sinus and the costa) and therefore forming a united vein continuing to the sinus, or reaching the sinus at the same point; lowermost pinnae of a leaf as long as the pinnae above, or only slightly smaller (> 80% as long) (except in *Christella*); pinnae 3.5-45 cm long, usually at least the longer > 15 cm long (except in *Christella*).
        9 Basal veins from adjacent lobes of the pinna either uniting either below the sinus (between the sinus and the costa) and therefore forming a united vein continuing to the sinus; rhizomes 3-12 mm in diameter
        ..... ***Pelazoneuron***
        9 Basal veins from adjacent lobes of the pinna reaching the sinus at the same point (but not uniting to form a united vein to the sinus); rhizomes 3-6 mm in diameter.
        ..... ***Christella***

Amauropelta Kunze 1843



A genus of about 233 species, perennial herbs, mainly of the New World tropics, but also in the Old World tropics. References: Fawcett & Smith (2021); He & Zhang (2012); Kuo et al (2019b); Smith & Flory (1990); Smith & Kessler (2017); Smith (1981); Smith (1993a) in FNA2 (1993b); Smith (1993a) in FNA2 (1993b).

Amauropelta noveboracensis (Linnaeus) S.E. Fawcett & A.R. Smith. NEW YORK FERN. **Hab:** Mesic forests, bottomland forests, bogs, submesic forests. **Dist:** NL (Newfoundland) and WI south to GA, AL, and AR. Reported for MO by Brant (2018). **Phen:** May-Aug. **ID Notes:** Distinctive in the leaves tapering about equally to both tip and base. **Syn:** = Fawcett & Smith (2021); = *Dryopteris noveboracensis* (Linnaeus) A. Gray – F; = *Parathelypteris noveboracensis* (Linnaeus) Ching – K3, K4, NE, Va; = *Thelypteris noveboracensis* (Linnaeus) Nieuwland – Ar, C, FNA2, G, Il, K1, NY, Pa, RAB, Sf, Tn, W, WV. NatureServe G5 (Secure).

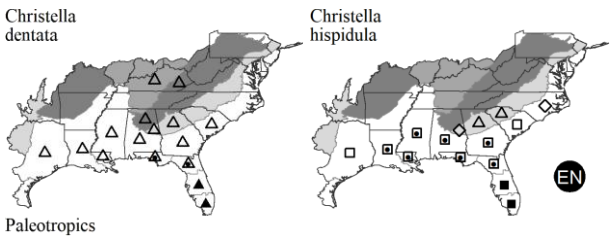
Christella H. Léveillé 1915 (MAIDEN FERN, SHIELD FERN)

A genus of about 66 species, perennial herbs, mainly of the Old World tropics and e. Asia (Fawcett & Smith 2021; Smith & Kessler 2017; Almeida et al. 2016). References: Fawcett & Smith (2021); He & Zhang (2012); FoC; FoC; Smith & Flory (1990); Smith & Kessler (2017); Smith (1981); Smith (1993a) in FNA2 (1993b).

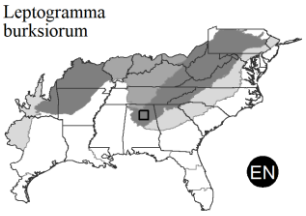
1 Rachises and petioles usually purplish; costae densely short-hairy on the lower surface, the hairs 0-0.1 (-0.2) mm long (about half as long as the costa width); widest point of the leaf usually 3-5 pairs of pinnae up from the base..... ***Christella dentata***
1 Rachises and petioles usually tan; costae sparsely hairy on the lower surface, the hairs variable in length, most of them > 0.3 mm long and at least some > 0.5 mm long (the longer as long as or longer than the costa width); widest point of the leaf usually 1-3 pairs of pinnae up from the base..... ***Christella hispidula***

* ***Christella dentata*** (Forsskål) Brownsey & Jermy. DOWNY MAIDEN FERN, SOFT FERN, DOWNY SHIELD FERN. **Hab:** Moist forests, hammocks, streambanks, swamps, disturbed areas. **Dist:** Native of tropical and subtropical Asia and Africa. **Phen:** Jun-Sep. **Syn:** = K4, Fawcett & Smith (2021), Smith & Kessler (2017); = *Cyclosorus dentatus* (Forsskål) Ching – FoC, K3; = *Thelypteris dentata* (Forsskål) E.P. St. John – Bah, ETx1, FNA2, K1, Meso1, Tx, TxFerns, WH3; > *Thelypteris dentata* (Forsskål) E.P. St. John – Sf; > *Thelypteris reducta* Small ex R.P. St. John – Sf. NatureServe G5 (Secure).

Christella hispidula (Decaisne) Holttum. HAIRY MAIDEN FERN. **Hab:** Hammocks, limesinks, moist forests, streamsides, on soil in disturbed areas, and on mortar / masonry. **Dist:** Se. NC (Brunswick County) and e. SC south to s. FL, west to e. TX. The boundary of native vs. adventive distribution is unclear. **Phen:** May-Oct. **Tax:** The species is sometimes separated into varieties (see synonymy). Our variety would be var. *versicolor*, but that combination has not been made in the genus *Christella*. Other varieties occur in the West Indies, in tropical New and Old World. **Syn:** = Fawcett & Smith (2021), Smith & Kessler (2017); = *Cristella quadrangularis* (Fée) Holttum – K4; = *Cyclosorus hispidulus* (Decaisne) Ching – K3; > *Thelypteris* ×*versicolor* R. St. John – Tx; > *Thelypteris hispidula* (Decaisne) C.F. Reed var. *versicolor* (R.P. St. John) Lellinger – ETx1, Fl1, FNA2, K1, TxFerns, WH3; > *Thelypteris versicolor* R.P. St. John – Sf. NatureServe G5T3T5 (Apparently Secure).



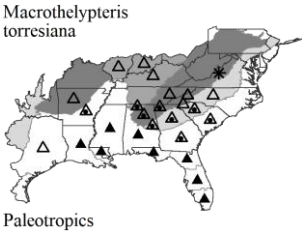
Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



Leptogramma J. Smith 1842 (STREAK-SORUS FERN)

A genus of about 29 species, perennial herbs, of e. and s. Asia, s. Europe, Africa, and tropical (rarely temperate) America. Circumscription of the genus and its subgenera here follows Kuo et al. (2019) in separating *Leptogramma* from a more broadly circumscribed *Stegnogramma*. Our single species is in subgenus *Leptogramma*. References: Fawcett & Smith (2021); He & Zhang (2012); Kuo et al (2019a); Smith & Flory (1990); Smith (1981); Smith (1993a) in FNA2 (1993b); Weakley et al (2011).

Leptogramma burksiorum (J.E. Watkins & D.R. Farrar) Y.H. Chang & L.Y. Kuo. ALABAMA STREAK-SORUS FERN. **Hab:** Moist sandstone grottoes. **Dist:** A narrow endemic of nc. AL. **Tax:** Watkins & Farrar (2002, 2005) present evidence for its recognition as a species distinct from *Thelypteris pilosa* and discuss its likely evolution as an ancient relictual taxon. With the splitting of Thelypteris into smaller genera, this taxon has moved to *Stegnogramma* and now *Leptogramma* (Weakley 2011, Kuo et al. 2019). **Syn:** = Fawcett & Smith (2021), Kuo et al (2019a); = *Stegnogramma burksiorum* (J.E. Watkins & D.R. Farrar) Weakley – K3, K4, Weakley et al (2011); = *Thelypteris pilosa* (M. Martens & Galeotti) Crawford var. *alabamensis* Crawford – FNA2, K1; < *Thelypteris pilosa* – Meso1.



Macrothelypteris (H. Itô) Ching 1963 (MAIDEN FERN)

A genus of about 10 species, tropical and subtropical. References: Fawcett & Smith (2021); FoC; Smith & Flory (1990); Smith & Kessler (2017); Smith (1993a) in FNA2 (1993b); Wyatt (2020).

* ***Macrothelypteris torresiana*** (Gaudichaud-Beaupré) Ching. MARIANA MAIDEN FERN. **Hab:** Wet hammocks, cypress swamps, streamsides, moist forests, disturbed areas, increasingly invasive in natural habitats (especially in the southern parts of our area). **Dist:** Native of the Asian and African tropics. Leonard (1972) and Wyatt (2020) discussed the history of this species in the southeastern United States. *Macrothelypteris torresiana* continues to spread northward, and is reported for KY (Gorman, Bruton, & Estes 2011) and IL (Mohlenbrock 2014). **Phen:** Jan-Dec. **Syn:** = Ar, Bah, ETx1, Fl1, FNA2, Il, K1, K3, K4, Meso1, Tn, TxFerns, WH3, Fawcett & Smith (2021), Smith & Kessler (2017); = *Dryopteris setigera* (Blume) Kuntze – Sf, misapplied; = *Thelypteris torresiana* (Gaudichaud-Beaupré) Alston – Tx. NatureServe G5 (Secure).

Pelazoneuron (Holttum) A.R. Smith & S.E. Fawcett 2021

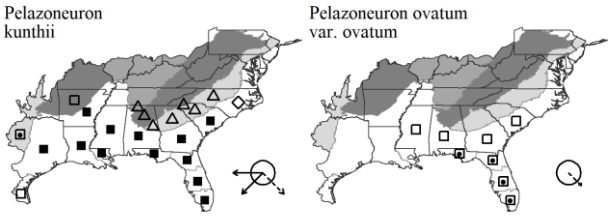
A genus of 16 species, perennial (rhizomatous) ferns, of the New World tropics and subtropics. References: Fawcett & Smith (2021).

2 Upper surface of the costae and costules with at least a few stout hairs > 0.3 mm long; upper leaf surface pubescent to nearly glabrous, also glandular with stipitate glands. ..... ***Pelazoneuron kunthii***

2 Upper surface of the costae and costules glabrous above (rarely minutely hairy, the hairs never > 0.2 mm long), eglandular ..... ***Pelazoneuron ovatum var. ovatum***

Pelazoneuron kunthii (Desvaux) A.R. Smith & S.E. Fawcett. KUNTH'S MAIDEN FERN, SOUTHERN SHIELD FERN. **Hab:** Coquina limestone ('marl') outcrops, calcareous bluffs and sinkhole slopes, also adventive on and around coquina limestone (marl) riprap around small bridges and ditches and in suburban forests. **Dist:** Se. NC south to s. FL and west to c. TX; West Indies; Mexico south through Central America into n. South America. **Phen:** (Jan-) May-Aug (-Dec). **Syn:** = Fawcett & Smith (2021); = *Cyclosorus kunthii* (Desvaux) Christenhusz – K3; = *Thelypteris kunthii* (Desvaux) C.V. Morton – Ar, Bah, ETx1, Fl1, FNA2, K1, Meso1, RAB, Tx, TxFerns, WH3; < *Christella normalis* (C. Christensen) Holttum – K4; < *Thelypteris normalis* (C. Christensen) Moxley – Sf. NatureServe G5 (Secure).

Pelazoneuron ovatum (R.P. St. John) A.R. Smith & S.E. Fawcett *var.* ***ovatum***. OVATE MAIDEN FERN. **Hab:** On coquina limestone ('marl') or in disturbed, calcareous areas. **Dist:** E. SC south to s. FL, west to s. AL; Bahamas. **Phen:** Jan-Dec. **Syn:** = Fawcett & Smith (2021); = *Christella ovata* var. *ovata* – K4; = *Cyclosorus ovatus* (R.P. St. John) Mazumdar & Mukhopadyay var. *ovatus* – K3; = *Thelypteris ovata* R.P. St. John var. *ovata* – Bah, FNA2, K1; < *Thelypteris ovata* – Fl1, WH3; > *Thelypteris ovata* var. *harperi* (C. Christensen) R.P. St. John – Sf; > *Thelypteris ovata* R.P. St. John var. *ovata* – Sf. NatureServe G3G5T3T4 (Vulnerable).



Phegopteris (C. Presl) Fée 1852 (BEECH FERN)

A genus of about 8 (or ultimately probably more) species, mainly north temperate and boreal. References: Fawcett & Smith (2021); Fujiwara et al (2021); Gilman (2020); FoC; Patel, Fawcett, & Gilman (2019); Smith & Flory (1990); Smith (1993a) in FNA2 (1993b).

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

F42. THELYPTERIDACEAE

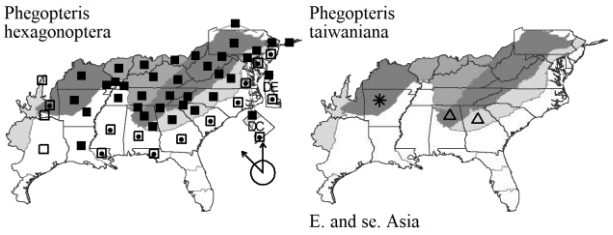
1 Rhizome short, erect; all the pinnae interconnected by orbicular auricles or triangular wings between the pinnae; leaf blade lanceolate, > 4× as long as wide, tapering to both ends from near the middle (the largest pinnae near the middle of the blade); primary pinnae alternate ..... ***Phegopteris taiwaniana***

1 Rhizome long creeping; all the pinnae interconnected by a narrow rachis wing, or the proximal 1-3 pairs of pinnae free; leaf blade broadly triangular, broadest at or near the base (the largest pinnae the basal or next pair); primary pinnae opposite.

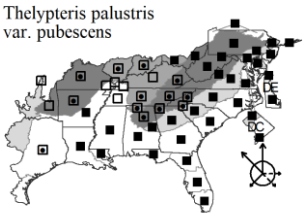
..... ***Phegopteris hexagonoptera***

Phegopteris hexagonoptera (Michaux) Fée. BROAD BEECH FERN. **Hab:** Mesic to submesic forests. **Dist:** QC west to ON, WI, and MN, south to Panhandle FL and e. TX. **Phen:** Apr-Aug. **Syn:** = Ar, Fl1, FNA2, GrPl, Il, K1, K3, K4, Mo1, NE, NY, Pa, Sf, Tn, TxFerns, Va, WH3, WV, Fawcett & Smith (2021), Gilman (2020), Patel, Fawcett, & Gilman (2019); = *Dryopteris hexagonoptera* (Michaux) C. Christensen – F; = *Thelypteris hexagonoptera* (Michaux) Weatherby – C, G, RAB, Tx, W. NatureServe G5 (Secure).

* ***Phegopteris taiwaniana*** T. Fujiwara, Ogiso, & Serizawa. JAPANESE BEECH FERN. **Hab:** Vertical rock outcrops, moist slopes. **Dist:** Native of e. and se. Asia. This species is naturalizing on sandstone cliffs, other outcrops, rocky banks at scattered locations around the Southeastern United States, and seems likely to become more common. See Florez-Parra & Keener (2016) for additional information. **Tax:** See Fujiwara et al. (2021) for discussion about the *Phegopteris decursivepinnata* polyploid complex. **Syn:** = Fujiwara et al (2021); < *Phegopteris decursive-pinnata* (N.C. Hall) Fée – FoC, K3, K4, Fawcett & Smith (2021), Patel, Fawcett, & Gilman (2019), orthographic variant.



Thelypteris Schmidel 1763 (MARSH FERN)



A genus of 2 species, perennial herbs, circumboreal in distribution (with several varieties) and also with a Southern Hemisphere member. Often in the past considered a large genus (with about 1190 species), clearly warranting segregation, a consensus has developed to recognize smaller genera in Thelypteridaceae, as reflected in this treatment. Our species fall into several disparate groups, here recognized as genera, following much recent literature and synopsized in PPG I (2016). References: Fawcett & Smith (2021); He & Zhang (2012); FoC; PPG I (2016); Smith & Flory (1990); Smith (1981); Smith (1993a) in FNA2 (1993b).

Identification Notes: In the northern and/or or more montane parts of our region, *Coryphoteris simulata* is similar to and can be mistaken for *Thelypteris palustris* var. *pubescens*; see *Coryphopteris* for identification notes.

Thelypteris palustris Schott *var.* ***pubescens*** (G. Lawson) Fernald. MARSH FERN. **Hab:** Bogs, marshes (including freshwater tidal marshes), and bottomland forests. **Dist:** The species is circumboreal, occurring in n. Europe, n. Asia, and n. North America. Var. *pubescens* is the American variety, ranging from NL (Newfoundland) and MB south to s. FL and c. TX; c. Mexico (Michoacán, Distrito Federal); Bermuda, Cuba; also e. Asia. **Phen:** Jun-Sep. **Syn:** = Ar, C, ETx1, FNA2, G, Il, K1, K3, K4, Mo1, NE, NY, Pa, Tn, TxFerns, Va, W, WH3, WV, Fawcett & Smith (2021); = *Dryopteris thelypteris* (Linnaeus) Swartz var. *pubescens* (Lawson) A.R. Prince ex Weatherby – F; < *Thelypteris palustris* – GrPl, RAB; > *Thelypteris palustris* var. *haleana* Fernald – Tx; < *Thelypteris thelypteris* (Linnaeus) Nieuwland – Sf. NatureServe G5T5 (Secure).

F45. DRYOPTERIDACEAE Herter 1949 (WOOD-FERN FAMILY) [in POLYPODIALES]

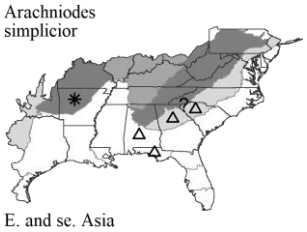
A family of about 26 genera and about 2115 species, cosmopolitan in distribution, but concentrated in temperate and montane areas. Here circumscribed (following Smith et al. 2006b, PPG I 2016, and others) to exclude Onocleaceae and Woodsiaceae. References: Kramer & Green (1990); Lellinger (1985); Smith (1993b) in FNA2 (1993b); Smith et al (2006b).

1 Leaf blades pentagonal in outline, ca. 1× as long as wide, the terminal pinna by far the largest; [introduced species, naturalized in moist ravines in SC] ..... ***Arachniodes simplicior***

1 Leaf blades lanceolate, oblong, or ovate in outline, 1.5× or more as long as wide.
- 2 Costae rounded or flat on the upper surface; costae with dense, multicellular hairs ..... ***Ctenitis***
- 2 Costae grooved on the upper surface; costae lacking hairs.
  - 3 Indusium reniform, attached laterally and with a sinus on one side ..... ***Dryopteris***
  - 3 Indusium peltate, round.
    - 5 Veins anastamosing, rejoining to form a netlike pattern; pinnae 4-25 pairs per leaf; [non-native, rarely naturalized] ..... ***Cyrtomium***
    - 5 Veins branching dichotomously, free, not rejoining to form a netlike pattern; pinnae 25-50 pairs on larger leaves; [plant a common native species] ..... ***Polystichum***

Key to Map Symbology: □⊡■ └native┘ ◇◈◆ └maybe exotic┘ △◬▲ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated

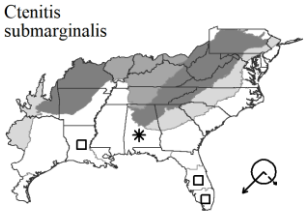
Arachniodes Blume 1828 (EAST INDIAN HOLLY FERN)



A genus of about 60 species, of tropical and warm temperate regions, and especially of Asia and America. References: He et al. (2013); Kramer & Green (1990); PPG I (2016); Smith (1993c) in FNA2 (1993b); Thi Lu et al (2019).

* ***Arachniodes simplicior*** (Makino) Ohwi. SIMPLER EAST INDIAN HOLLY FERN. **Hab:** Moist banks in forested creek ravines. **Dist:** Native of Japan and China. Gordon (1981) discussed the SC population, apparently established for several decades at the time of its discovery, and likely originating from spores. **Syn:** = Ar, FNA2, K1, K3, K4. NatureServe GNR (Not Yet Ranked).

Ctenitis (C. Christensen) C. Christensen 1938 (COMB FERN)



A genus of about 125 species, perennial herbs and short shrubs, pantropical. References: Kramer & Green (1990); Moran (1993a) in FNA2 (1993b).

Ctenitis submarginalis (Langsdorff & Fischer) Ching. BROWN-HAIR COMB FERN. **Hab:** Swamps and wet hammocks, rockland hammocks. **Dist:** C. and s. peninsular FL; s. LA; West Indies; Mexico, Central America, and South America. **Comm:** {add to family key}. **Syn:** = Fl1, FNA2, K3, K4, Meso1, WH3; = *Thelypteris submarginalis* (Langsdorff & Fischer) Small – Sf. NatureServe G5 (Secure).

Cyrtomium C. Presl 1836 (NET-VEINED HOLLY FERN)

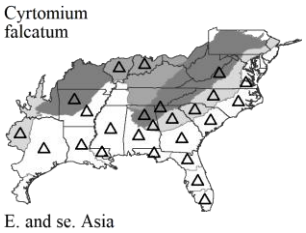
A genus of about 35 species, of temperate regions of Africa, Asia, and the Pacific Islands. *Cyrtomium* is closely related to *Polystichum*, with some recent molecular studies suggesting that they are reciprocally paraphyletic. They may be combined, or, alternatively, split into smaller genera (Li, Lu, & Barrington 2008). Both species in our flora are apogamous triploids. References: Kramer & Green (1990); Li, Lu, & Barrington (2008); MacDougal (1976); Wyatt (2020); Yatskievych (1993) in FNA2 (1993b); Zhang & Barrington (2013).

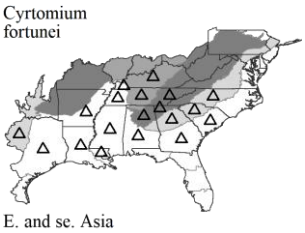
1 Leaf coriaceous, the upper surface dark green and shiny; pinnae 4-10 (-12) pairs per leaf, 1.5-3 cm wide, the margins coarsely toothed or undulate..... ***Cyrtomium falcatum***

1 Leaf less coriaceous, the upper surface pale green and dull; pinnae (8-) 10-25 pairs per leaf, 1-2 cm wide, the margins finely denticulate..... ***Cyrtomium fortunei***

* ***Cyrtomium falcatum*** (Linnaeus f.) C. Presl. ASIAN NET-VEINED HOLLY FERN. **Hab:** Ditches, disturbed swamps, moist ravines, old mortar of brick walls. **Dist:** Native of e. Asia. Reported for se. VA (Virginia Beach) (Robert Wright, pers.comm., 2021). **Phen:** Jun-Oct. **Syn:** = Ar, ETx1, Fl1, FNA2, K1, K3, K4, Sf, TxFerns, WH3. NatureServe G5 (Secure).

* ***Cyrtomium fortunei*** J. Smith. FORTUNE'S NET-VEINED HOLLY FERN. **Hab:** Roadside banks, rock outcrops, old mortar of brick walls. **Dist:** Native of se. China. **Tax:** Three varieties are sometimes recognized. **Comm:** Reported for Polk County, TN (D. Estes, pers. comm., 2010). **Syn:** = *Cyrtomium fortunei* J. Smith var. *fortunei* – FNA2; < *Cyrtomium fortunei* J. Smith – K1, K3, K4. NatureServe G3G5 (Apparently Secure).





Dryopteris Adanson 1763 (WOODFERN, SHIELDFERN)

A genus of about 400 species, nearly cosmopolitan, but concentrated in temperate Asia. Sessa, Zimmer, & Givnish (2012) discuss the phylogeny and biogeography of *Dryopteris*; the clades shown in the key are from their work. References: Hoshizaki & Wilson (1999); Kees & Weakley (2018) in Weakley et al (2018b); Kramer & Green (1990); Montgomery & Paulton (1981); Montgomery & Wagner (1993) in FNA2 (1993b); Montgomery (1982); Sessa, Zimmer, & Givnish (2012); Umstead & Diggs (2018); Wyatt (2020).

Identification Notes: *Dryopteris* and *Athyrium* are often confused when not fertile; they can be easily distinguished by breaking off a leaf and counting vascular bundles (which will appear as thread-like strands). *Dryopteris* has 5 and *Athyrium* has 2. Many *Dryopteris* species will hybridize with one another to form sterile hybrids. Whenever two or more *Dryopteris* species are found growing together, there is a good chance that hybrids are present. Hybrids generally show intermediacy between the two parents, and have abortive sporangia or spores.

1 Leaves bipinnate-pinnatifid to tripinnate-pinnatifid (or to quadripinnate in the lower pinnae), divided 2.5-4×; ["clade II"]. ***Dryopteris intermedia***

1 Leaves pinnate, pinnate-pinnatifid, to bipinnate (or to bipinnate-pinnatifid in the lower pinnae), divided 1-2.5×.

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

4 Leaves pinnate, divided 1× (the pinnae toohed, but not further lobed or divided); rachis densely clothed with blackish scales; ["clade I"] ..... ***Dryopteris hangchowensis***

4 Leaves pinnate-pinnatifid to bipinnate (or to bipinnate-pinnatifid in the lower pinnae), divided 1.5-2.5×; rachis sparesely to moderately clothed with light tan to brown scales.

5 Sori marginal (no blade tissue visible on the underside of the blade between the sori and the margins); leaves evergreen, gray-green, leathery in texture; ["clade I"] ..... ***Dryopteris marginalis***

5 Sori medial or submedial (some blade tissue visible on the underside of the blade between the sori and the margins); leaves evergreen or deciduous, dark- to bright-green, thin to stiff in texture.

9 Costa with bullate (blistered-appearing) scales abundant, usually dark; [naturalized alien]; ["clade V"] ..... ***Dryopteris erythrosora***

9 Costa lacking bullate scales; [native, sometimes also cultivated]; ["clade III"].

10 Leaves evergreen, fertile only toward the tip, the fertile pinnae and segments narrower than the sterile and more widely spaced; scales at the petiole base light brown, not shiny.

11 Fertile leaflets only slightly narrower than the sterile leaflets and spaced similarly along the rachis; teeth tapering to sharp points; spores shrunken and irregular..... ***Dryopteris australis***

11 Fertile leaflets much narrower and obviously more widely spaced along the rachis than the sterile leaflets; teeth triangular (acute); spores full..... ***Dryopteris ludoviciana***

10 Leaves deciduous or semi-evergreen, fertile throughout or nearly so, the fertile pinnae and segments not differentiated from sterile ones; scales at petiole base medium to dark brown, shiny or not.

12 Sterile leaves semi-evergreen; fertile leaves deciduous with sori submedial, not touching the costule at maturity; leaf blade lanceolate, usually 2-4× as long as wide, gradually tapering at the apex; scales at the petiole base medium to dark brown, with a narrow black central band..... ***Dryopteris celsa***

12 Leaves deciduous with sori medial, touching the costule at maturity; leaf blade ovate to narrowly ovate, usually 1.5-3× as long as wide; abruptly tapering at the apex; scales at the petiole base dark brown, nearly black, with a narrow pale margin ..... ***Dryopteris goldieana***

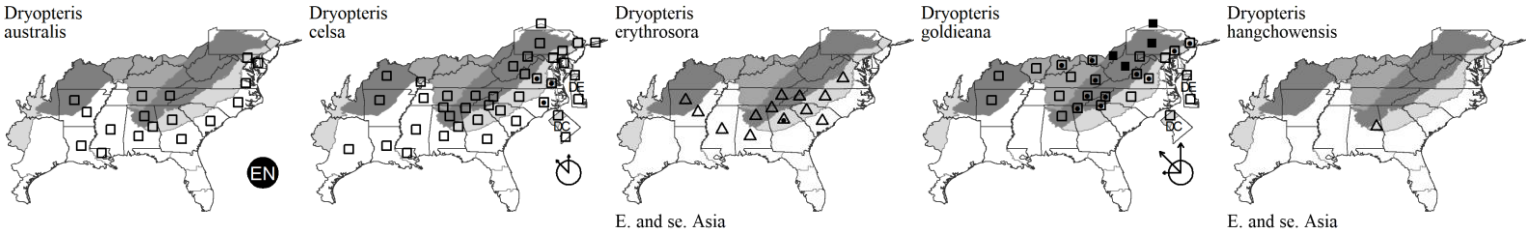
Dryopteris australis (Wherry) Small [celsa × ludoviciana]. SOUTHERN WOODFERN, SOUTHERN SHIELDFERN. **Hab:** Swamps, bottomlands, mesic forests. **Dist:** MD south to n. GA, s. AL, MS, w. LA and AR. **Tax:** *Dryopteris australis* originated as a hybrid of *D. celsa* × *D. ludoviciana*. It regularly occurs in the absence of one or both parents and also sometimes outside the current distribution of one of its parents, suggesting that it is able to reproduce via viable spores. It is therefore treated here without the hybrid ×, which would misleadingly indicate sterility and non-independence. **Syn:** = Sf; = *Dryopteris ×australis* – K3, K4, pro species.

Dryopteris celsa (W. Palmer) Knowlton, W. Palmer, & Pollard. LOG FERN. **Hab:** Swamps, seepage bogs, and calcareous floodplains, typically associated with calcareous substrates. **Dist:** Ne. NJ and ne. NY west to s. IL, e. MO, and AR, south to SC, GA, n. AL, TN, e. and n. LA, and e. TX (Mink, Singhurst, & Holmes 2011a); disjunct in w. NY and w. MI; overall very scattered in its distribution. Discovered in MS by John Kees (Kees & Weakley 2018). **Phen:** Jun-Sep. **Comm:** This species is a fertile allotetraploid derived from hybridization of *D. goldiana* and *D. ludoviciana*; its chromosome complement is symbolized GGLL (Werth 1991). **Syn:** = Ar, C, ETx1, F, FNA2, Il, K1, K3, K4, Mo1, NY, Pa, RAB, Tn, TxFerns, Va, W, WV, Montgomery & Paulton (1981); = *Dryopteris goldiana* (Hooker ex Goldie) ssp. *celsa* W. Palmer – G; > *Dryopteris atropalustris* Small – Sf; > *Dryopteris celsa* (W. Palmer) Knowlton, W. Palmer, & Pollard – Sf; >< *Dryopteris cristata* (Linnaeus) A. Gray – Tx, misidentification.

* ***Dryopteris erythrosora*** (D.C. Eaton) Kuntze. AUTUMN FERN, JAPANESE RED SHIELDFERN. **Hab:** Suburban woodlands, especially in ravines and along creeks. **Dist:** Native of Japan, Korea, and China. Also recently reported as naturalizing in AR (Simpson, Crank, Witsell, & Peck 2008; Peck 2011), nc. NC (Rothfels, Sigel, & Windham 2012), and c. GA (Zomlefer et al. 2018; Umstead & Diggs 2018). This species seems to be well on its way to being an aggressive invasive, likely to be widespread in our area; see discussion in Wyatt (2020). **Comm:** "Two factors suggest [*Dryopyeris erythrosora*] might have tremendous potential [for spread in the future]. First, it is wildly popular as an ornamental planting and undoubtedly hundreds of thousands, if not millions, of plants will be installed in landscapes all over Georgia and the Southeast. Second, this species is hardy over most of the United States" (Wyatt 2020). **Syn:** = Ar, K3, K4, Umstead & Diggs (2018).

Dryopteris goldieana (Hooker ex Goldie) A. Gray. GOLDIE'S WOODFERN. **Hab:** Boulderfield forests, rich cove forests, seepage swamps, especially over calcareous sedimentary or mafic metamorphic or igneous rocks. **Dist:** NB west to s. ON and MN, south to nw. SC, n. GA, TN, KY, AR (Peck 2011), IL, and IA. **Phen:** Jun-Sep. **Tax:** This species is one of the diploid 'parent species' of the e. North American reticulately-evolved *Dryopteris* complex. Its genome (symbolized GG) forms half of the genome of the tetraploid *D. celsa*, and one third of the hexaploid *D. clintoniana*. The epithet is correctly spelled "*goldieana*", following the ICNafp. **Syn:** = K4; = *Dryopteris goldiana* (Hooker ex Goldie) A. Gray – Ar, C, F, FNA2, GrPl, Il, K1, K3, Mo1, NE, NY, Pa, RAB, Sf, Tn, Va, W, WV, Montgomery & Paulton (1981); = *Dryopteris goldiana* ssp. *goldiana* – G. NatureServe G4G5 (Apparently Secure).

* ***Dryopteris hangchowensis*** Ching. SHAGGY WOODFERN. **Hab:** Moist forest. **Dist:** Native of Japan and e. China. Discovered naturalized in AL by W. Barger (pers.comm., 2020). **Comm:** Initially reported for AL as *D. cycadina* (Franchet & Savatier) C. Christensen. **Syn:** = FoC.



Dryopteris intermedia (Muhlenberg ex Willdenow) A. Gray. FANCY FERN, EVERGREEN WOODFERN. **Hab:** Cove forests, other moist, rocky forests, over a variety of substrates. **Dist:** NL (Newfoundland) west to MN, south to n. GA and s. MO. **Phen:** Jun-Sep. **Tax:** This species is one of the diploid "parent species" of the e. North American reticulately-evolved *Dryopteris* complex. Its genome (symbolized II) forms half of the genome of the tetraploids *Dryopteris campyloptera* and *Dryopteris carthusiana* and 2/3s of the genome of the triploid hybrid *Dryopteris ×triploidea* (*Dryopteris carthusiana* × *intermedia*, with chromosome symbolized IIS), which is frequent in areas with both parents present. **Syn:** = C, FNA2, Il, K1, K3, K4, Mo1, NE, NY, Pa, RAB, Sf, Tn, Va, W, WV, Montgomery & Paulton (1981); = *Dryopteris austriaca* (Jacquin) Woynar ex Schinz & Thellung var.

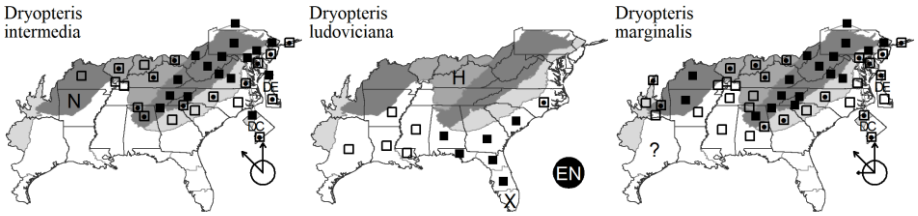
Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

F45. DRYOPTERIDACEAE

intermedia (Muhlenberg ex Willdenow) Morton – G; = *Dryopteris spinulosa* (O.F. Mueller) Watt var. *intermedia* (Muhlenberg ex Willdenow) Underwood – F. NatureServe G5 (Secure).

Dryopteris ludoviciana (Kunze) Small. SOUTHERN WOODFERN. **Hab:** Blackwater swamp forests, hammocks. **Dist:** A Southeastern Coastal Plain species: e. NC south to s. FL, west to s. AL, s. MS (Sorrie & Leonard 1999), and e. LA; disjunct in the West Gulf Coastal Plain of LA and AR (Peck 2011), and possibly disjunct in sc. KY, the report old and somewhat uncertain. **Phen:** Jun-Sep. **Comm:** This species is one of the diploid "parent species" of the e. North American reticulately-evolved *Dryopteris* complex. Its genome (symbolized LL) forms half of the genome of the tetraploids *D. cristata* and *D. celsa*, as well as contributing one third of the genome of *D. clintoniana* indirectly (via its daughter species *D. cristata*). **Syn:** = Ar, ETx1, Fl1, FNA2, K1, K3, K4, RAB, Sf, TxFerns, WH3, Montgomery & Paulton (1981). NatureServe G4 (Apparently Secure).

Dryopteris marginalis (Linnaeus) A. Gray. MARGINAL WOODFERN. **Hab:** Rock outcrops, boulderfield forests, other rocky forests. **Dist:** NL (Newfoundland) west to s. ON and MI, south to SC, c. GA, AL, TN, AR, e. OK, and n. TX. **Phen:** Jun-Sep. **Comm:** *D. marginalis* has not participated in the reticulate evolution of *Dryopteris* in e. North America; it does, however, form sterile hybrids with some other species. **Syn:** = Ar, C, F, FNA2, G, GrPl, Il, K1, K3, K4, Mo1, NE, NY, Pa, RAB, Sf, Tn, TxFerns, Va, W, WV, Montgomery & Paulton (1981). NatureServe G5 (Secure).



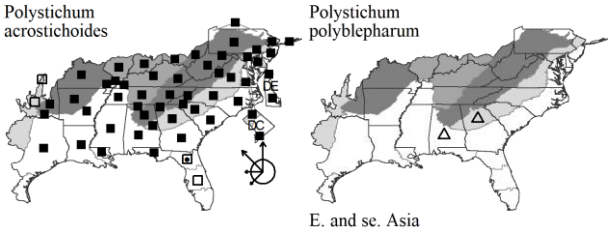
Polystichum Roth 1799 (HOLLY FERN)

A genus of about 500 species, nearly cosmopolitan in distribution. References: Kramer & Green (1990); Wagner (1993) in FNA2 (1993b); Zhang & Barrington (2013).

1 Leaves 1-pinnate; sori confluent, covering the lower surface of the fertile pinnae; [common, widespread, native]**.....*Polystichum acrostichoides***
1 Leaves 1-pinnate-pinnatifid to 2-pinnate; sori distinct.
..... *Polystichum polyblepharum*

Polystichum acrostichoides (Michaux) Schott. CHRISTMAS FERN. **Hab:** Moist to dry forests and woodlands, especially slopes, ravines, and small stream bottomlands. **Dist:** NS west to MN, south to s. FL and e. TX; also in ne. Mexico (NLE and TAM). **Phen:** Jun-Nov. **Tax:** Var. *lonchitoides* Brooks, allegedly endemic to WV, is just a form and should not be recognized taxonomically. **Comm:** One of the most familiar ferns in e. North America. **Syn:** = Ar, C, ETx1, F, Fl1, FNA2, G, GrPl, Il, K3, K4, Mo1, NE, NY, Pa, RAB, Sf, Tn, Tx, TxFerns, Va, W, WH3, WV; > *Polystichum acrostichoides* var. *acrostichoides* – K1; > *Polystichum acrostichoides* var. *lonchitoides* Brook – K1.

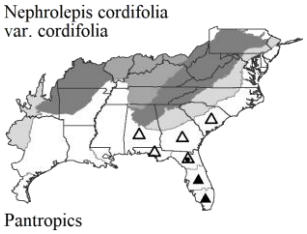
* ***Polystichum polyblepharum*** (Roemer ex Kunze) C. Presl. JAPANESE TASSEL-FERN. **Hab:** Moist ravines. **Dist:** Native of e. Asia. Reported for AL as *P. braunii* (Spenner) Fée. **Syn:** = K3, K4.



F46. NEPHROLEPIDACEAE Pichi Sermolli 1975 (SWORD FERN FAMILY) [in POLYPODIALES]

A family of 1 genus and about 19 species. Sometimes united, as by Smith et al. (2006b), into the Lomariopsidaceae. References: Christenhusz, Zhang, & Schneider (2011); PPG I (2016).

Nephrolepis Schott 1834 (SWORD FERN)



A genus of about 19-20 species, widespread in tropical and subtropical areas. The familiar cultivated "Boston Fern" is a hybrid of *N. biserrata* × *cordifolia* (Yahaya et al. 2016). References: Hovenkamp & Miyamoto (2005); Nauman (1993e) in FNA2 (1993b); Xing, Wang, & Hovenkamp in FoC (2013); Yahaya et al (2016).

* ***Nephrolepis cordifolia*** (Linnaeus) C. Presl *var*. ***cordifolia***. NARROW SWORD FERN. **Hab:** Swamps and hammocks, disturbed moist and wet areas; probably not native in FL (or other states of the Southeastern US). **Dist:** Pantropical, the original distribution obscure. **Phen:** Jan-Dec. **Syn:** = Hovenkamp & Miyamoto (2005); < *Nephrolepis cordifolia* – Fl1, FNA2, K1, K3, K4, Meso1, Sf, WH3. NatureServe G4G5 (Apparently Secure).

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

F51. POLYPODIACEAE J. Presl & C. Presl 1822 (POLYPODY FAMILY) [in POLYPODIALES]

A family of about 65 genera and about 1650 species, cosmopolitan, especially tropical. Here circumscribed to include Grammitidaceae, following PPG I (2016) and Wei & Zhang (2022). Subfamily classification shown in the key follows Wei & Zhang (2022). References: Hennipman, Veldhoen, & Kramer in Kramer & Green (1990); Hirai et al (2011); Parris in Kramer & Green (1990); PPG I (2016); Smith & Tejero-Díez (2014); Smith (1993e) in FNA2 (1993b); Smith et al (2006a); Smith et al (2006b); Sundue et al (2014); Wei & Zhang (2022).

8 Leaf blade densely scaly on the lower surface with peltate, bicolored scales; rhizome 1-2 mm in diameter; leaf segment margins entire; [subfamily Polypodioideae] .. ***Pleopeltis***

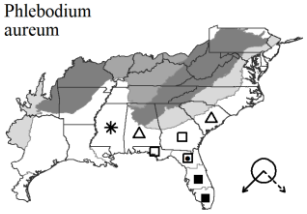
8 Leaf blade scaleless on the lower surface; rhizome 3-15 (-30) mm in diameter; leaf segment margins denticulate (*Polypodium*) or entire (*Pecluma*, *Phlebodium*, *Phymatosorus*).

10 Venation free or with a row of areoles between the pinnae midveins and margins; rhizome 3-6 mm in diameter; leaf blade < 9 cm wide; [subfamily Polypodioideae] ***Polypodium***

10 Venation highly reticulate, with 3-4 rows of areoles between the pinnae midveins and margins; rhizome 3-30 mm in diameter; leaf blade 10-50 cm wide. ***Phlebodium aureum***

Phlebodium (R. Brown) J. Smith 1841 (GOLDEN POLYPODY)

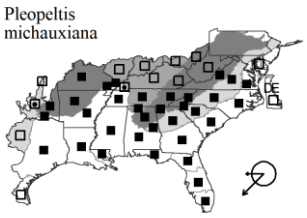
A genus of 2-4 species, of tropical and subtropical regions of the Western Hemisphere. References: Hennipman, Veldhoen, & Kramer in Kramer & Green (1990); Mickel & Smith (2004); Nauman (1993f) in FNA2 (1993b); Smith et al (2018); Tejero-Díez, Mickel, & Smith (2009).



Phlebodium aureum (Linnaeus) J. Smith. GOLDFOOT FERN, GOLDEN POLYPODY. **Hab:** Epiphytic on the old leaf bases of *Sabal palmetto* and in crotches and crevices of other trees, particularly *Quercus virginiana*, and rarely terrestrial on calcareous soils or masonry. **Dist:** E. SC (Beaufort, Jasper, and Charleston counties), e. GA (Camden, Chatham, and Glynn counties), south to s. FL, west to Panhandle FL (Wakulla County) (Kunzer et al. 2009); West Indies; South America. Found in Cape Romain National Wildlife Refuge (Charleston County, SC) in the late 1970s by Steve Bowling, where apparently native (S. Bowling, pers. comm. 2007); also introduced and apparently established in SC (Beaufort, Jasper, Charleston counties) via planting of palmettos from farther south (P. McMillan, pers. comm. 2005). Also introduced on cultivated palmettos in s. AL and s. MS. **Phen:** Jan-Dec. **Tax:** *Phlebodium pseudaureum* has been reported as occurring in FL peninsula, but it seems as if plants so attributed may be within the variation of *P. aureum* (W. Testo, pers. comm. 2019). See Davidse, Sousa, & Knapp 1995) for additional discussion. **Syn:** = Fl1, FNA2, K1, K3, K4, Sf, WH3; = *Polypodium aureum* Linnaeus – Bah; >< *Polypodium pseudaureum* (Cavanilles) Lellinger – Meso1. NatureServe G5 (Secure).

Pleopeltis Humboldt & Bonpland ex Willdenow 1810 (SHIELDED-SORUS POLYPODY)

A genus of about 90 species (as circumscribed by Smith & Tejero-Díez 2014 and PPG I 2016), primarily tropical. Windham (1993) and later authors, such as Otto et al. (2009), make a compelling case, based on morphological, chemical, and molecular data, that the "scaly polypodies" should be placed in *Pleopeltis*, rather than in *Polypodium*. The *Pleopeltis polypodioides* complex is monographed by Sprunt (2010) as including eight taxa at species rank: one (*P. michauxiana*) in se. North America, six in tropical America from s. FL and Mexico south through the West Indies, Central America to South America, and one in s. Africa. References: Andrews & Windham (1993) in FNA2 (1993b); Hennipman, Veldhoen, & Kramer in Kramer & Green (1990); Mickel & Smith (2004); Nauman (1993i) in FNA2 (1993b); Otto et al (2009); Smith & Tejero-Díez (2014); Smith et al (2018); Sprunt (2010); Vincent & Hickey (2014); Windham (1993).



Pleopeltis michauxiana (Weatherby) Hickey & Sprunt. RESURRECTION FERN, SCALY POLYPODY. **Hab:** On tree limbs and trunks (especially when leaning) in a wide variety of forest types, especially southwards, and less typically (but not uncommonly) on rocks. **Dist:** *P. michauxiana* ranges from se. MD, IL, MO, and se. KS, south to s. FL and TX; Mexico and Central America (Guatemala, Honduras); Bahamas (Abaco Island). **Phen:** (Jan-) Jun-Oct (-Dec). **Tax:** Although traditionally treated as a variety of *Pleopeltis polypodioides*, recent studies suggest that this taxon warrants specific status (Sprunt 2010; Sprunt et al. 2011; Vincent & Hickey 2014). Seven additional taxa in the complex are tropical in s. FL, Mexico, Central America, South America, and Africa. **Syn:** = K4, Vincent & Hickey (2014); = *Pleopeltis polypodioides* ssp. *michauxiana* – Va, nomen nudum; = *Pleopeltis polypodioides* (Linnaeus) E.G. Andrews & Windham var. *michauxiana* (Weatherby) E.G. Andrews & Windham – Ar, ETx1, Fl1, FNA2, K2, TxFerns, Va, WH3, Smith & Tejero-Díez (2014); = *Polypodium polypodioides* (Linnaeus) Watt var. *michauxianum* Weatherby – C, F, G, GrPl, Meso1, Mo1, Tx, W, WV, Mickel & Smith (2004); < *Marginaria polypodioides* (Linnaeus) Tidestrøm – Sf; < *Pleopeltis polypodioides* (Linnaeus) E.G. Andrews & Windham – Il; < *Polypodium polypodioides* (Linnaeus) Watt – RAB. NatureServe G5T5 (Secure).

Polypodium Linnaeus 1753 (POLYPODY)

A genus of about 40 species, cosmopolitan. References: Bryan & Doltis (1987); Cusick (2002); Haufler & Windham (1991); Haufler et al (1993) in FNA2 (1993b); Haufler, Windham, & Rabe (1995); Hennipman, Veldhoen, & Kramer in Kramer & Green (1990); Kott & Britton (1982).

Identification Notes: The two species are somewhat cryptic, and the relatively frequent triploid backcross makes field identification still more problematic. Individuals not identified to species may be referred to as "*Polypodium virginianum* complex". The hybrid between our 2 species, *P.* ×*incognitum* Cusick has features generally intermediate and can be best identified by its spores abortive and malformed (vs. fertile and well-formed).

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

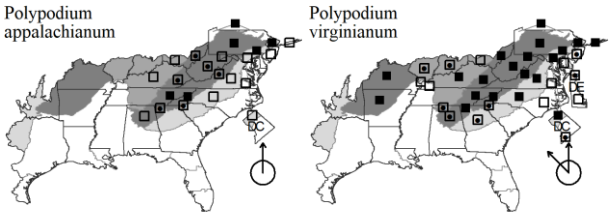
F51. POLYPODIACEAE

1 Leaf blade averaging 5.8 cm wide (range of 3.2-8.2 cm), widest at the base, thus the blade elongate-deltoid in outline; rhizome scales averaging 1.1 mm wide, mostly golden brown throughout; paraphyses (sporangiasters) usually > 40 per sorus (range of 25-120); leaves mostly lobed to apex, without an attenuate, unlobed tip ..... ***Polypodium appalachianum***

1 Leaf blade averaging 4.5 cm wide (range of 3.0-5.8 cm); blade widest near the middle, thus the blade oblong to narrowly lanceolate in outline; rhizome scales averaging 1.5 mm wide, mostly brown, with a dark central stripe; paraphyses (sporangiasters) usually < 40 per sorus (range of 7-69); leaves mostly with an attenuate, unlobed tip..... ***Polypodium virginianum***

Polypodium appalachianum Haufler & Windham [*P. virginianum* complex]. APPALACHIAN ROCKCAP FERN. **Hab:** Moist rocks at low to high elevations, especially in ravines, on north-facing outcrops, and in other moist sites, rarely epiphytic on tree trunks. **Dist:** NL (Newfoundland) west to e. ON, south to n. GA and n. AL; nearly restricted to the Appalachian Mountains. **Phen:** Jun-Oct. **Comm:** Its chromosome complement can be symbolized as AA. It is one parent of *P. virginianum*. **Syn:** = FNA2, K1, K3, K4, NE, NY, Pa, Tn, Va, Haufler, Windham, & Rabe (1995); < *Polypodium virginianum* Linnaeus – C, F, RAB, Sf, W, WV; < *Polypodium vulgare* Linnaeus var. *virginianum* (Linnaeus) Eaton – G.

Polypodium virginianum Linnaeus [*P. virginianum* complex]. COMMON ROCKCAP FERN. **Hab:** Moist rocks. **Dist:** Haufler and Windham (1991) indicate that the tetraploid cytotype (*P. virginianum*) of the *P. virginianum* complex is an allotetraploid derivative of the sterile hybrid of the diploid occurring in our area (*P. appalachianum*) and another diploid with a boreal distribution (*P. sibiricum* Siplivinsky). **Phen:** Jun-Oct. **Comm:** Electrophoretic evidence supports this finding (Bryan & Soltis 1987, Haufler, Windham, & Rabe 1995). Thus, *Polypodium* in our area is another classic example of the reticulate evolution of pteridophytes, and the cytotypes warrant recognition as independent species, though their morphological identification is problematic. The chromosome complement of *P. virginianum* can be symbolized as AASS. **Syn:** = Ar, FNA2, Il, K1, K3, K4, Mo1, NE, NY, Pa, Tn, Va, Haufler, Windham, & Rabe (1995); < *Polypodium virginianum* Linnaeus – C, F, GrPl, RAB, Sf, W, WV; < *Polypodium vulgare* Linnaeus var. *virginianum* (Linnaeus) Eaton – G.



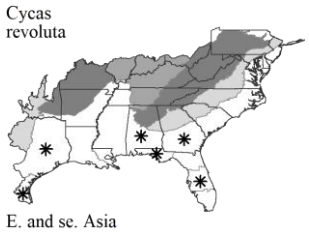
Key to Map Symbology: □⊙■ └native┘ ◇◈◆ └maybe exotic┘ △◬▲ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated

SECTION 3: GYMNOSPERMS

G01. CYCADACEAE Persoon 1807 (CYCAD FAMILY, SAGO-PALM FAMILY) [in CYCADALES]

A family of 1 genus and about 107 species, trees and shrubs, of the Old World tropics and warm temperate areas. References: Johnson & Wilson in Kramer & Green (1990); Jones (1993).

Cycas Linnaeus 1753 (CYCAD, SAGO-PALM)



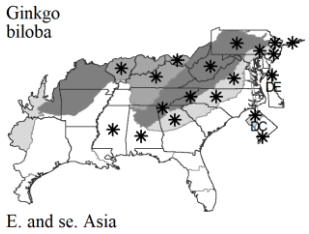
A genus of about 107 species, trees and shrubs, of the Old World tropics and warm temperate areas. References: Johnson & Wilson in Kramer & Green (1990); Jones (1993).

* ***Cycas revoluta*** Thunberg. SAGO-PALM. **Hab:** Suburban woodlands; persistent from horticultural use. **Dist:** Native of Japan. Reported as naturalized in the Tallahassee area (Leon County) of the Florida Panhandle (Clewell & Tobe 2011) and Mobile and Baldwin counties AL (H. Horne, pers. comm. 2013). **Syn:** = Fl1, K3, K4, WH3. NatureServe GNR (Not Yet Ranked).

G03. GINKGOACEAE Engler 1897 (GINKGO FAMILY) [in GINKGOALES]

A family of a single genus and single species, a tree, native of China. *Ginkgo biloba* has no close living relatives. References: Page in Kramer & Green (1990); Whetstone (1993) in FNA2 (1993b).

Ginkgo Linnaeus 1771 (GINKGO, MAIDENHAIR TREE)



A monotypic genus, a tree, native of China. *Ginkgo* is famous as a "living fossil," known from fossils nearly 200 million years old which are nearly identical to modern plants; it may be extinct as a native plant. References: Crane (2013); Page in Kramer & Green (1990); Whetstone (1993) in FNA2 (1993b).

* ***Ginkgo biloba*** Linnaeus. GINKGO, MAIDENHAIR TREE. **Hab:** Frequently planted, rarely seeding down locally near plantings in suburban woodlands and yards. **Dist:** Native to se. China; *Ginkgo* is only weakly naturalized in our area (FNA). **Comm:** See Crane (2013) for a book-length discussion of Ginkgo from all angles. **Syn:** = C, FNA2, Il, K1, K4, Pa. NatureServe G1 (Critically Imperiled).

G07. PINACEAE Sprengel ex Rudolphi 1830 (PINE FAMILY) [in PINALES]

A family of about 12 genera and about 220 species, trees and shrubs, almost exclusively in the Northern Hemisphere. References: Page in Kramer & Green (1990); Price (1989); Thieret (1993) in FNA2 (1993b).

1 Leaves either borne in fascicles of 2-5 (basally bound by a scarious sheath) or on short shoots in clusters of many leaves in apparent whorls. ..... ***Pinus***

1 Leaves alternate; [subfamily *Abietoideae*]. ..... ***Tsuga***

Pinus Linnaeus 1753 (PINE)

A genus of about 110 species, trees, of the Northern Hemisphere, south to Central America. The classification of subgenera, sections, and subsections follows Zeb et al. (2019). References: Duncan & Duncan (1988); Gernandt et al (2005); Kral (1993) in FNA2 (1993b); Krings (2020); Page in Kramer & Green (1990); Pile et al (2018); Price, Liston, & Strauss (1998); Richardson (1998); Silba (2011); Wang & Wang (2014); Ward (1963); Zeb et al (2019).

The State Tree of North Carolina is the "Pine," the species left (artfully and politically?) ambiguous.

Identification Notes: Young saplings generally have shorter needles than larger saplings and mature trees; measurements in the key are those of mature trees. Seedlings have needles single, rather than fascicled; see Krings (2020) for information on distinguishing seedlings of *P. taeda*, *P. echinata*, and *P. virginiana*. "Cones" in the key below refers to mature (brown) female (seed) cones.

1 Needles 5 in each bundle; each needle with 1 vascular bundle (visible in X-section, by breaking or cutting a needle); [subgenus *Strobus*, section *Quinquefoliae*, subsection *Strobus*] ..... ***Pinus strobus***

1 Needles 2-3 (-4) in each bundle; each needle with 2 vascular bundles; [subgenus *Pinus*].

2 Bracts and bud scales fimbriate; sheath > 1.3 cm long; needles 20-50 cm long, in bundles of 3 (-4); twigs about 1 cm in diameter; [subgenus *Pinus*, section *Trifoliae*, subsection *Australes*] ..... ***Pinus palustris***

2 Bracts and bud scales entire or edged with hairs, but not fimbriate; sheath < 1.5 cm long; needles (2-) 3-30 cm long, in bundles of 2-4; twigs < 1 cm in diameter.

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

3 Needles in bundles of 3, or 2 and 3, or 3 and 4 (predominantly or at least substantially in 3's); [subgenus *Pinus*, section *Trifoliae*, subsection *Australes*].
4 Needles in bundles of 3 (rarely with a few bundles of 2, 4, or 5).
5 Cones distinctly longer than broad when open or closed, 5-13 cm long; needles mostly (10-) 12-23 (-28) cm long, 0.7-1.5 mm wide; buds not resinous (or only slightly so); trunks not producing adventitious sprouts (epicormic sprouting) ..... ***Pinus taeda***
5 Cones about as broad as long, 3-6 (-9) cm long; needles (4-) 7-20 cm long, 1.5-2.0 mm wide; buds resinous; trunks commonly producing adventitious sprouts (epicormic sprouting), especially in response to fire. ..... ***Pinus serotina***
4 Needles in bundles of 2 and 3.
7 Needles 3-11 (-13) cm long. ..... ***Pinus echinata***
7 Needles 17-30 cm long. ..... ***Pinus elliottii***
3 Needles in bundles of 2 only.
12 Needles 2-8 cm long, generally twisted; cones either opening at maturity, not serotinous, the scales bearing prominent, slender prickles 2-5 mm long, or serotinous and unarmed; [subgenus *Pinus*, section *Trifoliae*, subsection *Contortae*]. ..... ***Pinus virginiana***
12 Needles 5-13 cm long, twisted or not; cones opening at maturity or serotinous, the scales bearing prominent, short, stout prickles or minute, deciduous prickles, and also with a faint to conspicuous horizontal ridge.
14 Anthers dark orange; bark flaky, the laminated layers sloughing off in a manner typical of a pine; [native in xeric sands, also sometimes planted in pine tree farms]; [subgenus *Pinus*, section *Trifoliae*, subsection *Contortae*] ..... ***Pinus clausa***
14 Anthers yellow; bark tight, closely ridged, not sloughing off, reminiscent of a hardwood; [mesic to fairly wet, fertile soils]; [subgenus *Pinus*, section *Trifoliae*, subsection *Australes*] ..... ***Pinus glabra***

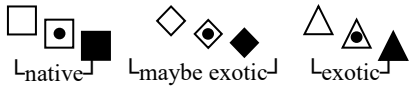
Pinus clausa (Chapman ex Engelmann) Vasey ex Sargent. SAND PINE. **Hab:** Florida scrub, and dry sands where planted outside of its native range, for instance widely planted in pulp plantations in FL and s. GA, experimentally planted as far north as NC (and persisting and naturalizing). **Dist:** FL Panhandle, S. AL, and s. MS, south to s. FL; planted and naturalized further north in GA, SC, and NC Coastal Plain. **Tax:** *P. clausa* is closely related to *P. virginiana*, the n. North American *P. banksiana*, and the nw. North American *P. contorta* complex. **Syn:** = Fl1, FNA2, K1, K3, K4, S, WH3, Price (1989); > *Pinus clausa* var. *clausa* – Ward (1963); > *Pinus clausa* var. *immuginata* D.B. Ward – Ward (1963). NatureServe G4 (Apparently Secure).

Pinus echinata P. Miller. SHORTLEAF PINE, ROSEMARY PINE, YELLOW PINE. **Hab:** Dry to dry-mesic upland forests and woodlands, rocky ridges and slopes, glades, bluffs, Coastal Plain sandhills, old fields, riparian forests, generally in rather xeric sites and on acid soils, but also occurring in mesic to even wet sites and on mafic or subcalcareous rocks. **Dist:** Widespread in se. North America, north to s. NY, NJ, s. PA, s. OH, s. IL, s. MO, and e. OK, perhaps reaching its greatest importance in dry, sandstone landscapes, such as the Cumberland Plateau of WV, KY, TN, and AL, and the Ozarks and Ouachitas of AR, MO, and OK. **Phen:** Mar-Apr; Sep-Oct. **ID Notes:** Where their ranges overlap, *P. echinata* often co-occurs with *P. virginiana* and is sometimes confused because both species have short needles and small cones that tend to persist on the trees. *P. echinata* has needles 7-13 cm long, not twisted, or slightly so, in bundles of 2, usually with some in bundles of 3, rather slender, < 1.0 mm wide (vs. needles 2-8 cm long, typically twisted, in bundles of 2, rather stout, often 1.0-1.2 mm wide), bark plates mostly > 4 cm wide, with crater-like blisters ca. 1 mm in diameter (vs. bark plates mostly about 2 cm wide, without crater-like blisters), winter buds not very resinous (vs. very resinous), and 3-4 year-old twigs rough and flaking (vs. smoothish to rough). **Syn:** = Ar, C, ETx1, F, Fl1, FNA2, G, Il, K1, K3, K4, Mo1, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV, Price (1989), Ward (1963). NatureServe G5 (Secure).

Pinus elliottii Engelmann. SLASH PINE. **Hab:** Native in wet pine flatwoods and maritime forests, also extensively planted (over a broader distribution than the natural one, as in GA, SC, and NC) in silvicultural plantations on a wide variety of soils, many of them unsuitable for its successful growth. **Dist:** *P. elliottii* ranges from e. SC south to c. peninsular FL, west to e. LA. **Phen:** Jan-Feb; Oct-Nov. **Comm:** *P. elliottii* has been extensively planted throughout the Coastal Plain of Georgia, North Carolina, and South Carolina, where it now occupies tens of thousands of hectares. Superficially, *P. elliottii* resembles both *P. palustris* and *P. taeda*, with cone size and needle length intermediate. *P. elliottii* is sometimes difficult to tell from *P. taeda*; additional helpful characteristics are the seed cones on 1.5-3 cm long stalks (vs. essentially sessile), seed cones reddish-brown and glossy, appearing varnished (vs. brown and dull), needles thicker and a dark glossy green (vs. thinner and a yellowish green); bark prominently flaking off and revealing reddish patches (vs. not notably flaking off and not revealing reddish patches). **Syn:** = *Pinus elliottii* var. *elliottii* – FNA2, K1, K3, Price (1989), Ward (1963); < *Pinus elliottii* Engelmann – ETx1, Fl1, RAB, Tx, WH3; ? *Pinus heterophylla* – S; >< *Pinus palustris* P. Miller – S, misapplied.

Pinus glabra Walter. SPRUCE PINE, WALTER'S PINE. **Hab:** Bottomland forests, rich, moist soils, also upland in calcareous areas, such as calcareous bluffs. **Dist:** SC south to n. FL and west to se. LA. **Phen:** Mar-Apr; Sep-Oct. **Comm:** This pine is unusual in growing in moist (even infrequently flooded), fertile habitats, usually mixed with bottomland hardwoods, and rather shade tolerant, sometimes growing as an understory tree. **Syn:** = Ar, Fl1, FNA2, K1, K3, K4, RAB, S, WH3, Price (1989), Ward (1963). NatureServe G5? (Secure).

Pinus palustris P. Miller. LONGLEAF PINE, SOUTHERN PINE. **Hab:** Formerly throughout the Coastal Plain, Sandhills, and lower Piedmont, on a wide variety of soils (sandy, loamy, clayey, or peaty), from very dry to very wet conditions, in savannas, woodlands, and forests affected by relatively frequent natural (lightning caused) fires (likely augmented by native Americans), now reduced to less than a tenth of its former abundance by a variety of forces, including turpentining, timbering, free-range hogs, fire suppression, and 'site conversion' by foresters to other trees, now extremely rare in VA and north of the Neuse River in NC, still occurring in some abundance in the outer Coastal Plain from Carteret County, NC south into GA, in the Bladen Lakes area of Bladen and Cumberland counties, and in the Fall-Line Sandhills of Harnett, Hoke, Scotland, Richmond, Moore, Anson, and Montgomery counties, NC and south into GA. **Dist:** A Southeastern Coastal Plain endemic: se. VA south to FL and west to se. TX; it extends slightly into the Piedmont in most states where it occurs, and further into the Piedmont and low mountains in GA and AL. **Phen:** Jan-Apr; Sep-Oct. **Comm:** "The species has been heavily exploited for timber and turpentine production, and it has been estimated that by 1930 only ten percent of its original volume of timber remained" (Price 1989); certainly much less now remains. Longleaf Pine is featured in the official NC State Toast ("Here's to the land of the longleaf Pine…") and the highest honor that the Governor of North Carolina can bestow on an individual for service to the state is to appoint him or her to the honorary Order of the Longleaf Pine. A hybrid with *P. taeda*, *P.* ×*sondereggeri* H.H. Chapman, occurs. **Syn:** = Ar, C, ETx1, Fl1, FNA2, K1, K3, K4, RAB, Tx, Va, WH3, Ward (1963); = *Pinus australis* Michaux f. – F, G, S.

Key to Map Symbology: 

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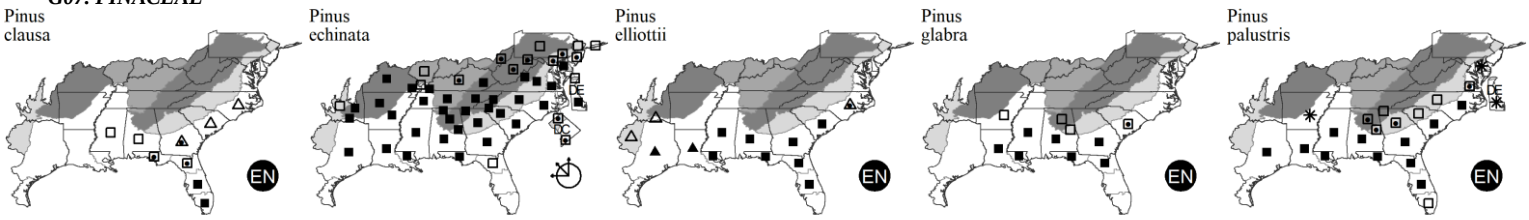
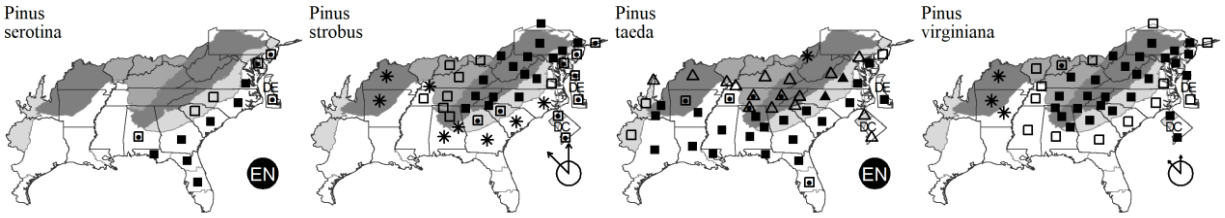


Pinus serotina Michaux. POCOSIN PINE, POND PINE, MARSH PINE. **Hab:** Peaty soils of pocosins, swamps of small blackwater streams, sometimes a component of very wet pine savannas over an herbaceous groundlayer, but usually associated with dense pocosin shrubs. **Dist:** A Southeastern Coastal Plain endemic: s. NJ south to n. FL and se. AL, restricted to the Coastal Plain. **Phen:** Apr; Aug (or at any time of year in response to fire). **Comm:** A remarkable tree, well-adapted to fire by its serotinous cones and its ability to resprout needles from the branches, trunk ('epicormic sprouting'), or roots following fire. Extensive areas of peatland in the outer Coastal Plain are dominated by *P. serotina*, sometimes codominant with *Gordonia lasianthus*. Following fires which destroy all branches but do not kill the trees, epicormic sprouting results in entire forests of odd-looking cylindrical pines, the trunk thickly beset with needles, the outline of the tree a narrow cylinder 10-20 meters tall and less than 1 meter in diameter from base to summit. *P. serotina* is clearly a southern relative of *P. rigida*. It normally occurs in fire-maintained wetlands associated with ('downhill' from) *P. palustris*. On deep peats, *P. serotina* is stunted and of very irregular form; on mineral or shallower organic soils it can reach large size. **ID Notes:** Even when well-developed, the trunk is typically twisted and gnarled, helping to distinguish it from *P. taeda*. **Syn:** = C, F, Fl1, FNA2, G, K1, K3, K4, RAB, S, Va, WH3, Price (1989), Ward (1963). NatureServe G5 (Secure).

Pinus strobus Linnaeus. EASTERN WHITE PINE. **Hab:** Moist to dry forests, bottomlands, dry, rocky ridges in humid gorges. **Dist:** Widespread in ne. North America, south to VA, w. and (rarely) c. NC, nw. SC, n. GA, e. TN, KY, IN, n. IL, e. IA, and MN. **Phen:** Apr; Aug-Sep. **Comm:** *P. strobus* was probably the tallest tree in e. North America, reaching heights of 60-70 meters. It was a very important timber tree historically. In NC, a notable relict and disjunct stand of *P. strobus* occurs on bluffs of the Deep River in the eastern Piedmont of Chatham County; in VA *P. strobus* is widely but irregularly distributed in the lower Piedmont. **Syn:** = Ar, C, F, FNA2, G, Il, K1, K3, K4, Mi, Mo1, NE, NY, Pa, RAB, Tn, Va, W, WV, Price (1989); = *Strobus strobus* (Linnaeus) Small – S; > *Pinus strobus* ssp. *cumberlandensis* J. Silba – Silba (2011); > *Pinus strobus* ssp. *strobus* – Silba (2011). NatureServe G5 (Secure).

Pinus taeda Linnaeus. LOBLOLLY PINE, OLD FIELD PINE. **Hab:** Dry to dry-mesic upland forests and woodlands, riparian forests, maritime forests, sandy rises in bottomland forests, pine flatwoods, roadsides, pine plantations, disturbed areas, especially in acid soil, much more abundant and widespread than formerly, and occurring farther inland than as a native. **Dist:** Native from s. NJ, DE, and e. MD south to n. peninsular FL, west to e. TX and se. OK, primarily on the Coastal Plain, but inland to s. TN; this distribution now expanded by forestry plantation northward. **Phen:** Mar-Apr; Oct-Nov. **Comm:** See *P. elliottii* for additional characters to distinguish these two species. **Syn:** = Ar, C, ETx1, F, Fl1, FNA2, G, Il, K1, K3, K4, RAB, S, Tn, Tx, Va, W, WH3, Price (1989), Ward (1963). NatureServe G5 (Secure).

Pinus virginiana P. Miller. VIRGINIA PINE, SCRUB PINE, JERSEY PINE. **Hab:** Dry forests and woodlands, especially on slopes and ridges, also common in certain areas as a weedy successional tree on nearly any kind of site, such as rocky, sandy, or clayey successional old fields or blowdowns. **Dist:** Primarily a Central and Southern Appalachian endemic: s. NY, NJ, and PA, south through VA, WV, s. OH, s. IL, KY, TN, and NC to nw. SC, n. GA, n. AL, and ne. MS. **Phen:** Mar-May; Sep-Nov. **Comm:** A small, scrubby pine, occurring in very dense, monospecific stands in the upper Piedmont as a result of secondary succession of old fields. **ID Notes:** The small, thin, curling bark plates colored orangish and purplish-brown are distinctive for *Pinus virginiana*. From a distance, its crown has a spiky appearance, from the ascending and narrow branches with short needles. **Syn:** = Ar, C, F, FNA2, G, Il, K1, K3, K4, Mo1, NY, Pa, RAB, S, Tn, Va, W, WV, Price (1989). NatureServe G5 (Secure).

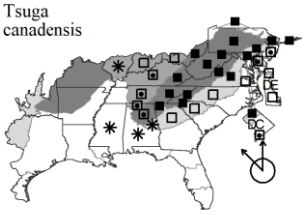


Tsuga Carrière 1847 (HEMLOCK)

A genus of about 14 species, trees, of e. Asia (China, Japan, and Taiwan), e. North America, and w. North America. References: Page in Kramer & Green (1990); Taylor (1993a) in FNA2 (1993b).

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

G07. PINACEAE



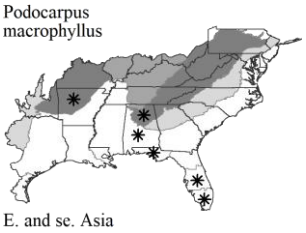
Tsuga canadensis (Linnaeus) Carrière. EASTERN HEMLOCK, CANADA HEMLOCK. **Hab:** In a wide variety of habitats in the mountains, most typically and abundantly in moist sites in ravines or coves along streams, but likely to be found in all but the driest habitats between 300 and 1500 m (even occurring in peaty bogs, where it has a sickly yellow color and short life expectancy); in the western Piedmont of NC limited to progressively rarer microhabitats (primarily north-facing river bluffs), reaching its eastward limit in NC at a disjunct stand at Hemlock Bluff State Natural Area, Wake County (but uncommon in the Piedmont of VA and even present, though rare, in the Coastal Plain of VA). **Dist:** Widespread in ne. North America, south to w. and c. VA, w. and (rarely) c. NC, nw. SC, n. GA, n. AL, TN, KY, IN, WI, and MN. **Phen:** Mar-Apr; Sep-Nov. **Comm:** One of the largest trees commonly encountered nowadays in our area, but probably not naturally larger than many other trees – because of its low timber value, it was often left by loggers. The hemlock woolly adelgid is severely affecting this species. **Syn:** = C, F, FNA2, G, K1, K3, K4, Mi, Mo1, NE, NY, Pa, RAB, S, Tn, Va, W, WV, Price (1989). NatureServe G4G5 (Apparently Secure).

G09. PODOCARPACEAE Endlicher 1847 (PODOCARP FAMILY) [in ARAUCARIALES]

A family of 19 genera and ca. 130 species, trees and shrubs, mainly tropical and subtropical and mainly southern hemisphere. References: Page in Kramer & Green (1990).

Podocarpus L'Héritier ex Persoon 1807 (PODOCARP, PLUM PINE)

A genus of ca. 100 species, trees (rarely shrubs), mainly tropical, subtropical, and south temperate of both hemispheres, but extending north to warm temperate Asia. References: Page in Kramer & Green (1990).



* ***Podocarpus macrophyllus*** (Thunberg) Sweet. YEW PLUM PINE. **Hab:** Forests, shell middens. **Dist:** Native of China and Japan. Reported for AL by Barger et al. (2012). **Phen:** Apr-Jul. **Syn:** = Fl2, WH3; > *Podocarpus macrophyllus* var. *maki* – K4. NatureServe GNRTNR (Not Yet Ranked).

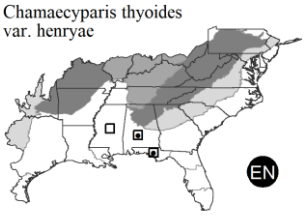
G11. CUPRESSACEAE S.F. Gray 1822 (CYPRESS FAMILY) [in CUPRESSALES]

A family of about 29 genera and about 130 species. Recent studies indicate that the separation of the Taxodiaceae from the Cupressaceae is not warranted, and they are here combined (Gadek et al. 2000; Brunsfeld et al. 1994). The subfamilial classification used here follows Gadek et al. (2000). References: Farjon (2005); Hardin (1971b); Hart & Price (1990); Page in Kramer & Green (1990); Schulz, Knopf, & Stützel (2005); Watson & Eckenwalder (1993) in FNA2 (1993b); Zhu et al (2018).

1 Leaves alternate.
  3 Leaves evergreen, rigid, > 2 cm long, tapering from near the base to a long-acuminate apex; [subfamily *Cunninghamioideae*]..... ***Cunninghamia lanceolata***
  3 Leaves deciduous, flexible, < 2 cm long, parallel-sided, the apex short-acute; [subfamily *Taxodioideae*]..... ***Taxodium***
1 Leaves opposite or whorled; [subfamily *Cupressoideae*].
  5 Plants dioecious, male and female cones on separate plants; mature female cones fleshy and berry-like, with smooth surfaces, indehiscent; branchlets not disposed in one plane, thus bushy and not fan-like; leaves of a branchlet monomorphic; [subfamily *Cupressoideae*]..... ***Juniperus***
  5 Plants monoecious, male and female cones on the same plant; mature female cones woody or leathery, with irregular surfaces, dehiscent; ; branchlets either disposed in one plane, thus flattened and fan-like, or not disposed in one plane, thus bushy and not fan-like; leaves of a branchlet either monomorphic (*Callitris*, *Hesperocyparis*) or dimorphic.
    7 Leaves of a branchlet monomorphic; branchlets not disposed in one plane, thus bushy and not fan-like; female cone globose, 20-30 mm in diameter ..... ***Hesperocyparis arizonica***
    7 Leaves of a branchlet dimorphic; branchlets disposed in one plane; thus flattened and fan-like; female cone < 12 mm in diameter.
      8 Leaves acute; female cones globose and woody, the hard scales peltate, not imbricate; ultimate branchlets (including the scale leaves) about 1 mm broad.... ***Chamaecyparis***
      8 Leaves obtuse; female cones ellipsoid and leathery, the pliable scales basally attached, imbricate; ultimate branchlets (including the scale leaves) about 1.5 mm broad ..... ***Platycladus orientalis***

Chamaecyparis Spach 1841 (WHITE CEDAR)

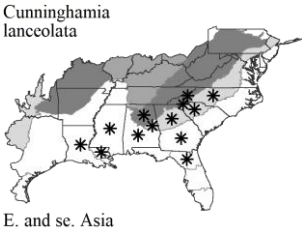
A genus of about 6 species, trees, of warm temperate to cool temperate North America and Asia. The genus consists of 5 species – ours, 1 in w. North America, and 3 in Japan & Taiwan. References: Farjon (1998); Farjon (2005); Michener (1993) in FNA2 (1993b); Mylecraine et al. (2005, 2006, 2009); Page in Kramer & Green (1990); Schulz, Knopf, & Stützel (2005).



Chamaecyparis thyoides (Linnaeus) Britton, Sterns, & Poggenburg *var.* ***henryae*** (H.L. Li) Little. PANHANDLE WHITE CEDAR. **Hab:** Blackwater stream swamps. **Dist:** Var. henryae is sometimes interpreted as endemic of the w. Panhandle of FL and s. AL east of Mobile Bay, notably in the drainages of the Yellow River, Blackwater River, Escambia River, and Perdido River, with populations further west (in s. MS) as being part of *Chamaecyparis thyoides* var. *thyoides*, or arguably in a third, unnamed, clade. **Tax:** The recognition of this taxon at either varietal or specific rank has been controversial. Mylecraine et al. (2004) found significant genetic variation, with Group 2 (FL peninsula) first diverging, Gulf Coast populations (Group 3) in three clusters in a major clade, and all populations north of GA in Group 1. **Syn:** = Farjon (1998), Farjon (2005), Mylecraine et al. (2005, 2006, 2009), Schulz, Knopf, & Stützel (2005); < *Chamaecyparis thyoides* – FNA2, K1, K3, K4, S, WH3.

Cunninghamia R. Brown 1826 (CHINA-FIR)

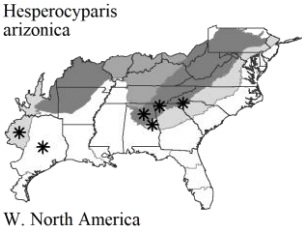
A genus of 2 species, trees, of e. Asia (China and Taiwan). References: Farjon (1998); Page in Kramer & Green (1990).



* ***Cunninghamia lanceolata*** (Lambert) Hooker. CHINA-FIR. **Hab:** Suburban woodlands; commonly planted horticulturally, rarely naturalizing. **Dist:** Native of China. **Comm:** A variety of forms are seen, some with dark-green, others with glaucous-blue foliage. **Syn:** = K1, K4, Farjon (1998); = n/a – RAB. NatureServe GNR (Not Yet Ranked).

Hesperocyparis Bartel & R.A. Price 2009 (NEW WORLD CYPRESS, WESTERN CYPRESS)

A genus of about 16 species, trees and shrubs, of sw. United States and Mexico. The New World cypresses were traditionally treated as congeneric with Old World *Cupressus*, but it is now increasingly clear based on molecular and morphological evidence that they should be regarded as a separate genus (Zhu et al. 2018). References: Adams, Bartel, & Price (2009); Eckenwalder (1993) in FNA2 (1993b); Zhu et al (2018).



* ***Hesperocyparis arizonica*** (Greene) Bartel. ARIZONA CYPRESS. **Hab:** Fencerows, weakly naturalizing from horticultural plantings. **Dist:** Native of sw. United States (AZ, NM, w. TX, sw. UT, s, NV) and n. and c. Mexico (AGU, BCN, CHH, COA, COL, DUR, HID, JAL, MEX, MIC, NAY, NLE, SLP, SIN, SON, TAM, VER, ZAC). **Syn:** = K3, Adams, Bartel, & Price (2009); = *Cupressus arizonica* – FNA2, K4, Tx; = n/a – RAB. NatureServe G4 (Apparently Secure).

Juniperus Linnaeus 1753 (RED CEDAR, JUNIPER, SAVIN)

A genus of about 60 species, trees and shrubs, of temperate, boreal, and subtropical regions of the Northern Hemisphere. Various species of *Juniperus*, especially creeping species, are frequently used in landscaping. Molecular studies suggest that section *Juniperus* (*J. communis* in our area) and section *Sabina* are quite divergent (Adams & Demeke 1993). Small's (1933) recognition of the genus *Sabina* may prove to be warranted; some modern authors accept it (especially Europeans) and recent molecular evidence provides some support. References: Adams & Demeke (1993); Adams & Schwarzbach (2012); Adams & Schwarzbach (2013); Adams (1986); Adams (1993) in FNA2 (1993b); Adams (1995); Adams (2008a); Adams (2008b); Adams (2008c); Adams (2008d); Adams (2014); Adams et al (2016); Page in Kramer & Green (1990).

1 Leaves flat-acicular or grooved, 8-25 mm long, never scale-like, with a white stomatal band on the upper surface; leaves borne in whorls of 3, spreading at 45-90 degrees from the twig; female cones ("berries") axillary, maturing in 2-3 years; [section *Juniperus*]
  2 Leaves U- or V-shaped in ×-section; white stomatal band <1× as wide as the green leaf margin; female cone (“berry”) 8-12 mm in diameter; procumbent shrub.... ***Juniperus conferta***
  2 Leaves flat to broadly curved in ×-section; white stomatal band 1-3× as wide as the green leaf margin; female cone (“berry”) 6-10 mm in diameter; prostrate to spreading-ascending shrub or columnar small tree. ***Juniperus communis var. depressa***

1 Leaves primarily scale-like (scale-leaves), ca. 1-2 mm long, though acicular and 2-10 mm long (whip-leaves) are often present on young trees and some lower branches of larger trees, without a white line on the upper surface (though often somewhat glaucous); leaves of mature twigs borne in opposite pairs of 2, decussate (thus 4-ranked), appressed to the twig (leaves of immature twigs sometimes in whorls of 3, spreading at 10-45 degrees from the twig); female cones ("berries") terminal on short branches, maturing the first year; [section *Sabina*].
  6 Female cones ("berries") 3-4 mm long; male cones 4-5 mm long; terminal twigs 0.75-0.90 mm wide (including the scale-like leaves); scale leaves 1.20-1.45 mm long, obtuse to acute; trees generally with rounded or flattened crowns, the lower branches often drooping; [upland to wetland saline or calcareous habitats near the coast] ***Juniperus silicicola***
  6 Female cones ("berries") 4-7 mm long; male cones 3-4 mm long; terminal twigs 0.85-1.00 mm wide (including the scale-like leaves); scale leaves 1.40-1.65 mm long, acute; trees generally with sharply tapered crowns, the lower branches generally ascending; [upland habitats inland] ***Juniperus virginiana***

Juniperus communis Linnaeus *var.* ***depressa*** Pursh. GROUND JUNIPER, MOUNTAIN JUNIPER, COMMON JUNIPER. **Hab:** In thin soil around rock outcrops on mountain summits and Piedmont monadnocks and rocky bluffs (in GA and NC), high elevation old fields (in VA), xeric Coastal Plain sandhills (in SC and VA). **Dist:** This species is circumpolar, widespread in n. North America, n. Europe, and n. Asia. Adams (2008a, 2008b, 2008c) recognizes 5 varieties in North America, all eastern North American plants belonging to var. *depressa*. In North America *J. communis* is primarily northern and montane, occurring nearly throughout Canada and AK, south in the Appalachians to SC, GA, and AL, south in the Rocky Mountains to NM, AZ, and CA. Its berry is the juniper berry used as a spice, as well as the main flavoring of gin. It is sometimes planted as a landscaping plant. In e. North America, it is rare and scattered south of PA, MI, and WI, ranging south to a few disjunct sites in VA, NC, SC, GA, and s. IN, in our area

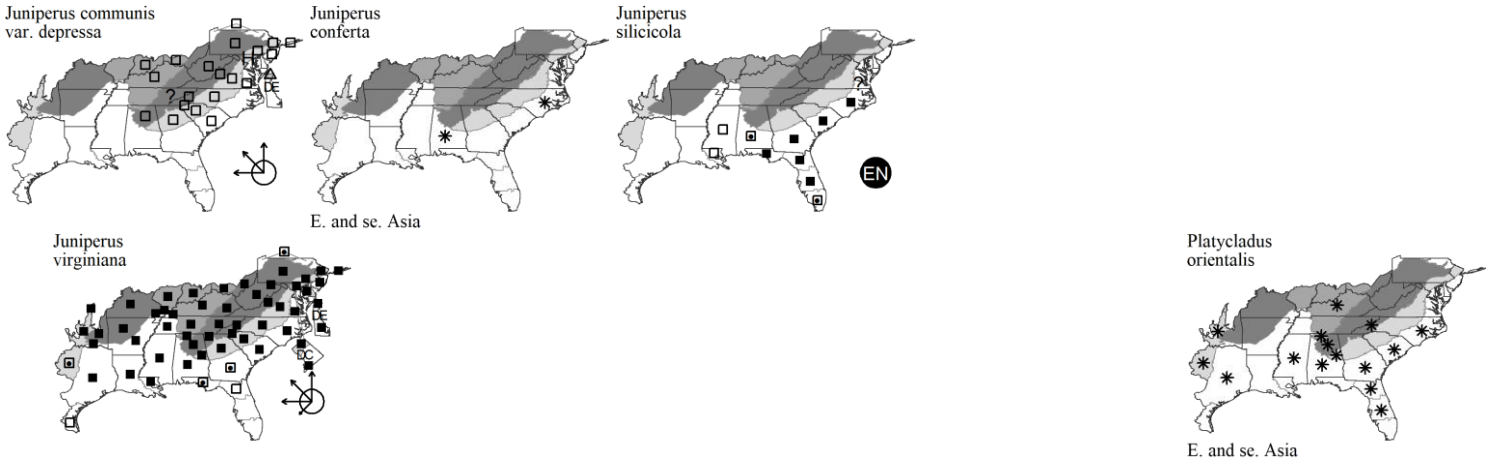
Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

notably known from Mount Satulah (Macon County, NC), King's Pinnacle (Gaston County, NC), and in sandy soils at Hitchcock Woods (Aiken County, SC). **Phen:** Mar-Apr; fleshy cone maturing in second or third year. **Tax:** Var. *depressa*, a decumbent shrub, up to about 1 meter high, forms large clonal patches. Harvill et al. (1992) report scattered sites for var. *communis* in montane VA; these are based on columnar trees. Adams in FNA (1993b) considers var. *depressa* to be the only variety occurring in e. United States, and states that var. *depressa* sometimes forms columnar trees to 10 m tall; Adams et al. (2016) accept var. *communis* from our area. Additional problems about the status of *Juniperus communis* in our area remain unresolved; variation in growth form, morphologic characters, and habitat suggest the possibility of the presence of several native taxa. See Coker & Totten (1945) for additional discussion. **Syn:** = C, F, FNA2, G, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, Va, W, Adams (2008b), Adams (2014), Adams et al (2016); = *Juniperus sibirica* Burgsdorff – S; < *Juniperus communis* – GrPl, WV. NatureServe G5T5 (Secure).

* ***Juniperus conferta*** Parlatore. JAPANESE SHORE JUNIPER. **Hab:** Roadsides. **Dist:** Native of Japan. Reported as naturalizing in AL (Barger, et al. 2012). **Comm:** Also reported for MA. **Syn:** = K3; = *Juniperus rigida* Siebold & Zuccarini var. *conferta* (Parlatore) Patschke – K4, Adams (2008b), Adams (2014); = n/a – RAB.

Juniperus silicicola (Small) L.H. Bailey. SOUTHERN RED CEDAR, COASTAL RED CEDAR. **Hab:** Maritime forests and maritime scrub, hammocks, coastal shell middens and natural shell deposits, brackish marshes, pine rocklands in s. FL, and other sandy or peaty, circumneutral situations. **Dist:** Se. VA south to s. FL, west to e. LA (Florida Parishes); reports from further west (e.g. TX) are misidentifications. **Phen:** Jan-Feb; Oct-Nov. **Tax:** The recognition of the "*silicicola*" entity (and if recognized, at what rank) has been controversial. Some authors have treated this taxon as a species, but Adams (1986, 2008a, 2008b, 2014), Adams in FNA (1993b), and Adams & Schwarzbach (2012, 2013) considered varietal status more appropriate. Adams (1995) suggested that the two may have diverged as recently as the Pleistocene. Later, however, Adams (2008c, 2014) and Adams & Schwarzbach (2012, 2013) presented molecular evidence that "var. *silicicola* may be of Caribbean origin or perhaps of hybrid origin between *J. barbadensis* var. *lucayana* and *J. virginiana* var. *virginiana*". The "*virginiana*" and "*silicicola*" entities have been said to intergrade in GA, and in other areas the characters used to separate them seem variable or imperfectly correlated. A preliminary molecular phylogeny, however, shows *J. virginiana* clading with *J. maritima* of BC and WA, this clade sister to *J. silicicola* (Adams & Schwarzbach 2012, 2013), which if confirmed with more detailed sampling and analysis would suggest that species status is warranted. Given the uncertainty that "*virginiana*" and "*silicicola*" are indeed sister taxa (more closely related to one another than to other species) I choose to accord them species rank, despite the sometime challenges in their straightforward identification based on morphologic features. **Comm:** Large individuals can be as much as a meter in diameter. **Syn:** = RAB; = *Juniperus virginiana* Linnaeus var. *silicicola* (Small) E. Murray – FNA2, K1, K2, K4, Adams & Schwarzbach (2012), Adams & Schwarzbach (2013), Adams (2008b), Adams (2014); = *Sabina silicicola* Small – S; >< *Juniperus barbadensis* Linnaeus – Bah; < *Juniperus virginiana* Linnaeus – Fl1, WH3. NatureServe G5T4T5 (Apparently Secure).

Juniperus virginiana Linnaeus. EASTERN RED CEDAR. **Hab:** Bluffs, glades, upland forests and woodlands, pastures, old fields, roadsides, and fencerows, primarily upland, occurring most abundantly on (but by no means restricted to) circumneutral soils (including shrink-swell clays) derived from mafic or calcareous rocks. **Dist:** S. ME west to e. ND, south to n. FL, s. AL, s. MS, s. LA, and c. TX; disjunct in Coahuila, Mexico (Adams 2011). **Phen:** Jan-Mar; Oct-Nov. **Comm:** The wood is much used for fence posts and the traditional southern cedar chest (which takes advantage of the aromatic and moth-deterrent properties of cedar wood). **Syn:** = GrPl, Il, Mi, NcTx, Pa, RAB, Tn, W, WV; = *Juniperus virginiana* Linnaeus var. *virginiana* – Ar, C, ETx1, F, FNA2, G, K1, K2, K4, Mo1, NE, NY, Va, Adams & Schwarzbach (2012), Adams & Schwarzbach (2013), Adams (2008b), Adams (2014); = *Sabina virginiana* (Linnaeus) Antoine – S; > *Juniperus silicicola* (Small) L.H. Bailey – Tx, misapplied; < *Juniperus virginiana* Linnaeus – Fl1, WH3; > *Juniperus virginiana* Linnaeus – Tx. NatureServe G5T5 (Secure).



Platycladus Spach 1842 (CHINESE ARBORVITAE)

A monotypic genus, a tree, of e. Asia (n. China and Manchuria). *Platycladus* is distinct from *Thuja*. References: Page in Kramer & Green (1990); Watson & Eckenwalder in FNA (1993).

* ***Platycladus orientalis*** (Linnaeus) Franco. ORIENTAL ARBORVITAE, TREE-OF-LIFE. **Hab:** Commonly planted, especially in graveyards, and rarely persisting and spreading to pastures, fields, and roadsides. **Dist:** Native of Asia. **Syn:** = Fl1, FNA2, K1, K3, K4, WH3; = *Biota orientalis* (Linnaeus) Endlicher – S. NatureServe G5? (Secure).

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more)

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Taxodium L.C. Richard 1810 (BALD-CYPRESS)

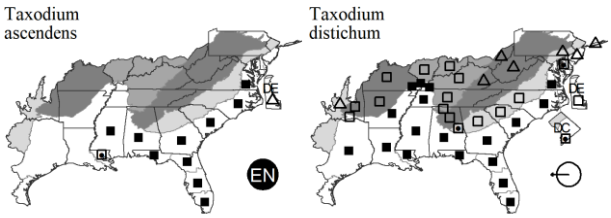
A genus of 3 species, trees, of e. North America and Mexico. There has been much debate over whether the taxa of *Taxodium* should be treated as species or varieties, and if as varieties, the proper nomenclature. I agree with Godfrey (1988), in his preference "to recognize two species [within his area, which did not include the distribution of *Taxodium mucronatum*]... because it is my perception that the vast majority of trees (populations) are thus distinguishable." True intermediates appear to be very rare, though the "mimicry" of the two species creates "pseudo-intermediates" that can cause difficulties in identification. Occasionally, the *Taxodium ascendens* and *Taxodium distichum* can be seen growing together, in "hybrid habitats," as at the junction of Lake Waccamaw and the Waccamaw River (Columbus County, NC); a few recognizable intermediates can be seen. See Lickey & Walker (2002) for a contrary argument supporting varietal status. Neufeld (1986) discusses the different architecture and ecophysiology of the two species. The third taxon in the genus is *Taxodium mucronatum* Tenore, ranging from s. TX south to Mexico and Guatemala. West of the Mississippi River, the architecture of *Taxodium distichum* comes to resemble that of *Taxodium mucronatum*, suggesting the possibility of introgression. For this and other reasons, Watson in FNA (1993b) and other authors prefer to treat *Taxodium mucronatum* at varietal rank, as *Taxodium distichum* var. *mexicanum* Gordon. *Taxodium* is most closely related to *Glyptostrobus* and *Cryptomeris*. References: Duncan & Duncan (1988); Godfrey (1988); Lickey & Walker (2002); Page in Kramer & Green (1990); Tiwari et al (2012); Tsumura et al (1999); Watson (1993) in FNA2 (1993b).

2 Larger knees short, rarely > 4 dm tall, usually columnar or broad and mound-like, with thick, compact bark on top; leafy branchlets ascending from the twigs, secundly erect (the base often curving, the apical portion of the branchlet borne in a vertical plane), except on juvenile trees (which mimic *T. distichum*); leaves subulate, spirally arranged, not spreading laterally and featherlike (except on juvenile trees), ascending or appressed; leaves mostly 3-10 mm long (to 15 mm long on juvenile trees); bark thick (1-2.5 cm thick), furrowed, dark-brown, not exfoliating; [trees mainly of fire-maintained habitats: isolated depressions (clay-based Carolina bays, depression ponds), wet pine savannas, pocosins and other wet peaty habitats, domes and stringers in wet prairies, and, less commonly, blackwater swamps and natural lakes] ..... ***Taxodium ascendens***

2 Larger knees often tall, often > 4 dm tall, usually narrowly conical, with thin, shreddy bark on top; leafy branchlets spreading laterally from the twigs, except in the crowns of mature trees (which sometimes mimic *T. ascendens*); leaves linear, flat, spirally arranged but by twisting of their basal portions spreading laterally and featherlike (pseudo-distichous), appressed only on drooping branches of the crown, if at all; leaves mostly 8-20 mm long (sometimes less on crown branches); bark thin (< 1 cm thick), exfoliating in shreddy, orange-brown strips; [trees of brownwater swamp forests, blackwater swamp forests, natural lakes, and millponds] ..... ***Taxodium distichum***

Taxodium ascendens Brongniart. POND-CYPRESS. **Hab:** Limesink ponds (dolines), clay-based Carolina bays, wet savannas, pocosins and other wet, peaty habitats, shores of natural blackwater lakes, swamps of blackwater streams, forming "domes" and "stringers" in Florida in very flat, fire landscapes, also as "hatrack" stands of widely spaced and stunted trees on oolite in south Florida. **Dist:** Se. VA south to s. FL, west to e. LA. **Phen:** Mar-Apr; Oct. **Comm:** *Taxodium ascendens* is surely one of the most scenic trees of eastern North America. **Syn:** = Fl1, G, K1, K3, K4, RAB, S, Va, WH3, Godfrey (1988); = *Taxodium distichum* var. *imbricarium* (Nuttall) Croom – FNA2, Lickey & Walker (2002); < *Taxodium distichum* (Linnaeus) L.C. Richard – F.

Taxodium distichum (Linnaeus) L.C. Richard. BALD-CYPRESS. **Hab:** Brownwater and blackwater swamps, usually in riverine situations, depressions in bottomland forests, lake margins, river banks, rarely in wooded seeps. **Dist:** DE and e. MD south to s. FL and west to e. TX and se. OK, north along the Mississippi River and its tributaries to s. IN and s. IL. This species is sometimes planted as an ornamental in upland and wetland sites within and beyond its natural range, and these planted trees are very long persistent and may be encountered. **Phen:** Mar-Apr; Oct. **Comm:** A remarkable population of Taxodium distichum is found along a stretch of the Black River in NC, with many trees exceeding 1500 years old. **Syn:** = Fl1, G, Il, K1, K4, Mi, Pa, RAB, S, Tn, Tx, Va, WH3, WV, Godfrey (1988); = *Taxodium distichum* var. *distichum* – Ar, C, ETx1, K3, Mo1, NY, Lickey & Walker (2002); < *Taxodium distichum* (Linnaeus) L.C. Richard – F; < *Taxodium distichum* var. *distichum* – FNA2.



Key to Map Symbology: □⊙■ └native┘ ◇◈◆ └maybe exotic┘ △◬▲ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated

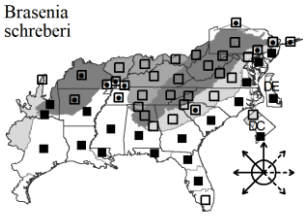
SECTION 4: MAGNOLIIDS AND PRIMITIVE ANGIOSPERMS

3. CABOMBACEAE Richard ex A. Richard 1822 (WATER-SHIELD FAMILY) [in NYMPHAEALES]

A family of 2 genera and about 6 species, aquatic herbs, nearly cosmopolitan. This family is closely related to the Nymphaeaceae and is sometimes combined with it (Angiosperm Phylogeny Group 2003). References: Les & Crawford (1999); Wiersema (1997c) in FNA3 (1997); Williamson & Schneider in Kubitzki, Rohwer, & Bittrich (1993).

1 Plants with all leaves floating and peltate; underwater portions of plants coated with a layer of transparent, mucilaginous jelly; floating peltate leaves 3.5-11 cm long, 2-6.5 cm wide; [subfamily *Hydropeltoideae*] ..... ***Brasenia***
1 Plants with submersed leaves dichotomously divided into linear segments; plants not coated with mucilaginous material; floating peltate leaves (when present) 0.6-3.0 cm long, 0.1-0.4 wide; [subfamily *Cabomboideae*] ..... ***Cabomba***

Brasenia Schreber 1789 (WATER-SHIELD)



A monotypic genus, an aquatic herb, widely distributed in tropical and temperate regions of the Old and New World. References: Wiersema (1997c) in FNA3 (1997); Williamson & Schneider in Kubitzki, Rohwer, & Bittrich (1993).

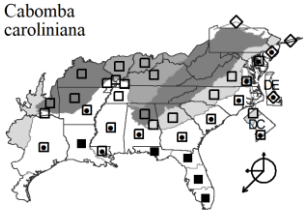
Identification Notes: The elliptic, peltate, floating leaves and mucilaginous petioles make *Brasenia* unmistakable.

Brasenia schreberi J.F. Gmelin. WATER-SHIELD, PURPLE WEN-DOCK. **Hab:** Lakes, ponds, sluggish streams, floodplain oxbow ponds, beaver ponds. **Dist:** NS west to MN, south to s. FL and TX; also from BC south to CA; also in tropical America and the Old World. **Phen:** Jun-Oct. **ID Notes:** The elliptical, peltate leaves are distinctive in comparison to our other rooted aquatics with broad, floating leaves. Also distinctive is the thick layer of gelatinous mucilage coating underwater parts of the plant (stems, petioles, and leaf undersurfaces), presumably acting as an anti-herbivory deterrent. **Syn:** = Ar, C, F, Fl2, FNA3, G, GrPl, GW2, Il, K1, K3, K4, Mi, Mo2, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3. NatureServe G5 (Secure).

Cabomba Aublet 1775 (FANWORT)

A genus of about 5 species, aquatic herbs, tropical and temperate regions of America. References: Fassett (1953); Ørgaard (1991); Wiersema (1997c) in FNA3 (1997); Williamson & Schneider in Kubitzki, Rohwer, & Bittrich (1993).

Identification Notes: *Cabomba* is sometimes mistaken for other, superficially somewhat similar aquatics, such as *Ceratophyllum* (Ceratophyllaceae), *Utricularia* (Lentibulariaceae), and *Myriophyllum* (Haloragaceae). *Cabomba* has the leaves opposite (rather than whorled), dichotomously divided (like *Ceratophyllum*), but the divisions lacking the marginal denticles of *Ceratophyllum*, and on a 1-3 cm long petiole (vs. sessile or on a petiole 0-2 mm long). *Utricularia* has the leaves sometimes dichotomously divided, but the divisions are usually irregular, the leaves are alternate (in most species), and bladder traps are present. *Myriophyllum* has the leaves pectinately rather than dichotomously divided.



Cabomba caroliniana A. Gray. FANWORT. **Hab:** Millponds, lakes, slow-moving streams. **Dist:** MA, NY, and NJ west to OH, s. MI, and MO, south to FL and TX; also native in s. South America (s. Brazil, Paraguay, Uruguay, and n. Argentina). Additionally sporadically introduced elsewhere from aquarium "throw-outs". **Phen:** May-Sep. **Tax:** *C. caroliniana* var. *pulcherrima* R.M. Harper, with purplish flowers and vegetative parts (vs. white flowers and green vegetative parts), occurs in the southeastern Coastal Plain; it needs further evaluation. Godfrey & Wooten (1981) imply that the purple pigmentation may be merely an environmental response to warm waters, and is not correlated with morphologic characters. **Syn:** = Ar, C, F, Fl2, FNA3, G, GrPl, GW2, Il, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, WH3; > *Cabomba caroliniana* A. Gray – Fassett (1953); > *Cabomba caroliniana* var. *caroliniana* – K1, Mo2, Ørgaard (1991); > *Cabomba caroliniana* var. *pulcherrima* R.M. Harper – K1, Ørgaard (1991); > *Cabomba pulcherrima* (R.M. Harper) Fassett – Fassett (1953).

4. NYMPHAEACEAE Salisbury 1805 (WATER-LILY FAMILY) [in NYMPHAEALES]

A family of 6 genera and about 75 species, aquatic herbs, cosmopolitan. References: Les & Crawford (1999); Schneider & Williamson in Kubitzki, Rohwer, & Bittrich (1993); Wiersema & Hellquist (1997) in FNA3 (1997).

1 Flowers nearly spherical, 2-5 cm in diameter; sepals 6 (in our species), petaloid, green to yellow, incurved; petals many, inconspicuous, scalelike or staminodial; leaves often of 2 types, the submersed leaves (when present) thinner in texture than the floating or emersed leaves; floating or emersed leaves having 60-90% of their surface area with vasculature derived from the midrib; rhizome with triangular or winged leaf scars; [subfamily *Nupharoideae*] ..... ***Nuphar***
1 Flowers hemispheric, 4-20 cm across; sepals 4, greenish, inconspicuous; petals spreading and ascending, white or yellow, showy; leaves of 1 type, floating; floating leaves having 25-40 % of their surface area with vasculature derived from the midrib; rhizome with circular leaf scars; [subfamily *Nymphaeoideae*] ..... ***Nymphaea***

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Nuphar J.E. Smith 1809 (SPATTERDOCK, YELLOW PONDLILY)

A genus of about 16 species, aquatic herbs, of north temperate areas. Beal (1956) recognized 8 taxa of *Nuphar* in North America, which he treated as subspecies of the European *N. lutea*. Voss's (1985) statement (about the genus in Michigan) "our plants are quite easily distinguished ... and they are treated here as closely related species" applies equally (or better!) in our area. Recent treatments (see references) recognize multiple species. References: Beal (1956); Padgett (1999); Padgett (2007); Schneider & Williamson in Kubitzki, Rohwer, & Bittrich (1993); Wiersema & Hellquist (1997) in FNA3 (1997).

3 Floating leaf blades 2-6× as long as wide, the sinus < ¼ as long as the midrib; thin-textured submersed leaves often more abundant than the floating leaves; [of blackwater or tidal streams, rivers, and lakes of the Coastal Plain, se. VA, e. NC, e. SC, Panhandle FL, s. AL]. ..... ***Nuphar ulvacea***

3 Floating leaf blades 1-2× as long as wide, the sinus > ¼ as long as the midrib; thin-textured submersed leaves absent or at least fewer than floating or emersed leaves; [collectively of various habitats and distributions, but not as above].

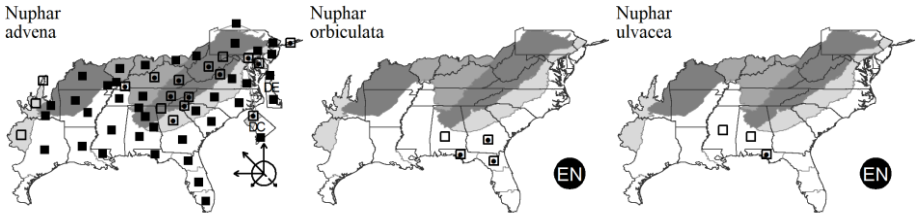
6 Lower leaf surface densely silvery-pubescent; leaves 20-45 cm wide, ca. 1× as long as wide, the lobes broadly rounded; leaves mostly floating; [of AL, FL, and GA Coastal Plain]..... ***Nuphar orbiculata***

6 Lower leaf surface glabrous to sparsely pubescent; leaves 7-30 cm wide, (1-) 1.5 (-2)× as long as wide, the lobes acute to broadly rounded; leaves mostly emersed; [widespread in our area] ..... ***Nuphar advena***

Nuphar advena (Aiton) R. Brown ex W.T. Aiton. BROADLEAF PONDLILY. **Hab:** Lakes, ponds, natural depression ponds, old millponds, slow-flowing rivers (blackwater and brownwater), tidal freshwater marshes. **Dist:** The most widespread and common *Nuphar* in e. North America, ranging from ME west to WI, south to s. FL, Cuba, TX, and n. Mexico. **Phen:** Apr-Oct. **Syn:** = C, Il, Mi, NcTx, NE, Pa, Tn, Va, WV; = *Nuphar advena* ssp. *advena* – Fl2, K3, K4, NY, WH3, Padgett (1999), Padgett (2007); = *Nuphar lutea* J.E. Smith ssp. *advena* (Aiton) Kartesz & Gandhi – K1; = *Nuphar luteum* (Linnaeus) Sibthorp & J.E. Smith ssp. *macrophyllum* (Small) E.O. Beal – GrPl, GW2, RAB, Tx, W, Beal (1956); < *Nuphar advena* (Aiton) R. Brown ex W.T. Aiton – FNA3; > *Nuphar advena* (Aiton) R. Brown ex W.T. Aiton – F, G; > *Nuphar fluviatile* (R.M. Harper) Standley – F, G; > *Nuphar puteorum* Fernald – F; > *Nymphaea advena* Aiton – S; > *Nymphaea chartacea* Miller & Standley – S; > *Nymphaea fluviatilis* R.M. Harper – S; > *Nymphaea macrophylla* Small – S.

Nuphar orbiculata (Small) Standley. **Hab:** Quiet waters in blackwater swamps. **Dist:** A Southeastern Coastal Plain endemic: e. GA south to Panhandle FL and s. AL. **Phen:** May-Oct. **Syn:** = FNA3; = *Nuphar advena* (Aiton) W.T. Aiton ssp. *orbiculata* (Small) D. Padgett – Fl2, K3, K4, WH3, Padgett (1999), Padgett (2007); = *Nuphar lutea* ssp. *orbiculata* (Small) E.O. Beal – K1; = *Nuphar luteum* ssp. *orbiculatum* (Small) E.O. Beal – Beal (1956); > *Nymphaea bombycina* (Miller & Standley) Standley – S; > *Nymphaea orbiculata* Small – S. NatureServe G5T3 (Vulnerable).

Nuphar ulvacea (G.S. Miller & Standley) Standley. SEA-LETTUCE PONDLILY. **Hab:** Blackwater streams. **Dist:** Endemic to Panhandle FL, s. AL, and recently reported for s. MS (Jackson County) (H. Horne, pers. comm., 2014). **Comm:** Apr-Sep. **Syn:** = FNA3; = *Nuphar advena* (Aiton) R. Brown ssp. *ulvacea* (G.S. Miller & Standley) D. Padgett – Fl2, K3, K4, WH3, Padgett (2007); = *Nuphar luteum* (Linnaeus) Sibthorp & J.E. Smith ssp. *ulvaceum* (G.S. Miller & Standley) E.O. Beal – GW2, K1; = *Nymphaea ulvacea* G.S. Miller & Standley – S.



Nymphaea Linnaeus 1753 (WATERLILY)

A genus of about 50 species, aquatic herbs, cosmopolitan. References: Borsch et al (2014); Borsch et al (2017); Schneider & Williamson in Kubitzki, Rohwer, & Bittrich (1993); Wiersema (1997b) in FNA3 (1997); Woods et al (2005a); Woods et al (2005b).

6 Petals yellow; plants producing stolons ..... ***Nymphaea mexicana***

6 Petals white (to pink); plants not producing stolons. ..... ***Nymphaea odorata ssp. odorata***

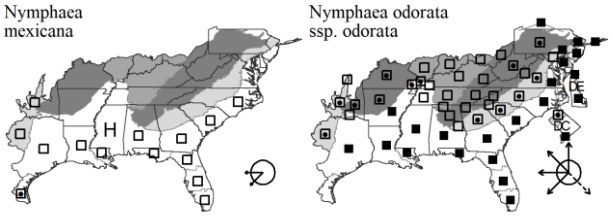
Nymphaea mexicana Zuccarini. BANANA WATERLILY, YELLOW WATERLILY. **Hab:** Sluggish or stagnant waters; scattered in occurrence and possibly introduced from farther south, but the introduction agents may well be wild ducks, such as canvasbacks. **Dist:** Ne. NC south to s. FL, west to TX, also in sw. United States and Mexico. **Phen:** Jun-Sep. **Syn:** = FNA3, GW2, K1, K3, K4, NcTx, NcTx, RAB, Tx, WH3, Borsch et al (2014), Borsch et al (2017), Woods et al (2005a), Woods et al (2005b); = *Castalia flava* (Leitner) Greene – S. NatureServe G3G4 (Vulnerable).

Nymphaea odorata Aiton *ssp. **odorata***. WHITE WATERLILY. **Hab:** Ponds, sluggish waters. **Dist:** NL (Newfoundland) west to MB, south to FL and TX; also scattered in the w. United States as an introduction. **Phen:** Jun-Sep. **Comm:** *N. odorata* is polymorphic, leading to the naming of numerous species, subspecies, and varieties (see synonymy for a few of the named entities). Wiersema in FNA (1997) recognizes ssp. *odorata* (most of our plants) and ssp. *tuberosa* (Paine) Wiersema & Hellquist, more western and northern, but edging into our area. Other named entities warrant further evaluation. *N. odorata* var. *gigantea* [= *Castalia lekophylla* Small] occurs on the Coastal Plain, and is considered to differ from var. *odorata* in its larger leaves (1.5-6 dm in diameter vs. 0.5-2.5 dm), larger flowers (mostly > 15 cm wide vs. mostly < 10 cm), and leaves upturned at the margins (vs. flat). *N. odorata* var. *minor* [= *Castalia minor* (Sims) Nyar] is considered to differ from var. *odorata* in its generally smaller size, leaves 5-11 cm in diameter, flowers mostly < 8 cm wide (vs. mostly > 9 cm wide); it may be merely a dwarfed form of extremely nutrient-limited waters of the Coastal Plain. **Syn:** = Ar, FNA3, K1, K3, K4, Mi, NY, Va, Borsch et al (2014), Borsch et al (2017), Woods et al (2005a), Woods et al (2005b); = *Nymphaea*

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

4. NYMPHAEACEAE

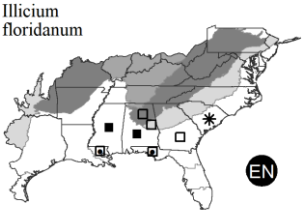
odorata – GrPl, GW2, Il, NE; > *Castalia lekophylla* Small – S; > *Castalia minor* (Sims) Nyar – S; > *Castalia odorata* (Aiton) Wood – S; < *Nymphaea odorata* – Fl2, NcTx, Pa, RAB, Tx, WH3, WV; > *Nymphaea odorata* var. *gigantea* Tricker – C, F, G; > *Nymphaea odorata* var. *odorata* – F, G; >< *Nymphaea odorata* var. *odorata* – C; > *Nymphaea odorata* var. *stenopetala* Fernald – F. NatureServe G5T5 (Secure).



7a. ILLICIACEAE A.C. Smith 1947 (STAR-ANISE FAMILY) [in AUSTROBAILEYALES]

A family of 1 genus and about 42 species, shrubs and trees, of temperate and subtropical se. Asia and se. North America (se. United States, Cuba, Haiti, and e. Mexico). The family is most closely related to the Schisandraceae, Austrobaileyaceae, and Trimeniaceae. References: Keng in Kubitzki, Rohwer, & Bittrich (1993); Vincent (1997a) in FNA3 (1997).

Illicium Linnaeus 1759 (STAR-ANISE)



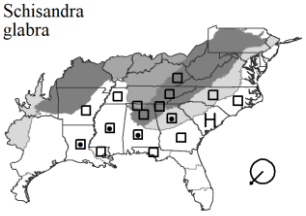
A genus of about 42 species, shrubs and trees, of temperate and subtropical se. Asia and se. North America (se. United States, Cuba, Haiti, and e. Mexico). Morris et al. (2007) studied the evolution of the genus and revised its sectional taxonomy; New World and Old World taxa form separate clades, treated as separate sections, our species being in section *Cymbostemon*. References: Keng in Kubitzki, Rohwer, & Bittrich (1993); Morris et al (2007); Stone & Freeman (1968); Vincent (1997a) in FNA3 (1997).

Illicium floridanum J. Ellis. FLORIDA STAR-ANISE. **Hab:** Acid ravines and small stream swamps. **Dist:** Sw. GA west to e. LA; disjunct in ne. FL. Sparingly naturalized north of its native range from plantings, as along Black Creek, at Kalmia Gardens, Hartsville, Darlington County, SC (D. Hope, pers.comm. 2008). **Phen:** Apr-Jun. **Tax:** Most closely related to *I. mexicanum*, of ne. Mexico (HID, PUE, SLP, TAM, and VER). **Syn:** = Fl2, FNA3, GW2, K1, K3, K4, S, WH3. NatureServe G5 (Secure).

7b. SCHISANDRACEAE Blume 1830 (STAR-VINE FAMILY) [in AUSTROBAILEYALES]

A family of 2 genera and about 40-60 species, woody vines, of e. Asia and e. North America (only our single species). The family is most closely related to the Illiciaceae, Austrobaileyaceae, and Trimeniaceae. In APG III (2009), Schisandraceae is included in Illiciaceae, but the differences seem entirely sufficient to keep them separate. References: Keng in Kubitzki, Rohwer, & Bittrich (1993); Saunders (2001); Vincent (1997b) in FNA3 (1997).

Schisandra Michaux 1803 (STAR-VINE)



A genus of about 26 species, woody vines, of e. Asia (about 25 species) and e. North America (1 species). References: Godfrey (1988); Keng in Kubitzki, Rohwer, & Bittrich (1993); Lin, Shui, & Yang (2011); Saunders (2001); Stone (1968); Vincent in FNA3 (1997).

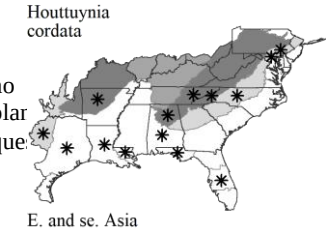
Schisandra glabra (Brickell) Rehder. BAY STARVINE, CLIMBING-MAGNOLIA, MAGNOLIA-VINE. **Hab:** Rich slopes adjacent to bottomland forests, mesic "islands" surrounded by bottomlands, moist hammocks. **Dist:** Ne. NC (Martin County), sc. NC (Gaston County), n. GA, w. TN, e. and se. KY, and e. AR south to the FL Panhandle and LA; Mexico (Baja California Sur, Hidalgo, Veracruz). **Phen:** Apr-Jun; Jul-Aug. **Syn:** = Ar, Fl2, K1, K3, RAB, Tn, WH3, Godfrey (1988), Saunders (2001); = *Schisandra coccinea* – Tx, W; = *Schizandra coccinea* Michaux – S, orthographic variant. NatureServe G3 (Vulnerable).

10. SAURURACEAE Richard ex T. Lestiboudois 1826 (LIZARD'S-TAIL FAMILY) [in PIPERALES]

A family of 4 genera and 6 species, perennial herbs, of temperate e. and se. Asia (*Saururus*, *Gymnotheca*, *Houttuynia*), w. North America (*Anemopsis*), and e. North America (*Saururus*). One other member of the family occurs in North America: *Anemopsis californica* Hooker & Arnott, primarily of the sw. United States. References: Buddell & Thieret (1997) in FNA3 (1997); Cheng-Yih & Kubitzki in Kubitzki, Rohwer, & Bittrich (1993); Meng et al (2003); Wood (1971).

1 Ovary of 3 (-4) carpels, these fully fused and forming a single locule; stamens 3 ..... ***Houttuynia***
1 Ovary of (3-) 4 carpels fused only at the base; stamens 6 ..... ***Saururus***

Houttuynia Thunberg 1783



Key to Map Symbology:

* : waif
EN : endemic
H : historic

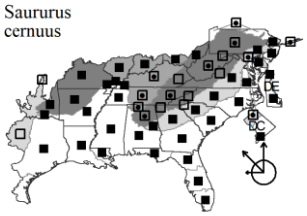
N : no
P : plar
? : que

10. SAURURACEAE

A monotypic genus, a perennial herb, native of e. and se. Asia. References: Cheng-Yih & Kubitzki in Kubitzki, Rohwer, & Bittrich (1993).

* ***Houttuynia cordata*** Thunberg. FISHMINT, CHAMELEON-PLANT, FISHLEAF. **Hab:** Disturbed areas, moist suburban forests, ditches, spread from cultivation. **Dist:** Native of e. Asia. **Comm:** This species is aggressive and difficult to control. **Syn:** = Ar, Fl2, K3, K4, NcTx, NY, WH3; = n/a – RAB. NatureServe GNR (Not Yet Ranked).

Saururus Linnaeus 1753 (LIZARD'S-TAIL, WATER-DRAGON)



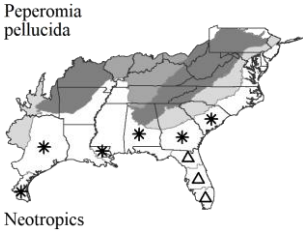
A genus of 2 species, perennial herbs, our species in temperate e. North America, the other in e. Asia. References: Buddell & Thieret (1997) in FNA3 (1997); Cheng-Yih & Kubitzki in Kubitzki, Rohwer, & Bittrich (1993).

Saururus cernuus Linnaeus. LIZARD'S-TAIL, WATER-DRAGON. **Hab:** Swamps, overwash pools in stream floodplains, freshwater and oligohaline tidal marshes, semipermanently inundated rocky bars and shores, beaver ponds, ditches, usually where water ponds seasonally or periodically. In swamps of the Coastal Plain, *Saururus* often is dominant in large patches. **Dist:** CT, s. QC, s. ON, and MI south to s. FL and e. TX. **Phen:** (Dec-) May-Sep; Aug-Nov. **Comm:** Thien et al. (1994) studied the reproductive biology of *Saururus cernuus*, and found that pollination was both by wind and by insects. **ID Notes:** The elongate inflorescence, drooping at the tip, is distinctive, attractive, and the fanciful inspiration for the genus name, the specific epithet, and the common names. **Syn:** = Ar, C, F, Fl2, FNA3, G, GrPl, GW2, Il, K1, K3, K4, Mi, NcTx, NcTx, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV. NatureServe G5 (Secure).

11. PIPERACEAE Giseke 1792 (PEPPER FAMILY) [in PIPERALES]

A family of about 5-8 genera and 3000 species, shrubs, herbs, trees, and vines, of tropical and subtropical areas. References: Boufford (1997a) in FNA3 (1997); Tebbs in Kubitzki, Rohwer, & Bittrich (1993).

Peperomia Ruiz & Pavón 1794 (PEPEROMIA)



A genus of about 1000 species, of tropical and subtropical regions, especially America. References: WI; Boufford (1982); Boufford (1997a) in FNA3 (1997); Tebbs in Kubitzki, Rohwer, & Bittrich (1993); Ward (2012a).

* ***Peperomia pellucida*** (Linnaeus) Kunth. PEPPER-ELDER, MAN-TO-MAN, RAT-EAR. **Hab:** Disturbed areas, especially around greenhouses. **Dist:** Native of the Neotropics. *P. pellucida* has been collected escaped from cultivation in FL, LA, and GA (in the vicinity of Savannah). **Phen:** Jan-Dec. **Comm:** Boufford (1982) describes the species as showing "weedy tendencies" in the southeastern United States, where "first collected in 1957", and states that "it will be interesting to see if this plant will continue to expand its range". **Syn:** = Fl2, FNA3, K1, K3, K4, WH3, Boufford (1982). NatureServe GNR (Not Yet Ranked).

12. ARISTOLOCHIACEAE A.L. de Jussieu 1789 (BIRTHWORT FAMILY) [in PIPERALES]

A family of about 6-12 genera and 600 species, vines, shrubs, and herbs, of tropical, subtropical, and warm temperate regions. References: Barringer & Whittemore (1997) in FNA3 (1997); Huber in Kubitzki, Rohwer, & Bittrich (1993); Neinhuis et al (2005); Ohi-Toma et al (2006).

1 Acaulescent herb; calyx tube straight, radially symmetrical; stamens 12; [subfamily *Asaroideae*].
  2 Leaves deciduous, pubescent, paired..... ***Asarum***
  2 Leaves evergreen, glabrous, not paired..... ***Hexastylis***
1 Caulescent herb, herbaceous vine, or liana; calyx tube bent, bilaterally symmetrical; stamens 6; [subfamily *Aristolochioideae*, tribe *Aristolochieae*].
  3 Woody, twining vine; leaves 3-35 cm wide; [subtribe *Isotrematinae*]
  ..... ***Isotrema***
  3 Erect to ascending herb or twining, herbaceous vine; leaves 0.7-6.5 cm wide.
  ..... ***Endodeca***

Asarum Linnaeus 1753 (WILD GINGER)

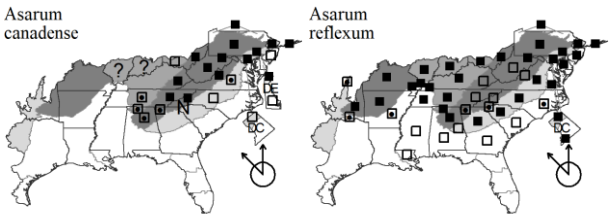
A genus of about 10 species, perennial herbs, of temperate North America and Eurasia. See *Hexastylis* for discussion of generic limits. References: Huber in Kubitzki, Rohwer, & Bittrich (1993); Weakley & Poindexter (2020a) in Weakley et al (2020); Whittemore, Mesler, & Lu (1997) in FNA3 (1997).

1 Calyx lobes 5-10 (-12) mm long, strongly reflexed, often more-or-less appressed back against the calyx tube (but spreading or ascending as the fruit starts to develop), acute or acuminate, the tubular tips 0-4 mm long..... ***Asarum reflexum***
1 Calyx lobes 10-35 mm long, spreading to ascending from the base, acuminate to caudate, the tubular tips 4-20 mm long.
  ..... ***Asarum canadense***

Asarum canadense Linnaeus. COMMON WILD GINGER. **Hab:** Rich deciduous forests in circumneutral soils. **Dist:** NB and QC west to MN, south to NC and AL. **Phen:** Apr-May. **Comm:** Taxa recognized at varietal or specific level in the past have recently often been ignored, but have merit and deserve further attention. **Syn:** = S; < *Asarum canadense* Linnaeus – FNA3, GrPl, K1, K3, K4, Mi, NE, Pa, RAB, Tn, Va, W; > *Asarum canadense* var. *ambiguum* (E.P. Bicknell) Farwell – F, Il; < *Asarum canadense* var. *canadense* – C, G; > *Asarum canadense* var. *canadense* – F, Il.

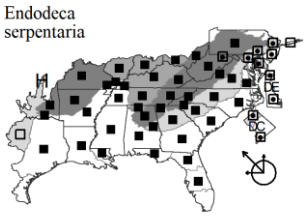
Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Asarum reflexum E.P. Bicknell. **Hab:** Rich deciduous forests in circumneutral soils. **Dist:** CT west to s. MB, south to NC, KY, and AR. **Phen:** Apr-May. **Syn:** = S; = *Asarum canadense* Linnaeus var. *reflexum* (E.P. Bicknell) B.L. Robinson – C, F, G, Il; < *Asarum canadense* Linnaeus – Ar, FNA3, GrPl, GrPl, K1, K3, K4, Mo2, NE, Pa, RAB, Tn, Va, W.



Endodeca Rafinesque 1828 (TURPENTINE-ROOT)

A genus of 2 (or more?) species, of eastern and sc. North America. This genus is morphologically distinctive within *Aristolochia* (in the broad sense), and forms a clade with *Isotrema* separate from *Aristolochia* s.s., this clade now usually accorded subtribe rank as Isotrematinae (Ohi-Toma et al. 2006, Floden & Weakley 2018). Zhu et al. (2019) argue for the recognition of *Isotrema* at generic rank, but include *Endodeca* in it; we prefer to separate *Endodeca* (basal to *Isotrema* s.s.) at genus rank as well (Floden & Weakley 2018). References: Barringer (1997) in FNA3 (1997); Floden & Weakley (2018) in Weakley et al (2018a); Huber in Kubitzki, Rohwer, & Bittrich (1993); Kelly & González (2003); Neinhuis et al (2005); Ohi-Toma et al (2006); Zhu et al (2019).



Endodeca serpentaria (Linnaeus) Rafinesque. TURPENTINE-ROOT, VIRGINIA SNAKEROOT, SERPENT BIRTHWORT. **Hab:** Dry to mesic forests, perhaps more restricted to mesic situations over acidic substrate, ranging into drier situations over calcareous or mafic substrates. **Dist:** CT and NY west to IL, MI, and MO, south to c. peninsular FL and TX. **Phen:** May-Jun; Jun-Jul. **Tax:** If treated in the genus *Isotrema*, the correct spelling is *I. serpentaria*, as Linnaeus capitalized '*Serpentaria*' as a noun (pre-Linnaean genus name) and used it as a noun in apposition. **Comm:** The tremendous variation in this species needs further study. Plants with sparingly pubescent, thin-textured, linear to lanceolate leaves have been called *Aristolochia hastata*. Plants with broadly ovate, densely pubescent leaves have been called *Aristolochia convolvulacea*. Aristolochia nashii was based on plants from peninsular FL with very narrow leaves. These may represent merely morphologic extremes of a polymorphic complex; alternatively, some taxonomic recognition of such plants as distinct from *E. serpentaria* (in a narrow sense) may be warranted. **Syn:** = Mi, NE, NY, Tn, Va; = *Aristolochia serpentaria* Linnaeus – Ar, C, Fl2, FNA3, G, GrPl, K3, Mo2, NcTx, Pa, RAB, W, WH3; = *Isotrema serpentarium* (Linnaeus) X.X. Zhu, S. Liao, & J.S. Ma – K4, Zhu et al (2019), orthographic error; > *Aristolochia convolvulacea* Small – S; > *Aristolochia hastata* Nuttall – S; > *Aristolochia serpentaria* Linnaeus – S; > *Aristolochia serpentaria* var. *hastata* (Nuttall) Duchartre – F, Tx; > *Aristolochia serpentaria* var. *serpentaria* – F, Tx; > *Endodeca hastata* (Nuttall) Rafinesque – Il; > *Endodeca serpentaria* (Linnaeus) Rafinesque – Il.

Hexastylis Rafinesque 1825 (HEARTLEAF)

A genus of perhaps 15-20 species, herbs, of se. North America, very possibly best expanded to include Asian taxa treated in *Heterotropa* and *Asiasarum*. Barringer (1993) and Kelly (1997, 1998) have recently employed a broad definition of *Asarum*, including *Hexastylis*. Over the last half-century various students of the group (emphasizing a range of fields of evidence) have arrayed themselves for and against the recognition of *Hexastylis* as a genus distinct from *Asarum. A cladistic analysis (Kelly 1997, 1998) showed distinctive clades which could be interpreted as evidence for the recognition of Hexastylis* (including the Asian *Heterotropa*), though the author preferred to recognize 2 subgenera. I choose here to follow the more traditional (at least in our area) separation of *Hexastylis* from *Asarum*, until and unless stronger evidence is presented for their combination. Electrophoretic and morphologic studies currently in progress validate the species / varietal level taxonomy presented, insofar as results are available (Z. Murrell, pers. comm., 2013; R. Wyatt, pers. comm.). A difficult genus, *Hexastylis* is made more frustrating by the fact that nearly all diagnostic features relate to the shape and size of the fleshy and brittle calyx – characters which are difficult to describe and are largely lost when specimens are pressed. The difficulty of identifying herbarium specimens has sometimes been (apparently) used as a justification for reducing (often drastically, as in Gleason & Cronquist 1991) the number of taxa recognized. To those familiar with this genus in the field, however, the taxa here recognized form geographically distinctive populations. Size and (to a lesser degree) shape of individual flowers show considerable variation and can be altered by environmental factors; individual flowers or plants can be difficult to identify if taken out of context. Populations, however, are usually readily identifiable. References: Barringer (1993); Blomquist (1957); Gaddy in W (1989); Gaddy (1986); Gaddy (1987a); Gaddy (1987b); Huber in Kubitzki, Rohwer, & Bittrich (1993); Keener & Davenport (2015); Keener & Todia (2021); Keener (2020); Schaner (2021); Sinn (2015); Sinn (2017a); Sinn (2017b); Sinn, Kelly, & Freudenstein (2015a); Sinn, Kelly, & Freudenstein (2015b); Sugawara (1987); Weakley & Poindexter (2020a) in Weakley et al (2020); Whittemore & Gaddy (1997) in FNA3 (1997).

Identification Notes: The photograph (Figure 1) in Gaddy (1987a) of the flowers of all species then known (other than *H. arifolia* and *H. speciosa*) is highly recommended as an aid to identification. The calyx tube orifice is measured on the inside – the diameter of the opening. The width of calyx lobes is measured from sinus (notch) to sinus (notch).

1 Leaves triangular to ovate-sagittate or subhastate, portions of the sides of larger leaves straight or concave; leaves mottled, the paler areas between the veins; style extension bifid to the stigma.
  2 Calyx abruptly contracted near the middle, the lower portion narrowly cuplike, abruptly expanded into a much broader upper half; calyx tube with internal raised reticulations; [of AL].

Key to Map Symbology: native, maybe exotic, exotic; ←rare ←uncommon ←common (see introduction for more); * : waif, EN : endemic, H : historic; N : no, P : planted, ? : questionable, X : extirpated

3 Calyx lobes erect; style appendages maroon; [endemic in n. AL] ..... ***Hexastylis finzelii***
3 Calyx lobes recurved; style appendages greenish; fresh plants odorless; [endemic in Coastal Plain of AL].
4 Inside of calyx without stripes; pedicels stiff, ascending to erect, thus holding the flowers well above the substrate, but strongly recurved near the base of the flower; orifice of the flowers usually nodding and facing the substrate; [native distribution uncertain, probably from Coffee County, AL] ..... ***Hexastylis rollinsiae***
4 Inside of calyx with numerous and well defined yellow and maroon stripes oriented toward the center of flower; pedicels lax, causing flowers to rest on substrate or on top of other flowers, not recurved near the base of the flower; orifice of the flowers usually facing laterally to ascending related to the plane of the substrate; [endemic near Montgomery, AL] ..... ***Hexastylis speciosa***
2 Calyx gradually contracted to a smooth waist just below the calyx lobes; calyx tube smooth internally; calyx lobes spreading or erect; [collectively widespread in our area].
5 Calyx lobes erect, 2-4 mm long, 2-4 mm wide at base; [of the Mountains and westward]. ..... ***Hexastylis ruthii***
5 Calyx lobes spreading, 2.5-8 mm long, 3-9 mm wide at base; [of the Coastal Plain, Piedmont, and eastern Mountains].
7 Calyx tube 13-18 mm long, 6-10 mm wide; calyx lobes 2.5-8 mm long, 3-9 mm wide across the base; [of the Coastal Plain, Piedmont, and Mountains of s. VA, NC, SC, GA, and westward through AL and MS to se. LA] ..... ***Hexastylis arifolia***
7 Calyx tube 20-25 mm long, 10-12 mm wide; calyx lobes 12-20 mm long, 8-15 mm wide across the base; [of the lower Gulf Coastal Plain, of sw. GA, FL Panhandle, s. AL, s. MS, and se. LA] ..... ***Hexastylis callifolia***
1 Leaves rounded, with cordate base, all portions of the sides of the leaves convex; leaves mottled or unmottled, if mottled, the paler areas along the veins; style extension notched or divided at the apex, not bifid to the stigma.
10 Calyx tube > 30 mm long, relatively thin and especially brittle (in fresh flowers); flower odor often acidic and rancid.
11 Leaves scattered along the length of the long-creeping rhizome, plants thus forming clonal mats; [of Coastal Plain and lower Piedmont of GA and AL] ..... ***Hexastylis harperi***
11 Leaves clustered at the tip of the rhizome, plants thus in clumps; [of the Mountains and upper Piedmont of NC, SC, and GA] ..... ***Hexastylis shuttleworthii***
10 Calyx tube < 30 mm long, thicker and less brittle (in fresh flowers); flower odor malodorous, but not acidic and rancid. ..... ***Hexastylis heterophylla***

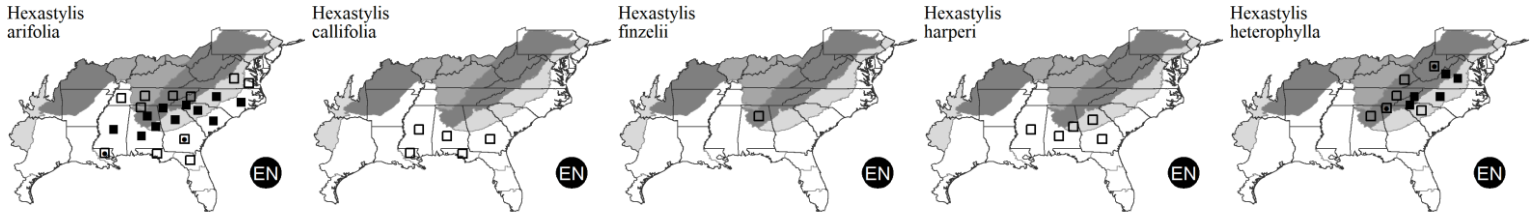
Hexastylis arifolia (Michaux) Small. LITTLE BROWN JUG, ARROWLEAF HEARTLEAF, PIGS. **Hab:** In a wide variety of dry to mesic forests. **Dist:** Se. VA, sw. VA, se. KY, se. TN, and n. AL south to se. GA (Carter, Baker, & Morris 2009), Panhandle FL, s. MS, and se. LA, primarily on the Coastal Plain and Piedmont; recently reported for far sw. TN, in the Mississippi Embayment of the Coastal Plain (Trently 2017). **Phen:** (Late Feb) Mar-May. **Syn:** = G, S; = *Asarum arifolium* Michaux – F; = *Asarum arifolium* Michaux var. *arifolium* – Barringer (1993); = *Hexastylis arifolia* (Michaux) Small var. *arifolia* – C, FNA3, K1, K3, K4, Tn, Va, W, Blomquist (1957), Gaddy (1987a); < *Asarum arifolium* Michaux – Fl2, WH3; < *Hexastylis arifolia* (Michaux) Small – RAB. NatureServe G5T5 (Secure).

Hexastylis callifolia (Small) Small. GULF LITTLE BROWN JUG. **Hab:** Mesic forests. **Dist:** Sw. GA and Panhandle FL west to se. LA, in the lower East Gulf Coastal Plain. **Phen:** Mar-May. **Syn:** = S; = *Asarum arifolium* Michaux var. *callifolium* (Small) Barringer – Barringer (1993); = *Hexastylis arifolia* (Michaux) Small var. *callifolia* (Small) Blomquist – FNA3, K1, K3, K4, Blomquist (1957), Gaddy (1987a); < *Asarum arifolium* Michaux – Fl2, WH3. NatureServe G5T4? (Apparently Secure).

Hexastylis finzelii B.R. Keener. FINZEL'S HEARTLEAF. **Hab:** Rocky, submesic forests. **Dist:** Endemic to Marshall County, AL (as far as is known). **Phen:** Early April. **Tax:** See Keener (2020) for detailed information. **Syn:** = Keener & Todia (2021), Keener (2020). NatureServe G1 (Critically Imperiled).

Hexastylis harperi (Gaddy) B.R. Keener & L.J. Davenport. HARPER'S HEARTLEAF. **Hab:** Bogs, acid hammocks. **Dist:** C. GA, c. AL, and ne. MS, south and west of (and allopatric from) *H. shuttleworthii*; it approaches SC and should be sought there (Gaddy 1987b). **Comm:** Keener & Davenport (2015) elevate it to specific rank in *Hexastylis*; Diamond (2016a) gives it specific rank in *Asarum*. **Syn:** = K4, Keener & Davenport (2015); = *Asarum shuttleworthii* Britten & Baker f. var. *harperi* (Gaddy) Barringer – Barringer (1993), Sinn (2015); = *Hexastylis shuttleworthii* (Britten & Baker f.) Small var. *harperi* Gaddy – FNA3, K1, K3, Gaddy (1987a); < *Hexastylis shuttleworthii* (Britten & Baker f.) Small – S. NatureServe G4T3 (Vulnerable).

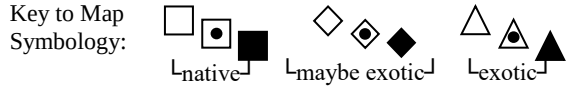
Hexastylis heterophylla (Ashe) Small. VARIABLE-LEAF HEARTLEAF. **Hab:** Slopes and bluffs in xeric to mesic forests, usually associated with *Kalmia latifolia*. **Dist:** A broad Southern Appalachian endemic: w. VA and WV south through e. KY, ne. TN, and w. NC to nw. SC, n. GA, and n. AL. **Phen:** Mar-late May. **Syn:** = FNA3, K1, K3, K4, RAB, S, Tn, Va, W, Blomquist (1957), Gaddy (1987a); = *Asarum heterophyllum* Ashe – WV, Sinn (2015); < *Asarum virginicum* Linnaeus – F, G; < *Hexastylis virginicum* – C. NatureServe G4G5Q (Apparently Secure).



Hexastylis rollinsiae B.R. Keener & Todia. **Hab:** Habitat unknown. **Dist:** Native distribution unknown, probably from Coffee County, AL. **Phen:** May. **Syn:** = Keener & Todia (2021). NatureServe GHC (Possibly Extinct).

Hexastylis ruthii (Ashe) Small. APPALACHIAN LITTLE BROWN JUG. **Hab:** Upland acidic forests, ultramafic outcrop barrens, calcareous forests. **Dist:** A Southern Appalachian endemic: sw. VA, se. KY, w. NC, e. TN, n. AL, and n. GA. **Phen:** Mar-Jun. **Syn:** = G, S; = *Asarum arifolium* Michaux var. *ruthii* (Ashe) Barringer – Barringer (1993); = *Asarum ruthii* Ashe – F; = *Hexastylis arifolia* (Michaux) Small var. *ruthii* (Ashe) Blomquist – C, FNA3, K1, K3, K4, Tn, Va, W, Blomquist (1957), Gaddy (1987a); < *Hexastylis arifolia* (Michaux) Small – RAB. NatureServe G5T4? (Apparently Secure).

Hexastylis shuttleworthii (Britten & Baker f.) Small. LARGE-FLOWER HEARTLEAF. **Hab:** Acidic soils in deciduous and deciduous-coniferous forests, often along creeks under *Rhododendron maximum*. **Dist:** Endemic to the Southern Appalachians: W. NC and e. TN to nw. SC, n. GA, and ne. AL; previous reports of *H. shuttleworthii* for VA and WV are apparently based on large-flowered individuals of *H. heterophylla* (J. Townsend, pers. comm. 2008). **Phen:** May-Jul. **Syn:** = K4, Keener & Davenport (2015); = *Asarum shuttleworthii* Britten & Baker f. var. *shuttleworthii* – Barringer (1993),

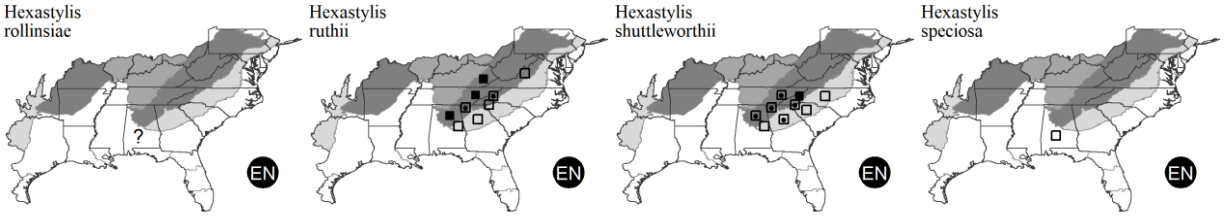


Key to Map Symbology: ←rare ←uncommon ←common (see introduction for more)
* : waif EN : endemic H : historic
N : no P : planted ? : questionable
X : extirpated

12. ARISTOLOCHIACEAE

Sinn (2015); = *Hexastylis shuttleworthii* (Britten & Baker f.) Small var. *shuttleworthii* – FNA3, K1, K3, Gaddy (1987a); < *Asarum shuttleworthii* Britten & Baker – F; < *Hexastylis shuttleworthii* (Britten & Baker f.) Small – C, G, RAB, S, Tn, W, Blomquist (1957). NatureServe G4T4 (Apparently Secure).

Hexastylis speciosa R.M. Harper. ALABAMA HEARTLEAF, ALABAMA GINGER. **Hab:** Shaded forests along streams and bogs. **Dist:** Endemic to a small area in central AL (Autauga, Chilton, and Elmore counties, north of Montgomery). **Phen:** Apr-May. **Syn:** = FNA3, K1, K3, K4, S, Blomquist (1957), Gaddy (1987a), Keener & Todia (2021); = *Asarum speciosum* (R.M. Harper) Barringer – Barringer (1993). NatureServe G2 (Imperiled).



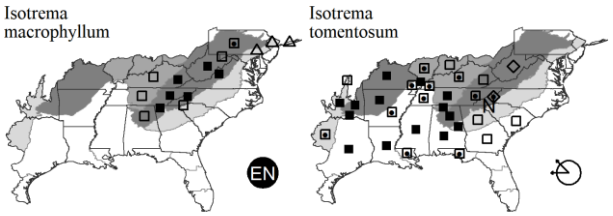
Isotrema Rafinesque 1819 (DUTCHMAN'S-PIPE)

A genus of about 90-100 species, of temperate and tropical Asia, se. North America, and Central America. Zhu et al. (2019) argue for the recognition of *Isotrema* at generic rank, but include *Endodeca* in it; we prefer to separate *Endodeca* (basal to *Isotrema* s.s.). References: Barringer (1997) in FNA3 (1997); Huber in Kubitzki, Rohwer, & Bittrich (1993); Kelly & González (2003); Ohi-Toma et al (2006); Zhu et al (2019).

1 Plant nearly glabrous; leaves abruptly pointed (short acuminate); calyx purple or brown; [of the Mountains]..... ***Isotrema macrophyllum***
1 Plant soft pubescent; leaves blunt; calyx yellow, with a purple mouth; [largely of west or south of the Appalachians, also locally spread from cultivation]..... ***Isotrema tomentosum***

Isotrema macrophyllum (Lamarck) C.F. Reed. PIPEVINE, DUTCHMAN'S-PIPE. **Hab:** Cove forests and other mesic mountain forests. **Dist:** A southern-central Appalachian endemic: sw. PA to c. TN and n. GA and ne. AL. **Phen:** May-Jun; Aug-Sep. **Syn:** = K3, K4, Mi, NE, NY, Va, Zhu et al (2019); = *Aristolochia durior* Hill – F, G, GrPl; = *Aristolochia macrophylla* Lamarck – C, FNA3, K1, Pa, RAB, S, W; = *Isotrema macrophylla* (Lamarck) C.F. Reed – Tn, orthographic variant. NatureServe G5 (Secure).

Isotrema tomentosum (Sims) H. Huber. WOOLLY DUTCHMAN'S-PIPE, PIPEVINE. **Hab:** Bottomland and riparian forests, stream and river banks, disturbed areas. **Dist:** S. IN, s. MO, and se. OK, south to sw. GA, Panhandle FL, and c. TX. Also cultivated horticulturally and persistent or spreading more widely around eastern North America. **Phen:** May-Jun. **Comm:** FNA also reports that it is escaped in VA. **Syn:** = K3, K4, Mi, NE, NY, Zhu et al (2019); = *Aristolochia tomentosa* Sims – Ar, C, F, Fl2, FNA3, G, GrPl, GW2, Il, K1, Mo2, NcTx, RAB, S, Tx, WH3; = *Isotrema tomentosa* – Tn, orthographic variant. NatureServe G5 (Secure).



14. MAGNOLIACEAE A.L. de Jussieu 1789 (MAGNOLIA FAMILY) [in MAGNOLIALES]

A family of about 7 genera and 223 species, trees and shrubs, tropical and warm temperate, of e. and se. Asia, and from e. North America south through West Indies and Central America to Brazil. References: Figlar & Nooteboom (2004); Frodin & Govaerts (1996); Hardin & Jones (1989); Hardin (1972); Kim et al (2001); Meyer (1997a) in FNA3 (1997); Nie et al (2008); Nooteboom in Kubitzki, Rohwer, & Bittrich (1993).

1 Leaves about as broad as long, (0-) 4 (-8)-lobed; fruit a lanceoloid aggregate of samaras (a "samaracetum"), each samara 2-seeded, tan, and indehiscent; [subfamily *Liriodendroideae*]..... ***Liriodendron***
1 Leaves longer than broad, not lobed (in some species the leaves auriculate-cordate basally); fruit an ovoid, cone-like aggregate of follicles (a "follicetum"), each follicle dehiscing to reveal a scarlet seed, at first connected to the follicle by a thread-like strand; [subfamily *Magnolioideae*]..... ***Magnolia***

Liriodendron Linnaeus 1753 (TULIP-TREE)

A genus of 2-4 species (or taxa), trees, relictually distributed, with *L. tulipifera* in e. North America and *L. chinense* (Hemsley) Sargent in c. China and n. Vietnam. References: Fetter & Weakley (2019); Fetter (2014); Fetter, Weakley, & Poindexter () (in prep); Nooteboom in Kubitzki, Rohwer, & Bittrich (1993).

Identification Notes: Leaf characters of shade leaves and vigorous young shoots are highly variable and also show a variety of shapes not encountered in mature, sun leaves. The leaf characters in the key are based on mature, sun leaves subtending flowers/fruits. The length measurements of the leaf blades are made from the point of attachment of the petiole to the tip of the midvein.

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

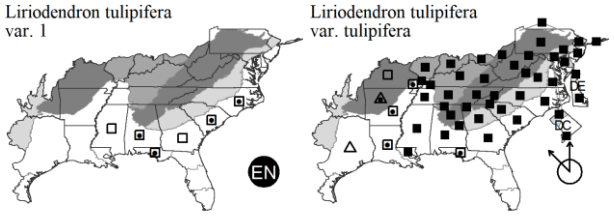
14. MAGNOLIACEAE

2 Mature leaves of fertile branches small [measurements], 0-4-lobed (sun leaves), the terminal lobes obtuse, broadly rounded to acuminate, though when acuminate the ultimate tip minutely blunt, the base cuneate, rounded, or truncate; fully-developed tepals 3.0-4.0 cm long; aggregate fruit (samaracetum) {< 6} cm long at maturity; stamens < 32; [of the Coastal Plain, especially fire-maintained, wetland, acidic, saturated, peaty/sandy sites]..... ***Liriodendron tulipifera var. 1***

2 Mature leaves of fertile branches large [measurements], 4-8-lobed (sun leaves), the terminal lobes acute to acuminate, and often terminating in an apiculum, the base cordate to broadly cuneate; fully-developed tepals 4.5-5+ cm long; aggregate fruit (samaracetum) {usually > 6} cm long at maturity; stamens mostly > 30; [of the Mountains, Piedmont, and Coastal Plain (in the Coastal Plain, especially along brownwater rivers and on mesic bluffs and slopes)]..... ***Liriodendron tulipifera var. tulipifera***

Liriodendron tulipifera Linnaeus *var*. ***1***. COASTAL PLAIN TULIP-TREE, SOUTHERN YELLOW POPLAR. **Hab:** Streamhead pocosins, pineland seepage swamps, small blackwater stream swamps. **Dist:** Sc. and se. NC south to Panhandle FL, west to s. MS. **Phen:** Apr-Jun; Sep-Oct. **Tax:** Under study by Fetter, Weakley, & Poindexter (in prep.). **Comm:** Its occurrence in fire-maintained, acid soil habitats in the Coastal Plain is surprising to people used to *Liriodendron* as a tree of mesic, rich soil forests with little or no fire. This variety is, however, a typical species of streamhead pocosins in the fall-line sandhills, growing with *Pinus serotina*, *Nyssa biflora*, and *Acer rubrum*, and often with scorch marks twenty feet up the trunk. **Syn:** = Fetter, Weakley, & Poindexter () (in prep); < *Liriodendron tulipifera* – Fl2, FNA3, GW2, K1, K3, RAB, S, WH3; >< *Liriodendron tulipifera* var. *obtusiloba* Michaux – K4; >< *Liriodendron tulipifera* Linnaeus var. *tulipifera* – K4.

Liriodendron tulipifera Linnaeus *var*. ***tulipifera***. TULIP-TREE, YELLOW POPLAR, WHITEWOOD. **Hab:** Mesic forests, cove forests in the Mountains to at least 1500m in elevation, bottomland forests and swamps. **Dist:** MA, VT, NY, ON, MI, and n. IL south to Panhandle FL and w. LA; also spread elsewhere from cultivation. **Phen:** Apr-Jun; Sep-Oct. **Comm:** An important timber tree in the Southern Appalachians. **Syn:** = Fetter, Weakley, & Poindexter () (in prep); < *Liriodendron tulipifera* – Ar, C, F, Fl2, FNA3, G, GW2, Il, K1, K3, Mi, NE, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV, Hardin & Jones (1989); > *Liriodendron tulipifera* var. *obtusiloba* Michaux – K4; > *Liriodendron tulipifera* Linnaeus var. *tulipifera* – K4.



Magnolia Linnaeus 1753 (MAGNOLIA, CUCUMBER-TREE)

As treated here, a genus of about 130 species, trees and shrubs, of e. Asia (Himalayas and Sri Lanka to Japan and w. Malaysia) and America (e. North America to West Indies, Central America, and South America); alternate treatments in current use divide *Magnolia* into as many as 16 genera (of which *Magnolia* Linnaeus, *Houpoea* N.H. Xia & C.Y. Wu, *Metamagnolia* Sima & S.G. Lu, *Paramagnolia* Sima & S.G. Lu, and *Yulania* Spach are represented in our flora). Molecular phylogenetics show *Magnolia virginiana* and *Magnolia grandiflora* as closely related in a New World primarily subtropical clade, *Magnolia macrophylla* and *Magnolia ashei* in one branch in a clade with *M. fraseri* and *M. pyramidata* in another branch, *Magnolia acuminata* as basal in a clade that is otherwise Asian (equivalent to subgenus *Yulania*), and *Magnolia tripetala* grouped in another clade that is otherwise Asian (Azuma et al. 2001). The sections used follow Wang et al. (2020). References: Azuma et al (2001); Azuma, Thien, & Kawano (1999); Figlar & Nooteboom (2004); Frodin & Govaerts (1996); García-Morales, Iamonico, & García Jiménez (2019); Hunt (1998); Kim et al (2001); Nooteboom in Kubitzki, Rohwer, & Bittrich (1993); Palmarola-Bejerano, Romanov, & Bobrov (2008); Sima & Lu (2012); Spongberg (1998); Tobe (1998); Vázquez-García et al (2016); Wang et al (2020); Williams (1999).

Unkeyed waifs: *Magnolia ×soulangeana*

1 Leaves cordate-auriculate at base; [subgenus *Magnolia*].

2 Leaves glaucous and finely appressed-pubescent beneath; buds and twigs pubescent; [section *Macrophylla*; or genus *Metamagnolia*]. ..... ***Magnolia macrophylla***

2 Leaves green and glabrous beneath; buds and twigs glabrous; [section *Tuliparia*; or genus *Paramagnolia*].

4 Stamens 8-15 mm long; leaves (most of them) over 25 cm long; conelike aggregate fruit (follicetum) 6.5-11 (-14) cm long; [of the Mountains and Piedmont].. ***Magnolia fraseri***

4 Stamens 4-8 (-10.5) mm long; leaves (most of them) < 25 cm long; conelike aggregate fruit (follicetum) 3.5-5.5 (-6) cm long; [of the Coastal Plain]..... ***Magnolia pyramidata***

1 Leaves cuneate to rounded (subcordate) at base.

5 Leaves evergreen, coriaceous in texture, glossy dark green above as if varnished, rusty tomentose or green beneath; [section *Magnolia*; or genus *Magnolia*]..... ***Magnolia grandiflora***

5 Leaves variably evergreen to deciduous, herbaceous or subcoriaceous in texture, medium green above with a slightly glossy or dull finish; glaucous or green beneath.

6 Leaves evergreen to deciduous, aromatic when fresh, 8-20 cm long, elliptic, strongly glaucous beneath; [section *Magnolia*; or genus *Magnolia*]. ..... ***Magnolia virginiana var. australis***

6 Leaves deciduous, non-aromatic, 3-80 cm long, either ovate, obovate, or oblanceolate, green beneath.

8 Leaf base cuneate-attenuate; leaf blade obovate or oblanceolate (broader toward the tip); buds either glabrous or sericeous. ..... ***Magnolia tripetala***

8 Leaf base rounded to subcordate (often cuneate to widely cuneate in *M. acuminata* var. *subcordata*); leaves 10-30 cm long, broader near the middle or toward the base, borne scattered along the twig; buds pubescent; [section *Tulipastrum*; or genus *Yulania*].

10 Twigs of the current year glabrous; petals greenish or greenish-yellow; medium to large tree..... ***Magnolia acuminata var. acuminata***

10 Twigs of the current year pubescent, or at least with persistent hair-bases, petals golden-yellow above, light-yellow below; small tree (rarely larger)..... ***Magnolia acuminata var. subcordata***

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

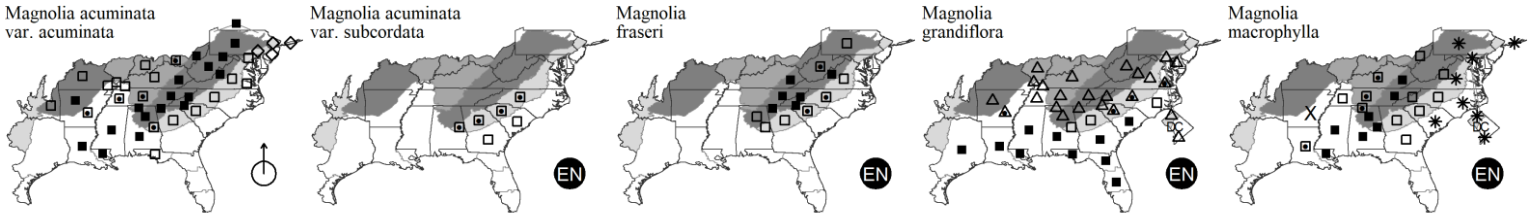
Magnolia acuminata (Linnaeus) Linnaeus *var*. ***acuminata***. CUCUMBER-TREE, CUCUMBER MAGNOLIA. **Hab:** Mesic to subxeric forests, especially (but by no means strictly) over mafic or calcareous rocks, up to at least 1550m (where growing with *Betula alleghaniensis*, *Abies fraseri*, *Picea rubens*, and *Sorbus americana*), ultramafic outcrop barrens (where codominant with *Pinus rigida* and *Quercus alba*). **Dist:** S. ME, MY, c. IN, s. MO, and e. OK, south to c. GA, w. Panhandle FL (Holmes and Walton counties), s. AL, s. MS, and w. LA. **Phen:** Apr-Jun; Jul-Aug. **Tax:** The recognition of two varieties is uncertain (see discussion below). **Syn:** = C, F, G, W, Frodin & Govaerts (1996), Spongberg (1998), Tobe (1998); = *Tulipastrum acuminatum* (Linnaeus) Small – S; < *Magnolia acuminata* – Ar, Fl2, FNA3, Il, K1, K3, K4, NE, NY, Pa, RAB, Tn, Va, WH3, WV, Hardin & Jones (1989); < *Yulania acuminata* (Linnaeus) D.L. Fu – Sima & Lu (2012).

Magnolia acuminata (Linnaeus) Linnaeus *var*. ***subcordata*** (Spach) Dandy. YELLOW CUCUMBER-TREE, SHOWY CUCUMBER MAGNOLIA. **Hab:** Moist to dry slopes and bottomlands over mafic or calcareous rocks. **Dist:** Var. *subcordata* ranges from sc. NC south to AL. **Comm:** It has been treated variously as a variety, a species, or merged with *M. acuminata*. Coker (1943) discusses its history, distribution, and taxonomic status. Additional study is needed. **Syn:** = Frodin & Govaerts (1996), Spongberg (1998), Tobe (1998); = *Tulipastrum cordatum* (Michaux) Small – S; < *Magnolia acuminata* – FNA3, K1, K3, K4, RAB, W, Hardin & Jones (1989); < *Yulania acuminata* (Linnaeus) D.L. Fu – Sima & Lu (2012).

Magnolia fraseri Walter. FRASER MAGNOLIA, MOUNTAIN MAGNOLIA, EARLEAF UMBRELLA-TREE. **Hab:** Mesic to dry forests. **Dist:** A Southern and Central Appalachian endemic: sw. PA (found in the 2010s, S. Grund, pers. comm., 2019), KY, and w. VA south through w. NC and e. TN to nw. SC, n. GA, and ne. AL. **Phen:** Apr-May; Jul-Aug. **Syn:** = C, F, FNA3, G, K1, K3, K4, NY, RAB, S, Tn, Va, W, Hardin & Jones (1989); = *Magnolia fraseri* ssp. *fraseri* – Tobe (1998); = *Magnolia fraseri* var. *fraseri* – Frodin & Govaerts (1996), Spongberg (1998); = *Paramagnolia fraseri* (Walter) Sima & S.G. Lu var. *fraseri* – Sima & Lu (2012).

Magnolia grandiflora Linnaeus. SOUTHERN MAGNOLIA, BULL BAY. **Hab:** Maritime forests, mesic Coastal Plain bluffs and flats, bottomlands, now also widely naturalized, spreading from cultivation into wet to mesic (and even dry) forests. **Dist:** The pre-Columbian range was apparently from se. NC south to c. peninsular FL, west to e. TX, largely on the Coastal Plain, now somewhat expanded northward and inland by naturalization from centuries of horticultural planting and spread by birds to nearby forests. **Phen:** Apr-Jun; Sep-Oct. **Comm:** Curtis (1860) states that "the northern limit of this tree is in Brunswick County [NC], south of the Cape Fear; but it flourishes in cultivation through all the lower part of the State". This is, of course, the classic "southern magnolia", along with live oak (*Quercus virginiana*) and bald-cypress (*Taxodium distichum*), a totem tree of the Deep South. **Syn:** = Ar, C, Fl2, FNA3, GW2, K1, K3, K4, RAB, S, Tn, Tx, Va, Frodin & Govaerts (1996), Sima & Lu (2012), Tobe (1998). NatureServe G5 (Secure).

Magnolia macrophylla Michaux. BIGLEAF MAGNOLIA. **Hab:** Mesic forests, primarily over limestone, other calcareous sedimentary rocks (calcareous shales, sandstones, etc.), or mafic rocks (east of the Blue Ridge), mesic hammocks in the Coastal Plain. **Dist:** S. OH and sw. VA south through e. TN to w. GA, west to AL, MS, n. LA, and se. AR (Sundell et al. 1999); disjunct on Crowleys Ridge in ne. AR (population now extirpated), c. and nc. SC, and e. SC (where probably not native). The range of this species is sometimes stated in such a way as to imply that it is a tree of the southern Blue Ridge, which it barely and marginally enters. Actually, it avoids the Southern Blue Ridge, reaching its greatest abundance in the sedimentary rock Appalachians west of the Blue Ridge, particularly the Cumberland Plateau, and occurs east of the Blue Ridge only as a rare disjunct. **Phen:** May-Jun; Jul-Aug. **Tax:** The Gulf Coast endemic *Magnolia ashei* Weatherby is related and is sometimes treated as a variety or subspecies of *M. macrophylla*. **Comm:** See Williams (1999) for additional information about the discovery and nomenclature of this species. **ID Notes:** The leaves are up to 1.1 meter long and 3.5 dm wide. The large size of the leaves, the small lobes (auricles) at the base of the leaf, and the strongly whitened lower leaf surface separate it from all other species in our flora, except its sister species, *Magnolia macrophylla*, which is allopatric (not geographically overlapping) in the FL Panhandle. **Syn:** = Ar, C, F, FNA3, G, K1, K3, K4, NY, RAB, S, Tn, Va, W, Hardin & Jones (1989), Vázquez-García et al (2016); = *Magnolia macrophylla* ssp. *macrophylla* – Frodin & Govaerts (1996), Spongberg (1998), Tobe (1998); = *Metamagnolia macrophylla* (Michaux) Sima & S.G. Lu ssp. *macrophylla* – Sima & Lu (2012). NatureServe G5 (Secure).



Magnolia pyramidata Bartram. PYRAMID MAGNOLIA. **Hab:** Mesic hammocks, mesic forests, especially of bluffs and ravines. **Dist:** A Southeastern Coastal Plain endemic: c. SC south to Panhandle FL, west to e. TX. **Phen:** Apr-May; Aug. **Tax:** Sometimes treated as a variety or subspecies of *M. fraseri*, to which it is clearly closely related, but the distributional and morphological differences are discrete and specific status seems warranted. **Syn:** = Fl2, FNA3, K1, K3, K4, RAB, S, WH3, Hardin & Jones (1989); = *Magnolia fraseri* Walter ssp. *pyramidata* (Bartram) E. Murray – Tobe (1998); = *Magnolia fraseri* Walter var. *pyramidata* (Bartram) Pampinini – Frodin & Govaerts (1996), Spongberg (1998); = *Paramagnolia fraseri* (Walter) Sima & S.G. Liu var. *pyramidata* (Bartram) Sima & S.G. Liu – Sima & Lu (2012); > *Magnolia fraseri* Walter – Tx, misapplied; > *Magnolia pyramidata* Bartram – Tx.

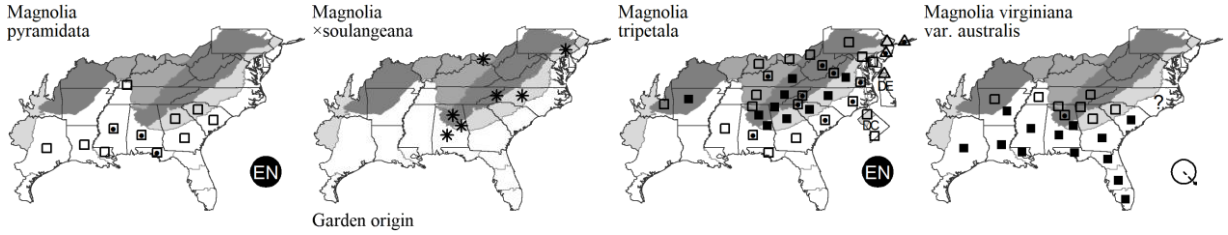
* ***Magnolia ×soulangeana*** Soulange-Bodin. SAUCER MAGNOLIA, TULIP MAGNOLIA. **Hab:** Cultivated, persistent or weakly naturalizing near plantings. **Dist:** Reported for Barbour and Morgan counties, AL (D. Spaulding, pers. comm., 2013) and scattered other sites in eastern North America outside of our flora area (Kartesz 2010). **Comm:** {add synonymy; not yet keyed}. **Syn:** = K1, K3, K4; = *Magnolia denudata* × *lilliflora* – NY; = *Magnolia soulangeana* – Pa; = *Yulania* ×*soulangeana* (Soulange-Bodin) D.L. Fu – Sima & Lu (2012).

Magnolia tripetala (Linnaeus) Linnaeus. UMBRELLA MAGNOLIA, UMBRELLA-TREE. **Hab:** Mesic forests, ravines. **Dist:** Centered in the Southern Appalachians, but avoiding higher elevations, and therefore occurring primarily "around" the Blue Ridge; ranging from sc. and sw. PA, s. OH, s. IN south to SC, GA, Panhandle FL (Tobe 2007), AL, and MS; also disjunct in the Ouachita Mountains of c. AR and e. OK. **Phen:** Apr-May; Jul-Oct. **Tax:** Most closely related to several e. Asian species. **Syn:** = Ar, C, F, Fl2, FNA3, G, K1, K3, K4, Mo1, NE, NY, Pa, RAB, S, Tn, Va, W, WH3, WV, Frodin & Govaerts (1996), Hardin & Jones (1989), Spongberg (1998), Tobe (1998); = *Houpoea tripetala* (Linnaeus) Sima & S.G. Lu – Sima & Lu (2012). NatureServe G5 (Secure).

Magnolia virginiana Linnaeus *var*. ***australis*** Sargent. SOUTHERN SWEET BAY. **Hab:** Pocosins, bay forests, and swamps in the Coastal Plain, streamhead pocosins, swamps, and sandhill seeps in the Sandhills, bogs and peaty swamps in the Piedmont and Mountains. **Dist:** S. SC (se. NC?) south to s. FL, and west to e. TX, rarely extending into adjacent, more interior provinces; disjunct in nw. Cuba. **Phen:** Apr-Jul; Jul-Oct. **Tax:**

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated

Magnolia virginiana has been discovered in Cuba, the single population named as ssp. *oviedoae* A. Palmarola, M.S. Romanov, & A.V. Bobrov (Palmarola-Bejerano, Romanov, & Bobrov 2008), but based on molecular results of Azuma et al. (2011), it seems better to consider this population as part of *M. virginiana* var. *australis*. Morphological, molecular, and chemical studies have shown strong variation in *M. virginiana* in North America, but the patterns are not clear based on the limited current studies (Azuma, Thien, & Kawano 1999). Based on the studies of Azuma et al. (2011), Azuma, Thien, & Kawano (1999), Tobe (1998), and McDaniel (1966), the recognition of two varieties seems clearly warranted, with a strong genetic break occurring in SC (a secondary and less strong genetic break separates West Gulf Coastal Plain populations from more eastern populations) (Azuma et al. 2011). Additional study is needed to understand the exact distributions of the two taxa in the area of contact (SC and adjacent GA and NC), whether species status is warranted, as suggested by Azuma et al. (2011), and the correlation between morphological traits and genetic variation. **Syn:** = F, K3, K4, Tx, Tobe (1998); = *Magnolia virginiana* ssp. *australis* (Sargent) A.E. Murray – Palmarola-Bejerano, Romanov, & Bobrov (2008); < *Magnolia virginiana* – Ar, C, Fl2, FNA3, G, GW2, K1, RAB, S, Tn, W, WH3, Frodin & Govaerts (1996), Hardin & Jones (1989), Sima & Lu (2012), Spongberg (1998).



18. ANNONACEAE A.L. de Jussieu 1789 (CUSTARD-APPLE FAMILY) [in MAGNOLIALES]

A family of about 128-130 genera and about 2200-2300 species, trees, shrubs, and lianas, mostly tropical. Infrafamilial classification follows Chatrou et al. (2012); *Asimina* and *Annona* are in subfamily Annonoideae, tribe Annonineae. References: Chatrou et al (2012); Kessler in Kubitzki, Rohwer, & Bittrich (1993); Kral (1997) in FNA3 (1997); Mercer et al (2015).

Asimina Adanson 1763 (PAWPAW)

A genus of about 12 species of shrubs and small trees, endemic to e. North America. A preliminary molecular analysis by Mercer et al. (2015) is flawed and should not serve as a basis for the inclusion of *Deeringothamnus* in *Asimina*. It is possible that a better division of *Asimina* would be as done by J.K. Small (1933), with *Asimina* confined to *A. triloba* and *A. parviflora*, and all other species (and including *Deeringothamnus*), placed in a second genus (*Pityothamnus*). It is likely that additional taxa will be named. References: DeLaney (2010); Godfrey (1988); Horn (2015); Kessler in Kubitzki, Rohwer, & Bittrich (1993); Kral (1960); Kral (1997) in FNA3 (1997); Mercer et al (2015); Ward (2001); Wilbur (1970a).

Identification Notes: Hybrids are known between some of the species, notably *A. angustifolia* × *incana* [= *A.* ×*nashii* Kral], and should be expected where two species are present. The known hybrids between the pineland species are named as binomials and further discussed in DeLaney (2010). The hybrid *A. parviflora* × *triloba* has also been given a binomial, *A.* ×*piedmontana* C.N. Horn, and is discussed at length by Horn (2015).

1 Leaves herbaceous in texture, obovate, > 6 cm wide, acute-acuminate at the apex; flowers (inner petals and outer petals) reddish-maroon; shrubs and trees, 1-15 m tall; [collectively widespread in our area]; [*Asimina s.s.*].
  2 Flowering pedicels 2-7 mm long, the hairs tan to rusty; well-developed leaves (largest leaves on a plant) 6-15 (-22) cm long; sepals 4-7 mm long; outer petals 3-8 (-10) mm long; fruit 1-3 (-6) cm long; plant a non-clonal, clumped shrub 1-2 m (rarely to 5 m) tall; [of the Coastal Plain, but also extending inland into the Piedmont and low Mountains of NC, SC, GA, and AL] ..... ***Asimina parviflora***
  2 Flowering pedicels (10-) 15-20 (-25) mm long, the hairs dark reddish-brown; well-developed leaves (largest leaves on a plant) 24-45 cm long; sepals 8-12 mm long; outer petals 15-25 mm long; fruit (3-) 7-15 cm long; plant a clonal tree (with solitary stems) to 15 m tall; [widespread in our area] ..... ***Asimina triloba***
1 Leaves coriaceous in texture, linear to oval, blunt at the tip (or acute-acuminate); peduncles lacking bracts; flowers reddish-maroon, pale pink, yellow, cream, or white; shrubs to 4.5 m tall; [mainly FL peninsula, north to e. GA, very rarely e. SC, s. AL, and FL Panhandle]; [*"Pityothamnus"*]. ..... ***Asimina spatulata***

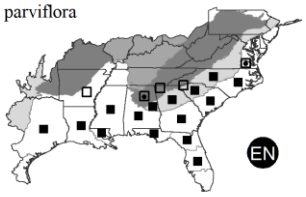
Asimina parviflora (Michaux) Dunal. SMALL-FLOWERED PAWPAW, SMALL-FRUITED PAWPAW. **Hab:** Sandy or rocky, dry to fairly moist forests. **Dist:** Se. VA south to c. peninsular FL, west to se. TX, primarily on the Coastal Plain, but inland to w. NC, nw. SC, n. GA, n. AL, n. MS, and s. AR. **Phen:** Apr-May; Jul-Sep. **Syn:** = Ar, C, F, Fl2, FNA3, G, K1, K3, K4, RAB, S, Tx, Va, W, WH3, DeLaney (2010), Godfrey (1988), Kral (1960), Wilbur (1970a). NatureServe G5 (Secure).

Asimina spatulata (Kral) D.B. Ward. SLIMLEAF PAWPAW. **Hab:** Dry pinelands. **Dist:** E. GA south to n. FL (west of the Suwanee River), west to Panhandle FL and s. AL. **Tax:** DeLaney (2010) discusses that *A. spatulata* includes a variety of geographically somewhat coherent forms, and for now may be considered a 'species of convenience' needing additional study. **Syn:** = Fl2, K3, K4, WH3, DeLaney (2010); = *Asimina longifolia* Kral var. *spatulata* Kral – FNA3, Godfrey (1988), Kral (1960); = n/a – RAB; < *Asimina angustifolia* Rafinesque – K1, Wilbur (1970a); < *Pityothamnus angustifolius* (Rafinesque) Small – S. NatureServe G4TNR (Not Yet Ranked).

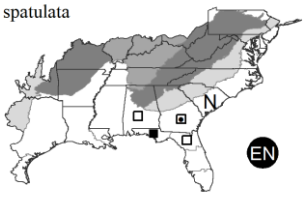
Asimina triloba (Linnaeus) Dunal. COMMON PAWPAW, INDIAN-BANANA. **Hab:** Alluvial forests, other moist, nutrient-rich forests. **Dist:** NJ, w. NY, and s. ON west to s. MI and e. NE, south to Panhandle FL, s. LA, and ne. TX. **Phen:** Mar-May; Aug-Oct. **Comm:** Often forming clonal stands of an acre or more. **Syn:** = Ar, C, F, Fl2, FNA3, G, GrPl, Il, K1, K3, K4, Mi, Mo2, NcTx, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, DeLaney (2010), Godfrey (1988), Kral (1960), Wilbur (1970a). NatureServe G5 (Secure).

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

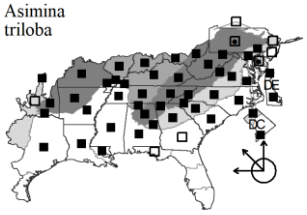
Asimina parviflora



Asimina spatulata



Asimina triloba



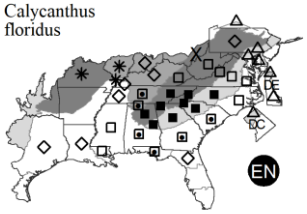
19. CALYCANTHACEAE Lindley 1819 (SWEET-SHRUB FAMILY) [in LAURALES]

A family of 4 genera and about 8 species, shrubs and trees, of temperate e. China, temperate e. North America, temperate w. North America, and tropical ne. Australia. References: Kubitzki, Rohwer, & Bittrich (1993); Li et al (2004); Nicely (1965); Wood (1958).

Calycanthus Linnaeus 1759 (SWEET-SHRUB)

A genus of 2-4 species, 1 (or possibly 2) of e. North America, 1 of w. North America, and 1 of China (the latter sometimes segregated as a separate genus, *Sinocalycanthus*). References: Ferry & Ferry (1987); Johnson (1997) in FNA3 (1997); Kubitzki, Rohwer, & Bittrich (1993); Nicely (1965); Weakley (2017a) in Weakley et al (2017).

Calycanthus floridus



Calycanthus floridus Linnaeus. SWEET-SHRUB, STRAWBERRY-SHRUB, CAROLINA ALLSPICE, SWEET BUBBY-BUSH. **Hab:** Mesic to dry-mesic forests and streambanks; in the East Gulf Coastal plain in dry-mesic beech-magnolia bluff forests and lower slopes of sandhills. **Dist:** PA, WV, and KY, south to GA, nw. FL, AL, s. MS, and e. LA (but note that the outer edges of the natural original distribution are obscured by centuries of cultivation and naturalization). **Phen:** Apr-May; Aug-Sep. **Tax:** Two varieties have traditionally been recognized, var. *floridus* with pubescent twigs, petioles, and leaf undersurfaces, and var. *glaucus* with glabrous (or sparsely pubescent) twigs, petioles, and leaf undersurfaces. They have broadly overlapping distributions and variable characters and seem best considered as taxonomically uninformative variation (Weakley 2017a). *C. brockianus* Ferry & Ferry (of n. GA) has been controversial, alleged to differ in pale yellowish-green tepals (vs. reddish-brown tepals) and seeds with short, curved hairs (vs. long, straighter hairs). **Syn:** = Il, NY, Va, Weakley (2017a) in Weakley et al (2017); > *Calycanthus brockiana* – K1, Ferry & Ferry (1987), orthographic variant; > *Calycanthus brockianus* – K3, K4; > *Calycanthus fertilis* Walter – F, G, S; > *Calycanthus floridus* Linnaeus – F, K4, S; > *Calycanthus floridus* var. *floridus* – Fl2, FNA3, GW2, K1, K3, NE, Pa, RAB, Tn, WH3, Ferry & Ferry (1987), Nicely (1965); > *Calycanthus floridus* Linnaeus var. *glaucus* (Willdenow) Torrey & A. Gray – C, Fl2, FNA3, K1, K3, NE, Tn, WH3, Ferry & Ferry (1987); > *Calycanthus floridus* var. *laevigatus* (Willdenow) Torrey & A. Gray – GW2, Pa, RAB, Nicely (1965); > *Calycanthus mohrii* Small – S; > *Calycanthus nanus* Loiseleur – S.

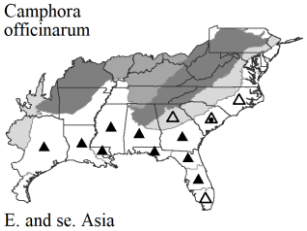
25. LAURACEAE A.L. de Jussieu 1789 (LAUREL FAMILY) [in LAURALES]

A family of about 50 genera and 2500-3500 species, trees and shrubs, of tropical, subtropical, and (rarely) warm temperate regions. *Laurus nobilis* Linnaeus, Laurel, Bay, native to the Mediterranean region of Europe and the bay leaf of commerce; planted as an ornamental and spice, especially in warmer parts of our area, but is not known to escape in our area. References: Rohwer in Kubitzki, Rohwer, & Bittrich (1993); Song et al (2020); van der Werff & Richter (1996); van der Werff (1997a) in FNA3 (1997).

2 Leaves deciduous; flowers unisexual; [tribe *Laureae*].
  3 Some of the leaves with 1-2 (-5) rounded lobes; small to medium trees..... ***Sassafras albidum***
  3 None of the leaves lobed; medium to large shrubs.
    ..... ***Lindera***
2 Leaves evergreen; flowers bisexual; [tribe *Perseeae*].
  5 Leaf surfaces glabrous, bright green; leaf venation 3-nerved from at or near the base of the blade; crushed leaves with the odor of camphor
    ..... ***Camphora officinarum***
  5 Leaf surfaces pubescent to glabrate or glabrous, dark to medium green; leaf venation strongly pinnate; principal vein axils lacking yellow domatia; crushed fresh leaves with the odor of bay.
    ..... ***Tamala***

Camphora Fabricius 1759 (CAMPHOR)

Camphora officinarum



E. and se. Asia

A genus of about XX species, trees and shrubs, of e. and se. Asia. Huang et al. (2016) showed our introduced species "*Cinnamomum camphora*" in a basal clade to the rest of *Cinnamomum*, morphologically and biogeographically distinctive, warranting its re-separation as genus *Camphora* Fabricius. References: Franck (2012); Huang et al (2016); Rohwer in Kubitzki, Rohwer, & Bittrich (1993); van der Werff (1997a) in FNA3 (1997).

* ***Camphora officinarum*** Nees. CAMPHORTREE. **Hab:** Disturbed areas, suburban woodlands, increasingly in natural forests. **Dist:** Native of e. Asia. A serious invasive, especially southwards. **Phen:** Apr-May. **Comm:** Reported as escaped and apparently naturalized in South Carolina by Hill & Horn (1997). In NC, reported for Moore County. **Syn:** = *Camphora*

Key to Map Symbology:

←rare ←uncommon ←common (see introduction for more)

* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable

X : extirpated

25. LAURACEAE

camphora (Linnaeus) Karsten – S, invalid name (tautonym); = *Cinnamomum camphora* (Linnaeus) J. Presl – Fl2, FNA3, K1, K3, K4, Tx, WH3, Franck (2012). NatureServe GNR (Not Yet Ranked).

Lindera Thunberg 1783 (SPICEBUSH, BENZOIN)

A genus of about 100 species, trees and shrubs, of tropical and temperate Asia, Australia, and e. North America. References: McCartney, Wurdack, & Moore (1989); Rohwer in Kubitzki, Rohwer, & Bittrich (1993); Steyermark (1949); Wofford (1983); Wofford (1997a) in FNA3 (1997).

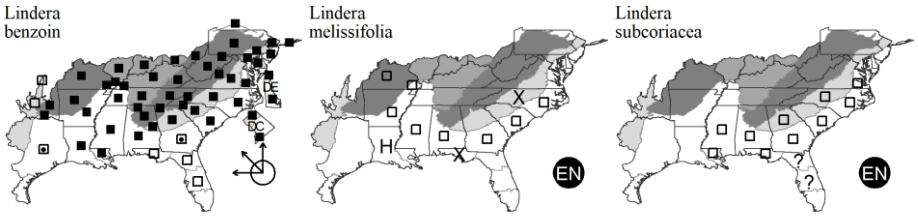
Identification Notes: The odor of *Lindera* leaves decreases in the fall and may not be detectable.

1 Leaves typically with a thick, subcoriaceous texture (though sometimes thinner in texture if growing in shade), 4-8 (-10.5 in male plants) cm long, 2-3.5 (-4.8 in male plants) cm wide, narrowly obovate to oblanceolate (and characteristically also with smaller broadly obovate leaves basal on the branches), pubescent and strongly whitened below; leaves and bark aromatic, the odor lemony ..... ***Lindera subcoriacea***
1 Leaves with a thin, membranous texture, 6-16 cm long, 2-6 cm wide, obovate, elliptic, or ovate, glabrous to pubescent below, but not strongly whitened; leaves and bark strongly aromatic, the odor spicy or like sassafras.
2 Leaf base cuneate; leaves widely obovate, plane (not rugose), with a short-acuminate apex, glabrous above, borne horizontally, spicy-fragrant when crushed; shrubs not colonial, often multi-stemmed from base, short to tall (to 5 m tall); fruiting pedicels 3-5 mm long ..... ***Lindera benzoin***
2 Leaf base widely cuneate to rounded; leaves narrowly ovate, reticulate-rugose, with an acute apex, pubescent above, drooping, fragrant when crushed with an odor like sassafras; shrubs colonial, short (to 2 m tall); fruiting pedicels 7-12 mm long ..... ***Lindera melissifolia***

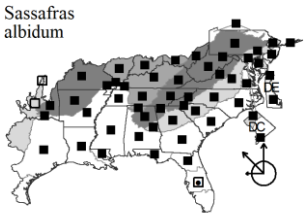
Lindera benzoin (Linnaeus) Blume. NORTHERN SPICEBUSH. **Hab:** Rich alluvial forests, mesic forests on slopes with circumneutral soils, bottomlands, swamps. **Dist:** ME, s. ON, and MI, south to Panhandle FL and e. TX; disjunct in Edwards Plateau of c. TX. **Phen:** Mar-Apr; Aug-Sep. **Tax:** Some floristic treatments recognize two varieties based on whether the leaves and young twigs are pubescent (var. *pubescens*) or not (var. *benzoin*) but the varieties so recognized overlap broadly in distribution; it seems best to regard this as mere variation within the species. **Comm:** Where occurring on upland slopes, *L. benzoin* is an excellent indicator of base-rich soils, generally derived from calcareous sedimentary rocks or mafic metamorphic or igneous rocks. **Syn:** = Ar, Fl2, FNA3, GrPl, GW2, K3, K4, Mi, NE, NY, Pa, RAB, Tn, Va, W, WH3, WV, Wofford (1983); = *Benzoin aestivale* (Linnaeus) Nees – S; > *Lindera benzoin* var. *benzoin* – C, F, G, Il, K1; > *Lindera benzoin* (Linnaeus) Blume var. *pubescens* (Palmer & Steyermark) Rehder – C, F, G, Il, K1, NcTx, Tx.

Lindera melissifolia (Walter) Blume. SOUTHERN SPICEBUSH, PONDBERRY. **Hab:** Wet flats and depressions, generally with pocosin shrubs. **Dist:** This species is southern in range, with a very scattered distribution in se. and c. NC, e. SC, e. & sw. GA, nw. FL, sw. AL (?), nw. MS, se. MO-AR, and se. AR-LA (recent collections unknown from FL and LA). It is nearly extirpated in NC, currently known only from three populations, in Sampson, Bladen, and Cumberland counties. A historic record from Orange County, NC (in the lower Piedmont), collected by Elisha Mitchell in 1820 and 1822, appears to be bonafide (McVaugh, McVaugh, & Ayers 1996). **Phen:** Mar-Apr; Aug-Sep. **Syn:** = Ar, Fl2, FNA3, K1, K3, K4, WH3, Wofford (1983); = *Benzoin melissaefolium* (Walter) Nees – S; = *Lindera melissaefolia* – F, GW2, RAB, orthographic variant. NatureServe G3 (Vulnerable); USESA E.

Lindera subcoriacea Wofford. BOG SPICEBUSH. **Hab:** Peaty seepage bogs in headwaters of blackwater streams, in the sandhills and immediately adjacent Piedmont, with other pocosin shrubs. **Dist:** The overall range of this newly described species is still poorly known; it appears to be a Southeastern Coastal Plain endemic, ranging from se. VA (perhaps s. NJ) south to FL and west to LA. **Phen:** Mar-Apr; Jul-Aug. **Comm:** Occurring in the Carolinas primarily in a scattering of small populations in the fall line Sandhills of NC and SC, with an outlier or two in "Piedmont pocosins" just west of the Sandhills. Anderson (1999) reports on the sexual dimorphism of the species, with male plants having larger leaves. Reports in some areas (as VA) have been doubted as being authentic *L. subcoriacea*. **ID Notes:** Distinctive characteristics of sun-grown plants include the rounded apex of the leaf, the leaf strongly whitened beneath and borne in an ascending to even appressed position in relation to the twigs, and a typically fastigiate or virgate branching pattern, with multiple stems or branches ascending vertically and nearly parallel to one another. Shade plants have a different form. **Syn:** = Fl2, FNA3, K1, K3, K4, WH3, Wofford (1983); = n/a – RAB. NatureServe G3 (Vulnerable).



Sassafras J. Presl 1825 (SASSAFRAS)



A genus of 3 species, trees, of temperate e. Asia (2 species) and e. North America (1 species). References: Rohwer in Kubitzki, Rohwer, & Bittrich (1993); van der Werff (1997a) in FNA3 (1997).

Sassafras albidum (Nuttall) Nees. SASSAFRAS. **Hab:** A wide variety of forests, old fields, disturbed areas, fencerows. **Dist:** S. ME, s. ON, MI, and s. WI, south to c. peninsular FL, s. AL, s. MS, and se. TX. **Phen:** Mar-Apr; Jun-Jul. **Comm:** The original source of 'root beer'. **Syn:** = Ar, C, Fl2, FNA3, G, GrPl, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, Tn, Va, W, WH3; > *Sassafras albidum* var. *albidum* – F, Il, Tx, WV; > *Sassafras albidum* var. *molle* (Rafinesque) Fernald – F, Il, Tx, WV.

Key to Map Symbology: □ native; ◇ maybe exotic; △ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

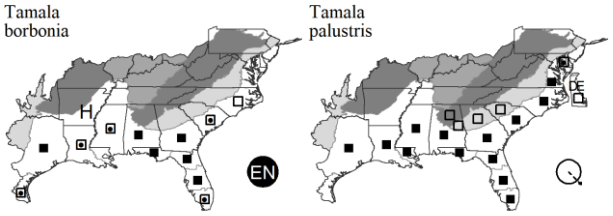
Tamala Rafinesque 1838 (BAY, RED-BAY)

A genus of 3 species, trees and large shrubs, of se. North America and the Bahamas. Song et al. (2020) and other recent phylogenetic studies showed that the current circumscription of *Persea* is untenable, and our three native species should be placed in another genus, *Tamala* (as done by Small 1933). The affinities of *Tamala* appear to be with Asian genera, not with *Persea* s.s. References: Clewell (1985); Godfrey (1988); Rohwer in Kubitzki, Rohwer, & Bittrich (1993); Shearman, Wang, & Mayfield (2022); Song et al (2020); Wofford (1997b) in FNA3 (1997).

1 Lower surfaces of leaves with ascending to spreading, rusty hairs, especially evident along the midrib and principal veins; peduncles 4-7 cm long; leaf blades tending to be larger and more acute; drupe 7-9 mm in diameter **.....*Tamala palustris***
1 Lower surfaces of leaves with appressed hairs, silvery, golden, or blackish (the color depending on age), uniform across the surface and veins; peduncles 1-3 cm long; leaves tending to be smaller and blunter; drupe 8-12 mm in diameter.
.....*Tamala borbonia*

Tamala borbonia (Linnaeus) Rafinesque. RED BAY, TISSWOOD. **Hab:** Hammocks, dunes, maritime forests, in dry sandy soils on barrier islands. **Dist:** E. NC (Carteret County) south to s. FL and west to s. TX; reports of the species north of NC are based on the inclusion of *T. palustris* in a broadly defined *T. borbonia*, or are simply in error, based on less hairy plants of *T. palustris*. **Phen:** May-Jun; Sep-Oct. **Comm:** This species is rare north of Florida and becoming rarer with the destruction of most maritime and near coastal upland forests for the construction of vacation homes and tourist accommodations. **Syn:** = *Persea borbonia* (Linnaeus) Sprengel – Ar, FNA3, G, GW2, K1, K3, K4, Godfrey (1988), Shearman, Wang, & Mayfield (2022); = *Persea borbonia* var. *borbonia* – Fl2, WH3; < *Persea borbonia* (Linnaeus) Sprengel – F, RAB, Tx; > *Tamala borbonia* (Linnaeus) Rafinesque – S; > *Tamala littoralis* (Small) Small – S.

Tamala palustris Rafinesque. SWAMP BAY. **Hab:** Swamps, pocosins, bay forests, maritime forests, generally in wet peaty soils, but also in fairly dry, sandy soils in maritime forests. **Dist:** DE, e. MD, and se. VA south to s. FL and west to se. TX; Bahamas. **Phen:** May-Jun; Sep-Oct. **ID Notes:** Though variable in amount of hairs on the leaves, the hairs of *T. palustris* are always of a distinctly different character than those of *T. borbonia* (see key). **Syn:** = *Persea palustris* (Rafinesque) Sargent – C, Fl2, FNA3, G, GW2, K1, K3, K4, Va, WH3, Godfrey (1988), Shearman, Wang, & Mayfield (2022); = *Tamala pubescens* (Pursh) Small – S; < *Persea borbonia* (Linnaeus) Sprengel – Bah, F, RAB, Tx.



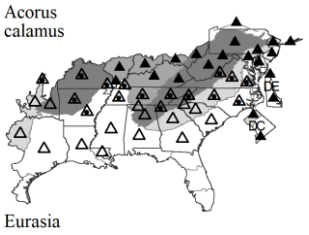
Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

SECTION 5: MONOCOTYLEDONAE (MONOCOTS)

27. ACORACEAE Martinov 1820 (CALAMUS FAMILY) [in ACORALES]

The family consists only of *Acorus*, a genus of 2-4 species, perennial herbs. Although traditionally treated as part of the Araceae, a wide variety of morphological, anatomical, and embryological evidence supports the segregation of the Acoraceae (Grayum 1987), a segregation additionally supported by molecular studies (Duvall et al. 1993; Chase et al. 1993). The spathe in *Acorus* is not morphologically equivalent to the spathe of the Araceae. References: Bogner & Mayo in Kubitzki (1998b); Thompson (2000a) in FNA22 (2000).

Acorus Linnaeus 1753 (CALAMUS, SWEETFLAG)



A genus of 3-4 species, perennial herbs, widespread in north temperate and subtropical regions. References: Grayum (1987); Haines (2000); Simmons et al (2020); Spaulding et al (2019); Thompson (2000a) in FNA22 (2000).

* ***Acorus calamus*** Linnaeus. EUROPEAN CALAMUS, SWEETFLAG. **Hab:** Marshes, wet meadows, other wet areas. **Dist:** Native of Eurasia, now widespread in e. North America. **Phen:** May-Jun. **Tax:** Populations of *A. calamus* in our area are apparently sterile triploids introduced from Europe, though diploid and tetraploid populations of *A. calamus* are known from Asia. **Comm:** The aromatic rhizome and leaves have been used medicinally and candied as a confection. **Syn:** = Ar, ETx1, FNA22, Il, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, Tx, Va, Spaulding et al (2019); < *Acorus americanus* (Rafinesque) Rafinesque – W; < *Acorus calamus* Linnaeus – C, F, G, GrPl, GW1, RAB, S.

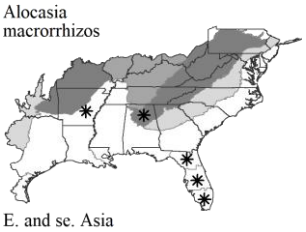
28. ARACEAE A.L. de Jussieu 1789 (ARUM FAMILY) [in ALISMATALES]

A family of about 100-110 genera and about 3000-4000 species, herbs and reduced aquatic herbs, cosmopolitan, but mostly tropical and subtropical. Circumscription of the Araceae is uncertain. Recent phylogenetic studies (Lee et al. 2019) show four distinctive and major clades in what is now (APG IV 2016) generally considered to comprise Araceae s.l., with the four clades generally now treated as subfamilies: Gymnostachydoideae, Orontioideae, Lemnoideae, and Aroideae. A strong case exists for treating these morphologically and molecularly disparate clades at family rank, as has variably been done traditionally. References: Bown (2000); Cabrera et al (2008); Cusimano et al (2011); Keating (2004); Landolt in Kubitzki (1998b); Landolt (1980); Landolt (1986); Landolt (2000) in FNA22 (2000); Lee et al (2019); Les & Crawford (1999); Mayo, Bogner, & Boyce in Kubitzki (1998b); Nauheimer, Metzler, & Renner (2012); Serviss, McDaniel, & Bryson (2000); Thompson (2000b) in FNA22 (2000).

1 Plant a floating aquatic (or stranded), the individual thalloid leaves < 2 cm long; [subfamily *Lemnoideae*].
  2 Fronds rootless; fronds without nerves; reproductive pouch 1, terminal.
    3 Fronds thick, globoid, < 2 mm long ..... ***Wolffia***
    3 Fronds flat, elongate and curved, 4-14 mm long ..... ***Wolffiella***
  2 Fronds with roots; fronds with 1 or more nerves; reproductive pouches 2, lateral.
    4 Roots 1 per frond; fronds with 1-5 (-7) nerves ..... ***Lemna***
    4 Roots (1-) 2-21 per frond; fronds with (3-) 5-21 nerves.
      5 Roots (1-) 2-7 (-12) per frond; fronds with (3-) 5-7 nerves; fronds 1.5-3× as long as wide; all of the roots perforating the scalelike leaflet ..... ***Landoltia punctata***
      5 Roots 7-21 per frond; fronds with 7-16 (-21) nerves; fronds 1-1.5× as long as wide; only some of the roots perforating the scalelike leaflet (borne on the underside) ..... ***Spirodela***
1 Plant terrestrial, rooted in wetlands, or a floating aquatic (if a floating aquatic – *Pistia* – the individual leaves > 2 cm long).
  6 Plant a floating aquatic, with gray-green, velvety, cabbage-like leaves; [subfamily Aroideae, tribe Pistieae] ..... ***Pistia stratiotes***
  6 Plant rooted (even when growing in water), the leaves various, but not as above.
    7 Leaves compound (or sometimes very deeply 3-lobed, with only <3 mm leaf tissue connecting the lobes). ..... ***Arisaema***
    7 Leaves simple.
      10 Leaves both peltate and cordate-hastate; [subfamily Aroideae, tribe Colocasieae]
        11 Primary lateral veins and midrib of abaxial leaf surfaces with wax glands; mature fruit orange or red and odorless, some containing a few large seeds ..... ***Alocasia***
        11 Primary lateral veins and midrib of abaxial leaf surfaces without wax glands; fruits inconspicuously colored and odorous, with many small mucilaginous seeds ..... ***Colocasia esculenta***
      10 Leaves not peltate, either cuneate, rounded, cordate, or hastate.
        12 Spathe absent or obscure; leaf blade 2.5-5× as long as wide, cuneate at the base, lanceolate or narrowly elliptic; leaf venation parallel; [subfamily Orontioideae, tribe Orontieae] ..... ***Orontium aquaticum***
        12 Spathe present, surrounding the spadix, at least at its base; leaf blade 1-2.5× as long as wide, either hastate at the base (*Arum*, *Peltandra*, *Syngonium*, and *Xanthosoma*), or rounded (*Symplocarpus*), or cordate (*Calla*), broadly ovate in outline.
          16 Larger leaf blades > 5 dm long; longer petioles 10-20 dm long; [subfamily Aroideae, tribe Caladieae] ..... ***Xanthosoma sagittifolium***
          16 Larger leaf blades < 5 dm long; longer petioles < 7 dm long.
            17 Plant from a horizontal tuber; leaves variegated; [alien, of moist soils]; [subfamily Aroideae, tribe Areae] ..... ***Arum italicum ssp. italicum***
            17 Plant from fibrous roots; leaves not variegated; [native, of wetlands]; [subfamily Aroideae, tribe Peltandreae] ..... ***Peltandra***

Key to Map Symbology: □⊙■ └native┘ ◇◈◆ └maybe exotic┘ △◬▲ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated

Alocasia (Schott) G. Don 1839



A genus of 80-100 species, perennial herbs, of s. Asia and Malesia. References: Thompson (2000b) in FNA22 (2000).

* ***Alocasia macrorrhizos*** (Linnaeus) G. Don. GIANT TARO. **Hab:** Wet, disturbed areas, dumpsites. **Dist:** Native of tropical Asia. **Syn:** = FNA22, K3, K4, WH3. NatureServe G5 (Secure).

Arisaema Martius 1831 (JACK-IN-THE-PULPIT, INDIAN-TURNIP)

A genus of about 150-170 species, of Asia, e. North America, e. Africa, and Arabia. The taxa of the *Arisaema triphyllum* complex have been variously treated as species, subspecies, varieties, and forms. They are here treated as species with relatively subtle morphological distinctions; they are broadly sympatric, and sometimes occur together in mixed populations with little sign of introgression or hybridization and seem to behave as biological species. *A. quinatum* has often been treated as a full species and seems to warrant that status. *A. stewardsonii* seems amply distinct in morphology, northern distribution, and boggy habitat. *A. triphyllum* is tetraploid and does not produce fertile seed when crossed with the other (diploid) taxa, including *A. pusillum*, with which it is broadly sympatric (Treiber 1980). The size (though diploid) and strongly attenuated spathe apex seem good reason to accord *A. acuminatum* species status as well. References: Gusman & Gusman (2002); Huttleston (1949); Huttleston (1981); Mayo, Bogner, & Boyce in Kubitzki (1998b); Renner, Zhang, & Murata (2004); Spaulding et al (2019); Thompson (2000b) in FNA22 (2000); Treiber (1980); Ward (2012b).

Identification Notes: Can be confused in vegetative condition with *Pinellia*.

1 Leaf with (5-) 7-15 leaflets, arranged pedately on a semicircular axis; spadix 9-20 cm long, attenuate, long-exserted from the spathe; [section *Tortuosa*] ..... ***Arisaema dracontium***

1 Leaf with 3-5 leaflets, arranged palmately; spadix 3.5-8 cm long, clavate or cylindrical and blunt, included in the spathe; [section *Pedatisecta*].

2 Leaves glaucous beneath at maturity; spathe flange 2-9 mm broad; spathe hood green, or green with purple stripes; sterile spadix (appendix) clavate or cylindrical.

3 Leaves (3-) 5-foliolate (the lateral leaflets of at least the primary leaf 2-parted or 2-lobed); sterile spadix 1-3 mm in diameter, cylindrical, gently curved outward; spathe hood green, obtuse to abruptly acute; [s. NC and TN south to Panhandle FL, LA, and e. TX] ..... ***Arisaema quinatum***

3 Leaves 3-foliolate (the lateral leaflets undivided, rarely lobed); sterile spadix (appendix) 4-10 mm in diameter, cylindrical to clavate, straight; spathe hood green, or green striped with purple, long-acute; [NB west to se. MB, south to peninsular FL, LA, and e. TX] ..... ***Arisaema triphyllum***

2 Leaves green beneath at maturity (very rarely glaucous); spathe flange 1-3 mm broad; spathe hood green with white stripes, green with purple stripes, solid green, or solid purple; sterile spadix (appendix) cylindrical.

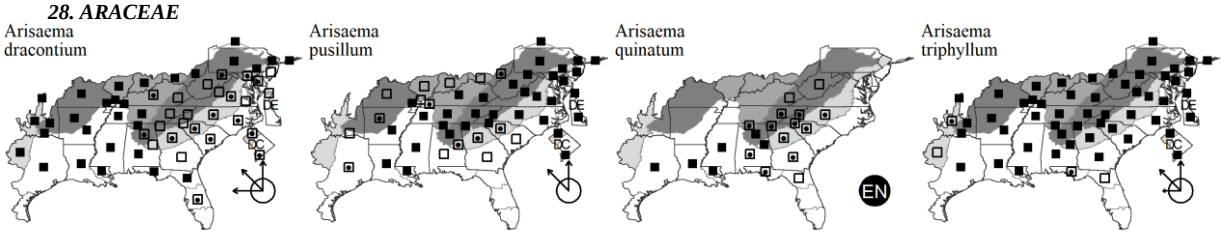
..... ***Arisaema pusillum***

Arisaema dracontium (Linnaeus) Schott. GREEN DRAGON. **Hab:** Bottomlands and floodplains, rarely in uplands over mafic rocks. **Dist:** S. QC, MI, and WI, south to n. peninsular FL and e. TX. **Phen:** May-Jun; Jul-Aug. **Tax:** Ward (2012b) recognizes two varieties: var. *dracontium* with the "spathe tightly inrolled around the spadix, to 1.5 cm broad when unrolled" and var. *macrospathum* (Bentham) D.G. Huttleston ex D.B. Ward, with the "spathe flared distally, forming a blade, to 2.5 cm broad". The latter entity is based on a type in Mexico, and is very unlikely to be correctly applied. **Syn:** = Ar, C, ETx1, F, FNA22, G, GrPl, GW1, Il, K1, K4, Mi, Mo1, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, W, WH3, Gusman & Gusman (2002), Spaulding et al (2019); = *Muricauda dracontium* (Linnaeus) Small – S; > *Arisaema dracontium* var. *dracontium* – K3, Ward (2012b); > *Arisaema dracontium* var. *macrospathum* (Bentham) D.G. Huttleston ex D.B. Ward – K3, Ward (2012b). NatureServe G5 (Secure).

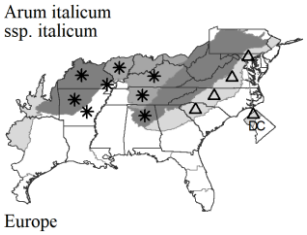
Arisaema pusillum (Peck) Nash. SMALL JACK-IN-THE-PULPIT, SWAMP JACK. **Hab:** Swamps and moist forests. **Dist:** CT, NY, and IN, south to GA, LA, and e. TX. **Phen:** Mar-May; Jul-Sep. **Comm:** This taxon is diploid (2n=28). **Syn:** = S, Spaulding et al (2019); = *Arisaema triphyllum* (Linnaeus) Schott – F, apparently misapplied; = *Arisaema triphyllum* (Linnaeus) Schott ssp. *pusillum* (Peck) Huttleston – Il, K1, NE, NY, Pa, Tn, Va, Huttleston (1949), Huttleston (1981); = *Arisaema triphyllum* var. *pusillum* Peck – C, G, Tx; < *Arisaema triphyllum* (Linnaeus) Schott – Ar, ETx1, FNA22, GW1, Mi, RAB, W, WH3; < *Arisaema triphyllum* (Linnaeus) Schott ssp. *pusillum* (Peck) Huttleston – K3, K4, Gusman & Gusman (2002), Treiber (1980); < *Arisaema triphyllum* var. *pusillum* Peck – Ward (2012b). NatureServe G5T5 (Secure).

Arisaema quinatum (Nuttall) Schott. SOUTHERN JACK-IN-THE-PULPIT, PREACHER JOHN. **Hab:** Mesic forests, bottomlands. **Dist:** Sc. NC, sw. NC, se. TN south to Panhandle FL and e. TX. **Phen:** Mar-Jun; Jul-Sep. **Tax:** This taxon has been of controversial validity and rank; Treiber lumped it with ssp. *pusillum*, while Huttleston recognized it as a full species (Huttleston 1949) or as a subspecies (Huttleston 1981). It is reported to flower later than *A. pusillum* or *A. triphyllum* when sympatric (Tennessee Flora Committee 2015). This taxon is diploid (2n=28). **Syn:** = GW1, S, Tn, Tx, WH3, Huttleston (1949), Ward (2012b); = *Arisaema triphyllum* (Linnaeus) Schott ssp. *quinatum* (Nuttall) Huttleston – ETx1, K1, Huttleston (1981); < *Arisaema triphyllum* (Linnaeus) Schott – FNA22, RAB, W; < *Arisaema triphyllum* (Linnaeus) Schott ssp. *pusillum* (Peck) Huttleston – K3, K4, Gusman & Gusman (2002), Treiber (1980).

Arisaema triphyllum (Linnaeus) Schott. COMMON JACK-IN-THE-PULPIT. **Hab:** Mesic forests, bottomlands. **Dist:** NB west to se. MB, south to Panhandle FL, LA, and e. TX (Treiber 1980). **Phen:** Mar-Apr. **Comm:** This taxon is tetraploid (2n=56). **Syn:** = S, Spaulding et al (2019); = *Arisaema atrorubens* (Aiton) Blume – F; = *Arisaema triphyllum* (Linnaeus) Schott ssp. *triphyllum* – Il, K1, K3, K4, Mo1, NE, NY, Pa, Tn, Va, Gusman & Gusman (2002), Huttleston (1949), Huttleston (1981), Treiber (1980); = *Arisaema triphyllum* var. *triphyllum* – C, Tx, Ward (2012b); < *Arisaema triphyllum* (Linnaeus) Schott – Ar, ETx1, FNA22, GrPl, GW1, Mi, RAB, W, WH3.



Arum Linnaeus 1753 (ARUM)

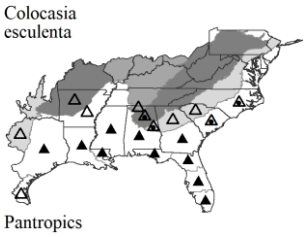


A genus of about 26 species, of temperate Eurasia. References: Boyce (1993); Linz et al (2010); Mayo, Bogner, & Boyce in Kubitzki (1998b); Thompson (2000b) in FNA22 (2000).

* ***Arum italicum*** P. Miller *ssp.* ***italicum***. ITALIAN ARUM, LORDS-AND-LADIES. **Hab:** Suburban woodlands, naturalizing from horticultural use. **Dist:** Native of Europe and n. Africa. Reported for Fairfax County, VA (Steury 2010). **Phen:** Apr-May; Jul-Sep. **Comm:** It has a large (> 10 cm long) greenish-white spathe. **Syn:** = Mo1, NY, Pa, Boyce (1993); < *Arum italicum* – Ar, FNA22, Il, K4. NatureServe GNR (Not Yet Ranked).

Colocasia Schott 1832 (ELEPHANT'S-EAR, TARO, DASHEEN)

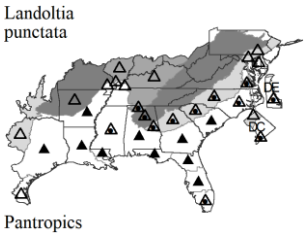
A genus of about 8 species, of tropical Asia. References: Mayo, Bogner, & Boyce in Kubitzki (1998b); Serviss, McDaniel, & Bryson (2000); Spaulding et al (2019); Thompson (2000b) in FNA22 (2000).



* ***Colocasia esculenta*** (Linnaeus) Schott. ELEPHANT'S-EAR, TARO, DASHEEN, COCO-YAM, EDDO. **Hab:** Ditches, shores, bottomland hardwood forests. **Dist:** Native of the Tropics. Frequently planted for its "tropical" appearance, becoming naturalized, for instance at Lake Waccamaw, Columbus County, NC, where it grows scattered along much of the shoreline, spread by fragments of rhizome. **Phen:** Jun-Oct. **Tax:** See Serviss, McDaniel, & Bryson (2000) for a discussion of various varieties cultivated in the southeastern United States, their identification, and their weediness. **Comm:** In our area, it is generally infertile. In the Tropics, *Colocasia* is a food crop cultivated for its rhizomes and shoots. The rhizomes are the source of "poi", a starchy staple of the Hawaiian Islands. **Syn:** = Ar, ETx1, FNA22, GW1, K1, NcTx, WH3, Spaulding et al (2019); > *Colocasia antiquorum* Schott – S; > *Colocasia esculenta* var. *antiquorum* (Schott) Hubb. & Rehder – K3, K4, Serviss, McDaniel, & Bryson (2000); > *Colocasia esculenta* (Linnaeus) Schott var. *aquatilis* Hasskarl – K3, K4; > *Colocasia esculenta* var. *esculenta* – K3, K4, Serviss, McDaniel, & Bryson (2000); > *Colocasia esculenta* (Linnaeus) Schott var. *nymphiifolia* (Ventenat) A.F. Hill – K3, K4. NatureServe GU (Unrankable).

Landoltia D.H. Les & D.J. Crawford 1999 (DUCKMEAT)

A monotypic genus, now cosmopolitan. References: Landolt in Kubitzki (1998b); Landolt (1980); Landolt (1986); Landolt (2000) in FNA22 (2000); Les & Crawford (1999); Spaulding et al (2019).



* ***Landoltia punctata*** (G.F.W. Meyer) Les & D.J. Crawford. DOTTED DUCKMEAT. **Hab:** Still to slowly moving waters of ponds, lakes, beaver ponds, and swamps. **Dist:** Native of the Southern Hemisphere. Widespread worldwide. **Tax:** Les & Crawford (1999) make a good case for recognition of this species in the monotypic genus *Landoltia*, very possibly more closely related to *Lemna* than to *Spirodela*. **Comm:** An introduced aquarium plant. **Syn:** = Ar, ETx1, FNA22, K3, NE, Pa, Tn, Va, WH3, Les & Crawford (1999), Spaulding et al (2019); = *Spirodela oligorhiza* – Tx, orthographic variant; = *Spirodela oligorrhiza* (Kurz) Hegelmann – F, G, K4, RAB; = *Spirodela punctata* (G.F.W. Meyer) C.H. Thompson – C, GW1, Il, K1, NcTx, Landolt (1980), Landolt (1986). NatureServe G5 (Secure).

Lemna Linnaeus 1753 (DUCKWEED)

A genus of 13 species, cosmopolitan. References: Bog et al (2020); Landolt in Kubitzki (1998b); Landolt (1980); Landolt (1986); Landolt (2000) in FNA22 (2000); Spaulding et al (2019).

2 Fronds with (0-) 1 nerve; anthocyanin absent in fronds (fronds green); [section *Uninerves*].
  3 Fronds 1-2× as long as wide; nerve indistinct to fairly prominent, reaching at most 2/3 of the distance from node to apex (nerve about as long as or shorter than the aerenchymatous portion of the frond); fruit 0.6-1.0 mm long ..... ***Lemna minuta***
  3 Fronds 1.3-3× as long as wide; nerve mostly prominent, reaching at least 3/4 of the distance from node to apex (nerve longer than the aerenchymatous portion of the frond); fruit 1.0-1.35 mm long ..... ***Lemna valdiviana***
2 Fronds with 3-5 (-7) nerves; anthocyanin absent or present in fronds (fronds green or red).
  4 Root sheath winged at the base; root tip sharply pointed; roots not longer than 3 cm long; anthocyanin absent in fronds; [section *Alatae*]. ..... ***Lemna aequinoctialis***
  4 Root sheath not winged at the base; root tip mostly rounded; roots often longer than 3 cm long; anthocyanin present or absent in fronds; [section *Lemna*].
    6 Plants forming small, olive-brown rootless turions, 0.8-1.6 mm in diameter, which sink to the bottom ..... ***Lemna turionifera***

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

6 Plants without distinct turions.
8 Fronds often gibbous; fronds with very distinct papillae above the node and near the apex on the upper surface, but not between the node and the apex; seeds with 10-16 distinct ribs.....***Lemna obscura***
8 Fronds flat; fronds with mostly distinct papillae on the midline on the upper surface; seeds with 3-60 indistinct ribs.....***Lemna turionifera***

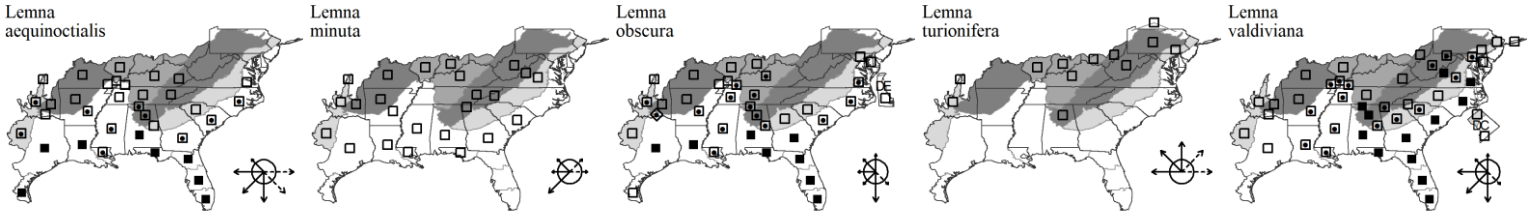
Lemna aequinoctialis Welwitsch. LESSER DUCKWEED. **Hab:** Still to slowly moving waters of ponds, lakes, beaver ponds, and swamps. **Dist:** Widespread worldwide, except in n. North America and n. Eurasia. **Syn:** = ETx1, FNA22, K1, K3, K4, NcTx, Va, WH3, Landolt (1980), Landolt (1986), Spaulding et al (2019); > *Lemna aequinoctialis* Welwitsch – Il; > *Lemna trinervis* (Austin) Small – Il, Tx.

Lemna minuta Kunth. LEAST DUCKWEED. **Hab:** Quiet waters, seepages. **Dist:** Widespread in North America, Central America, and South America; more local in Europe and Japan. **Syn:** = Ar, C, ETx1, FNA22, Il, K1, K3, NcTx, NE, WH3, Bog et al (2020); = *Lemna minima* – Tx; = *Lemna minuscula* Herter – Landolt (1980), Landolt (1986); = *Lemna valdiviana* Philippi var. *abbreviata* Hegelmann – F, K4; < *Lemna valdiviana* Philippi – GrPl.

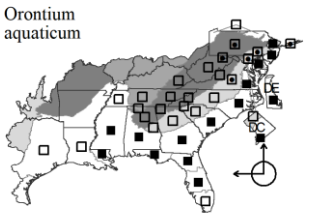
Lemna obscura (Austin) Daubs. LITTLE DUCKWEED. **Hab:** Still to slowly moving waters of ponds, lakes, beaver ponds, and swamps. **Dist:** NY west to MN and NE, south to s. FL, TX, Mexico, and the Bahamas. **Syn:** = Ar, Bah, ETx1, FNA22, Il, K1, K3, NcTx, Pa, Tn, Va, WH3, Landolt (1980), Landolt (1986), Spaulding et al (2019); < *Lemna minor* Linnaeus – C, F, G, GrPl, RAB.

Lemna turionifera Landolt. TURION DUCKWEED, RED DUCKWEED. **Hab:** Mesotrophic to eutrophic, quiet waters. **Dist:** Circumboreal, in North America from NL (Newfoundland) west to AK, south to c. PA (Rhoads & Klein 1993; Rhoads & Block 2007), WV, KY, n. AL (FNA), TX, NM, AZ, and CA. **Syn:** = ETx1, FNA22, Il, K1, K3, K4, Mi, NE, NY, Pa; < *Lemna gibba* Linnaeus – GrPl; < *Lemna minor* Linnaeus – C.

Lemna valdiviana Philippi. PALE DUCKWEED. **Hab:** Still to slowly moving waters of ponds, lakes, beaver ponds, and swamps. **Dist:** Widespread in North America, Central America, and South America. **Phen:** Jun-Sep. **Syn:** = Ar, C, ETx1, FNA22, G, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, W, WH3, WV, Bog et al (2020), Landolt (1980), Landolt (1986), Spaulding et al (2019); = *Lemna valdiviana* var. *valdiviana* – F; < *Lemna valdiviana* Philippi – GrPl.



Orontium Linnaeus 1753 (GOLDEN CLUB)



A monotypic genus, an aquatic herb, of e. North America. References: Lee et al (2019); Mayo, Bogner, & Boyce in Kubitzki (1998b); Nie et al (2006); Spaulding et al (2019); Thompson (2000b) in FNA22 (2000).

Orontium aquaticum Linnaeus. GOLDEN CLUB, BOG TORCHES, NEVER-WET. **Hab:** Generally in peaty and stagnant water (acidic to calcareous), such as beaver ponds, blackwater streams, swamps, pools in low pocosins, streambeds in the Piedmont, bogs and swamps in the mountains, tidal freshwater marshes. **Dist:** MA and c. NY south to s. FL and west to LA and e. TX, north in the inland to w. NC, KY, and WV, primarily but by no means strictly Coastal Plain. **Phen:** Feb-May; May-Jul. **ID Notes:** The fresh leaves are unwettable, silvery-glistening when forced under water. **Syn:** = C, ETx1, F, FNA22, G, GW1, K1, K3, K4, NE, NY, Pa, RAB, S, Tx, Va, W, WH3, WV, Spaulding et al (2019). NatureServe G5 (Secure).

Peltandra Rafinesque 1819 (ARROW-ARUM)

A genus of 2 species, endemic to e. North America. References: Blackwell & Blackwell (1974); Fernald (1948); Mayo, Bogner, & Boyce in Kubitzki (1998b); Spaulding et al (2019); Thompson (2000b) in FNA22 (2000).

Identification Notes: *Peltandra* is often confused in vegetative condition with *Pontederia* and *Sagittaria*, superficially similar emergent aquatics with hastate or sagittate leaves. *Peltandra* leaves have pinnate venation, a prominent midvein, a prominent vein running parallel to the leaf margin, and the hastate lobes with rounded to acute apices. *Pontederia* leaves have parallel venation, lack a prominent midvein and a prominent vein parallel to the leaf margin, and have hastate lobes with broadly rounded apices. The leaves of sagittate species of *Sagittaria* have parallel venation, a prominent midrib, a vein at 90 degrees to the midrib at the junction of the main blade and each of the hastate lobes that forks, with at least one fork directed apically and at least one fork directed into the basal lobe, lack a prominent vein parallel to the margin, and have hastate-sagittate lobes with acuminate apices.

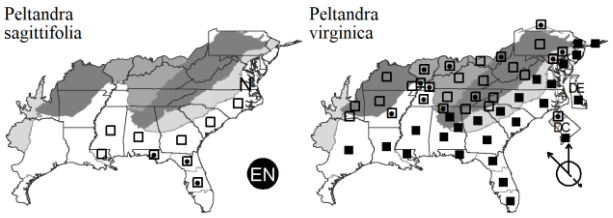
1 Spathe green at base, bright white above (the white portion not merely a margin), flared open and therefore only loosely surrounding the spadix, succulent below, the white portion thin and herbaceous, the margins generally nearly entire and plane; fruits red; distal portion of leaf blade lacking broad, coarse veins similar to the midvein (all the veins alike and fine); leaf underside distinctly paler than upper surface, and glaucescent.....***Peltandra sagittifolia***
1 Spathe green (rarely with a narrow cream-colored or whitish margin up to 1.7 cm wide), tightly surrounding the spadix, thick and succulent throughout, the margins crisped; fruits green to dark purplish-green; distal portion of leaf blade often with several broad, coarse veins similar to the midvein, the remainder of the veins fine (sometimes the distal portion of the leaf with fine veins only); leaf underside somewhat paler green than upper surface, but not at all glaucescent .....***Peltandra virginica***

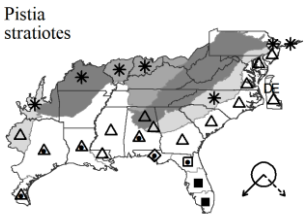
Peltandra sagittifolia (Michaux) Morong. SPOONFLOWER, WHITE ARROW-ARUM. **Hab:** Pocosins of the outer Coastal Plain, sphagnous swamps. **Dist:** A Southeastern Coastal Plain endemic: e. NC south to c. peninsular FL and west to se. LA. **Phen:** Jul-Aug. **Syn:** = FNA22, GW1, K1, K3, K4, WH3; = *Peltandra glauca* (Elliott) Feay – S; = *Peltandra sagittaefolia* (Michaux) Morong – RAB, orthographic variant; = *Peltandra virginica* ssp. *luteospadix*

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more)
* : waif EN : endemic H : historic
N : no P : planted ? : questionable
X : extirpated

(Fernald) Blackwell & Blackwell – Blackwell & Blackwell (1974), misapplied; >< *Peltandra luteospadix* Fernald – F, Fernald (1948), misapplied. NatureServe G3G4 (Vulnerable).

Peltandra virginica (Linnaeus) Schott. GREEN ARROW-ARUM, TUCKAHOE. **Hab:** Marshes, bogs, beaver ponds, pocosins, other stagnant, aquatic situations, freshwater to oligohaline tidal marshes. **Dist:** ME, s. QC, and n. MI south to s. FL and e. TX; Cuba. **Phen:** May-Jun. **Syn:** = Ar, C, ETx1, FNA22, G, GW1, Il, K1, K3, K4, Mi, Mo1, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, Spaulding et al (2019); = *Peltandra virginica* ssp. *virginica* – Blackwell & Blackwell (1974); > *Peltandra luteospadix* Fernald – F, Fernald (1948); > *Peltandra virginica* (Linnaeus) Schott – F, Fernald (1948).

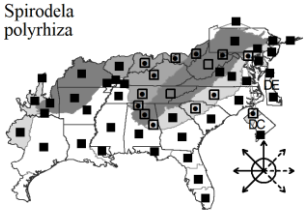




Pistia Linnaeus 1753 (WATER LETTUCE)

A genus of probably a single species, widespread in the tropics of both hemispheres. References: Evans (2013); Mayo, Bogner, & Boyce in Kubitzki (1998b); Spaulding et al (2019); Thompson (2000b) in FNA22 (2000).

Pistia stratiotes Linnaeus. WATER LETTUCE. **Hab:** Stagnant or slow-moving waters of rivers, sometimes cultivated in ponds, where it persists for a while (presumably eventually eliminated by cold winters in the more northern parts of our area). **Dist:** Native in a wide area across the Paleotropics and Neotropics, including in North America at least peninsular FL; it has been sometimes considered an alien and noxious waterweed in FL but evidence strongly supports its nativity there (Evans 2013). **Comm:** This floating aquatic appeared in the Waccamaw River of SC (downstream from NC) in 1990 and 1991, apparently successfully overwintering (Nelson 1993). **Syn:** = ETx1, FNA22, GW1, Il, K1, K3, K4, NcTx, NY, S, Tx, Va, WH3, Spaulding et al (2019). NatureServe G5 (Secure).



Spirodela Schleiden 1839

A genus of 2 species (with *Landoltia* removed), cosmopolitan. References: Landolt in Kubitzki (1998b); Landolt (1980); Landolt (1986); Landolt (2000) in FNA22 (2000); Les & Crawford (1999); Spaulding et al (2019).

Spirodela polyrhiza (Linnaeus) Schleiden. GREATER DUCKWEED, MINNOW-FOLE. **Hab:** Still to slowly moving waters of ponds, lakes, beaver ponds, and swamps. **Dist:** Widespread worldwide. **Tax:** The spelling of the epithet is correctly '*polyrhiza*', matching Linnaeus's basionym; there is no basis in the Code to change the spelling to '*polyrrhiza*'. **ID Notes:** The largest of the "duckweeds" (*Landoltia*, *Lemna*, *Spirodela*, *Wolffia*, *Wolffiella*). **Syn:** = C, ETx1, F, G, GW1, K4, Mi, NcTx, NY, Pa, S, Tn, Tx, W, WH3, WV; = *Spirodela polyrrhiza* (Linnaeus) Schleiden – Ar, FNA22, GrPl, Il, K1, K3, NE, RAB, Va, Landolt (1980), Landolt (1986), Les & Crawford (1999), Spaulding et al (2019), orthographic variant. NatureServe G5 (Secure).

Wolffia Horkel ex Schleiden 1844 (WATERMEAL, MUD-MARY, ROOTLESS-DUCKWEED)

A genus of 11 species, cosmopolitan. References: Landolt in Kubitzki (1998b); Landolt (1980); Landolt (1986); Landolt (2000) in FNA22 (2000); Spaulding et al (2019).

1 Fronds globoid to ovoid, 1-1.5× as deep as wide; thallus not brownish punctate above
..... ***Wolffia columbiana***

1 Fronds nutshell-like, 0.5-1.0× as deep as wide; thallus punctate above with brownish pigment cells (most visible on dead fronds).
..... ***Wolffia brasiliensis***

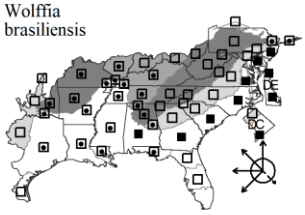
Wolffia brasiliensis Weddell. BRAZILIAN WATERMEAL. **Hab:** Still to slowly moving waters of ponds, lakes, beaver ponds, and swamps. **Dist:** Widespread in e. North America, Central America, and South America. **Syn:** = Ar, ETx1, FNA22, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, Tn, Va, W, WH3, Landolt (1980), Landolt (1986), Spaulding et al (2019); = *Wolffia papulifera* C. Thompson – C, F, G, GW1, RAB, Tx; = *Wolffia punctata* Grisebach – WV; < *Bruneria punctata* (Grisebach) Nieuwland – S.

Wolffia columbiana H. Karsten. COLOMBIAN WATERMEAL. **Hab:** Still to slowly moving waters of ponds, lakes, beaver ponds, and swamps. **Dist:** Widespread in North America, Central America, and South America. **Syn:** = Ar, C, ETx1, F, FNA22, G, GrPl, GW1, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, WH3, Landolt (1980), Landolt (1986), Spaulding et al (2019); = *Bruneria columbiana* (Karsten) Nieuwland – S. NatureServe G5 (Secure).

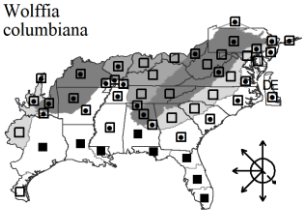
Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

28. ARACEAE

Wolffia brasiliensis

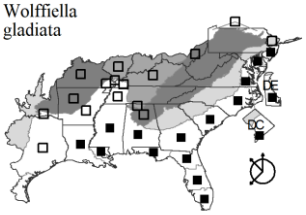


Wolffia columbiana



Wolffiella Hegelmaier 1895

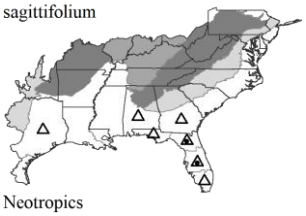
Wolffiella gladiata



A genus of 10 species, cosmopolitan. References: Landolt in Kubitzki (1998b); Landolt (1980); Landolt (1986); Landolt (2000) in FNA22 (2000); Spaulding et al (2019).

Wolffiella gladiata (Hegelmaier) Hegelmaier. MUD-MIDGETS. **Hab:** Ponds, ditches, beaver-ponds millponds, tidal waters. **Dist:** MA and n. IL (s. WI?) south to s. FL and TX; Mexico. **Phen:** Apr-Jun. **Syn:** = Ar, ETx1, FNA22, Il, K1, K3, K4, NcTx, NE, Pa, Tn, Va, WH3, Landolt (1980), Landolt (1986), Spaulding et al (2019); > *Wolffiella floridana* (Donnell-Smith) C. Thompson – C, F, G, GW1, RAB, S, Tx; > *Wolffiella gladiata* (Hegelmaier) Hegelmaier – GW1, Tx. NatureServe G5 (Secure).

Xanthosoma sagittifolium



Neotropics

Xanthosoma Schott 1832 (ELEPHANT-EAR)

A genus of about 60 species, herbs, of tropical Central and South America. References: Mayo, Bogner, & Boyce in Kubitzki (1998b); Serviss, McDaniel, & Bryson (2000); Thompson (2000b) in FNA22 (2000).

* ***Xanthosoma sagittifolium*** (Linnaeus) Schott. ARROWLEAF ELEPHANT-EAR. **Hab:** Ditches. **Dist:** Native of tropical America. **Phen:** Oct. **Comm:** It can be seen in ditches adjacent to ornamental plantings; it is uncertain whether it can be considered naturalized in the more northern parts of our area. It is superficially similar to *Colocasia*, differing in its non-peltate leaves. **Syn:** = ETx1, K1, K3, K4, NcTx, WH3, Serviss, McDaniel, & Bryson (2000); = *Xanthosma sagittifolium* – GW1, orthographic error. NatureServe GNR (Not Yet Ranked).

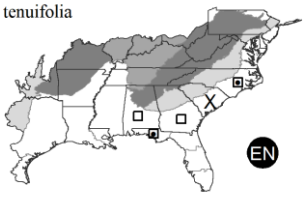
29. TOFIELDIACEAE Takhtajan 1995 (FALSE-ASPHODEL FAMILY) [in ALISMATALES]

A family of 4 genera and about 30 species, of disjunct distribution in north temperate and subarctic areas, and in the Guayana Shield and northern Andes areas of n. South America. There is controversy about the circumscription of the genera; Azuma & Tobe (2011) have clarified the phylogeny and generic subscriptions in the family. Some have believed that *Tofieldia*, *Triantha*, and *Pleea* should be treated together in a broadly circumscribed *Tofieldia* (Utech 1978, Zomlefer 1997c); others that all three should be treated separately (Ambrose 1980; Packer 1993; Cruden 1991). Packer in FNA (2002a) has recently recognized *Triantha*, *Pleea*, and *Tofieldia* as separate genera, a conclusion followed here in part because of the ancient, relictual nature of these units, and additionally supported by the molecular analysis of Azuma & Tobe (2011). Reveal & Zomlefer (1998) place the Tofieldiaceae in the monotypic order Tofieldiales, only distantly related to the Liliaceae. Tamura in Kubitzki (1998a) treats this group as subfamily Tofieldioideae of the Nartheciaceae; this treatment is not tenable following more recent research. References: Azuma & Tobe (2011); Tamura in Kubitzki (1998a); Zomlefer (1997c); Zomlefer (1999).

2 Bracts of the inflorescence large, spathelike, acuminate-aristate at the tip; tepals 9-17 mm long; stamens (6-) 9 (-12)..... ***Pleea tenuifolia***
2 Bracts of the inflorescence minute; tepals 2.5-5 mm long; stamens 6.
..... ***Triantha***

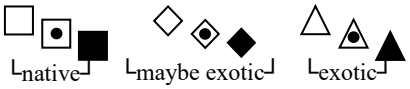
Pleea Michaux 1803 (RUSH-FEATHERLING)

Pleea tenuifolia



A monotypic genus, of se. North America, sometimes included in *Tofieldia* in the past, a treatment which now appears untenable. References: Packer (2002a) in FNA26 (2002a); Tamura in Kubitzki (1998a); Zomlefer (1997c).

Pleea tenuifolia Michaux. RUSH-FEATHERLING. **Hab:** Locally abundant in wet savannas, pocosin margins, usually in peaty soil, locally abundant in a few counties in se. NC, rare inland (very rarely as far as Cumberland County, NC). **Dist:** A Southeastern Coastal Plain endemic: se. NC and ne. SC south to sw. GA, Panhandle FL and s. AL, but apparently absent from s. SC and e. GA. **Phen:** Sep-Oct; Oct-Nov. **Comm:** When in flower in wet savannas and powerline rights-of-way in Brunswick County, *Pleea* visually dominates areas up to hundreds of hectares. **ID Notes:** In sterile condition, it is recognizable by its leathery equitant leaves, bright red at their bases. **Syn:** = FNA26, GW1, K1, K3, K4, RAB, S, WH3; = *Tofieldia tenuifolia* (Michaux) Utech – Zomlefer (1997c). NatureServe G4 (Apparently Secure).

Key to Map Symbology: 

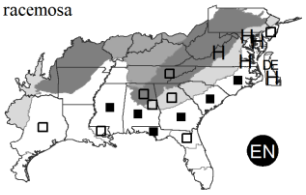
←rare ←uncommon ←common (see introduction for more)

* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable

X : extirpated

Triantha racemosa



Triantha (Nuttall) Baker 1879 (BOG ASPHODEL)

A genus of ca. 4 species, herbs, of North America and Japan. References: Azuma & Tobe (2011); Cruden (1991); Hitchcock (1944); Packer (2002c) in FNA26 (2002a); Spaulding et al (2019); Zomlefer (1997c).

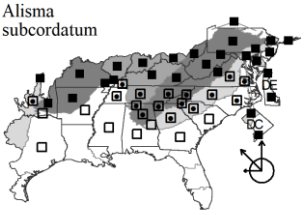
Triantha racemosa (Walter) Small. SOUTHERN BOG ASPHODEL, COASTAL PLAIN BOG ASPHODEL. **Hab:** Pine savannas, pine savanna-pocosin ecotones, seepage bogs, sinkhole ponds (dolines) in the mountains of VA, acidic wet barrens. **Dist:** NJ south to nw. FL, west to e. TX; disjunct in c. TN. **Phen:** Jun-early Aug; late Sep-Oct. **Tax:** The NJ populations are anomalous (as discussed by Packer in FNA 2002a) and are under taxonomic investigation by Sasha Eisenman. **Syn:** = ETx1, FNA26, K1, K3, K4, S, Tn, Va, Spaulding et al (2019); = *Tofieldia racemosa* (Walter) Britton, Sterns, & Poggenburg – C, F, G, GW1, Tx, W, WH3, Zomlefer (1997c); = *Tofieldia racemosa* var. *racemosa* – RAB. NatureServe G5 (Secure).

30. ALISMATACEAE Ventenat 1799 (WATER-PLANTAIN FAMILY) [in ALISMATALES]

A family of about 13 genera and 80 species, herbs, subcosmopolitan in distribution. Here including the Limnocharitaceae. References: Haynes & Hellquist (2000a) in FNA22 (2000); Haynes (2000b) in FNA22 (2000); Haynes, Les, & Holm-Nielsen in Kubitzki (1998b); Lehtonen & Myllys (2008); Lehtonen (2008); Rogers (1983).

1 Pistils in a single whorl, borne on a flat receptacle; stamens 6; inflorescence compound, many of the primary nodes bearing whorled branches which in turn bear whorled branches or whorled flowers ..... ***Alisma***
1 Pistils spiraled in several to many whorls, borne on a globose receptacle; stamens 6-many; inflorescence either racemose (or in some species of both *Echinodorus* and *Sagittaria* somewhat compound, with the lowermost node or two bearing branches which in turn bear whorled flowers) or umbellate (*Hydrocleys*).
  3 Achenes flattened, with winged margins and often also with irregular corky ornamentations on the faces; flower whorls subtended by 3 bracts, with no additional bracteoles ..... ***Sagittaria***
  3 Achenes turgid, with ribs or ridges; flower whorls subtended by 3 bracts and additional bracteoles.
    4 Leaf blades 5-20 cm long, 3-15 cm wide; achenes (pistils) 45-250 per head; stamens ca. 21; petals 6-12 mm long, scapes 20-120 cm tall, erect or arching/reclining ..... ***Echinodorus***
    4 Leaf blades 1-3 cm long, 0.2-2 cm wide; achenes (pistils) 10-20 per head; stamens 6 or 9; petals 1-3 mm long; scapes 5-10 cm tall, erect ..... ***Helanthium***

Alisma subcordatum

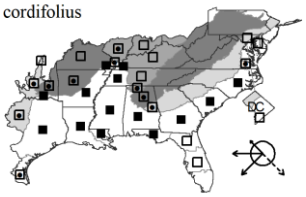


Alisma Linnaeus 1753 (WATER-PLANTAIN)

A genus of about 9 species, herbs, subcosmopolitan in distribution. References: Haynes & Hellquist (2000a) in FNA22 (2000); Haynes, Les, & Holm-Nielsen in Kubitzki (1998b).

Alisma subcordatum Rafinesque. SOUTHERN WATER-PLANTAIN. **Hab:** Marshes, ponds, stream edges. **Dist:** MA west to ND, south to GA and TX. **Phen:** Apr-Nov. **Syn:** = Ar, C, ETx1, F, FNA22, G, GrPl, GW1, Il, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, RAB, S, Tx, Va, W, WV. NatureServe G5 (Secure).

Echinodorus cordifolius



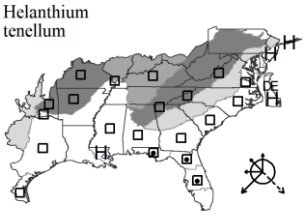
Echinodorus L.C. Richard ex Engelmann 1848 (BURHEAD)

A genus of about 27 species, herbs, primarily of the American tropics and subtropics. Christenhusz, Fay, & Byng (2018) propose splitting Echinodorus into two genera, *Echinodorus* (of *E. berteroi* only), and *Aquarius* Christenhusz & Byng (of all other species of *Echinodorus*), allegedly based on the results of Lehtonen & Myllys (2008). Lehtonen & Myllys's (2008) results are ambiguous, however, and it is unclear that this split is well-founded. References: Christenhusz, Fay, & Byng (2018); Haynes & Hellquist (2000a) in FNA22 (2000); Haynes, Les, & Holm-Nielsen in Kubitzki (1998b); Lehtonen & Myllys (2008); Lehtonen (2008); Lehtonen (2009).

1 Leaves monomorphic, all leaf blades 1-3 cm long, 0.2-2 cm wide; achenes (pistils) 10-20 per head; stamens 6 or 9; petals 1-3 mm long; scapes 5-10 cm tall, erect ..... ***Helanthium***
1 Leaves multimorphic, plants with one or more leaf type (differently shaped emersed, submersed, and floating leaves), usually at least some leaves 5-20 cm long, 3-15 cm wide; achenes (pistils) 40-250 per head; stamens ca. 21; petals 6-12 mm long, scapes 20-120 cm tall, erect or arching/reclining. ..... ***Echinodorus cordifolius***

Echinodorus cordifolius (Linnaeus) Grisebach. CREEPING BURHEAD. **Hab:** Swamps, ditches, wet thickets, especially on base-rich substrates, such as over calcareous or mafic rocks. **Dist:** MD south to c. peninsular FL, west to TX, south into tropical America (Mexico, South America, West Indies), and north in the interior (primarily in the Mississippi Embayment) to s. IL. **Phen:** (May-) Jun-Nov. **Syn:** = F, G, GrPl, GW1, Il, K1, K3, K4, Mo1, RAB, Tx, Va, WH3, Lehtonen (2008); = *Aquarius cordifolius* (Linnaeus) Christenhusz & Byng – Christenhusz, Fay, & Byng (2018); = *Echinodorus radicans* (Nuttall) Engelmann – S; > *Echinodorus cordifolius* ssp. *cordifolius* – Ar, FNA22; > *Echinodorus cordifolius* ssp. *fluitans* (Fassett) R.R. Haynes & Holm-Niels – NcTx; > *Echinodorus cordifolius* var. *cordifolius* – C, ETx1.

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



Helanthium (Bentham & Hooker f.) Engelmann ex J.G. Smith 1905 (DWARF-BURHEAD)

A genus of 2-9 species, annual and perennial herbs. Lehtonen & Myllys (2008) conducted a cladistic analysis of morphological and molecular data of *Echinodorus* and related genera and determined that *Helanthium* should be separated at the generic level. References: Haynes & Hellquist (2000a) in FNA22 (2000); Haynes, Les, & Holm-Nielsen in Kubitzki (1998b); Lehtonen & Myllys (2008).

Helanthium tenellum (Martius ex Schultes f.) Buchenau. MUD-BABIES, DWARF-BURHEAD. **Hab:** On drawdown zones of Coastal Plain ponds, pineland ponds, blackwater riverbanks, or ponds in the Mountains with Coastal Plain affinities (Augusta County, VA); also apparently adventive on drawdown zones of artificial impoundments (Lake Chatuge, sw. NC and n. GA). **Dist:** MA west to MI and KS, south to c. peninsular FL and s. TX, but widely scattered and disjunct in that range. See Belden et al. (2004) for a discussion of the species in Virginia. **Phen:** Aug-Sep. **Syn:** = K3, K4, NE, NY, Lehtonen & Myllys (2008); = *Echinodorus tenellus* (Martius) Buchenau – ETx1, FNA22, Il, K1, Meso6, Mi, Va, WH3; > *Echinodorus parvulus* Engelmann – G, GrPl, GW1, Tx; > *Echinodorus tenellus* (Martius) Buchenau var. *parvulus* (Engelmann) Fassett – C, Mo1; > *Helanthium parvulum* (Engelmann) Britton – S.

Sagittaria Linnaeus 1753 (ARROWHEAD, KATNISS, FLECHA DE AGUA)

A genus of about 25 species, herbs, primarily of the Americas. References: Adams (1961); Beal, Wooten, & Kaul (1982); Bogin (1955); Haynes & Hellquist (2000a) in FNA22 (2000); Haynes, Les, & Holm-Nielsen in Kubitzki (1998b); Sorrie & LeBlond (2008); Sorrie, Keener, & Edwards (2007); Wooten (1973).

Identification Notes: Portions of this key (and treatment) are provisional. The taxonomy and best characters to use in the linear-leaved species is particularly problematic.

1 Leaf blades sagittate or cordate (at least some of the leaves on a plant with sagittate or cordate basal lobes); some species are keyed both here and below).
  2 Leaf blades pubescent; [subgenus *Sagittaria*] ..... ***Sagittaria latifolia var. pubescens***
  2 Leaf blades glabrous.
    3 Sepals appressed in fruit; lower flowers bisexual, the stamens either functional or not; stamen filaments roughened with minute scales (except glabrous in *S. spatulata*); [subgenus *Lophotocarpus*].
      6 Petals white, immaculate; stamens of pistillate flowers functional; [inland sites, native or introduced at a given locality] ..... ***Sagittaria calycina***
      6 Petals white, with a purple spot at the base; stamens of pistillate flowers generally nonfunctional; [exotic, introduced around coastal ports] ..... ***Sagittaria montevidensis***
    3 Sepals reflexed or at least widely spreading in fruit; lower flowers pistillate; stamens glabrous (except roughened with minute scales in *S. rigida*); [subgenus *Sagittaria*].
      7 Leaves cordate basally, floating; stalks of the pistillate flowers stout, reflexed in fruit; stamens mostly fewer than 15 ..... ***Sagittaria filiformis***
      7 Leaves sagittate basally, emersed; stalks of the pistillate not notably stout, ascending in fruit; stamens 15 or more.
        8 Beak of the achene lateral (at a right angle to the long axis of the achene); bracts of the inflorescence 2-15 mm long, boat-shaped, obtuse or broadly acute. ..... ***Sagittaria latifolia var. latifolia***
        8 Beak of the achene terminal (extending along the long axis of the achene); bracts of the inflorescence 5-40 mm long, either blunt or acuminate, not boat-shaped.
          11 Bracts of the inflorescence thick and herbaceous, 5-25 mm long, rounded at the tip; flowers in 2-4 whorls; achenes with facial resin-ducts; [acidic, blackwater habitats of the Coastal Plain] ..... ***Sagittaria engelmanniana***
          11 Bracts of the inflorescence papery and tan, 7-40 mm long, acuminate at the tip; flowers in 5-12 whorls; achenes without resin-ducts; [primarily other habitats, collectively widespread].
            13 Petiole sharply 5-wing-angled in cross-section; inflorescence unbranched; fruiting heads 1.0-1.5 cm in diameter, globular ..... ***Sagittaria australis***
            13 Petiole corrugated but not wing-angled in cross-section; inflorescence often branched at the base; fruiting heads (1.2-) 1.7-2.2 cm in diameter, often globular-depressed ..... ***Sagittaria brevirostra***
1 Leaf blades linear, lanceolate, or ovate, or modified as linear, bladeless phyllodia, these often of spongy texture.
  14 Stalks of the pistillate flowers reflexed in fruit, often stout; stamen filaments glabrous (except roughened with minute scales in *S. platyphylla* and *S. calycina*).
    15 Sepals appressed in fruit; lower flowers bisexual, the stamens either functional or not; [subgenus *Lophotocarpus*]. ..... ***Sagittaria calycina***
    15 Sepals reflexed or at least widely spreading in fruit; lower flowers pistillate; [subgenus *Sagittaria*].
      17 Plant generally with erect, emersed leaves with well-developed blades with firm texture, the blades 2-8 cm wide. ..... ***Sagittaria platyphylla***
      17 Plant with all leaves phyllodial, if expanded at the summit, the expanded blade of weak texture, floating.
        19 Leaves 2-10 (-30) cm long, 3-8 mm wide (sometimes with dilated tip to 20 mm wide); [tidal, fresh to brackish waters] ..... ***Sagittaria subulata***
        19 Leaves 30-300 (or more) cm long, either 1-3 or 7-14 mm wide; [nontidal waters]. ..... ***Sagittaria filiformis***
  14 Stalks of the pistillate flowers ascending or spreading in fruit, not notably stout; stamen filaments roughened with minute scales (except glabrous in *S. engelmanniana*, *S. papillosa*, and *S. ambigua*).
    21 Stamen filaments linear, less thick than the anther, changing little in diameter from near base to near summit.
      23 Bracts of the inflorescence firm or delicate in texture, smooth; stamen filaments glabrous; [of inland wetlands] ..... ***Sagittaria engelmanniana***
      23 Bracts of the inflorescence either papillose or longitudinally striate-ribbed; stamen filaments roughened with minute scales; [estuarine areas and associated nontidal wetlands]. ..... ***Sagittaria lancifolia var. media***

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

21 Stamen filaments either distinctly dilated toward the base (often broadly conic) or thickened throughout, the filament (at least basally) as thick or thicker than the anther.
27 Leaves all phyllodia, the phyllodia terete or nearly so.
..... ***Sagittaria isoetiformis***
27 Leaves with blades and petioles, or if all phyllodia, the phyllodia flattened on upper surface or triangular in cross-section; [collectively widespread].
29 Plants with corms and/or stolons, lacking coarse rhizomes.
..... ***Sagittaria isoetiformis***
29 Plants with coarse rhizomes, lacking corms and stolons.
32 Abaxial wing of fruit scalloped or toothed; [n. AL and nw. GA] ..... ***Sagittaria secundifolia***
32 Abaxial wing of fruit entire; [collectively widespread].
34 Inflorescence branched at the base (in at least some plants of a population); bracts of the inflorescence only slightly connate, the free tips narrowly triangular, 6-15 mm long ..... ***Sagittaria chapmanii***
34 Inflorescence unbranched at the base; bracts of the inflorescence slightly to almost fully connate ..... ***Sagittaria graminea***

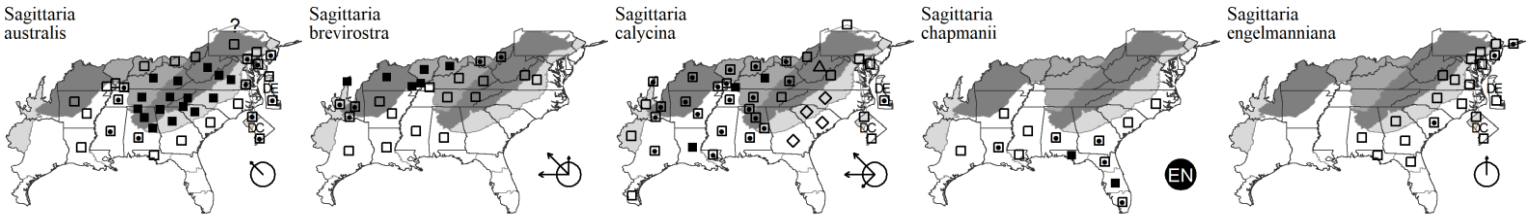
Sagittaria australis (J.G. Smith) Small. APPALACHIAN ARROWHEAD. **Hab:** Marshes, swamps, rivershores, backwaters, margins of ponds and lakes. **Dist:** NY west to s. IN and se. MO, south to SC, Panhandle FL, and MS. **Phen:** Jun-Oct. **Syn:** = Ar, C, F, FNA22, Il, K1, K3, K4, Pa, S, Va, W, WV, Beal, Wooten, & Kaul (1982); = *Sagittaria engelmanniana* J.G. Smith ssp. *longirostra* – G, GW1, Bogin (1955), misapplied; = *Sagittaria longirostra* – RAB, misapplied; < *Sagittaria australis* (J.G. Smith) Small – WH3.

Sagittaria brevirostra Mackenzie & Bush. MIDWESTERN ARROWHEAD. **Hab:** Shores, shallow water. **Dist:** OH west to ND, south to n. VA, e. TN, AL, and TX. **Phen:** Jun-Oct. **Syn:** = Ar, C, ETx1, F, FNA22, GrPl, Il, K1, K3, K4, Mi, Mo1, NcTx, Tx, W, Beal, Wooten, & Kaul (1982); = *Sagittaria engelmanniana* J.G. Smith ssp. *brevirostra* (Mackenzie & Bush) Bogin – G, Bogin (1955). NatureServe G5 (Secure).

Sagittaria calycina Engelmann. **Hab:** Seasonally exposed shores and flats of ponds, pools, and impoundments. **Dist:** N. OH and MI west to SD and CO, south to sw. VA, c. TN, LA, TX, and Mexico; disjunct in CA. Presumably only adventive east of the Appalachians, as in NC and SC. First reported for SC by Hill & Horn (1997). **Phen:** May-Sep. **Syn:** = C, GrPl, Il, K3, K4, RAB, Va, W; = *Lophotocarpus calycinus* (Engelmann) J.G. Smith – F, WV; = *Sagittaria montevidensis* Chamisso & Schlechtendal ssp. *calycina* (Engelmann) Bogin – Ar, ETx1, FNA22, G, GW1, Meso6, NcTx, Tx, Bogin (1955); > *Sagittaria calycina* var. *calycina* – K1, Mo1.

Sagittaria chapmanii (J.G. Smith) C. Mohr. CHAPMAN'S ARROWHEAD. **Hab:** Limesink (doline) ponds with drawdown hydrology, mucky ditches. **Dist:** E. NC south to s. FL, west to s. AR and e. TX. **Phen:** May-Sep. **Tax:** Analyses of allozyme variation in the *S. graminea* complex revealed great differentiation between *S. graminea*, *S. chapmanii*, and *S. platyphylla*; *S. graminea* and *S. platyphylla* appeared to be more closely related to one another than either was to *S. chapmanii* (Hauber & Legé 1999). Therefore, it seems best to treat these three taxa at equal rank and at the species level. **Comm:** First reported for SC by Nelson & Kely (1997). Records of *S. chapmanii* from west of the Mississippi River are in error (Sorrie & LeBlond 2008). **Syn:** = K3, K4, S, Sorrie & LeBlond (2008); = *Sagittaria graminea* Michaux ssp. *chapmanii* (J.G. Smith) R.R. Haynes & C.B. Hellquist – FNA22, Sorrie, Keener, & Edwards (2007); = *Sagittaria graminea* Michaux var. *chapmani* J.G. Smith – Bogin (1955), orthographic variant; = *Sagittaria graminea* Michaux var. *chapmanii* J.G. Smith – GW1, K1, WH3, Wooten (1973). NatureServe G5T3? (Vulnerable).

Sagittaria engelmanniana J.G. Smith. **Hab:** Blackwater streambanks, sphagnum bogs, pocosins, beaver ponds. **Dist:** MA and NY south to s. FL and s. AL, primarily on the Coastal Plain. **Phen:** Jun-Oct. **Syn:** = C, F, FNA22, K1, K3, K4, NE, NY, RAB, Va, W, Beal, Wooten, & Kaul (1982); = *Sagittaria engelmanniana* ssp. *engelmanniana* – G, GW1, Bogin (1955); = *Sagittaria longirostra* – S; < *Sagittaria australis* (J.G. Smith) Small – WH3.



Sagittaria filiformis J.G. Smith. **Hab:** Swiftly flowing water of blackwater rivers and streams, blackwater lake shores, tidal waters. **Dist:** As conceived here, probably ranging from MA south to s. FL, s. AL, and s. MS. **Phen:** May-Sep. **Comm:** The forms growing in swiftly flowing black water are remarkable and unlikely to be recognized as a *Sagittaria* unless in flower, with linear leaves over 100 cm long and only 1-3 mm wide, with 5-7 parallel ribbed veins, resembling *S. kurziana*. The proper taxonomic treatment and associated nomenclature to apply to these plants remains unclear (see synonymy). **Syn:** = FNA22, K1, K3, NE, NY, Pa, Va, WH3; = *Sagittaria stagnorum* Small – GW1; = *Sagittaria subulata* (Linnaeus) Buchenau var. *gracillima* (S. Watson) J.G. Smith – F, G, RAB, Bogin (1955); > *Sagittaria filiformis* J.G. Smith – S; > *Sagittaria lorata* Chapman – S; > *Sagittaria stagnorum* Small – S; < *Sagittaria subulata* (Linnaeus) Buchenau – C.

Sagittaria graminea Michaux. **Hab:** Marshes, ponds, freshwater and oligohaline tidal marshes. **Dist:** NL (Newfoundland) and NL (Labrador) west to MN and SD, south to s. FL and c. TX; West Indies. **Phen:** May-Nov. **Syn:** = Ar, ETx1, Il, K3, K4, Mi, Tx, Va, WV; = *Sagittaria graminea* ssp. *graminea* – FNA22, NY, Sorrie, Keener, & Edwards (2007); = *Sagittaria graminea* Michaux var. *graminea* – C, G, GrPl, GW1, K1, Mo1, NE, Pa, RAB, WH3, Wooten (1973); > *Sagittaria cycloptera* (J.G. Smith) C. Mohr – S; > *Sagittaria eatonii* J.G. Smith – F; < *Sagittaria graminea* Michaux – W; > *Sagittaria graminea* Michaux – F, S; < *Sagittaria graminea* Michaux var. *graminea* – Bogin (1955), (also see S. isoetiformis).

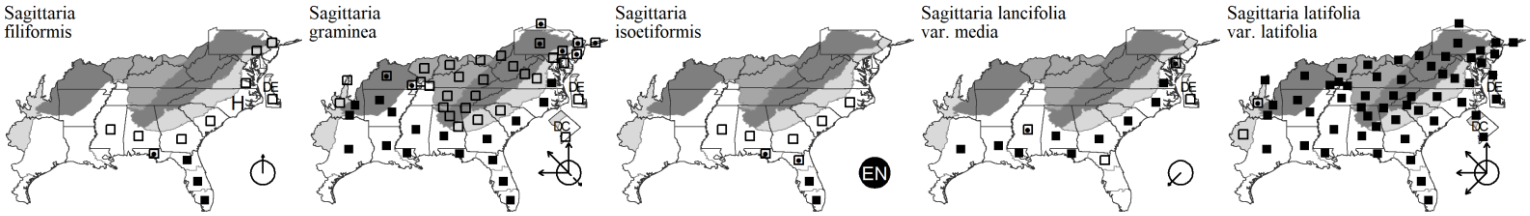
Sagittaria isoetiformis J.G. Smith. **Hab:** Pineland ponds, clay-based Carolina bays, other seasonally flooded depressions. **Dist:** Se. NC south to s. peninsular FL, west to s. MS (Sorrie & Leonard 1999). **Phen:** Jun-Sep. **Comm:** See Godfrey & Adams (1964) for additional discussion of this species. **Syn:** = FNA22, GW1, K1, K3, K4, S, WH3, Sorrie, Keener, & Edwards (2007), Wooten (1973); < *Sagittaria graminea* Michaux var. *graminea* – Bogin (1955); < *Sagittaria teres* S. Watson – RAB, S, misapplied.

Sagittaria lancifolia Linnaeus *var.* ***media*** Micheli. **Hab:** Freshwater to brackish (mesohaline) tidal marshes. **Dist:** S. DE south to ne. FL, FL Panhandle, west to TX; scattered in Central America. **Phen:** Jun-Oct. **Comm:** If recognized as a species, this taxon is *S. falcata*. **Syn:** = C, Va; = *Sagittaria falcata* Pursh – F, G, RAB, S; = *Sagittaria lancifolia* ssp. *media* (Micheli) Bogin – ETx1, FNA22, GW1, K1, K3, K4, Meso6, WH3, Bogin (1955); < *Sagittaria lancifolia* – Tx. NatureServe G5?TNR (Not Yet Ranked).

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

30. ALISMATACEAE

Sagittaria latifolia Willdenow *var*. ***latifolia***. **Hab:** Marshes, swamps, farm ponds, ditches, bogs. **Dist:** NS west to BC, south to tropical America (rare in the Appalachian region). **Phen:** Jul-Oct. **ID Notes:** In addition to the pubescence difference, var. *latifolia* and var. *pubescens* can be separated by the presence (var. *latifolia*) or absence (var. *pubescens*) of resin-ducts on the achene-faces. **Syn:** = C, G, GW1, Meso6, Mo1, Pa, Tx, W, Bogin (1955); = *Sagittaria latifolia* – WV; < *Sagittaria latifolia* – Ar, ETx1, FNA22, Il, K1, K3, K4, Mi, NcTx, NE, NY, Va, WH3; > *Sagittaria latifolia* – S; > *Sagittaria latifolia* Willdenow var. *latifolia* – F, RAB; > *Sagittaria latifolia* var. *obtusa* (Engelmann) Wiegand – F, RAB; > *Sagittaria ornithorhyncha* Small – S; > *Sagittaria planipes* Fernald – F; > *Sagittaria viscosa* C. Mohr – S.



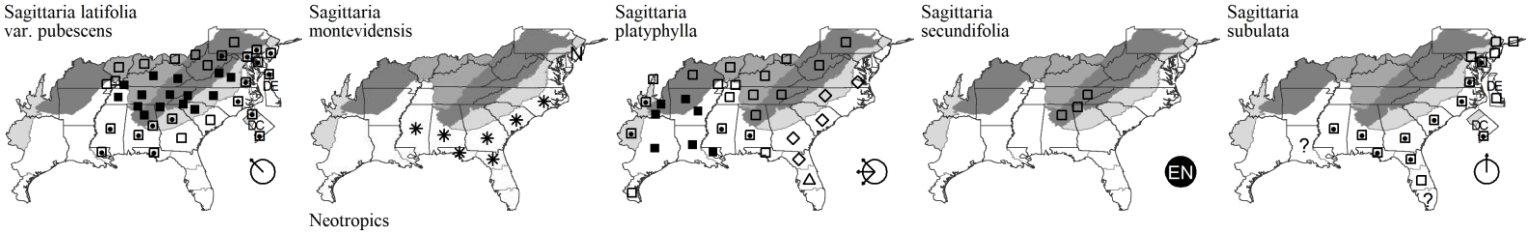
Sagittaria latifolia Willdenow *var*. ***pubescens*** (Muhlenberg ex Nuttall) J.G. Smith. **Hab:** Bogs, marshes. **Dist:** C. PA, OH, and TN, south to n. FL and e. LA, primarily in the Appalachians. **Phen:** Jul-Oct. **Syn:** = C, F, G, GW1, Pa, RAB, Tx, W, Bogin (1955); = *Sagittaria pubescens* Muhlenberg ex Nuttall – S, WV; < *Sagittaria latifolia* – FNA22, K1, K3, K4, NE, Va, WH3.

* ***Sagittaria montevidensis*** Chamisso & Schlechtendal. **Hab:** Disturbed areas, marshes. **Dist:** Native of South America. Most of the collections from the southeastern United States are old collections around major seaports, suggesting that this plant was introduced on the ballast of sailing ships. **Phen:** Jul. **Syn:** = K1, K3, K4, Mi, RAB, S, WH3; = *Sagittaria montevidensis* ssp. *montevidensis* – FNA22, GW1, Bogin (1955). NatureServe G5T4T5 (Apparently Secure).

Sagittaria platyphylla (Engelmann) J.G. Smith. DELTA ARROWHEAD. **Hab:** Marshes, ditches, farm ponds, pondcypress wetlands, canals. **Dist:** VA, OH, IL, MO, and OK, south to FL and TX. The distribution of this species is primarily in the Mississippi drainage; occurrences east of the Appalachians may be introduced, either by humans or by waterfowl. First reported for VA by Wieboldt et al. (1998). Reported for c. FL (Orange County) by Dalager (2022, who considers it as introduced there and likely via the aquatic plant industry. **Phen:** Jun-Sep (-Oct). **Syn:** = Ar, ETx1, F, FNA22, Il, K1, K3, K4, Meso6, Mo1, NcTx, Tx, Va, WH3, Sorrie, Keener, & Edwards (2007), Wooten (1973); = *Sagittaria graminea* Michaux var. *platyphylla* Engelmann – G, GrPl, RAB, Bogin (1955); > *Sagittaria mohrii* J.G. Smith – S; > *Sagittaria platyphylla* (Engelmann) J.G. Smith – S. NatureServe G5 (Secure).

Sagittaria secundifolia Kral. LITTLE RIVER WATER-PLANTAIN. **Hab:** Crevices in sandstone bedrock in streambeds. **Dist:** Endemic to se. TN, nw. GA, and nc. AL. **Comm:** See Kral (1982) and Threlkeld & Soehren (2003) for additional information. **Syn:** = FNA22, K1, K3, K4. NatureServe G1 (Critically Imperiled); USESA T.

Sagittaria subulata (Linnaeus) Buchenau. DWARF ARROWHEAD. **Hab:** Tidal marshes and mud flats. **Dist:** MA and NY south to n. peninsular FL and MS. **Phen:** May-Sep. **Syn:** = FNA22, GW1, K1, K3, K4, NE, NY, Pa, S, Va, WH3; = *Sagittaria subulata* var. *subulata* – G, RAB, Bogin (1955); < *Sagittaria subulata* (Linnaeus) Buchenau – C, (also see S. stagnorum); > *Sagittaria subulata* var. *natans* (Michaux) J.G. Smith – F; > *Sagittaria subulata* var. *subulata* – F.



32. HYDROCHARITACEAE A.L. de Jussieu 1789 (FROG'S-BIT FAMILY) [in ALISMATALES]

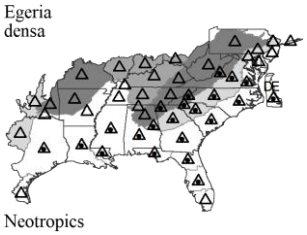
A family of about 18 genera and 120 species, aquatic herbs, cosmopolitan. Here circumscribed to include *Najas*, often traditionally placed in its own family, following the suggestion of Haynes, Holm-Nielsen, & Les in Kubitzki (1998b), APG (2016), and Bernardini & Lucchese (2018). Subfamilies shown in the key follow Les, Moody, & Soros (2006) and are congruent with the phylogeny of Bernardini & Lucchese (2018).
References: Bernardini & Lucchese (2018); Catling & Dore (1982); Cook in Kubitzki (1998b); Haynes & Hellquist (1996); Haynes (2000c) in FNA22 (2000); Haynes (2000e) in FNA22 (2000); Haynes, Holm-Nielsen, & Les in Kubitzki (1998b); Les, Moody, & Soros (2006).

1 Leaves along the stem or at its summit.
  3 Leaves opposite or in whorls of 3 (-4) (no whorls with > 4 leaves).
    4 Leaves slightly narrowed or straight-sided to base, sessile; perianth present; [subfamily *Anacharoideae*] ..... ***Elodea***
    4 Leaves broadened and sheathing at base, narrowing upward via "shoulders"; perianth absent; [subfamily *Hydrilloideae*] ..... ***Najas***
  3 Leaves in whorls of (3-) 4-8 (some or most whorls with 4 or more leaves).
    5 Leaves mostly 2-3 cm long, finely toothed with slender, weak teeth on the margins and rarely also the midrib beneath; fresh leaves not noticeably rough to the touch; leaf whorls generally crowded on all stems; petals white, 9-11 mm long; [subfamily *Anacharoideae*] ..... ***Egeria densa***
    5 Leaves mostly 1-2 cm long, toothed with stout, sharp teeth on the margins and also on conical bases along the midrib beneath; fresh leaves noticeably rough to the touch; leaf whorls crowded on terminal portions of stems, remote on older stems; petals translucent, 2-5 mm long; [subfamily *Hydrilloideae*] ..... ***Hydrilla verticillata***
1 Leaves basal, either elongate with parallel sides, or petiolate with a leaf blade.
  6 Leaves differentiated into petiole and blade, the blade ovate to orbicular. ..... ***Limnobium spongia***
  6 Leaves straplike, elongate, linear, the sides parallel and not differentiated into petiole and blade.

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

9 Leaves to 35 cm long; [saltwater]; [subfamily *Hydrilloideae*] ..... ***Thalassia testudinum***
9 Leaves usually > 40 cm long; [freshwater].
..... ***Vallisneria***

Egeria Planchon 1849 (SOUTH AMERICAN WATERWEED)



A genus of 2 species, aquatic herbs, native of tropical America (now subcosmopolitan in tropical and warm temperate regions by naturalization). *Egeria* should possibly be included in a more broadly circumscribed *Elodea* (including *Elodea*, *Egeria*, and *Apalanthe*) (Bernardini & Lucchese 2018). References: Haynes (2000c) in FNA22 (2000).

* ***Egeria densa*** Planchon. BRAZILIAN WATERWEED, "ELODEA", "ANACHARIS". **Hab:** Ponds and stagnant water of streams or rivers. **Dist:** Native of South America. **Phen:** May-Nov. **Comm:** This is the "Elodea" or "Anacharis" of the aquarium trade. **Syn:** = Ar, ETx1, FNA22, GW1, Il, K1, K3, K4, Meso6, Mo1, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, W, WH3; = *Anacharis densa* (Planchon) Marie-Victorin – G; = *Elodea densa* (Planchon) Caspary – F, GrPl; = *Philotria densa* (Planchon) Small & St. John – S. NatureServe G5 (Secure).

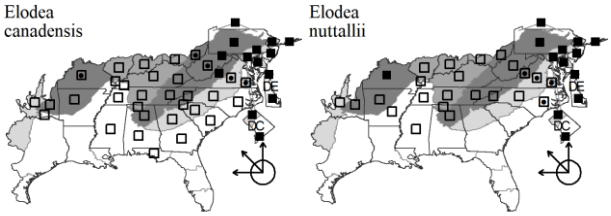
Elodea Michaux 1803 (WATERWEED)

A genus of about 5-12 species, aquatic herbs, native of temperate America. References: Cook in Kubitzki (1998b); Cook & Urmi-König (1985); Haynes (2000c) in FNA22 (2000).

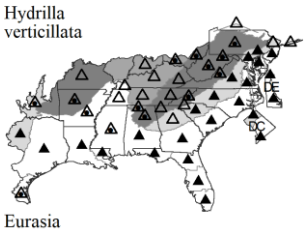
2 Well-developed leaves (1-) avg. 2 (-5) mm wide, mostly 2-5× as long as wide; staminate spathe 4-8 (-15) mm long, the flower at anthesis on an elongated, very slender, flexuous stalk; sepals of pistillate flowers 2-4.5 mm long ..... ***Elodea canadensis***
2 Well-developed leaves (0.3-) avg. 1.3 (-2) mm wide, mostly 5-10× as long as wide; staminate spathe 2-3 mm long, the flower at anthesis separating from the spathe (and plant) at maturity; sepals of pistillate flowers 1-1.5 mm long ..... ***Elodea nuttallii***

Elodea canadensis Michaux. COMMON WATERWEED. **Hab:** Rivers, lakes, ponds, stagnant waters of streams. **Dist:** QC west to SK, south to NC, Panhandle FL, n. AR, OK, NM, and CA. **Phen:** Jul-Sep. **Syn:** = Ar, C, F, FNA22, GrPl, GW1, Il, K1, K3, K4, Mi, Mo1, NE, NY, Pa, RAB, Tn, Va, W, WH3, WV; = *Anacharis canadensis* (Michaux) Planchon – G; < *Philotria canadensis* (Michaux) Britton – S. NatureServe G5 (Secure).

Elodea nuttallii (Planchon) H. St. John. NUTTALL'S WATERWEED, FREE-FLOWERED WATERWEED. **Hab:** Lakes, ponds, stagnant waters of streams. **Dist:** ME and QC west to MN and ID, south to NC, TN, OK, and NM. **Phen:** Jun-Sep. **Syn:** = Ar, C, F, FNA22, GrPl, GW1, Il, K1, K3, K4, Mi, Mo1, NE, NY, Pa, RAB, Tn, Va, W, WV; = *Anacharis nuttallii* Planchon – G; >< *Philotria canadensis* (Michaux) Britton – S; > *Philotria linearis* Rydberg – S. NatureServe G5 (Secure).

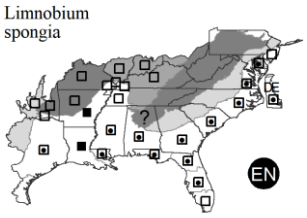


Hydrilla L.C. Richard 1814 (HYDRILLA)



A monotypic genus, an aquatic herb, native to the Old World. References: Cook in Kubitzki (1998b); Haynes (2000c) in FNA22 (2000).

* ***Hydrilla verticillata*** (Linnaeus f.) Royle. HYDRILLA. **Hab:** Ponds, lakes, rivers, often locally abundant. **Dist:** Native of the Old World. **Phen:** Jun-Aug. **Comm:** This species has become a serious aquatic weed. Reported for SC by Nelson & Kelly (1997). **Syn:** = Ar, C, ETx1, FNA22, GW1, K1, K3, K4, Meso6, NcTx, NE, NY, Pa, Tn, Va, WH3. NatureServe GNR (Not Yet Ranked).



Limnobium L.C. Richard 1814 (FROG'S-BIT)

A genus of 1-2 species, of se. North America and tropical America. Bernardini & Lucchese (2018) follow others in suggesting the possibility of including *Limnobium* in *Hydrocharis*, based on phylogenetic sister status and similar morphology. References: Bernardini & Lucchese (2018); Catling & Dore (1982); Cook in Kubitzki (1998b); Haynes (2000c) in FNA22 (2000).

Identification Notes: This species is often free-floating, the leaves with prominently large cells below.

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Limnobium spongia (Bosc) L.C. Richard ex Steudel. AMERICAN FROG'S-BIT, SPONGEPLANT. **Hab:** Swamps, marshes, ponds, pools. **Dist:** DE and MD south to s. FL, west to e. TX, north in the interior in the Mississippi Embayment to s. MO and s. IL; disjunct around the Great Lakes (as in n. IN and w. NY). **Phen:** Jun-Sep. **Tax:** Reports of *L. spongia* as also in tropical America are based on misapplication to *L. laevigatum* (Humboldt & Bonpland ex Willdenow) Heine. **Syn:** = Ar, C, ETx1, F, FNA22, G, GW1, Il, K1, K3, K4, NE, NY, RAB, S, Tn, Tx, Va, WH3; = *Limnobium spongia* ssp. *spongia* – Mo1. NatureServe G4 (Apparently Secure).

Najas Linnaeus 1753 (NAIAD, BUSHY-PONDWEED, WATER-NYMPH)

A genus of about 40 species, nearly cosmopolitan. Classification of subgenera and sections follows Ito et al. (2017). References: Bräuchler (2015); Crow & Hellquist (2000a); Fernald (1902); Freeman & Pfingsten (2021); Haynes & Hellquist (1996); Haynes (1979); Haynes (2000c) in FNA22 (2000); Haynes, Holm-Nielsen, & Les in Kubitzki (1998b); Ito et al (2017); Les et al (2015); Rüegg et al (2017).

Identification Notes: Counts of leaf-teeth do not include the broadened, sheathing base of the leaf. Seeds are necessary for the identification of most species.

2 Leaf-teeth multicellular, evident at 10× magnification, 5-22 per side; leaves either ascending to spreading, or becoming recurved late in the season; seed-coat pitted.
  3 Style offset to the side of the seed apex; [section *Caulinia*] ..... ***Najas gracillima***
  3 Style centered at summit of seed apex.
    5 Areoles of the seed coat longer than broad, never ladderlike; [of GA and FL]; [section *Americanae*] ..... ***Najas filifolia***
    5 Areoles of the seed coat distinctly wider than long, in ca. 12-18 ladder-like rows; [widespread]; [section *Caulinia*] ..... ***Najas minor***
2 Leaf-teeth unicellular, not or barely evident at 10× magnification, 18-100 per side; leaves spreading to ascending; seed-coat smooth or pitted, the areoles (if present) longer than wide or about as long as wide; [section *Americanae*].
  8 Anthers 1-locular; leaf teeth 18-42 per leaf side ..... ***Najas guadalupensis var. floridana***
  8 Anthers 4-locular; leaf teeth 20-100 per leaf side
    ..... ***Najas guadalupensis var. guadalupensis***

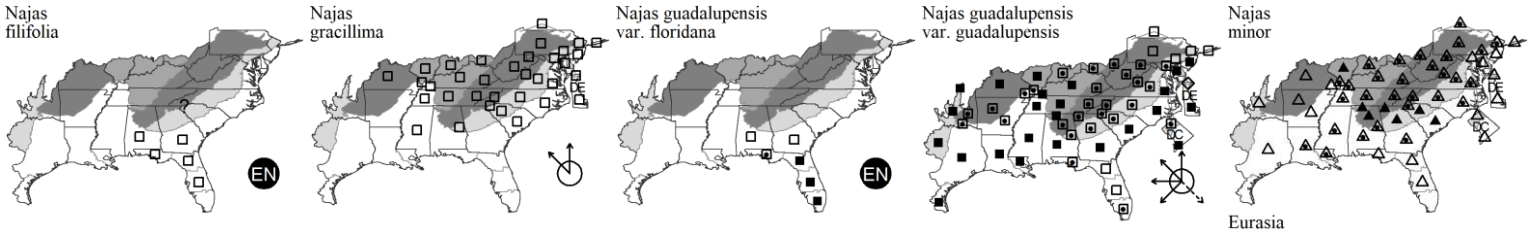
Najas filifolia R.R. Haynes. NARROWLEAF NAIAD. **Hab:** Lakes; rare. **Dist:** Sw. GA (Jones & Coile 1988) and s. AL to FL (Haynes in FNA 2000). **Syn:** = FNA22, K1, K3, WH3; = *Najas ancistrocarpa* A. Braun – GW1, Haynes (1979).

Najas gracillima (A. Braun ex Engelmann) Magnus. SLENDER NAIAD, BUSHY NAIAD. **Hab:** Ponds, lakes, slow-moving streams. **Dist:** NS west to MN, south to NC, AL, and MO; disjunct in CA (where likely alien). **Phen:** Jul-Oct. **Comm:** Haynes (1979) reports that this species cannot tolerate pollution and is apparently declining in abundance. **Syn:** = C, F, FNA22, G, Il, K1, K3, K4, Mi, Mo1, NE, NY, Pa, RAB, Tn, Va, W, WV, Crow & Hellquist (2000a), Haynes (1979). NatureServe G5? (Secure).

Najas guadalupensis (Sprengel) Magnus *var*. ***floridana*** R.R. Haynes & Wentz. **Hab:** Lakes and streams. **Dist:** S. GA and s. AL south to FL. **Syn:** = Haynes (1979); = *Najas guadalupensis* ssp. *floridana* (R.R. Haynes & Wentz) R.R. Haynes & C.B. Hellquist – FNA22, K1, K3, K4; < *Naias guadelupensis* – S, orthographic variant; < *Najas guadelupensis* – GW1, WH3, orthographic variant. NatureServe G5T3T5 (Apparently Secure).

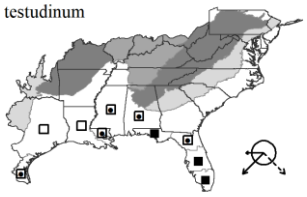
Najas guadalupensis (Sprengel) Magnus *var*. ***guadalupensis***. COMMON NAIAD, SOUTHERN NAIAD. **Hab:** Lakes, rivers, impoundments. **Dist:** ME to AB and WA, south to s. FL, TX, and CA, and south through Mexico, Central America, South America; West Indies. **Phen:** Jul-Oct. **Tax:** Haynes & Hellquist (1996) and Haynes in FNA (2000) treat all infraspecific taxa of *N. guadalupensis* as subspecies rather than varieties. **Syn:** = Meso6; = *Najas guadalupensis* (Sprengel) Magnus – NY; < *Naias guadelupensis* – S, orthographic variant; < *Najas guadalupensis* (Sprengel) Magnus – Bah, ETx1, F, G, GrPl, GW1, NcTx, Pa, RAB, Tn, Tx, W, WH3; < *Najas guadalupensis* ssp. *guadalupensis* – FNA22, K1, K3, K4, Mi, Mo1, NE, Crow & Hellquist (2000a); < *Najas guadalupensis* (Sprengel) Magnus var. *guadalupensis* – Ar, C, Il, Va, Haynes (1979). NatureServe G5T5 (Secure).

* ***Najas minor*** Allioni. SPINYLEAF NAIAD. **Hab:** Ponds, lakes, and reservoirs, particularly where eutrophic. **Dist:** Native of Eurasia. This species is apparently a rather recent introduction to North America, now widespread in e. North America. **Phen:** Jul-Oct. **Comm:** Haynes (1979) reports that it is becoming more abundant in e. North America because of its tolerance for polluted, eutrophic waters. **Syn:** = Ar, C, F, FNA22, G, GW1, Il, K1, K3, K4, Mi, Mo1, NE, NY, Pa, RAB, Tn, Va, W, WH3, WV, Crow & Hellquist (2000a), Haynes (1979). NatureServe GNR (Not Yet Ranked).



Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Thalassia testudinum



Thalassia Banks & Solander ex K.D. Koenig 1805 [1806] (TURTLEGRASS)

A genus of 2 species, seagrasses, of tropical and warm temperate waters of the Caribbean Sea and the Indian/Pacific oceans. References: Cook in Kubitzki (1998b); Haynes (2000c) in FNA22 (2000).

Thalassia testudinum Banks & Solander ex K.D. Koenig. TURTLEGRASS. **Hab:** Seagrass beds in estuarine waters. **Dist:** E. coast of c. peninsular FL (Indian River County) to s. FL, north along the west coast of FL to the Panhandle, west to TX, thence south through Mexico and Central America to South America; West Indies. **Phen:** Jan-Dec. **Syn:** = Bah, FNA22, K1, K3, K4, Meso6, S, Tx, WH3. NatureServe G4G5 (Apparently Secure).

Vallisneria Linnaeus 1753 (WATER-CELERY, EELGRASS)

A genus of ca. 15 species, aquatic herbs, of tropical and warm temperate regions of the Old and New World. References: Cook in Kubitzki (1998b); Frère Marie-Victorin (1943); Gorham et al (2021); Haynes (2000c) in FNA22 (2000); Les et al (2008); Lowden (1982).

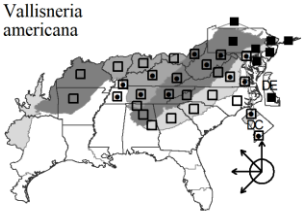
1 Stamens of staminate flowers free and obliquely extended; hairs absent at base of androecium; floral incision of pistillate flowers deepest between matching stigmatic lobes (opposite the petal rudiments), stigmas fringed..... ***Vallisneria denseserrulata × spiralis***
1 Stamens of staminate flowers upright with partially or totally united filaments; hairs at base of androecium; floral incision of pistillate flowers deepest between discordant stigmatic lobes (opposite the sepals), or equal to incision between matching stigmatic lobes, stigmas not fringed.
2 Sepals 2-3 mm long; leaves 5-6 (-10) mm wide, with broad, whitish lacunar band running down center of leaf; leaves lacking red-purple longitudinal stripes ..... ***Vallisneria americana***
2 Sepals 4-5.5 mm long; leaves 15-20 mm wide, lacking lacunar band; leaves with red or purple longitudinal stripes ..... ***Vallisneria neotropicalis***

Vallisneria americana Michaux. VALLISNERIA, WATER-CELERY, TAPEGRASS, EELGRASS. **Hab:** Lakes, rivers, estuaries, sounds. **Dist:** NS and QC west to ND, south to FL, TX, NM, AZ; south into tropical America {or is this all or partly *V. neotropicalis*?}. **Phen:** Jul-Oct. **Syn:** = Ar, ETx1, GrPl, Il, Mi, NcTx, NE, NY, RAB, Tn, Tx, Va, Frère Marie-Victorin (1943), Les et al (2008); ? *Vallisneria americana* Michaux – F, G, Pa, W, WV; < *Vallisneria americana* Michaux – FNA22, GW1, K1, K3, WH3; > *Vallisneria americana* Michaux – S; < *Vallisneria americana* var. *americana* – C, Meso6, Mo1, Lowden (1982); > *Vallisneria spiralis* Linnaeus – S.

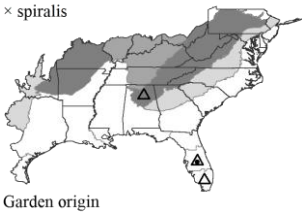
* ***Vallisneria denseserrulata × spiralis***. **Dist:** Known from coastal and inland FL and inland AL, but likely to be much more widespread. **Tax:** This entity appears to be a hybrid of two Old World species -- *Vallisneria denseserrulata* (Makino) Makino and *Vallisneria spiralis* Linnaeus which apparently hybridized in the aquatic plant industry and have spread deliberately or accidentally in aquatic restoration projects. **Syn:** = Gorham et al (2021).

Vallisneria neotropicalis Victorin. LARGE WATER-CELERY, LARGE EELGRASS. **Hab:** Spring runs; other aquatic habitats. **Dist:** FL Panhandle, s. FL; Cuba. **Comm:** The distinctiveness of this taxon has been defended by Les et al (2008) on morphological and molecular grounds. **Syn:** = Frère Marie-Victorin (1943), Les et al (2008); < *Vallisneria americana* Michaux – FNA22, GW1, K1, K3, WH3; < *Vallisneria americana* var. *americana* – Meso6, Lowden (1982).

Vallisneria americana

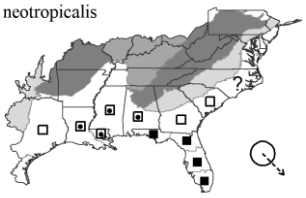


Vallisneria denseserrulata × spiralis



Garden origin

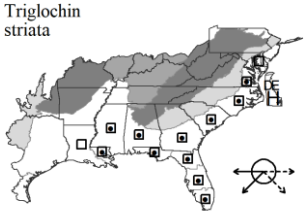
Vallisneria neotropicalis



35. JUNCAGINACEAE Richard 1808 (ARROWGRASS FAMILY) [in ALISMATALES]

A family of 3-4 genera and 20 species, of temperate and boreal regions of the Old and New World. References: Haynes & Hellquist (2000b) in FNA22 (2000); Haynes, Les, & Holm-Nielsen in Kubitzki (1998b); Thieret (1988).

Triglochin striata



Triglochin Linnaeus 1753 (ARROWGRASS)

A genus of about 12 species, cosmopolitan. References: Haynes & Hellquist (2000b) in FNA22 (2000); Haynes, Les, & Holm-Nielsen in Kubitzki (1998b); Thieret (1988).

Triglochin striata Ruiz & Pavón. SOUTHERN ARROWGRASS. **Hab:** Brackish to nearly freshwater marshes. **Dist:** The species has an extensive range, occurring in tropical Central and South America, West Indies, Africa, and Australia; in North America, it ranges from MD and DE south to s. FL and west to LA, and also on the west coast in CA and OR. **Phen:** May-Oct. **Syn:** = Bah, F, FNA22, G, K1, K3, K4, RAB, Va, WH3; = *Triglochin striatum* – C, GW1, S, Thieret (1988), orthographic variant. NatureServe G5 (Secure).

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

38. POTAMOGETONACEAE Berchtold & J. Presl 1823 (PONDWEED FAMILY) [in ALISMATALES]

A family of 6-7 genera and about 100 species (if circumscribed, as here, to include Zannichelliaceae), aquatic herbs, nearly cosmopolitan. Here circumscribed following recent molecular studies to include *Zannichellia* (Lindqvist et al. 2006; Angiosperm Phylogeny Group 2003, 2009).
References: Haynes & Hellquist (2000c) in FNA22 (2000); Haynes & Hellquist (2000d) in FNA22 (2000); Haynes (1978); Haynes, Les, & Holm-Nielsen in Kubitzki (1998b); Les & Haynes (1996); Lindqvist et al (2006); Wiegleb & Kaplan (1998).

1 Leaves opposite lobes ..... ***Zannichellia***
1 Leaves alternate.
  2 Stipules not adnate, or adnate to the blade < ½ the length of the stipule; peduncle stiff, the flowering spike elevated above the water's surface; submersed leaves translucent, flat, flexible; floating leaves present or absent ..... ***Potamogeton***
  2 Stipules adnate to the blade for at least 2/3 the length of the stipule; peduncle flexible, the flowering spike submersed; submersed leaves opaque, channeled, stiff; floating leaves absent ..... ***Stuckenia***

Potamogeton Linnaeus 1753 (PONDWEED)

A genus of about 80 species, aquatic herbs, nearly cosmopolitan. References: Haynes & Hellquist (1996); Haynes & Hellquist (2000c) in FNA22 (2000); Kaplan & Štěpánek (2003); Kaplan et al (2018); Wiegleb & Kaplan (1998).

1 Stipular sheaths of submersed leaves adnate with leaf blade base, the tip usually projecting as a ligule ..... ***Key A***
1 Stipular sheaths of submersed leaves free from the leaf blade base, or with only a few adnate, the ligule not obvious.
  2 Submersed leaves broadly linear-oblong to lanceolate to elliptic or nearly orbicular, 10-58 mm wide (occasional stranded forms lack submersed leaves) ..... ***Key B***
  2 Submersed leaves linear, thread-like or ribbon-like, 0.1-10 mm wide ..... ***Key C***

Key A

1 Leaves stiffish, conspicuously 2-ranked, auriculate-lobed to rounded at the junction with the stipule, with 20-60 fine veins ..... ***Potamogeton robbinsii***
1 Leaves lax, not conspicuously 2-ranked, lacking basal lobes, with fewer than 20 veins. ..... ***Potamogeton diversifolius***

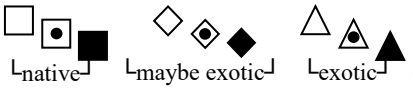
Key B

1 Leaf margins conspicuously serrate; stem flattened; fruit beak 2-3 mm long; turions commonly formed, hard ..... ***Potamogeton crispus***
1 Leaf margins entire; stem terete; fruit beak < 1 mm long; turions rarely formed.
  2 Submersed leaves clasping the stem; floating leaves absent. ..... ***Potamogeton perfoliatus***
  2 Submersed leaves petioled or sessile, not clasping the stem; floating leaves absent or present.
    4 Submersed leaves 19-49 veined, distinctly arcuate ..... ***Potamogeton amplifolius***
    4 Submersed leaves with fewer than 29 veins, not arcuate.
      5 Stems conspicuously black-spotted; submersed leaves crisped along the margin; floating leaves 15-21 veined ..... ***Potamogeton pulcher***
      5 Stems inconspicuously spotted or lacking spots; submersed leaves flat along the margin; floating leaves 7-29 veined.
        6 Submersed leaves with petioles 1-13 cm long.
          7 Larger submersed leaves acute at the apex with a sharp awl-like tip; fruit gray-green to olive-green, with well-developed lateral ridges ..... ***Potamogeton illinoensis***
          7 Larger submersed leaves acute at the apex but lacking a sharp awl-like tip; fruit red to reddish-brown, with muricate lateral ridges ..... ***Potamogeton nodosus***
        6 Submersed leaves sessile. ..... ***Potamogeton illinoensis***

Key C

1 Fruit with a prominent keel 0.2-1.2 mm broad; floating leaves often present; lacunae prominent in submersed leaves. ..... ***Potamogeton epihydrus***
1 Fruit with a keel < 0.2 mm broad; floating leaves absent or present; lacunae present in some species, but generally not prominent.
  7 Nodal glands absent. ..... ***Potamogeton foliosus var. foliosus***
  7 Nodal glands present.
    12 Mature fruit obovate, sides concave, beak mostly forward; peduncle filiform to cylindrical, usually 1-3 per plant; inflorescence usually interrupted; leaves with up to 2 rows of lacunae along midrib, apex acute, rarely apiculate; stipules mostly connate ..... ***Potamogeton pusillus***
    12 Mature fruit mostly widest at middle, or ovate, sides rounded, beak mostly central; peduncle cylindrical, usually > 3 per plant; inflorescence continuous; leaves with 1-5 rows of lacunae along midrib, apex acute to obtuse; stipules mostly convolute ..... ***Potamogeton berchtoldii ssp. berchtoldii***

Potamogeton amplifolius Tuckerman. BIGLEAF PONDWEED, MUSKIE-WEED. **Hab:** Ponds, lakes, sluggish streams, rivers. **Dist:** NL (Newfoundland) west to BC, south to e. NC, nw. GA (Jones & Coile 1988), n. AL, AR, OK, and CA. **Phen:** Jun-Sep. **Syn:** = Ar, C, F, FNA22, G, GrPl, Il, K1, K3, K4, Mi, Mo1, NE, NY, Pa, RAB, S, Tn, Va, W, WV, Wiegleb & Kaplan (1998). NatureServe G5 (Secure).

Key to Map Symbology: 

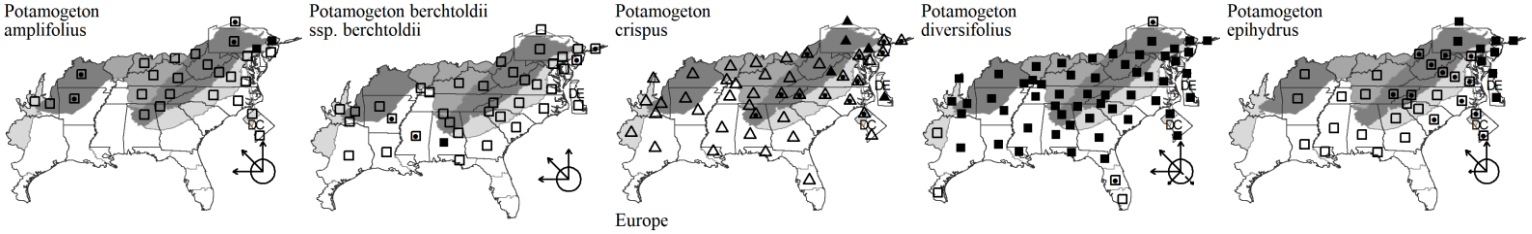
* : waif
EN : endemic
H : historic
N : no
P : planted
? : questionable
X : extirpated

Potamogeton berchtoldii Fieber *ssp. **berchtoldii***. SLENDER PONDWEED. **Hab:** Millponds, other quiet waters. **Dist:** NL (Newfoundland) west to AK, south to Panhandle FL, TX, NM, and CA. Reported from SC by Gaddy & Rayner (1980). **Phen:** May-Sep. **Syn:** = K3, K4; = *Potamogeton berchtoldi* – Mi, NE, NY, WV; = *Potamogeton pusillus* ssp. *tenuissimus* (Mertens & Koch) R.R. Haynes & C.B. Hellquist – Ar, ETx1, FNA22, K1, Tn; = *Potamogeton pusillus* Linnaeus var. *tenuissimus* F.K. Mertens & W.D.J. Koch – GrPl, Va, W; < *Potamogeton berchtoldii* Fieber – RAB; > *Potamogeton berchtoldii* var. *acuminatus* Fieber – F; > *Potamogeton berchtoldii* var. *berchtoldii* – F; > *Potamogeton berchtoldii* var. *lacunatus* (Hagström) Fernald – F; > *Potamogeton berchtoldii* var. *polyphyllus* (Morong) Fernald – F; > *Potamogeton berchtoldii* var. *tenuissimus* (Mertens & Koch) Fernald – F, Tx; < *Potamogeton pusillus* Linnaeus – G, GW1, Pa, S, WH3, Wiegleb & Kaplan (1998); < *Potamogeton pusillus* Linnaeus var. *pusillus* – C.

* ***Potamogeton crispus*** Linnaeus. CURLED PONDWEED, CURLY PONDWEED. **Hab:** Ponds, lakes, and streams, often in calcareous waters. **Dist:** Native of Europe. ME, MN, s. SK and s. BC, south to NC, Panhandle FL, TX, AZ, and CA. **Phen:** (Apr-) May-Sep. **Syn:** = Ar, C, ETx1, F, FNA22, G, GrPl, GW1, Il, K1, K3, K4, Meso6, Mi, Mo1, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, W, WH3, WV, Wiegleb & Kaplan (1998). NatureServe G5 (Secure).

Potamogeton diversifolius Rafinesque. SOUTHERN SNAILSEED PONDWEED, WATERTHREAD PONDWEED. **Hab:** Pools, ponds, lakes, streams, rivers. **Dist:** MA and NY west to MN, MT, and OR, south to c. peninsular FL, TX, and CA. **Phen:** Jun-Sep. **Syn:** = Ar, ETx1, FNA22, G, GrPl, Il, K1, K3, K4, Mo1, NcTx, NY, Pa, RAB, S, Tn, Va, W, WH3, WV, Wiegleb & Kaplan (1998); = *Potamogeton diversifolius* var. *diversifolius* – C, GW1, Tx; > *Potamogeton capillaceus* Poiret var. *atripes* Fernald – F; > *Potamogeton capillaceus* Poiret var. *capillaceus* – F; > *Potamogeton diversifolius* Rafinesque – F. NatureServe G5 (Secure).

Potamogeton epihydrus Rafinesque. RIBBONLEAF PONDWEED. **Hab:** Ponds, lakes, streams, and rivers. **Dist:** NL (Newfoundland) west to AK, south to GA, w. Panhandle FL, s. MS (Sorrie & Leonard 1999), LA, CO, and CA. **Phen:** Jun-Sep. **Syn:** = C, FNA22, GrPl, Il, K1, K3, K4, Mi, Mo1, NE, NY, Pa, RAB, S, Tn, Va, W, WH3, WV; < *Potamogeton epihydrus* Rafinesque – Wiegleb & Kaplan (1998); > *Potamogeton epihydrus* var. *epihydrus* – F, G, Il; > *Potamogeton epihydrus* var. *macellus* Fernald – Il; > *Potamogeton epihydrus* var. *nuttallii* (Chamisso & Schlechtendal) Fernald – F, G.



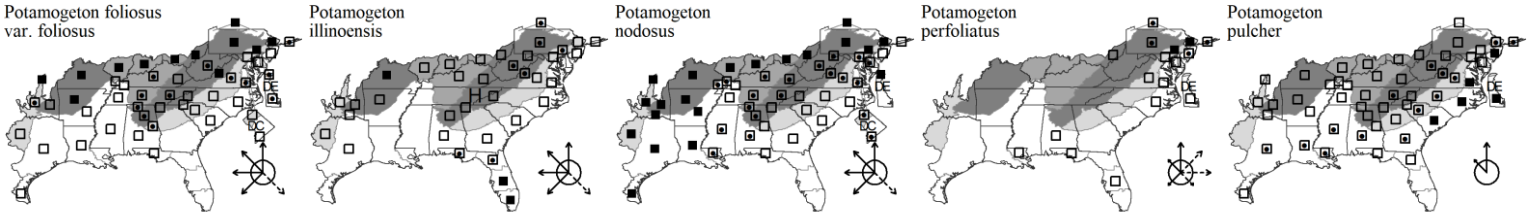
Potamogeton foliosus Rafinesque *var. **foliosus***. LEAFY PONDWEED. **Hab:** Shallow ponds, streams, lakes, and rivers. **Dist:** NL (Newfoundland) west to AK, south to SC, Panhandle FL, TX, and Mexico. **Phen:** May-Oct. **Syn:** = C, ETx1, Meso6, Mo1, Va; = *Potamogeton foliosus* ssp. *foliosus* – Ar, FNA22, K1, NE, NY; > *Potamogeton curtissii* Morong – S; < *Potamogeton foliosus* – G, GrPl, GW1, K3, K4, Mi, NcTx, Pa, RAB, S, Tn, W, WH3, Wiegleb & Kaplan (1998); > *Potamogeton foliosus* – S; > *Potamogeton foliosus* Rafinesque var. *foliosus* – F, Tx, WV; > *Potamogeton foliosus* var. *macellus* Fernald – F, Tx, WV. NatureServe G5T5 (Secure).

Potamogeton illinoensis Morong. ILLINOIS PONDWEED. **Hab:** Calcareous waters of rivers, streams, lakes, and ponds, spring-fed ponds, spring-fed branches and rivers, and sawgrass sloughs. **Dist:** QC west to NT and s. BC, south to s. FL, TX, CA, Mexico, and Central America. **Phen:** Apr-Sep. **Syn:** = Ar, C, ETx1, F, FNA22, G, GrPl, GW1, Il, K1, K3, K4, Meso6, Mi, Mo1, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, W, WH3, WV, Wiegleb & Kaplan (1998); > *Potamogeton angustifolius* Berchtold & C. Presl – S; > *Potamogeton heterophyllus* Schreber – S; > *Potamogeton lucens* Linnaeus – S, misapplied. NatureServe G5 (Secure).

Potamogeton nodosus Poiret. LONGLEAF PONDWEED, AMERICAN PONDWEED. **Hab:** Ponds, lakes, streams, and rivers. **Dist:** ME and QC west to BC, south to Panhandle FL, TX, CA, Mexico, and Central America. **Phen:** May-Sep. **Syn:** = Ar, C, ETx1, F, FNA22, G, GrPl, GW1, Il, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, W, WH3, WV, Wiegleb & Kaplan (1998); ? *Potamogeton fluitans* Roth – S. NatureServe G5 (Secure).

Potamogeton perfoliatus Linnaeus. PERFOLIATE PONDWEED, CLASPING-LEAF PONDWEED, REDHEAD GRASS. **Hab:** Fresh to oligohaline tidal aquatic beds, also ponds and other nontidal waters. **Dist:** NL (Newfoundland), NL (Labrador) west to MI, south to ne. NC, and n. OH; apparently disjunct in w. FL, c. peninsular FL, s. AL, and se. LA, and in SD; Guatemala. **Phen:** Jun-Oct. **Syn:** = FNA22, G, K1, K3, K4, Meso6, Mi, NE, NY, S, Va, WH3, Wiegleb & Kaplan (1998); < *Potamogeton perfoliatus* Linnaeus – Pa; > *Potamogeton perfoliatus* var. *bupleuroides* (Fernald) Farwell – F, GW1, RAB; > *Potamogeton perfoliatus* var. *perfoliatus* – F.

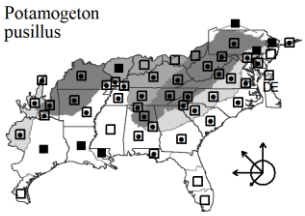
Potamogeton pulcher Tuckerman. SPOTTED PONDWEED, HEARTLEAF PONDWEED. **Hab:** Ponds, pools, ditches, streams. **Dist:** NS west to WI, south to n. peninsular FL and e. TX. **Phen:** Jun-Sep. **Tax:** *Potamogeton rotundifolium* Forster is an older name that has been rejected. **Syn:** = Ar, C, ETx1, F, FNA22, G, GW1, Il, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV, Wiegleb & Kaplan (1998). NatureServe G5 (Secure).

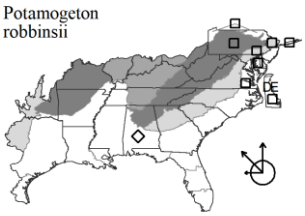


Potamogeton pusillus Linnaeus. SMALL PONDWEED. **Hab:** Acid and alkaline waters of ponds, lakes, and streams. **Dist:** NS west to AK, south to FL, Mexico, and Central America. **Phen:** May-Sep. **Syn:** = K3, Meso6, Mi, NcTx, NE, NY, Tx, WV, Kaplan & Štěpánek (2003); = *Potamogeton pusillus* ssp. *pusillus* – Ar, ETx1, FNA22, K1, Tn; < *Potamogeton berchtoldii* Fieber – RAB; < *Potamogeton pusillus* Linnaeus – G, GW1, K3, K4, Pa, S, WH3, Wiegleb & Kaplan (1998); > *Potamogeton pusillus* var. *minor* (Bivona-Bernardi) Fernald & Schubert – F, Il; < *Potamogeton pusillus* Linnaeus var. *pusillus* – C, GrPl, Mo1; > *Potamogeton pusillus* Linnaeus var. *pusillus* – F, Il.

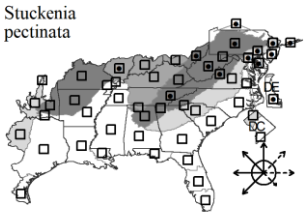
Potamogeton robbinsii Oakes. FERN PONDWEED, FLATLEAF PONDWEED. **Hab:** Tidal freshwater aquatic beds. **Dist:** NS and PE west to Keewatin and AK, south to n. VA, n. IL, s. MN, CO, UT, and CA; disjunct in s. AL (possibly introduced?). **Phen:** Aug-Sep. **Syn:** = C, F, FNA22, G, Il, K1, K3, K4, Mi, NE, NY, Pa, Va, Wiegleb & Kaplan (1998). NatureServe G5 (Secure).

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated





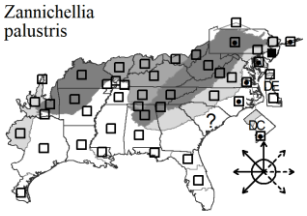
Stuckenia C. Börner 1912 (SAGO-PONDWEED)



A genus of about 10 species, nearly cosmopolitan. This genus should be called *Stuckenia*, which has priority over *Coleogeton*. Lindqvist et al. (2006) provide molecular support for recognition of *Stuckenia* as a genus. References: Haynes & Hellquist (2000c) in FNA22 (2000); Haynes, Les, & Král (1998); Les & Haynes (1996); Lindqvist et al (2006); Wiegleb & Kaplan (1998).

[Key adapted from FNA]

Stuckenia pectinata (Linnaeus) C. Börner. SAGO-PONDWEED. **Hab:** Calcareous or brackish waters of ponds, lakes, estuaries, sounds. **Dist:** The species is irregularly cosmopolitan. **Phen:** Jun-Sep. **Syn:** = Ar, ETx1, FNA22, Il, K1, K3, K4, NcTx, NE, NY, Tn, Va, WH3, Haynes, Les, & Král (1998); = *Coleogeton pectinatus* (Linnaeus) D.H. Les & R.R. Haynes – Les & Haynes (1996); = *Potamogeton pectinatus* Linnaeus – C, F, G, GrPl, GW1, Meso6, Mo1, Pa, RAB, S, Tx, W, WV, Wiegleb & Kaplan (1998). NatureServe G5 (Secure).



Zannichellia Linnaeus 1753 (HORNED PONDWEED)

A genus of about 5 species, aquatic herbs, nearly cosmopolitan. References: Haynes & Hellquist (2000d) in FNA22 (2000); Haynes & Holm-Nielsen (1987).

Identification Notes: *Zannichellia* is sometimes confused with other aquatics, such as *Ruppia* and narrow-leaved *Potamogeton*. *Potamogeton* has at least some leaves alternate; *Zannichellia* and *Ruppia* are opposite-leaved. *Zannichellia* lacks the abruptly broadened sheath of *Najas*. Also, the seeds are flattened in *Zannichellia*, and toothed down one side; *Najas* has a cylindric or elliptic fruit. *Zannichellia* has longer leaves (3-10 cm long) than *Najas* (< 4 cm long).

Zannichellia palustris Linnaeus. HORNED PONDWEED. **Hab:** Fresh or brackish water of ponds, lakes, and estuaries. **Dist:** The species occurs throughout much of the world. **Phen:** Feb-Oct. **Syn:** = Ar, C, ETx1, FNA22, G, GrPl, GW1, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV, Haynes & Holm-Nielsen (1987), Wiegleb & Kaplan (1998); > *Zannichellia palustris* var. *major* (Hartman) W.D.J. Koch – F, Il; > *Zannichellia palustris* var. *palustris* – F.

40+41. CYMODOCEACEAE Vines 1895 (MANATEE-GRASS FAMILY) [in ALISMATALES]

A family of about 6 genera and 20-25 species, estuarine aquatics, of tropical and subtropical (rarely temperate) waters. Les & Tippery (2013) have made a strong case for inclusion of *Ruppia* (often placed in the monogeneric family Ruppiaceae) in Cymodoceaceae, a course followed here. References: Green & Short (2003); Haynes (1978); Haynes (2000d) in FNA22 (2000); Haynes (2000f) in FNA22 (2000); Haynes, Holm-Nielsen, & Les in Kubitzki (1998b); Kuo & McComb in Kubitzki (1998b).

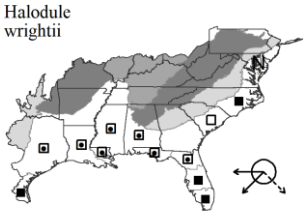
1 Leaves terete, to 35 cm long; plants of marine habitats, growing submersed in salt water; [of FL and the Gulf Coast of AL, MS, and LA]..... ***Syringodium***
1 Leaves flat or terete, to 200 cm long; plants of fresh or brackish waters; [collectively widespread].
  2 Leaves flat, with a notched or tricuspidate apex; stipules absent, or if present, either free or adnate to the leaf base and forming a sheath for < 10 mm; flowers solitary; pistils 2..... ***Halodule***
  2 Leaves filiform, terete or nearly so, with an obtuse to acute apex; stipules present, adnate to the leaf base and forming an apparently inflated sheath around the stem > 10 mm long; flowers usually 2, on a flexuous, elongate peduncle; pistils 4-16..... ***Ruppia***

Halodule Endlicher 1841 (SHOAL-GRASS)

A genus of about 6 species, of tropical and subtropical regions of both hemispheres. References: Green & Short (2003); Haynes (2000f) in FNA22 (2000); Kuo & McComb in Kubitzki (1998b); McRoy & Helfferich (1977).

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

40+41. CYMODOCEACEAE

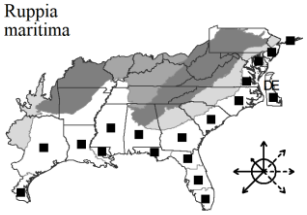


Halodule wrightii Ascherson. SHOAL-GRASS. **Hab:** Submerged in estuarine waters up to about 2 m deep, especially in Core and Pamlico sounds (North Carolina). **Dist:** E. NC, se. SC (reported in 2021; not known from GA); FL west to TX, and south along shores of the Gulf of México and Caribbean; also on the Pacific coast of Panama and Nicaragua. **Tax:** Haynes in FNA (2000) concludes that *H. beaudettei* is not taxonomically distinct from *H. wrightii* (the older name). Seagrasses (an informal group including species such as *Halodule wrightii, Zostera marina*, and *Ruppia maritima* in our area) are very important components of estuarine ecosystems, providing a large proportion of the primary productivity in such systems and providing shelter and nursery grounds for fish, shrimp, and other marine life. An estimated 80,000 hectares of seagrass beds are found in Pamlico and Core sounds, NC, most of that area having *Halodule* as the co-dominant or dominant species (Ferguson, Rivera, & Wood 1989). There is concern about the destruction of seagrass beds by pollution, dredging of waterways, and mechanical disturbance by fishing boats (Koch & Orth 2003; Green & Short 2003). **Syn:** = FNA22, K3, S, WH3, Green & Short (2003); > *Halodule beaudettei* (den Hartog) den Hartog – GW1, K1, Meso6, RAB, Tx; > *Halodule wrightii* Ascherson – Meso6. NatureServe G5 (Secure).

Ruppia Linnaeus 1753 (WIGEON-GRASS)

A genus of 4-10 species, nearly cosmopolitan. References: Haynes (1978); Haynes (2000d) in FNA22 (2000); Haynes, Holm-Nielsen, & Les in Kubitzki (1998b).

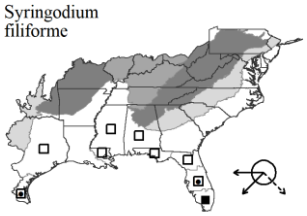
Identification Notes: Separable from superficially similar species of *Potamogeton* by the stipules adnate their entire length (vs. separate at least at the tip in *Potamogeton*).



Ruppia maritima Linnaeus. WIGEON-GRASS, DITCH-GRASS. **Hab:** Brackish estuaries, rivers, marsh pools. **Dist:** Nearly cosmopolitan. **Phen:** Jul-Oct. **Syn:** = C, FNA22, GW1, K1, K3, K4, Meso6, Mo1, NE, NY, RAB, S, Tx, Va, WH3, Haynes (1978); > *Ruppia maritima* var. *longipes* Hagström – F; > *Ruppia maritima* var. *maritima* – F, G; > *Ruppia maritima* Linnaeus var. *occidentalis* (S. Watson) Graebner – GrPl; > *Ruppia maritima* var. *rostrata* Agardh – F, G, GrPl.

Syringodium F.T. Kützing in R.F. Hohenacker 1860 (MANATEE-GRASS)

A genus of 2 species, seagrasses, of the Caribbean and Indo-West Pacific. References: Green & Short (2003); Haynes (2000f) in FNA22 (2000); Kuo & McComb in Kubitzki (1998b).



Syringodium filiforme F.T. Kützing in R.F. Hohenacker. MANATEE-GRASS. **Hab:** Estuarine waters. **Dist:** Panhandle FL, peninsular FL, westward along the Gulf Coast, and in the West Indies. **Comm:** *Syringodium* is occasionally cast ashore in Georgia and the Carolinas following hurricanes, but there is no evidence that it grows along the Atlantic coast north of Florida. **Syn:** = FNA22, K3, K4, Meso6, WH3, Green & Short (2003); = *Cymodocea filiformis* (F.T. Kützing in R.F. Hohenacker) Correll – GW1, K1, Tx; = *Cymodocea manatorum* Ascherson – S. NatureServe G4 (Apparently Secure).

43. NARTHECIACEAE Fries ex Bjurzon 1846 (BOG-ASPHODEL FAMILY) [in DIOSCOREALES]

As circumscribed here (excluding Tofieldiaceae), a family of about 5 genera and 40 species, of e. Asia, e. North America, n. Europe, and the Guyana Shield of n. South America. Reveal & Zomlefer (1998) place the Nartheciaceae in the monotypic order Nartheciales. The molecular phylogenetics of the family were corroborated by Fuse, Lee, & Tamura (2012). References: Fuse, Lee, & Tamura (2012); Reveal & Zomlefer (1998); Tamura in Kubitzki (1998a); Zomlefer (1997b); Zomlefer (1997b); Zomlefer (1999).

1 Leaves in a basal rosette, spirally arranged and radiating out from the stem base; tepals fused nearly to apex, white to yellow, farinose and glutinous on abaxial surface; septal nectaries present..... ***Aletris***
1 Leaves equitant, unifacial (laterally flattened, iris-like), ascending; tepals distinct (sometimes barely united basally), yellow, glabrous or tomentose on abaxial surface; septal nectaries not present.
..... ***Lophiola aurea***

Aletris Linnaeus 1753 (COLIC-ROOT, STARGRASS, MILLER'S-MAID)

As circumscribed here (excluding *Metanarthecium*, following Fuse, Lee, & Tamura 2012), a genus of about 30 species, of e. North America and e. Asia. References: Fuse, Lee, & Tamura (2012); Spaulding et al (2021); Sullivan (2002) in FNA26 (2002a); Tamura in Kubitzki (1998a); Ward (1978); Weigant (2002); Zomlefer (1997b).

Identification Notes: A distinctive genus, with a basal rosette of yellowish-green, lanceolate leaves with sharply pointed tips, and a nearly leafless flowering stalk with numerous, small, white or yellow flowers

1 Perianth golden yellow (often faded in dried specimens).
2 Perianth 1-2× as long as broad, the perianth lobes erect or incurved; [flowering late Apr-Jul] ..... ***Aletris aurea***
2 Perianth 2.5-4× as long as broad, the perianth lobes spreading somewhat; [flowering Mar-May]..... ***Aletris lutea***
1 Perianth white to creamy-white (rarely pinkish).
3 Perianth 4-6 mm long, campanulate at anthesis, ca. 1× as long as broad, the perianth lobes broadly deltoid (about as long as broad); fruiting perianth somewhat narrowed above the base ..... ***Aletris obovata***

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

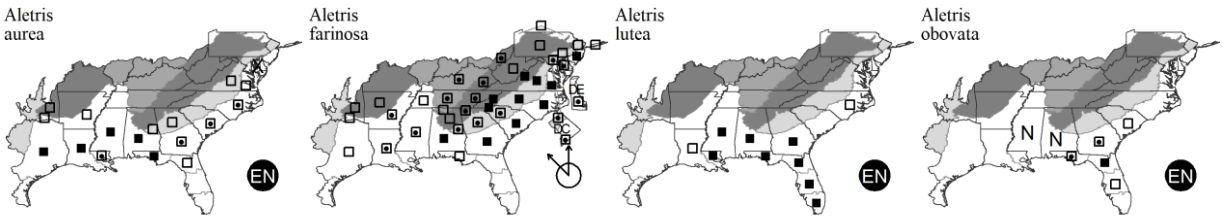
3 Perianth 6-10 mm long, cylindric at anthesis, 2-3× as long as broad, the perianth lobes narrowly deltoid (longer than broad); fruiting perianth markedly constricted above the middle ..... ***Aletris farinosa***

Aletris aurea Walter. GOLDEN COLIC-ROOT. **Hab:** Pine savannas, seepage bogs, pine flatwoods. **Dist:** S. MD south to ne. FL, Panhandle FL, west to e. TX and se. OK. **Phen:** Late Apr-Jul; late Jun-Aug. **ID Notes:** Flowering several weeks later than *A. farinosa* when growing together. **Syn:** = Ar, C, ETx1, F, FNA26, G, GW1, K1, K3, K4, NcTx, RAB, S, Tx, Va, WH3, Ward (1978), Weigant (2002), Zomlefer (1997b). NatureServe G5 (Secure).

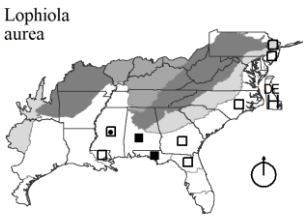
Aletris farinosa Linnaeus. NORTHERN WHITE COLIC-ROOT, MEALY COLIC-ROOT, STARGRASS. **Hab:** Pine savannas, pine flatwoods, seepage bogs, mafic fens and barrens, upland hardpan woodlands and savannas, roadbanks. **Dist:** S. ME, s. ON, and se. MN south to s. GA, FL (Wunderlin & Hansen 2011), LA (and e. TX), the only species of the genus not restricted (or very nearly so) to the Coastal Plain. **Phen:** Late Apr-Jun; Jul-Sep. **Syn:** = Ar, C, ETx1, F, FNA26, G, GW1, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, Spaulding et al (2021), Weigant (2002), Zomlefer (1997b).

Aletris lutea Small. YELLOW COLIC-ROOT. **Hab:** Wet pine savannas. **Dist:** E. GA (in immediate proximity to the SC border) south to s. FL, and west to e. LA (Weigant 2002); disjunct in w. LA (Sorrie & LeBlond 2008) and recently verified in se. NC (R. Thornhill, pers. comm. 2012) (another specimen collected in se. NC has recently been annotated as *A. lutea*, but it appears to be *A. farinosa*). The report by Fernald (1950) of *A. lutea* Small as far north as se. VA is probably in error. **Phen:** Mar-May. **Tax:** The hybrid of *A. lutea* with *A. obovata* is relatively frequent in the area of parental geographic overlap; it is intermediate, including in flower color, which is a creamy pale yellow. **Syn:** = FNA26, GW1, K1, K3, K4, S, WH3, Ward (1978), Weigant (2002), Zomlefer (1997b). NatureServe G4G5 (Apparently Secure).

Aletris obovata Small. SOUTHERN WHITE COLIC-ROOT. **Hab:** Pine savannas. **Dist:** Se. SC south to c. peninsular FL, west to e. Panhandle FL. **Phen:** May-early Jun; Aug. **Comm:** Reported for AL and MS (Kartesz 1999, 2015), but the reports rejected (based on misidentified specimens). **Syn:** = FNA26, GW1, K1, K3, K4, RAB, S, WH3, Ward (1978), Weigant (2002), Zomlefer (1997b). NatureServe G4G5 (Apparently Secure).



Lophiola Ker Gawler 1814 (GOLDEN CREST)



A monotypic genus (as here interpreted to include *L. americana* and *L. septentrionalis*), of temperate e. North America. Often previously placed in the Haemodoraceae (as in RAB, C, G, GW), *Lophiola* clearly belongs in the Nartheciaceae, as shown by studies of anatomy, pollen ultrastructure, chemistry, and DNA (Edwards, Churchill, & Weiss 1970; Simpson & Dickison 1981; Simpson 1983; Zavada 1983; Zavadu, Xu, & Edwards 1983; Ambrose 1985; Fuse, Lee, & Tamura 2012). References: Edwards, Churchill, & Weiss (1970); Fuse, Lee, & Tamura (2012); Robertson (2002) in FNA26 (2002a); Simpson (1983); Tamura in Kubitzki (1998a); Zomlefer (1997b).

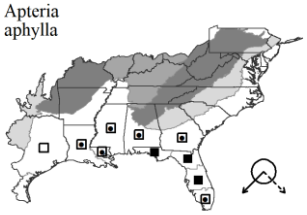
Lophiola aurea Ker Gawler. GOLDEN CREST. **Hab:** Wet savannas, bogs, marshes, ditches adjacent to these natural habitats. **Dist:** FL Panhandle and sw. GA west to e. LA; se. NC (where only a few populations remain); n. DE (at least formerly) and s. NJ; disjunct in NS. **Phen:** Late May-Jun; Aug-Sep. **Syn:** = C, FNA26, K1, K3, K4, S, WH3, Zomlefer (1997b); > *Lophiola americana* (Pursh) Wood – F, G, GW1, RAB; > *Lophiola septentrionalis* Fernald – F. NatureServe G4 (Apparently Secure).

44. BURMANNIACEAE Blume 1827 (BURMANNIA FAMILY) [in DIOSCOREALES]

A family of about 13-15 genera and 130 species, pantropical and warm-temperate. References: Lewis (2002) in FNA26 (2002a); Maas-van de Kamer in Kubitzki (1998a); Wood (1983a).

1 Floral tube (hypanthium) terete; flowers purple or whitish with purple marks; ovary 1-locular ..... ***Apteria***
1 Floral tube (hypanthium) 3-angled or 3-winged; flowers white, greenish, cream, or blue to violet; ovary 3-locular ..... ***Burmannia***

Apteria Nuttall 1834 (NODDING NIXIE)



A monotypic genus, the single species distributed from s. North America south to c. South America. References: Lewis (2002) in FNA26 (2002a); Maas-van de Kamer in Kubitzki (1998a).

Apteria aphylla (Nuttall) Barnhart ex Small. NODDING NIXIE. **Hab:** Wet hammocks, mesic hammocks, bay swamps, other acid swamps, mesic forests. **Dist:** E. GA west to e. TX, south to c. South America; West Indies. **Phen:** Jan-Dec. **Syn:** = ETx1, FNA26, GW1, K1, K3, K4, Meso6, S, Tx, WH3. NatureServe G4 (Apparently Secure).

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Burmannia Linnaeus 1753 (BURMANNIA)

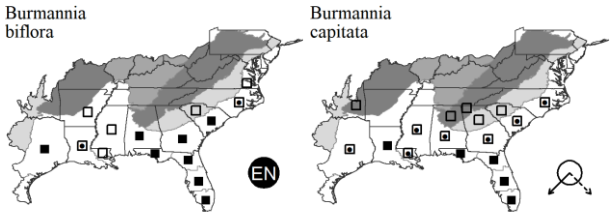
A genus of about 63 species, autotrophic or mycotrophic herbs, pantropical (to warm temperate). References: Lewis (2002) in FNA26 (2002a); Maas-van de Kamer in Kubitzki (1998a).

Identification Notes: Both species of *Burmannia* are very small and easy to overlook; they occasionally occur together.

1 Floral tube obtusely 3-angled, greenish to creamy white; flowers in a capitate cluster (solitary in depauperate individuals) ..... ***Burmannia capitata***
1 Floral tube 3-winged, violet or yellow to greenish; flowers in a spicate cyme (solitary in depauperate individuals) ..... ***Burmannia biflora***

Burmannia biflora Linnaeus. VIOLET BURMANNIA. **Hab:** Pine savannas, bogs, shores of Coastal Plain depression ponds. **Dist:** Se. VA south to s. FL, west to e. TX and sw. AR. **Phen:** Aug-Mar. **Syn:** = Ar, C, ETx1, F, FNA26, G, GW1, K1, K3, K4, RAB, S, Tx, Va, WH3. NatureServe G4G5 (Apparently Secure).

Burmannia capitata (Walter ex J.F. Gmelin) Martius. WHITE BURMANNIA. **Hab:** Pine savannas, bogs, shores of Coastal Plain depression ponds. **Dist:** E. NC south to s. FL, west to e. TX and se. OK; West Indies, Central America, and South America. **Phen:** Jul-Nov. **Syn:** = ETx1, FNA26, GW1, K1, K3, K4, Meso6, NcTx, RAB, S, Tx, WH3. NatureServe G5 (Secure).



45. DIOSCOREACEAE R. Brown 1810 (YAM FAMILY) [in DIOSCOREALES]

A family of about 3-20 genera and 600-880 species, of tropical and warm temperate regions. References: Huber in Kubitzki (1998a); Raz (2002) in FNA26 (2002a).

Dioscorea Linnaeus 1753 (YAM)

A genus of about 575-850 species, vines, of tropical and warm temperate regions of the Old World and New World. Huber in Kubitzki (1998a) advocates the division of the large and unwieldy *Dioscorea* into separate genera. *Dioscorea* (broadly defined) has a wide variety of economic uses, especially in the tropics, where it is most diverse. Various species are cultivated for their edible tubers (yams, not to be mistaken for sweet potatoes, *Ipomoea batatas*, which are often referred to colloquially as 'yams' in the southern United States), especially in Africa. Oral contraceptives were developed from extracts of *Dioscorea*. Many other uses are described in Al-Shehbaz & Schubert (1989). References: Al-Shehbaz & Schubert (1989); Huber in Kubitzki (1998a); Raz (2002) in FNA26 (2002a); Ward (1977c).

Identification Notes: *Smilax* section *Nemexia* are sometimes confused with our native *Dioscorea* (key lead 1a) because of a superficial similarity. They can be readily distinguished even in vegetative condition by *Smilax* section *Nemexia* having 3 (-5) main veins, the 3 central rejoining at the leaf apex (vs. *Dioscorea* with 7-13 main veins), and secondary veins in a complex reticulate pattern (vs. *Dioscorea* with secondary veins forming simpler and largely perpendicular cross-connections between the primary veins).

1 Leaves with a slightly to strongly concave section at the transition from the basal lobes to the terminal portion of the leaf; leaves alternate, opposite, or a mixture of alternate and opposite. ..... ***Dioscorea polystachya***
1 Leaves with continuously convex lateral margins (except just below the acute to acuminate leaf apex) or with slight undulations of straight to very slightly concave sections.
  3 Aerial tubers never present; perennial from rhizomes < 1.5 cm in diameter; leaves whorled, alternate, or a mixture of whorled and alternate; [native species, usually of forests and woodlands]; [section *Macropoda*].
    4 Leaves with 7 main veins; staminate inflorescences usually of 1 large and 1-2 smaller secondary panicles in each axil (of upper stem leaves); filaments inwardly curved, ca. 0.4 mm long; anther lobes connate; tepals oblong; leaf margins often with subtle, very broad lobes, the margin thus with straight or very slightly concave segments; [of SC south] ..... ***Dioscorea floridana***
    4 Leaves with 9 or more main veins; staminate inflorescence a single panicle in each axil (of median or upper leaves); filaments straight, ca. 0.2 mm long; anther lobes separate; tepals ovate; leaf margins convex; [widespread in our area] ..... ***Dioscorea villosa***
  3 Aerial tubers present; perennial from large, vertically-oriented tubers; leaves alternate, or a mixture of alternate and opposite; [non-native species, usually in disturbed areas, especially in bottomlands]; [section *Enantiophyllum*].
    5 Stems with 2-4 wings or angles (these often purplish); leaves alternate below, opposite and decussate above; aerial tubers dark-brown and elongate; stem twining from left to right (dextrorse; looking from below, the stem turns clockwise) ..... ***Dioscorea alata***
    5 Stems terete; leaves alternate; aerial tubers tan to light brown, usually globose; stem twining from right to left (sinistrorse; looking from below, the stem turns counterclockwise) ..... ***Dioscorea bulbifera***

Key to Map Symbology: □ native; ◇ maybe exotic; △ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

45. DIOSCOREACEAE

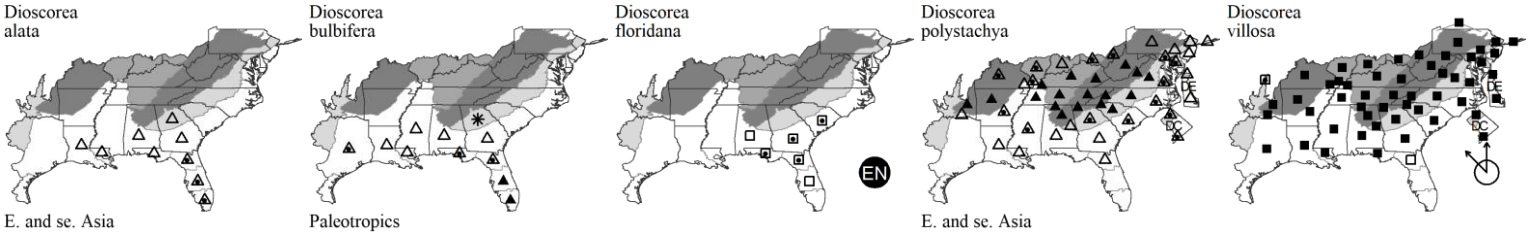
* ***Dioscorea alata*** Linnaeus. WHITE YAM, GREAT YAM. **Hab:** Disturbed areas, in moist soils. **Dist:** Native of se. Asia. Reported for Lowndes County, GA (Carter, Baker, & Morris 2009) and for Baldwin County, AL (Barger et al. 2019). **Syn:** = Bah, FNA26, K1, K3, K4, Meso6, WH3, Al-Shehbaz & Schubert (1989), Ward (1977c). NatureServe GNR (Not Yet Ranked).

* ***Dioscorea bulbifera*** Linnaeus. AIR YAM. **Hab:** Disturbed forests, thickets, and banks. **Dist:** Native of Africa and Asia. Reported for Camden County, GA (Carter, Baker, & Morris 2009). **Phen:** Jul-Sep. **Comm:** {add synonymy}. **Syn:** = Bah, ETx1, FNA26, K1, K3, K4, Meso6, WH3. NatureServe GNR (Not Yet Ranked).

Dioscorea floridana Bartlett. FLORIDA WILD YAM. **Hab:** Mesic to dry forests, swampy forests. **Dist:** SC south to n. FL, on the Coastal Plain. **Phen:** Jun-Jul; Aug-Nov. **Comm:** *D. floridana* is "the most distinctive of North American species" (Al-Shehbaz & Schubert 1989). **Syn:** = FNA26, K1, K3, K4, S, WH3, Al-Shehbaz & Schubert (1989), Ward (1977c); = *Dioscorea villosa* Linnaeus var. *floridana* (Bartlett) H.E. Ahles – RAB. NatureServe G3G4 (Vulnerable).

* ***Dioscorea polystachya*** Turczaninow. CINNAMON VINE, CHINESE YAM. **Hab:** Thickets, disturbed areas, bottomland forests. **Dist:** Native of China. **Phen:** Jun-Aug. **Comm:** A serious invasive species in our region. **Syn:** = Ar, FNA26, Il, K3, K4, NE, NY, Tn, Va, WH3; = *Dioscorea batatas* Decaisne – C, F, G, Pa, RAB, W, Ward (1977c); = *Dioscorea oppositifolia* Linnaeus – K1, Mo1, Al-Shehbaz & Schubert (1989), misapplied.

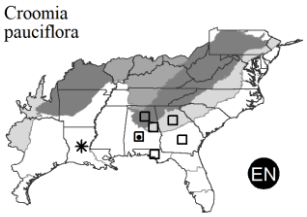
Dioscorea villosa Linnaeus. WILD YAM. **Hab:** Moist forests and woodlands. **Dist:** NJ, NY, s. ON, WI, MN, and IA south to n. FL and TX. **Phen:** Apr-Jun; Sep-Nov. **Tax:** Various specific and infraspecific taxa are here combined. Ward (1977c) states that "a recent study at Duke University by Shu-fun Au, unfinished due to the death of its author, tentatively recognized *D. hirticaulis* and *D. floridana* but combined all other entities without distinction under *D. villosa*". Further study is needed. Al-Shehbaz & Schubert (1989) indicate that the lectotype of *D. villosa* has pubescent stems; nomenclatural changes would apparently be needed if varietal status of the two named varieties of *D. villosa* proves warranted. **Syn:** = Ar, ETx1, FNA26, K3, K4, Mi, NE, NY, Tn, Va, WH3; > *Dioscorea glauca* Muhlenberg ex Bartlett – S; > *Dioscorea hirticaulis* Bartlett – F, G, S, Ward (1977c); > *Dioscorea quaternata* – C, F, G, K1, Mo1, NcTx, Pa, S, Tx, Al-Shehbaz & Schubert (1989), Ward (1977c); > *Dioscorea quaternata* var. *glauca* (Muhlenberg) Fernald – Il; > *Dioscorea quaternata* var. *quaternata* – Il; > *Dioscorea villosa* Linnaeus – F, G, Il, K1, Mo1, NcTx, Pa, S, Tx, W, Ward (1977c); > *Dioscorea villosa* Linnaeus var. *hirticaulis* (Bartlett) H.E. Ahles – C, RAB, Al-Shehbaz & Schubert (1989); > *Dioscorea villosa* var. *villosa* – C, RAB.



48. STEMONACEAE Caruel 1878 (STEMONA FAMILY) [in PANDANALES]

A family of 3-4 genera and 30-35 species, herbs and shrubs, of Asia, Australia, and se. North America. References: Kubitzki (1998a); Rogers (1982); Whetstone (2002) in FNA26 (2002a).

Croomia Torrey 1840 (CROOMIA)



A genus of 3 species, 2 in China and Japan and 1 in se. North America. Sometimes segregated into the Croomiaceae. References: Kubitzki (1998a); Rogers (1982); Whetstone (2002) in FNA26 (2002a).

Croomia pauciflora (Nuttall) Torrey. CROOMIA, ELFIN SHOES. **Hab:** Moist bluff forests, often with beech and basswood. **Dist:** Wc. GA and n. AL south to Panhandle FL (Gadsden & Liberty counties; Wunderlin & Hansen 2008), and allegedly se. GA (Whetstone in FNA 2002, Jones & Coile 1988) and s. LA. **Phen:** Apr-May. **Syn:** = FNA26, K1, K3, K4, S, WH3, Rogers (1982). NatureServe G3 (Vulnerable).

53a. TRILLIACEAE Chevallier 1827 (TRILLIUM FAMILY) [in LILIALES]

A family of ca. 6 genera and about 80 species, perennial herbs, of temperate Northern Hemisphere. The Trilliaceae is clearly monophyletic and strongly characterized morphologically, scarcely resembling its sibling groups (sister to Xerophyllaceae, divergence time ca. 60 million years ago); its recognition as a family seems well-warranted. References: Farmer & Schilling (2002); Floden & Schilling (2018b) in Weakley et al (2018b); Kim, Kim, & Kim (2019).

Trillium Linnaeus 1753 (TRILLIUM, TOADSHADE, WAKE-ROBIN)

A genus of about 50 species, of e. North America, w. North America, and e. Asia (especially se. North America). The genus *Trillium* in our area is difficult and complex. *Trillium* is now usually separated from the Liliaceae (along with Eurasian genera such as *Paris* into the Trilliaceae (Zomlefer 1996, Kato et al. 1995, Kawano & Kato 1995, and others) or less drastically as part of the Melanthiaceae (Chase et al. 2000; Tamura et al. 2004). The traditional division of the genus into two well-marked subgenera, subgenus *Trillium*, the pedicellate trilliums, and subgenus *Sessilium* (formerly often called *Phyllantherum*; see Reveal & Gandhi [2014]), the sessile-flowered trilliums, has been partly supported by molecular and morphological phylogenetic studies (Kawano & Kato 1995, Kato et al. 1995). These studies support the monophyly of subgenus *Sessilium*, but suggest that subgenus *Trillium* consists of several groups which are only rather distantly related (Kawano & Kato 1995, Kazempour Osaloo et al. 1999; Farmer & Schilling 2002; Lampley 2021). References: Bodkin & Reveal (1982); Bodkin & Reveal (1983); Case & Case (1997); Case (2002) in FNA26 (2002a); Farmer &

53a. TRILLIACEAE

Schilling (2002); Freeman (1975); Gaddy (2008); Kato et al (1995); Kawano & Kato (1995); Lampley (2021); Mitchell (1990); Patrick (1986); Patrick (1989) in W (1989); Patrick (2007); Schilling et al (2017); Schilling et al (2019a); Schilling, Floden, & Farmer (2013); Tamura in Kubitzki (1998a); Timmerman-Erskine, Dute, & Boyd (2002); Zomlefer (1996).

Identification Notes: Teratological forms are frequent in some species, as, for instance, leaves, sepals, and stamens in 2's or 4's, petals sepaloid, or sepals petaloid, and so forth. What are called “leaves” in *Trillium* are actually interpreted as bracts by some. Most species are slow-growing perennials; seedlings, juveniles, and depauperate or "tired" plants are one-leaved ("monilliums"), recognizable by the similar color, texture and venation of the single leaf to the three leaves of mature plants. In some species, such as *Trillidium undulatum* and taxa of the *Trillium pusillum* complex, individual plants remain in the single-leaf stage for long periods of time, and populations may consist largely of juvenile plants.

Unkeyed taxa: *Trillium species 3*, *Trillium species 4*

1 Leaves mottled with 2-3 different shades of green and silver (very rarely the mottling not apparent); flower sessile; [subgenus *Sessilium*] ..... ***Key A***
1 Leaves solid green; flower on a pedicel (the pedicel sometimes very short or essentially absent in some varieties of *T. pusillum*); [subgenus *Trillium*].
  2 Petals relatively thick in texture, straight-margined, maroon or white, rarely yellow or green (if white, turning brown with age); stigmas thicker at base, tapering gradually toward tip, distinct; ovary purple-black, maroon, pink, or white, 6-angled; [*Erectum* group] ..... ***Key B***
  2 Petals relatively delicate in texture, wavy-margined, white to deep pink (if white, generally fading to pink with age); stigmas thin, uniform in thickness from base to apex, somewhat fused at the base into a short style; ovary greenish-white to white, 3- or 6-angled or-lobed ..... ***Key C***

Key A - trilliums with sessile flowers and mottled leaves (subgenus *Sessilium*)

1 Plants prostrate, with scapes very short, holding bracts (leaves) near the ground; floral fragrance of rotting meat or manure-scented
  2 Anther dehiscence extrorse; bract apices rounded or obtuse, typically mottled only in 2 colors, silver and green ..... ***Trillium decumbens***
  2 Anther dehiscence introrse; bract apices obtuse or acute, conspicuously mottled in silver and three or more shades of green ..... ***Trillium reliquum***
1 Plants erect or ascending, with tall scapes holding bracts (leaves) well above ground, or sometimes bract tips barely touching the ground in early anthesis; floral fragrance various, foetid, pleasant, or mildly unpleasant
  4 Sepals abruptly deflexed between and below the leaves, distinctly descending below the approximately horizontal plane of the leaves; filaments about as long as incurved anthers; [*T. recurvatum* group].
    7 Leaves sessile or subsessile, borne in a descending or drooping manner (similar to the sepals); petals usually 4-7× as long as wide, strongly clawed ..... ***Trillium lancifolium***
    7 Leaves distinctly petiolate, borne in an ascending manner (strongly contrasting in position with the strongly deflexed sepals); petals usually ca. 2× as long as wide, attenuate to weakly clawed ..... ***Trillium recurvatum***
  4 Sepals erect, ascending, or spreading, usually borne at or above the approximately horizontal plane of the leaves; filaments much shorter than the upright anthers.
    8 Petals spreading to horizontal, with 1-2 spiral twists (looking something like an airplane propeller); anther dehiscence extrorse (toward the outside of the flower); [*T. sessile* group] ..... ***Trillium stamineum***
    8 Petals erect to slightly spreading, not spirally twisted; anther dehiscence introrse (toward the inside of the flower), or latrorse (toward the side).
      10 Stigmas > 1.5× as long as the ovary; stamens about 0.5× as long as the petals; anther connectives prominently prolonged into a beak 1.0-5.0 mm long (beyond the anther sacs); [*T. sessile* group] ..... ***Trillium sessile***
      10 Stigmas as long as the ovary or shorter; stamens < 0.5× as long as the petals; anthers blunt, the connectives extended < 1.0 mm beyond the anther sacs.
        11 Ovary ellipsoid; leaves acute, the margins of the outer 1/3 more or less straight; leaf blade mottled with 3 or more shades of green, the palest shade forming a very conspicuous pale silvery-green streak along the midvein; [of the Coastal Plain and fall-line area of GA, AL, and FL Panhandle]; [*T. sessile* group].
          12 Stem 2.5-3× as long as the leaves; petals oblanceolate-obovate, usually 1.5-3× as long as wide; flower fragrance yeasty-sweet (or similar to overripe bananas) ..... ***Trillium decipiens***
          12 Stem 1-2× as long as the leaves (though sometimes elongating late in the season); petals narrowly elliptic to oblanceolate-obovate, usually 3-5× as long as wide; flower fragrance yeasty-sweet (or reminiscent of stale beer) ..... ***Trillium underwoodii***
        11 Ovary ovoid; leaves acute to acuminate, the margins of the outer 1/3 convex; leaf blade mottled with 2-3 shades of green, paler shades sometimes prominent along the midvein, but not as above; [collectively widespread in our area]; [*T. maculatum* group].
          13 Petals < 4× as long as wide, elliptic-oblanceolate to oblanceolate; [of inland provinces, rarely in the Coastal Plain].
            14 Flower fragrance fruity-spicy, like green apples or *Calycanthus* (rarely musky); petals maroon, bronze, green, yellow; portions of ovary and stamens purplish during anthesis ..... ***Trillium cuneatum***
            14 Flower fragrance lemon-like; petals greenish-yellow darkening to yellow; ovary and stamens greenish-white during anthesis ..... ***Trillium luteum***
          13 Petals > 4.5× as long as wide, narrowly oblanceolate-spatulate to linear-oblanceolate; [of the Coastal Plain, rarely farther inland]. ..... ***Trillium maculatum***

Key B - trilliums with unmottled leaves and pedicellate flowers, of the *Erectum* Group

1 Flowers held below the leaves (the pedicel declined below a horizontal plane).
  2 Stamens far exceeding the pistil, filaments as long as the ovary or longer, at least partly maroon, the anther sacs yellow to maroon; ovary small, globose, 3-12 mm long, dark purplish black; flower fragrance pungent, rose-like; pedicel long, 3-13 cm long; petals strongly overlapping, usually maroon (rarely white or whitish) ..... ***Trillium vaseyi***
  2 Stamens at most 1.5× longer than the pistil, filaments shorter than the ovary, white (less commonly purplish), the anther sacs lavender to vivid purple (or albino); ovary white to pink or dull red, large, ovoid, 10-17 mm long; flower fragrance various; pedicel short to long, 1.5-12 cm long; petals not strongly overlapping, usually white (rarely maroon).
    3 Pedicels short, 1.5-4 cm long. ..... ***Trillium rugelii***
    3 Pedicels long, 4-12 cm long. ..... ***Trillium flexipes***
1 Flowers held at or above the level of the leaves (the pedicel nearly horizontal, inclined above the horizontal, or erect).

Key to Map Symbology:

* : waif
EN : endemic
H : historic
N : no
P : planted
? : questionable
X : extirpated

6 Ovary flask-shaped, broadest near the base, usually white to pinkish (sometimes darker); petals usually white to creamy white (maroon forma occasional). ..... ***Trillium flexipes***

6 Ovary globose, widest near the middle, black to purplish black; petals white, maroon, yellowish, or otherwise.

8 Petals lanceolate to narrowly ovate or elliptic, spreading from base in the same plane as the sepals, rarely > 2× as broad as the sepals; sepals 0.5-0.8× as long as the pedicel, weakly sulcate-tipped (roundly keeled and upturned near apex); flower fragrance unpleasant, musty.

9 Petals white..... ***Trillium erectum var. album***

9 Petals maroon to red ..... ***Trillium erectum var. erectum***

8 Petals ovate, overlapping in some instances and forming a cup-shaped base, variably recurved apically, > 2× as broad as the sepals; sepals 0.2-0.7× as long as the pedicel, sulcate-tipped; fragrance pleasant, sweet to fungal. ..... ***Trillium sulcatum***

Key C - trilliums with unmottled leaves and pedicellate flowers, of various affinities

2 Pedicel declined below the leaves (rarely erect); sepals arcuate-recurved; anthers irregularly twisted outward; pollen egg-yolk yellow..... ***Trillium catesbyi***

2 Pedicel inclined above leaves to strictly erect; sepals not arcuate-recurved; anthers erect, regular; pollen light yellow.

3 Sepals narrower than the petals, acute; anthers white to greenish-white between the anther sacs; leaves obtuse, acute, or acuminate; pedicel somewhat angled from the vertical. ..... ***Trillium grandiflorum***

3 Sepals about as broad as the petals or broader, obtuse; leaves obtuse; anthers purplish-green between anther sacs; pedicel erect through fruiting; [*Trillium pusillum* complex]. ..... ***Trillium pusillum var. 1***

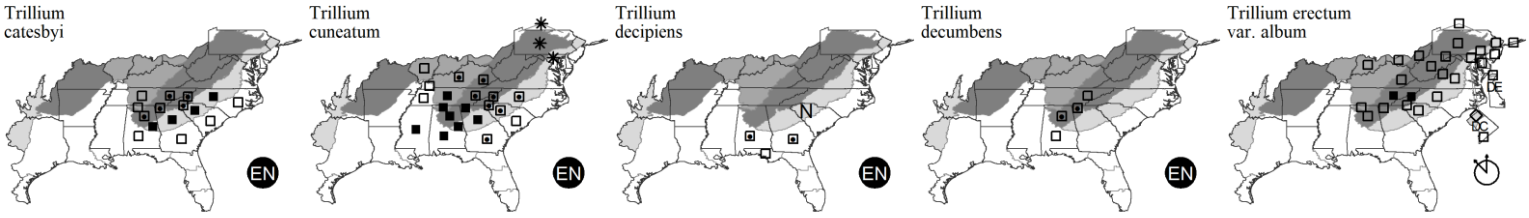
Trillium catesbyi Elliott. CATESBY'S TRILLIUM, BASHFUL TRILLIUM, ROSY WAKE-ROBIN. **Hab:** Bottomland forests, mesic slopes, cove forests. **Dist:** Nc. NC south to sw. GA and se. AL, north in the interior to n. AL and se. TN, centered in the Piedmont from NC to GA, but extending into the Mountains and Coastal Plain. **Phen:** Late Mar-early Jun; Jul-Aug. **Tax:** This species is morphologically and genetically complex and may include several semi-cryptic taxa. Traditionally spelled '*catesbaei*', this is necessarily corrected to '*catesbyi*' under provisions of the Code. **Comm:** Petals white to pink. **Syn:** = *Trillium catesbaei* Elliott – FNA26, K1, K3, K4, RAB, S, Tn, W, Case & Case (1997), Patrick (1986), Patrick (2007). NatureServe G4G5 (Apparently Secure).

Trillium cuneatum Rafinesque. SWEET BETSY, PURPLE TOADSHADE, LARGE TOADSHADE, WEDGE-PETAL TRILLIUM, BLOODY BUTCHER. **Hab:** In rich soils of cove forests, moist slopes, and bottomlands, usually over mafic or calcareous rocks, locally abundant. **Dist:** Nc. NC, c. KY, and s. IL south to sc. GA, sc. AL, and s. MS. Sometimes spreading from cultivation outside of this area. **Phen:** (Jan-) Mid Mar-Apr; late May-Jun. **Comm:** Petals maroon, yellow, green, or various intermediate shades. **Syn:** = C, FNA26, Il, K1, K3, K4, Mi, Pa, Tn, W, Case & Case (1997), Freeman (1975), Patrick (1986), Patrick (2007); = *Trillium cuneatum* var. *cuneatum* – RAB; > *Trillium cuneatum* Rafinesque – F; > *Trillium hugeri* Small – S; >< *Trillium underwoodii* Small – S, misapplied; >< *Trillium viride* Beck – F, misapplied with respect to NC material; < *Trillium viride* var. *luteum* (Muhlenberg) Gleason – G, misapplied (also see T. luteum).

Trillium decipiens J.D. Freeman. CHATTAHOOCHEE TRILLIUM, DECEPTIVE TRILLIUM. **Hab:** Moist forests. **Dist:** FL Panhandle (Jackson and Walton counties) and sc. AL east to ec. GA. Material in Abbeville County, SC, previously attributed here is under study. **Phen:** Jan-early Apr. **ID Notes:** It is similar to *T. underwoodii*. **Syn:** = FNA26, K1, K3, K4, WH3, Case & Case (1997), Freeman (1975), Patrick (1986), Patrick (2007). NatureServe G3G4 (Vulnerable).

Trillium decumbens Harbison. DECUMBENT TRILLIUM. **Hab:** Moist forests. **Dist:** Se. TN (Chester et al. 1993) south and west to nw. GA and nc. AL; it should be sought in extreme sw. NC, an extremely "under-botanized" area. **Phen:** Mid-Mar-Apr. **Syn:** = FNA26, K1, K3, K4, S, Tn, W, Case & Case (1997), Freeman (1975), Patrick (1986), Schilling et al (2019a). NatureServe G4 (Apparently Secure).

Trillium erectum Linnaeus *var.* ***album*** (Michaux) Pursh. WHITE-FLOWERED RED TRILLIUM. **Hab:** Wooded slopes, usually at low elevations. **Dist:** Distribution poorly understood, but especially common in and around Great Smoky Mountains National Park, NC and TN. **Phen:** Apr-early Jun; Jul-Aug. **Comm:** Apparently as genetically distinct from *T. erectum* var. *erectum* as are other members of the *Trillium erectum* complex (K.G. Mathews, pers. comm., 2006). **Syn:** = FNA26, Il, Pa, Tn; < *Trillium erectum* – C, F, G, K1, K3, K4, S, Va, W, Case & Case (1997), Patrick (1986), Patrick (2007); < *Trillium erectum* Linnaeus var. *erectum* – RAB, WV.



Trillium erectum Linnaeus *var.* ***erectum***. RED TRILLIUM, PURPLE TRILLIUM, STINKING WILLIE, STINKING BENJAMIN, WAKE-ROBIN. **Hab:** Wooded slopes, usually at middle to high elevations. **Dist:** NB, QC, and MI south to w. NC, nw. SC, n. GA, e. TN, IN, and se. WI. **Phen:** Apr-early Jun; Jul-Aug. **Tax:** In a limited study, *Trillium erectum* var. *album* was apparently as genetically distinct from *T. erectum* var. *erectum* as are other members of the *Trillium erectum* complex (K.G. Mathews, pers. comm., 2006). Additional study is needed. **Comm:** Petals maroon, yellow, green, or various intermediate shades. **Syn:** = FNA26, Il, Pa, Tn; < *Trillium erectum* – C, F, G, K1, K3, K4, Mi, NE, NY, S, Va, W, Case & Case (1997), Patrick (1986), Patrick (2007); < *Trillium erectum* Linnaeus var. *erectum* – RAB, WV.

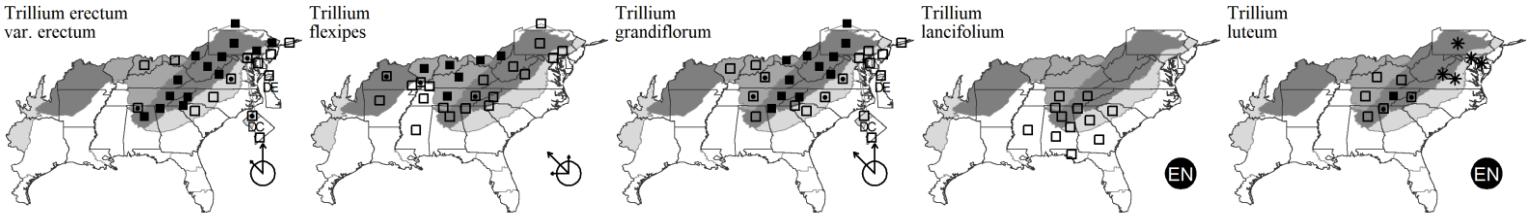
Trillium flexipes Rafinesque. BENT WHITE TRILLIUM. **Hab:** Moist coves over mafic or calcareous rocks. **Dist:** E. PA, s. ON and s. MN south to w. NC, nw. GA, n. AL, ne. MS (Tishomingo County), mostly west of the Blue Ridge, but scattered in the Blue Ridge of NC, and disjunct east of the Blue Ridge in DE, PA, and MD. **Phen:** Apr. **Comm:** Petals white or maroon. **Syn:** = Ar, C, F, FNA26, Il, K1, K3, K4, Mi, Mo1, NY, Pa, Tn, Va, W, Case & Case (1997), Patrick (1986), Patrick (2007); = *Trillium declinatum* (A. Gray) Gleason – S, misapplied; = *Trillium erectum* var. *declinatum* – WV; = *Trillium gleasoni* Fernald – G; < *Trillium erectum* var. *vaseyi* (Harbison) H.E. Ahles – RAB. NatureServe G5 (Secure).

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Trillium grandiflorum (Michaux) Salisbury. LARGE-FLOWERED TRILLIUM, WHITE TRILLIUM, GREAT WHITE TRILLIUM. **Hab:** Rich coves and mesic slopes, also less typically on ridges over "rich" rock types. **Dist:** S. QC, s. ON, MI, and MN, south to NJ, c. NC, nw. SC, n. GA, n. AL, s. IL, and IA. **Phen:** Apr-May; Jul-Aug. **Comm:** Petals white to pink. **Syn:** = C, F, FNA26, G, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Va, W, WV, Case & Case (1997), Patrick (1986), Patrick (2007). NatureServe G5 (Secure).

Trillium lancifolium Rafinesque. LANCELEAF TRILLIUM, NARROWLEAF TRILLIUM. **Hab:** Rich forests over marble, limestone, and other calcareous substrates, floodplain forests. **Dist:** Se. TN south through w. GA and AL to Panhandle FL and se. AL. **Phen:** (Late Jan-) Mar-Apr. **Comm:** Petals purple, green, or greenish-purple. Material previously referred to this species from Kershaw County, SC represents the newly described *T. oostingii*. **Syn:** = FNA26, K1, K3, K4, Tn, WH3, Case & Case (1997), Freeman (1975), Patrick (1986), Patrick (2007); = *Trillium lanceolatum* (S. Watson) Boykin ex Small – RAB, S. NatureServe G3 (Vulnerable).

Trillium luteum (Muhlenberg) Harbison. YELLOW TRILLIUM, YELLOW TOADSHADE, WAX TRILLIUM, LEMON-SCENTED TRILLIUM. **Hab:** Moist coves over mafic or calcareous rocks, locally abundant in the vicinity of the Great Smokies. **Dist:** Nearly endemic to the Southern Appalachians: w. NC, e. TN, nw. GA, and se. KY, allegedly disjunct in c. AL (planted and naturalized in Frederick County, VA, and elsewhere, as in MD and PA). **Phen:** Mid Mar-Apr; late May-Jun. **Comm:** Petals yellow. **Syn:** = C, F, FNA26, K1, K3, K4, Mi, Pa, Tn, Va, W, Case & Case (1997), Freeman (1975), Patrick (1986), Patrick (2007); = *Trillium cuneatum* var. *luteum* (Muhlenberg) H.E. Ahles – RAB; < *Trillium sessile* Linnaeus – S, misapplied; < *Trillium viride* var. *luteum* (Muhlenberg) Gleason – G, (also see T. cuneatum).



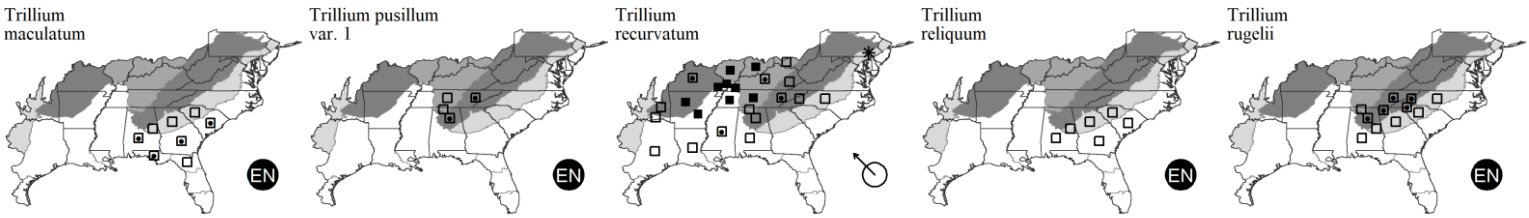
Trillium maculatum Rafinesque. MOTTLED TRILLIUM, SPOTTED TRILLIUM. **Hab:** Rich forests and floodplains, over calcareous materials such as coquina limestone ("marl") or on shell middens. **Dist:** S. SC south to n. FL, west to sc. AL. **Phen:** Jan-Mar (-mid Apr). **Comm:** Petals maroon or yellow. **Syn:** = FNA26, K1, K3, K4, WH3, Case & Case (1997), Freeman (1975), Patrick (1986), Patrick (2007); < *Trillium sessile* Linnaeus – S, misapplied; < *Trillium viride* Beck – RAB, misapplied.

Trillium pusillum Michaux *var. **1***. ALABAMA LEAST TRILLIUM. **Hab:** Swamps and floodplains. **Dist:** C. TN south to n. AL. **Tax:** Under study by Farmer, Schilling, and Floden. **Comm:** Petals white to pink. **Syn:** = *Trillium alabamicum* C.J. Garrett ex S.B. Farmer – K4, nomen nudum; = *Trillium pusillum* var. *alabamicum* – Case & Case (1997), nomen nudum; < *Trillium pusillum* Michaux – G, S, Tn, Patrick (1986), Timmerman-Erskine, Dute, & Boyd (2002); < *Trillium pusillum* Michaux var. *pusillum* – C, F, FNA26, K1, K3.

Trillium recurvatum Beck. PRAIRIE TRILLIUM, RECURVED TRILLIUM, PRAIRIE WAKE-ROBIN. **Hab:** Rich soils over calcareous or mafic rocks. **Dist:** W. OH west to s. MI, s. WI, and e. IA, south to c. TN, c. AL, c. MS, n. LA, and e. TX; disjunct in the Cumberland Plateau of e. TN, e. KY, and the Blue Ridge and w. Piedmont of NC. The two known NC occurrences (Catawba and Madison counties) appear to be native. **Phen:** Mar-May. **Comm:** Petals maroon or yellow. **Syn:** = Ar, C, ETx1, F, FNA26, G, Il, K1, K3, K4, Mi, Mo1, NE, NY, Pa, S, Tn, Tx, Case & Case (1997), Freeman (1975), Patrick (1986). NatureServe G5 (Secure).

Trillium reliquum J.D. Freeman. RELICT TRILLIUM. **Hab:** Rich forests on bluffs and ravine slopes. **Dist:** Known from two disjunct areas, along the Savannah River in the vicinity of Augusta, on the border of SC (Aiken and Edgefield counties) and GA (Richmond county), and along the Chattahoochee River in sw. GA (Clay and Early counties). **Phen:** Mid Mar-late Apr. **Syn:** = FNA26, K1, K3, K4, Case & Case (1997), Freeman (1975), Patrick (1986), Patrick (2007). NatureServe G3 (Vulnerable); USESA E.

Trillium rugelii Rendle. SOUTHERN NODDING TRILLIUM. **Hab:** Rich woodlands and forests over mafic or calcareous rocks. **Dist:** W. NC and e. TN south to c. GA, and c. AL. **Phen:** Apr-early May. **Comm:** Petals white or maroon. **Syn:** = FNA26, K1, K3, K4, Tn, W, Case & Case (1997), Patrick (1986), Patrick (2007); < *Trillium cernuum* Linnaeus – F, RAB, S; < *Trillium cernuum* var. *macranthum* A.J. Eames & Wiegand – C, G.



Trillium sessile Linnaeus. SESSILE TRILLIUM, SESSILE TOADSHADE, TOAD TRILLIUM. **Hab:** Rich forests. **Dist:** Primarily a species of the northern Midwest, *T. sessile* ranges from w. NY, s. MI, n. IL, n. MO, and e. KS south to e. VA, ne. NC, c. TN, n. AL, AR, and e. OK. The easternmost occurrences are disjunct populations east of the Blue Ridge, in MD, VA, and along the Roanoke River in ne. NC (where limited to very rich soils of natural levees and lower slopes along the Roanoke River). **Phen:** Mar-Apr. **Comm:** Petals maroon or green. **Syn:** = Ar, C, F, FNA26, G, Il, K1, K3, K4, Mi, Mo1, NY, Pa, Tn, Va, W, WV, Case & Case (1997), Freeman (1975), Patrick (1986).

Trillium species 3. LOOKOUT MOUNTAIN TRILLIUM, RUBY FALLS TRILLIUM, FREEMAN'S TRILLIUM. **Hab:** Rich forests. **Dist:** Endemic to the Lookout Mountain region of nw. GA, se. TN, and ne. AL. **Comm:** Resembles *T. ludovicianum*. **Syn:** = *Trillium freemanii in prep.* – Lampley (2021); < *Trillium ludovicianum* Harbison – Patrick (2007).

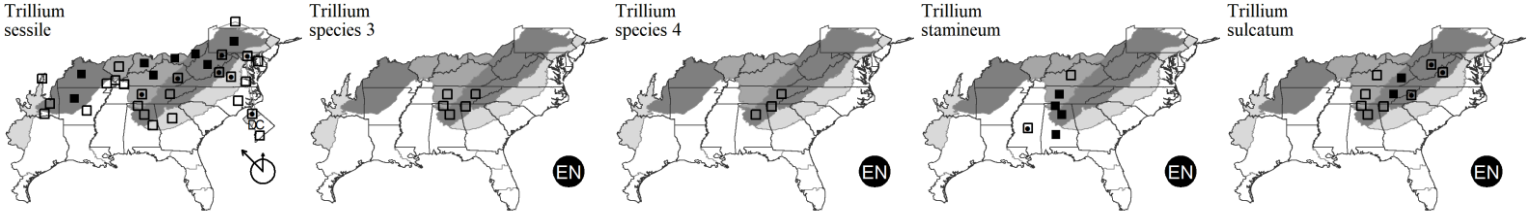
Trillium species 4. RADIANT TRILLIUM. **Hab:** Rich coves and other rich mesic forests. **Dist:** Endemic to ne. AL, nw. GA, and se TN. **Phen:** Late Mar-mid Apr. **Tax:** See Lampley (2021). **Syn:** = *Trillium radiatum in prep.* – Lampley (2021).

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

53a. TRILLIACEAE

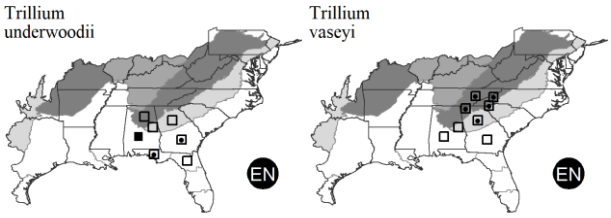
Trillium stamineum Harbison. TWISTED TRILLIUM, HELICOPTER TRILLIUM. **Hab:** Floodplains, slopes, especially over limestone. **Dist:** Sw. KY (Logan and Todd counties; Brock 2020) and c. TN (Chester et al. 1993) south to c. AL and e. MS. **Phen:** Late Mar-mid May. **Syn:** = FNA26, K1, K3, K4, S, Tn, Case & Case (1997), Freeman (1975), Patrick (1986). NatureServe G4 (Apparently Secure).

Trillium sulcatum T.S. Patrick. SOUTHERN RED TRILLIUM, BARKSDALE'S TRILLIUM. **Hab:** Coves and moist slopes. **Dist:** Primarily a species of the sedimentary rock Appalachians, *T. sulcatum* ranges from s. WV, sw. VA, and e. KY south to nw. NC (where it enters the Blue Ridge), w. TN, nw. GA, and ne. AL. **Phen:** Apr-May. **Comm:** This species seems quite distinctive for its small, generally maroon flowers (with strongly sulcate sepals purplish as well), borne on very long pedicels. Petals maroon or white. **Syn:** = C, FNA26, K1, K3, K4, Tn, Va, W, Case & Case (1997), Patrick (1986), Patrick (2007); < *Trillium erectum* – F, G, S; < *Trillium erectum* Linnaeus var. *erectum* – RAB, WV.



Trillium underwoodii Small. UNDERWOOD'S TRILLIUM. **Hab:** Moist forests. **Dist:** N. FL north to c. GA and c. and s. AL. **Phen:** (Late Jan-) Feb-mid Apr. **Comm:** The only erect trillium with the stems typically < 2× as long as the leaves (though sometimes elongating later in the season). **Syn:** = FNA26, K1, K3, K4, S, WH3, Case & Case (1997), Freeman (1975), Patrick (1986), Patrick (2007).

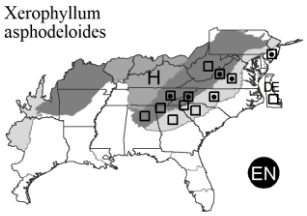
Trillium vaseyi Harbison. SWEET TRILLIUM, VASEY'S TRILLIUM, SWEET BETH. **Hab:** Cove forests, other rich forests. **Dist:** This species is a Southern Appalachian endemic: w. NC and e. TN south to nw. SC, n. GA, and ne. AL, but extending south into the Coastal Plain of GA and AL. **Phen:** Late Apr-early Jun. **ID Notes:** Perhaps the largest trillium species, with the stems to 7 dm tall. Petals maroon or white. **Syn:** = FNA26, K1, K3, K4, S, Tn, W, Case & Case (1997), Patrick (1986), Patrick (2007); < *Trillium erectum* var. *vaseyi* (Harbison) H.E. Ahles – RAB. NatureServe G3 (Vulnerable).



53b. XEROPHYLLACEAE Takhtajan 1996 (BEARGRASS FAMILY) [in LILIALES]

A family of a single genus and 2 species, perennial herbs, of e. and nw. North America. Apparently sister to the Trilliaceae, but quite isolated genetically and based on that and the widely different morphology, best separated at family rank (see, Kim, Kim, & Kim 2019, who however do not promote this interpretation). References: Dahlgren, Clifford, & Yeo (1985); Tamura in Kubitzki (1998a); Zomlefer (1996, 2003); Zomlefer (1997a); Zomlefer et al (2001).

Xerophyllum Michaux 1803 (TURKEYBEARD, BEARGRASS)



A genus of 2 species, rather woody herbs of temperate North America. The other species in the genus is *X. tenax* (Pursh) Nuttall, distributed from AB, BC, and s. AK south to nw. WY, ID, and CA. References: Tamura in Kubitzki (1998a); Utech (2002e) in FNA26 (2002a); Zomlefer (1997a).

Identification Notes: Sterile plants resemble tussocks of a bunchgrass, but the leaf bases are white and flattened and are obviously not those of a grass. The leaves remain (gray-) green throughout the winter.

Xerophyllum asphodeloides (Linnaeus) Nuttall. TURKEYBEARD, BEARGRASS, MOUNTAIN-ASPHODEL. **Hab:** Dry ridges and slopes in the mountains, primarily in dry, strongly acidic sites which burn periodically, such as pine/heath woodlands and forests, heath balds, and xeric oak forests, most of the populations in the Blue Ridge Escarpment, often associated with *Pinus rigida* or *P. pungens*, disjunct to similar sites on quartzite monadnocks of the upper Piedmont, in the Coastal Plain in acidic pinelands, and rarely in montane bogs. **Dist:** In two disjunct areas; the Coastal Plain of s. NJ and DE, and the Southern Appalachians from w. VA and e. WV south to e. TN, w. NC, nw. SC, ne. GA, and ne. AL. **Phen:** May-Jun; Jul-Aug. **Syn:** = C, F, FNA26, G, K1, K3, K4, RAB, S, Tn, Va, W, WV, Zomlefer (1997a). NatureServe G4 (Apparently Secure).

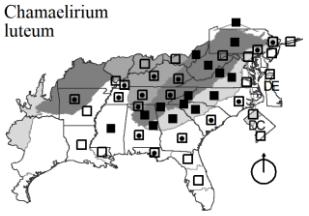
53d. CHIONOGRAPHIDACEAE Takhtajan 1996 (FAIRY-WAND FAMILY) [in LILIALES]

A family of 2 genera, and 5 species, perennial herbs, of e. Asia and e. North America. We here accept a narrower circumscription of Melanthiaceae (excluding Trilliaceae, Xerophyllaceae, Chionographidaceae, and Heloniaceae) than currently traditional, based on the age, phylogeny, and morphological distinctiveness of these clades (Kim, Kim, & Kim 2019). References: Kim, Kim, & Kim (2019); Tamura in Kubitzki (1998a); Utech (2002a) in FNA26 (2002a); Zomlefer (1997a).

Key to Map Symbology: □ native; ◇ maybe exotic; △ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

53d. CHIONOGRAPHIDACEAE

Chamaelirium Willdenow 1808 (DEVIL'S-BIT, FAIRY-WAND)



A monotypic genus, an herb of temperate e. North America. References: Tamura in Kubitzki (1998a); Utech (2002c) in FNA26 (2002a); Zomlefer (1997a).

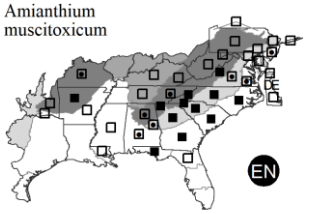
Chamaelirium luteum (Linnaeus) A. Gray. DEVIL'S-BIT, FAIRY-WAND. **Hab:** Moist slopes, bottomlands, wet pine savannas. **Dist:** MA west to ON, OH, s. IN, and AR, south to FL and LA. **Phen:** Mar-May; Sep-Nov. **Tax:** The ecological amplitude and morphologic variability of this species is surprising; it needs additional, more careful, study. *C. obovale* Small (or other previously unnamed entities) may warrant recognition at some level and need additional study. **Syn:** = Ar, C, F, FNA26, G, GW1, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, Tn, W, WH3, Zomlefer (1997a); > *Chamaelirium luteum* (Linnaeus) A. Gray – S; > *Chamaelirium obovale* Small – S. NatureServe G5 (Secure).

53e. MELANTHIACEAE Batsch 1793 (BUNCHFLOWER FAMILY) [in LILIALES]

A family of about 8 genera and 80 species, mostly temperate and northern hemisphere, but extending into South America (Peru). We here accept a narrower circumscription of Melanthiaceae (excluding Trilliaceae, Xerophyllaceae, Chionographidaceae, and Heloniadaceae) than currently traditional, based on the age, phylogeny, and morphological distinctiveness of the units (Kim, Kim, & Kim 2019). References: Dahlgren, Clifford, & Yeo (1985); Kim et al (2016); Kim, Kim, & Kim (2019); Tamura in Kubitzki (1998a); Tamura et al (2004); Zomlefer (1996); Zomlefer (1997a); Zomlefer (2003); Zomlefer et al (2001).

1 Leaves 3, whorled at the summit of the stem; flowers 1 per plant, solitary and terminal ..... ***Trilliaceae***
1 Leaves many, not whorled at the summit of the stem; flowers many per plant, in spikes, racemes, or panicles.
  2 Leaves 1-2 mm wide, linear, stiff, sclerified ..... ***Xerophyllaceae***
  2 Leaves 3-150 mm wide, linear, obovate, or oblanceolate, not notably stiff.
    3 Main (basal) leaves obovate or oblanceolate, the main secondary veins diverging individually (at angles of < 10°) from the midvein in the lower half of the expanded blade and rejoining at the apex; flowers pink, white or cream. ..... ***Chionographidaceae***
    3 Main (basal) leaves linear, elliptic, or obovate, the main veins parallel, all diverging at the base of the leaf and rejoining at the apex; flowers white, cream, yellowish, greenish, or brownish.
      5 Inflorescence a spike or raceme.
        7 Basal leaves 4-many, (4-) 7-10 (-23) mm wide; basal leaves not enclosed by a basal sheath (all basal leaves with blades, and the leaf bases usually white); capsule suborbicular, 5-7 mm long, 5-7 mm wide; older flowers and developing capsules turning green; bulb broadly ovoid; [widespread in our area, including Coastal Plain pine savannas] ..... ***Amianthium muscitoxicum***
        7 Basal leaves 1-3, 2-6 (-10) mm wide; basal leaves enclosed by a basal purple (bladeless) sheath 3-8 cm long; capsule conical, 7-12 mm long, 3-4 mm wide; older flowers and developing capsules turning pink; bulb cylindrical; [of Coastal Plain pine savannas and similar habitats] ..... ***Stenanthium densum***
      5 Inflorescence a panicle.
        8 Inflorescence axes scurfy-pubescent; seeds winged; leaves either linear or broader, < 14 cm wide. ..... ***Melanthium***
        8 Inflorescence axes glabrous; seeds not winged (though sometimes angled); leaves linear, < 2 cm wide.
          10 Leaves strongly keeled, (5-) 10-20 mm wide; plant colonial, from thick, hard, horizontal, short-creeping rhizomes covered with fibrous old leaf bases; inner tepals (petals) 7-17 mm long, distinctly clawed, acute-acuminate at the tip, bearing 2 glands well above the base ..... ***Zigadenus glaberrimus***
          10 Leaves slightly or not at all keeled, 2-12 mm wide; plant solitary, from a bulbous or semibulbous base; inner tepals (petals) 3-6 or 7-12 mm long, clawed or not, bearing either a single (sometimes obscure to essentially invisible) gland near the base or a bilobed gland well above the base. ..... ***Stenanthium***

Amianthium A. Gray 1837 (FLY-POISON)

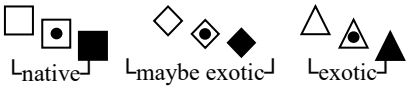


A monotypic genus, an herb of temperate e. North America. Zomlefer et al. (2001) confirm that *Amianthium* should be treated as a monotypic genus. *Amianthium* has a chromosome number of 2n=32 (Zomlefer & Smith 2002). Like other members of the family, it produces very toxic alkaloids. References: Tamura in Kubitzki (1998a); Utech (2002g) in FNA26 (2002a); Zomlefer & Judd (2002); Zomlefer (1997a).

Amianthium muscitoxicum (Walter) A. Gray. FLY-POISON. **Hab:** In a wide variety of mesic to dry forests, pine savannas, longleaf pine sandhills, meadows, from 5m to at least 1600m in elevation. **Dist:** S. NY, PA, MO, and OK, south to Panhandle FL, MS, and AR. **Phen:** May-Jul; Jul-Sep. **Syn:** = Ar, FNA26, K1, K3, Mo1, NY, Tn, Va, Zomlefer & Judd (2002); = *Amianthium muscaetoxicum* – C, F, G, GW1, K4, Pa, RAB, W, WH3, orthographic variant; = *Chrosperma muscaetoxicum* (Walter) Kuntze – S; = *Zigadenus muscitoxicus* (Walter) Regel – Zomlefer (1997a). NatureServe G4G5 (Apparently Secure).

Melanthium Linnaeus 1753 (BUNCHFLOWER)

A genus of 4 species, herbs of e. North America. While sometimes included in *Veratrum*, the best molecular study to date (Kim et al. 2016) suggests that *Melanthium* is more closely related to *Stenanthium* and *Anticlea* than to *Veratrum* s.s. References: Bodkin & Utech (2002) in FNA26 (2002a); Kim et al (2016); Tamura in Kubitzki (1998a); Zomlefer (1997a); Zomlefer (2012); Zomlefer et al (2003).

Key to Map Symbology:  (native; maybe exotic; exotic) ←rare ←uncommon ←common (see introduction for more)

* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable
X : extirpated

53e. MELANTHIACEAE

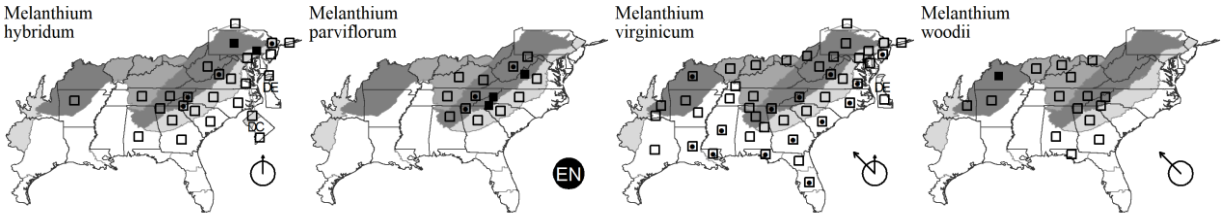
1 Leaf blades (the larger, basal) linear or narrowly oblanceolate, 30-85 cm long, 1-7 cm wide, lacking an obvious petiole; tepals white to cream, clawed; tepal blade 1-1.5× as long as wide.
  2 Leaves narrowly oblanceolate, with margins widening from base to a point well beyond the midpoint of the leaf's length; tepal margins strongly crisped-undulate; tepal nectary glands whitish to pale green when fresh, blending in (when fresh) with the nonglandular portion of the tepal blade; tepal claw ca. ½ as long as the tepal blade; [of mesic to dry forests] ..... ***Melanthium hybridum***
  2 Leaves (the larger, basal) linear, with margins parallel for most of the leaf's length; tepal margins entire and planar or nearly so; tepal nectary glands yellow, obviously contrasting (when fresh) from the nonglandular portion of the tepal blade; tepal claw < 1/3 as long as the tepal blade; [of seepy or saturated wetlands] ..... ***Melanthium virginicum***
1 Leaf blades (the larger, basal) narrowly to broadly elliptic, 17-50 cm long, 3-14 cm wide, with an obvious petiolar base 1-10 cm long; tepals green to maroon or purple, cuneate (not clawed); tepal blade 2-4× as long as wide.
  3 Tepals 4-7 mm long, pale to olive green; ovaries glabrous; leaves 4.5-14 cm wide; [Appalachian, from c. KY, c. TN, and n. AL eastwards and northwards]..... ***Melanthium parviflorum***
  3 Tepals 6-9 mm long, dark maroon (rarely green); ovaries densely pubescent; leaves 3-10 cm wide; [mainly midwestern, from w. OH, c. KY, e. TN, sw. NC, w. SC, c. GA, and Panhandle FL westwards]..... ***Melanthium woodii***

Melanthium hybridum Walter. CRISPED BUNCHFLOWER. **Hab:** Moist to dry forests, usually in base-rich soils. **Dist:** CT south to NC, SC, n. GA, and c. AL; disjunct west of the Mississippi River in nc. AR. **Phen:** Jul-Aug; Sep-Oct. **Comm:** See Ward (2010) and Zomlefer (2012) for discussion of the nomenclatural issues. **Syn:** = C, F, G, K4, NY, RAB, W, WV; = *Melanthium latifolium* Desrousseaux – FNA26, K1, S; = *Veratrum hybridum* (Walter) Zimmerman ex Zomlefer – K3, Va, Zomlefer (2012); = *Veratrum latifolium* (Desrousseaux) Zomlefer – Ar, NE, Pa, Tn, Zomlefer (1997a). NatureServe G5 (Secure).

Melanthium parviflorum (Michaux) S. Watson. MOUNTAIN BUNCHFLOWER. **Hab:** Moist to rather dry forests, up to at least 1700 meters, most frequent in oak forests at middle elevations. **Dist:** A Southern Appalachian endemic: e. and sc. WV and KY south to VA, w. NC, e. TN, n. GA, and n. AL. **Phen:** Jul-early Sep; Aug-Oct. **Syn:** = F, FNA26, K1, K4, WV; = *Veratrum parviflorum* Michaux – C, G, K3, RAB, S, Tn, Va, W, Zomlefer (1997a). NatureServe G4? (Apparently Secure).

Melanthium virginicum Linnaeus. BOG BUNCHFLOWER, VIRGINIA BUNCHFLOWER. **Hab:** Pine savannas, bogs, fens, seeps, wet seepage-fed forests. **Dist:** S. NY, PA, OH, IN, IL, and IA south to c. peninsular FL and e. TX. **Phen:** May-Aug; Aug-Oct. **Syn:** = C, F, FNA26, G, GW1, Il, K1, K4, Mo1, NY, RAB, Tx, W, WV; = *Veratrum virginicum* (Linnaeus) W.T. Aiton – Ar, ETx1, K3, Pa, Tn, Va, WH3, Zomlefer (1997a); > *Melanthium dispersum* Small – S; > *Melanthium virginicum* Linnaeus – S. NatureServe G5 (Secure).

Melanthium woodii (J.W. Robbins ex Alph. Wood) Bodkin. OZARK BUNCHFLOWER, WOOD'S FALSE-HELLEBORE. **Hab:** Circumneutral soil of woodlands over mafic rocks (such as amphibolite) or other calcareous substrates, hammocks. **Dist:** Primarily Ozarkian, but extending in scattered populations eastward as far as FL Panhandle (Gadsden and Liberty counties), sw. GA, nw. GA, sc. TN, nw. SC (Pickens County), and sw. NC (Polk County). **Phen:** Jul; Sep. **Syn:** = FNA26, K1, K4; = *Veratrum woodii* J.W. Robbins ex Wood – Ar, C, F, G, Il, K3, Mo1, Mo1, Tn, WH3, Zomlefer (1997a); > *Veratrum intermedium* Chapman – S. NatureServe G5 (Secure).



Stenanthium (A. Gray) Kunth 1843 (FEATHERBELLS, FEATHERFLEECE)

A genus of about 6 (or more) species, perennial herbs, of e. North America. *Stenanthium*, as redefined by Zomlefer & Judd (2002), has a chromosome number of 2n=20, excludes a w. North American and an e. Asian species previously included, and includes some taxa formerly placed in *Zigadenus* (Zomlefer & Smith 2002). References: Schwartz (2002) in FNA26 (2002a); Sorrie & Weakley (2017b); Sorrie & Weakley (2018) in Weakley et al (2018a); Tamura in Kubitzki (1998a); Utech (2002f) in FNA26 (2002a); Wofford (2006); Zomlefer & Judd (2002); Zomlefer (1997a).

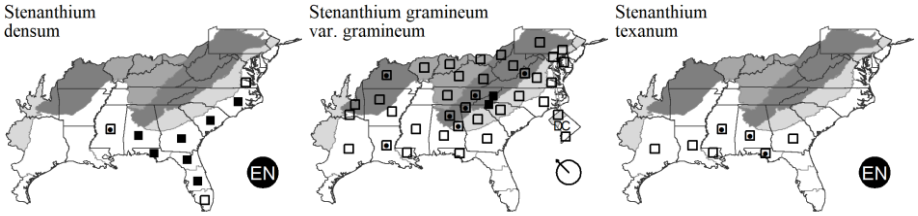
1 Tepals lanceolate, the tip acute-acuminate. ..... ***Stenanthium gramineum var. gramineum***
1 Tepals obovate, the tip rounded-obtuse.
  5 Largest leaves on a plant 3-7 mm wide (mean 4.3); inflorescence unbranched (a raceme); capsules averaging 11.0 mm long; [se. VA south to sc. peninsular FL, west to s. MS]..... ***Stenanthium densum***
  5 Largest leaves on a plant 4-12 mm wide (mean 7.1); inflorescence branched (a panicle) (rarely simple); capsules averaging 13.3 mm long; [GA and FL Panhandle west to e. TX]..... ***Stenanthium texanum***

Stenanthium densum (Desrousseaux) Zomlefer & Judd. CROW-POISON, OSCEOLA-PLUME. **Hab:** Pine savannas, pine flatwoods. **Dist:** Se. VA south to c. peninsular FL and west to s. MS, on the Coastal Plain. **Phen:** Apr-early Jun; late May-Jul. **Syn:** = K4, Sorrie & Weakley (2017b); = *Zigadenus densus* (Desrousseaux) Fernald – Tx; < *Stenanthium densum* (Desrousseaux) Zomlefer & Judd – Va, WH3, Zomlefer & Judd (2002); < *Tracyanthus angustifolius* (Michaux) Small – S; < *Zigadenus densus* (Desrousseaux) Fernald – C, FNA26, GW1, K1, K3, RAB, Zomlefer (1997a); < *Zygadenus densus* – G, orthographic variant. NatureServe G5 (Secure).

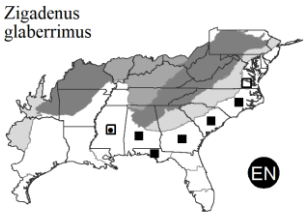
Stenanthium gramineum (Ker Gawler) Morong *var*. ***gramineum***. FEATHERBELLS. **Hab:** Dry and mesic forests and woodlands, grassy balds, serpentine barrens, to at least 1700m in elevation. **Dist:** PA west to IL and MO, south to ne. NC, Panhandle FL, and TX. **Phen:** Jul-early Sep; Aug-Oct. **Syn:** = Mo1; = *Stenanthium gramineum* (Ker Gawler) Morong – S; < *Stenanthium gramineum* (Ker Gawler) Morong – C, FNA26, G, K4, Mi, Pa, RAB, Tx, Va, W, WH3, Zomlefer (1997a); > *Stenanthium gramineum* (Ker Gawler) Morong var. *gramineum* – F, K1, WV; > *Stenanthium gramineum* var. *micranthum* – F, K1.

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Stenanthium texanum (Bush) Sorrie & Weakley. CROW-POISON, BLACK DEATH-CAMAS. **Hab:** Pine savannas, pine flatwoods. **Dist:** FL Panhandle and s. GA west to e. TX, on the Coastal Plain. **Phen:** Apr-early Jun; late May-Jul. **Syn:** = K4, Sorrie & Weakley (2018) in Weakley et al (2018a); = *Stenanthium macrum* Sorrie & Weakley – Sorrie & Weakley (2017b), illegitimate name; < *Stenanthium densum* (Desrousseaux) Zomlefer & Judd – Va, WH3, Zomlefer & Judd (2002); < *Tracyanthus angustifolius* (Michaux) Small – S; < *Zigadenus densus* (Desrousseaux) Fernald – C, FNA26, GW1, K1, K3, RAB, Zomlefer (1997a); < *Zigadenus leimanthoides* A. Gray – Tx; < *Zygadenus densus* – G, orthographic variant.



Zigadenus Michaux 1803 (DEATH-CAMAS)



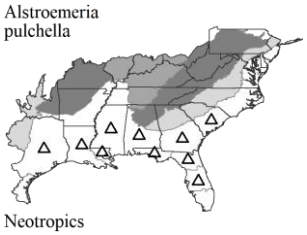
As redefined, a monotypic genus of se. North America. A molecular systematics study by Zomlefer et al. (2001) gives strong support to a treatment recognizing *Zigadenus* as monotypic (*Zigadenus glaberrimus*), *Anticlea* (including for our area the former *Zigadenus elegans* ssp. *glaucus*), *Stenanthium* (including for our area *Stenanthium* spp. and the former *Zigadenus densus* and *Z. leimanthoides*). *Zigadenus* (as redefined) has a chromosome number of 2n=54 (Zomlefer, McKain, & Rentsch 2014), unique in the family. References: Schwartz (2002) in FNA26 (2002a); Tamura in Kubitzki (1998a); Zomlefer (1997a); Zomlefer et al (2001); Zomlefer, McKain, & Rentsch (2014).

Zigadenus glaberrimus Michaux. LARGE DEATH-CAMAS, SNAKEROOT. **Hab:** Sandhill seepage bogs, pine savannas, pocosin edges. **Dist:** Se. VA south to Panhandle FL, west to MS, on the Coastal Plain. Reports from montane NC (Kartesz 2020) are false reports. **Phen:** Late Jun-early Sep; Aug-Nov. **Syn:** = C, F, FNA26, GW1, K1, K3, K4, RAB, Tx, Va, WH3, Zomlefer (1997a); = *Zygadenus glaberrimus* – G, S, orthographic variant. NatureServe G5 (Secure).

55. ALSTROEMERIACEAE Dumortier 1829 (PERUVIAN-LILY FAMILY) [in LILIALES]

A family of 5 genera and about 170 species, perennial herbs, of Central and South America. References: Holmes (2002a) in FNA26 (2002a).

Alstroemeria Linnaeus 1762 (PERUVIAN-LILY, ALSTROEMERIA)



A genus of about 60 species, perennials, of South America. References: Holmes (2002a) in FNA26 (2002a).

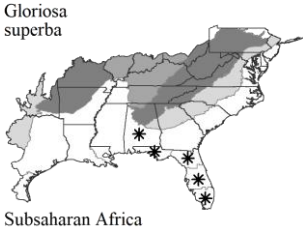
* ***Alstroemeria pulchella*** Linnaeus f. PERUVIAN-LILY, PARROT-LILY. **Hab:** Disturbed areas, roadsides and forest understories near plantings. **Dist:** Native of Brazil. Naturalized in GA, FL, AL, MS, LA, and TX (Holmes in FNA 2002; Singhurst, Keith, & Holmes 2005). **Syn:** = ETx1, FNA26, K4, WH3.

56. COLCHICACEAE A.P. de Candolle 1804 (MEADOW-SAFFRON FAMILY) [in LILIALES]

As here circumscribed, a family of about 15 genera and about 250 species, nearly cosmopolitan. References: Chacón, Cusimano, & Renner (2014); Dahlgren, Clifford, & Yeo (1985); Nordenstam in Kubitzki (1998a); Vinnersten & Manning (2007).

2 Tepals red or orange, reflexed; leaves attenuate into a tendril-like tip; [alien]; [tribe *Colchiceae*] ..... ***Gloriosa***
2 Tepals yellow, not reflexed; leaves acute to obtuse; [native]; [tribe *Uvularieae*] ..... ***Uvularia***

Gloriosa Linnaeus 1753 (FLAMELILY)



A genus of about 5 species, perennials, native of Africa and Asia.

* ***Gloriosa superba*** Linnaeus. FLAMELILY, GLORY-LILY. **Hab:** Disturbed areas. **Dist:** Native of tropical Africa. See Diamond (2021) for discussion of its occurrence in Alabama. **Syn:** = FNA26, K1, K3, K4, Meso6, WH3. NatureServe GNR (Not Yet Ranked).

Uvularia Linnaeus 1753 (BELLWORT, MERRYBELLS)

A genus of about 5 species, of temperate eastern North America. References: Nordenstam in Kubitzki (1998a); Utech & Kawano (2002) in FNA26 (2002a); Uttal (1991); Wilbur (1963b).

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

56. COLCHICACEAE

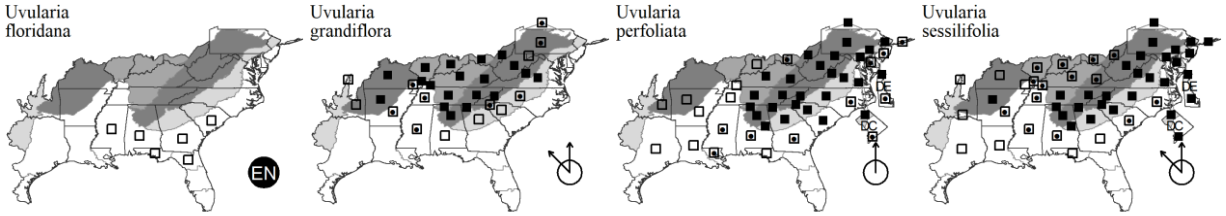
1 Leaves perfoliate, the margins scarious but smooth; upper stems terete in cross-section, hollow; [section *Uvularia*].
  2 Tepals glabrous within; leaves puberulent beneath (or rarely glabrate); leaves below the stem fork (0-) 1 (-2) ..... ***Uvularia grandiflora***
  2 Tepals conspicuously granular-papillose within; leaves glabrous and often glaucous beneath; leaves below the stem fork 2-4 ..... ***Uvularia perfoliata***
1 Leaves sessile, the margins scarious and minutely papillose-denticulate; upper stems angled in cross-section, solid; [section *Oakesiella*].
  4 Pedicel bearing a sessile, leaf-like bract 5-17 mm below the flower; capsule sessile, conspicuously beaked at apex ..... ***Uvularia floridana***
  4 Pedicel bractless; capsule on a stalk 2-4 (-6) mm long, not beaked ..... ***Uvularia sessilifolia***

Uvularia floridana Chapman. FLORIDA BELLWORT. **Hab:** Alluvial forests, moist ravines. **Dist:** C. SC south to ne. FL, and Panhandle FL, west to c. MS, rare and local throughout its range. **Phen:** Late Feb-early Apr. **Syn:** = FNA26, GW1, K1, K3, K4, RAB, WH3, Wilbur (1963b); = *Oakesiella floridana* (Chapman) Small – S. NatureServe G3 (Vulnerable).

Uvularia grandiflora J.E. Smith. LARGE-FLOWERED BELLWORT. **Hab:** Cove forests and other moist, rich, forested sites. **Dist:** S. QC west to ND, south to w. NC, w. SC, n. GA, c. AL, MS, c. AR, and e. OK. **Phen:** Mid Apr-mid May; Jul-Aug. **Syn:** = Ar, C, F, FNA26, G, Il, K1, K3, K4, Mi, Mo1, NE, NY, Pa, RAB, S, Tn, Va, W, WV, Wilbur (1963b). NatureServe G5 (Secure).

Uvularia perfoliata Linnaeus. PERFOLIATE BELLWORT. **Hab:** Moist to fairly dry hardwood forests. **Dist:** S. NH, s. ON, c. OH, and s. IL, south to Panhandle FL and LA. **Phen:** Apr-early May; Jun-Aug. **Syn:** = Ar, C, ETx1, F, FNA26, G, K1, K3, K4, NE, NY, Pa, RAB, S, Tn, Va, W, WH3, WV, Wilbur (1963b). NatureServe G5 (Secure).

Uvularia sessilifolia Linnaeus. STRAW-LILY, WILD-OATS, MERRYBELLS. **Hab:** Moist hardwood forests, on slopes and mainly in bottomlands. **Dist:** NS west to ND, south to Panhandle FL and n. LA and e. TX. **Phen:** Late Mar-early May; Aug-Oct. **Syn:** = Ar, C, ETx1, F, FNA26, Il, K1, K3, K4, Mi, Mo1, NE, NY, Pa, RAB, Tn, Va, W, WH3, WV, Wilbur (1963b); = *Oakesiella sessilifolia* (Linnaeus) S. Watson – S. NatureServe G5 (Secure).



59. SMILACACEAE Ventenat 1799 (GREENBRIAR FAMILY) [in LILIALES]

A family of a single genus and about 220 species, widespread in tropical, subtropical, and temperate regions. References: Conran in Kubitzki (1998a); Holmes (2002b) in FNA26 (2002a); Judd (1998); Qi et al (2013).

Smilax Linnaeus 1753 (GREENBRIAR, CARRIONFLOWER, SMILAX)

Contributed by Alan S. Weakley and Hannah Medford

A genus of about 220 species, woody vines and herbs, subcosmopolitan in temperate and tropical regions. Our deciduous species are a monophyletic group within *Smilax*, with a classic eastern North American/eastern Asian disjunction, and have been treated as section *Nemexia* or subgenus *Luiste* (Wilbur 2004, Fu et al. 2005); Li et al. (2011) found a complex phylogeny not easily reflected in a sectional taxonomy. *Smilax* berries and shoots provide important food sources for many wildlife species, including black bears (*Ursus americanus*). The clades shown in the key follow Qi et al. (2013). References: Bullard & Allen (2013); Coker (1944); Duncan (1967); Fu et al (2005); Godfrey (1988); Holmes (2002a) in FNA26 (2002a); Judd (1998); Li et al (2011); Li et al (2013); Mangaly (1968); Pennell (1916); Qi et al (2013); Sorrie (2014a); Wilbur (2003); Wilbur (2004); Wilder (2020).

Identification Notes: The carrionflowers or deciduous smilaxes (lead 1a) are sometimes mistaken for *Dioscorea* because of a superficial similarity. They can be readily distinguished even in vegetative condition by *Smilax* section *Nemexia* having 3 (-5) main veins, the 3 central rejoining at the leaf apex (vs. *Dioscorea* with 7-13 main veins), and secondary veins in a complex reticulate pattern (vs. *Dioscorea* with secondary veins forming simpler and largely perpendicular cross-connections between the primary veins). In the woody smilaxes (key lead 1b), the underground parts (while not easy or convenient to observe or collect) provide useful characters, used in the key and helpful (but not generally necessary for identification). "Tubers" are rounded, lumpy, and starch-filled thickenings (often borne in compound, rounded or elongate masses). "Rhizomes" are unthickened, straight underground stems, usually with swollen (but not tuberous) nodes. "Runners" are thinner, elongated rhizomes. "Rootstocks" are short, knotty underground stems, neither running nor tuberous. Coker (1944) remains a basic resource. Wilder (2020) provided a very valuable analysis of the morphology of *S. auriculata*, which is broadly applicable to the woody species of the genus.

1 Stem herbaceous, lacking prickles; ovules 2 per carpel; peduncles usually > 4 cm long; petioles 1-10 cm long; [section *Nemexia*]; [Clade C1].
  2 Plants erect, 0.2-1.0 m tall, even when well-developed with < 20 leaves [note that immature or depauperate individuals (nonflowering) of *S. pseudochina, S. herbacea, S. lasioneura*, and *S. pulverulenta* often have this aspect]; tendrils absent or rudimentary; peduncles usually few (usually 1-4), the lowest often from bract axils.
    3 Leaves glabrous and glaucous beneath, thick in texture, base cordate, tip acute or acuminate; lowest inflorescence from a leaf axil (very rarely from bract axils), upper inflorescences from leaf axils; leaves 4-7, clustered together near the summit of the stem ..... ***Smilax biltmoreana***
    3 Leaves pubescent and green (or glaucous) beneath, usually thin in texture, base cordate, truncate, or rounded, tip acuminate, acute, or obtuse; lowest inflorescence(s) from axils of bracts below the lowest leaves, upper inflorescences also often from bracts (the uppermost often from leaf axils); leaves 4-25, either clustered together near the summit of the stem or well distributed. ..... ***Smilax hugeri***
  2 Plants vine-like, climbing or sprawling, to 3 m tall, when well-developed with > 30 leaves [note that immature, nonflowering individuals may be much shorter and have fewer leaves]; tendrils present and numerous; peduncles usually many, from leaf axils.

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

7 Leaves glabrous and glaucous on the lower surface; fruit dark blue and glaucous. ..... ***Smilax herbacea***

7 Leaves puberulent on the lower surface, at least on the veins; fruit dark blue and glaucous or black and not glaucous; peduncles 1-10× as long as the subtending petioles.

9 Leaves pale green and dull below; fruit dark blue, glaucous; peduncles (3-) 5-10× as long as the subtending petioles ..... ***Smilax lasioneura***

9 Leaves bright green and shiny beneath; fruit black, not glaucous; peduncles 1-2 (-3)× as long as the subtending petioles ..... ***Smilax pulverulenta***

1 Stem woody, usually with prickles; ovules 1 per carpel; peduncles usually < 3 cm long; petioles 0.1-2 cm long; [section *China*].

10 Stems and petioles tomentose, lacking prickles; leaves densely tomentose beneath; berries orangish-red, obpyriform, with an acutish beak; plant trailing or ascending, the stem rarely > 0.5 m long (with determinate growth); [Clade B4] ..... ***Smilax pumila***

10 Stems and petioles stellate-scurfy or glabrous, generally with prickles; leaves glabrous or papillate beneath; berries black, dark blue, dark red, or bright red, globose, subglobose, or ovoid, lacking a beak; plant climbing, ascending, or trailing, mature plants with stems generally well over 0.5 m long (with indeterminate growth).

11 Lower surfaces of leaves strongly white-glaucous; [Clade B5] ..... ***Smilax glauca***

11 Lower surfaces of leaves green (rarely very slightly glaucous).

12 Prickles of the larger stems abundant, thin and needle-like, shiny brown or black, colored fully (not "dipped" just at the tips) (smaller and upper stems often with few or no prickles); leaf margins often with minute, flattish, tooth-like projections (visible under 10× magnification); petioles 7-34 mm long; leaves with 5-7 primary veins that are noticeably impressed into the upper leaf surface; [Clade B2].

13 Leaves with basal lobes, pandurate to occasionally hastate; petioles 0.7-2.9 mm long; [Coastal Plain] ..... ***Smilax hispida var. australis***

13 Leaves with no lobes, oblong to ovate; petioles 0.7-3.4 mm long; [widespread] ..... ***Smilax hispida var. hispida***

12 Prickles of the larger stems fewer, broad-based and awl-like or catclaw-like, green, brown, or black on the tips ("dipped"); leaf margins either fully entire, or spinose as in *S. bona-nox* and *S. havenensis* (occasional marginal enations present on *S. rotundifolia*) petioles 5-22 mm long; leaves with 3-7 primary veins.

14 Margin of the leaf blade with a prominent marginal cartilaginous band (this appearing as a thickening, a visible vein, or an apparent revolute margin); berries with 1-3 seeds.

15 Inflorescence peduncle (stalk of the umbel) 11-65 mm long, > (1.5-) 2× as long as the subtending leaf petiole; stems (especially the lower) and prickles either brownish stellate-scurfy or glabrous; leaves semi-evergreen to evergreen and thin; berries usually with 1 seed; [Clade B5].

16 Tubers and rhizomes with abundant tiny rounded bumps, plus densely covered with many sharp to blunt spines < 1 cm long and with dark, shiny tips; tubers lacking thorns; lower portion of aerial stems covered with abundant tiny raised bumps, each with compound stellate hairs distally; leaves with 5-7 primary veins; [various habitats, including wetlands] ..... ***Smilax bona-nox var. bona-nox***

16 Tubers and rhizomes with abundant tiny rounded bumps, with no spines or few and poorly developed sharp to blunt spines; tubers bearing simple or branched, woody, narrowly conical thorns; lower portion of aerial stems smooth, stellate hairs absent; leaves with 7-11 primary veins; [dry to moist maritime habitats] ..... ***Smilax bona-nox var. littoralis***

15 Inflorescence peduncle (stalk of the umbel) 1-17 mm long, about as long as or shorter than the subtending leaf petiole; stems and prickles glabrous; leaves evergreen and thick; berries usually with 2-3 seeds.

18 Leaf blades 4.5-6 (-8.5) cm long, 1.4-5.8 cm wide; prickles 1-4 mm long; secondary leaf veins prominently raised on lower surface; leaf blades various in shape, frequently broadened or auricled below the midpoint; [dry to moist habitats, e. NC south to s. FL, west to e. LA, Coastal Plain]; [Clade B5] ..... ***Smilax auriculata***

18 Leaf blades (5.2)7-13 cm long, 1.3-4 (-6) cm wide; prickles 6-12 mm long; secondary leaf veins not prominently raised on lower surface; leaf blades evenly oblong throughout ("laurel-like"); [pocosins, bogs, swamps, and other habitats, usually with saturated hydrology, NJ to s. FL, west to e. TX and se. OK, mainly Coastal Plain but also inland]; [Clade B4] ..... ***Smilax laurifolia***

14 Margin of the leaf blade thin, sometimes slightly revolute; berries with (1-) 2-4 seeds.

19 Margins of the leaves and the petioles often with minute, flattish, tooth-like projections; leaf blades 4.2-16 cm wide; leaf blades broadly ovate (< 1.5× as long as wide); berries blue-black to black; pedicel bases lacking prominent bracts; [a wide variety of upland and wetland habitats]; [clade B5] ..... ***Smilax rotundifolia***

19 Margins of the leaves and the petioles lacking minute, flattish, toothlike projections; leaf blades 1.5-4.8 cm wide; leaves lanceolate to ovate (> 1.5× as long as wide); berries black, or dull to bright red; pedicel bases with prominent ruffled bracts.

20 Leaves evergreen, mid-vein and petiole green; berries black to dull red; perianth green; [a wide variety of upland and wetland habitats]; [Clade B4] ..... ***Smilax smallii***

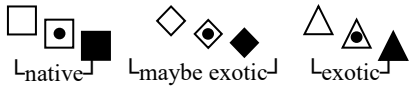
20 Leaves deciduous, often with a red mid-vein and petiole; berries bright red; perianth brownish-yellow [swamp forests, bogs, often where submersed for at least part of the year]; [clade B5] ..... ***Smilax walteri***

Smilax auriculata Walter. DUNE GREENBRIAR. **Hab:** Dunes on barrier islands, maritime scrub and thickets, dry sandy openings in maritime forests or sandhills (northward, as in the Carolinas, limited to sites near the coast). **Dist:** E. NC (Dare County) south to s. FL and west to e. LA; Bahama Islands. **Phen:** May-Jul; Oct-Nov (and persisting). **Syn:** = Bah, FNA26, GW1, K1, K3, K4, RAB, S, WH3, Bullard & Allen (2013), Coker (1944), Judd (1998). NatureServe G4? (Apparently Secure).

Smilax biltmoreana (Small) J.B. Norton ex Pennell. BILTMORE CARRIONFLOWER. **Hab:** Dry forests (such as dry pine ridges and chestnut oak forests) and moist forests. **Dist:** The species is apparently limited to NC, SC, and GA, primarily in the Blue Ridge Escarpment region, with disjunct occurrences in Panhandle FL, s. AL, and allegedly) c. KY and c. TN (Kartesz 2020). **Phen:** Apr-May; Aug-Oct. **Syn:** = FNA26, K1, K3, K4, W, Judd (1998), Mangaly (1968), Pennell (1916); = *Nemexia biltmoreana* Small – S; = *Smilax ecirrhata* (Engelmann ex Kunth) S. Watson var. *biltmoreana* (Small) H.E. Ahles – RAB; < *Smilax ecirrhata* – G, WH3; < *Smilax herbacea* Linnaeus – Li et al (2013).

Smilax bona-nox Linnaeus *var.* ***bona-nox***. STRETCHBERRY, FRINGED GREENBRIAR, CATBRIAR, TRAMP'S-TROUBLE. **Hab:** Dry to mesic forests and woodlands, bottomland and riparian forests, bluffs, hardwood flatwoods, pine flatwoods, prairies, old fields, fencerows, pastures, roadsides. **Dist:** MD and MO south to s. FL and TX; also in e. and s. Mexico. **Phen:** Late Apr-May; Sep-Nov. **Tax:** The Mexican material is provisionally assigned here; study is needed. **Syn:** = K3, K4, Coker (1944), Sorrie (2014a); < *Smilax bona-nox* – C, ETx1, FNA26, G, GW1, K1, Meso6, Mo1, NcTx, RAB, S, Tn, Tx, Va, W, WH3, Bullard & Allen (2013), Judd (1998); > *Smilax bona-nox* Linnaeus var. *bona-nox* – F, Il; > *Smilax bona-nox* var. *exauriculata* Fernald – F; > *Smilax bona-nox* var. *hastata* (Willdenow) A.L.P.P. de Candolle – F; > *Smilax bona-nox* var. *hederaefolia* (Beyrich) Fernald – F, Il. NatureServe G5TNR (Not Yet Ranked).

Smilax bona-nox Linnaeus *var.* ***littoralis*** Coker ex Sorrie. MARITIME CATBRIAR. **Hab:** Dunes, maritime thickets, maritime forests. **Dist:** E. VA south to c. FL, west to Panhandle FL and s. AL. **Phen:** Late Apr-May; Sep-Nov. **Tax:** See Sorrie (2014c) and Coker (1944) for details. **Syn:** = K3, K4, Coker (1944), Sorrie (2014a); < *Smilax bona-nox* – FNA26, GW1, K1, RAB, S, WH3, Bullard & Allen (2013), Judd (1998).

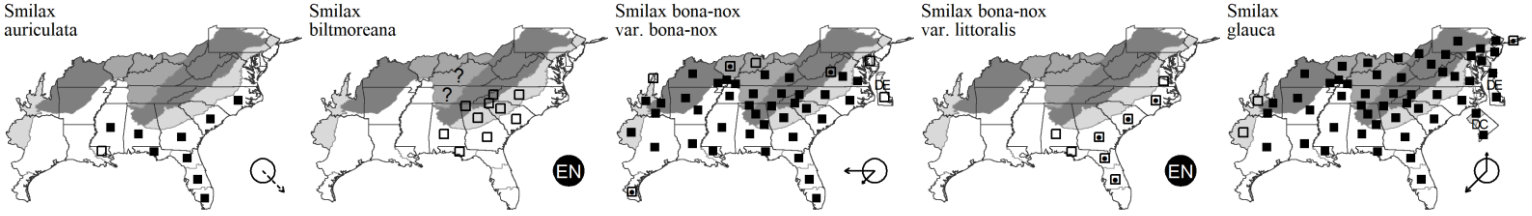
Key to Map Symbology: 

* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable

X : extirpated

Smilax glauca Walter. WHITELEAF GREENBRIAR, WILD SARSAPARILLA. **Hab:** Dry to mesic forests and woodlands, bottomland and riparian forests, bluffs, hardwood flatwoods, pine flatwoods, prairies, old fields, fencerows, pastures, roadsides; uncommon in wetlands. **Dist:** NJ, c. PA, OH, IN, MO, and KS, south to c. peninsular FL and TX, and also in e. and s. Mexico. **Phen:** Late Apr-early Jun; Sep-Nov (and persisting). **Comm:** A distinctive *Smilax* with pale (glaucous) lower leaf surface. **Syn:** = Ar, C, ETx1, FNA26, GW1, K3, K4, Meso6, Mo1, NcTx, NE, NY, Pa, RAB, S, Tn, Va, W, WH3, Bullard & Allen (2013), Coker (1944), Judd (1998); > *Smilax glauca* var. *glauca* – F, G, Il, K1, Tx, WV; > *Smilax glauca* var. *leurophylla* Blake – F, G, Il, K1, Tx, WV.



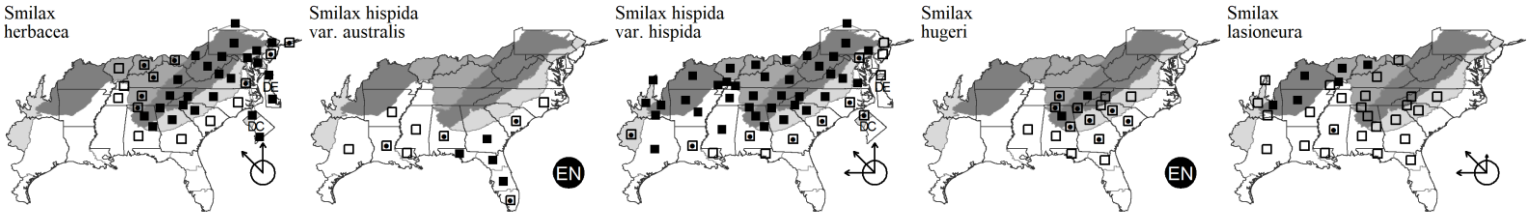
Smilax herbacea Linnaeus. COMMON CARRIONFLOWER, SMOOTH CARRIONFLOWER. **Hab:** Moist deciduous forests. **Dist:** Centered in the Appalachian Mountains, from QC and ME west to MI, south to AL, GA, and TN. **Phen:** May-Jun; Aug-Oct. **Comm:** Young, non-flowering plants closely resemble *S. biltmoreana*. **Syn:** = Ar, F, FNA26, K1, K3, K4, Mi, NE, NY, Pa, Tn, Va, W, WV, Judd (1998), Mangaly (1968), Pennell (1916); = *Nemexia herbacea* (Linnaeus) Small – S; = *Smilax herbacea* var. *herbacea* – C, G, RAB; < *Smilax herbacea* Linnaeus – Li et al (2013).

Smilax hispida Rafinesque *var*. ***australis*** J.B. Norton. SOUTHERN BRISTLY GREENBRIAR. **Hab:** Swamps, rich moist or dry forests and woodlands. **Dist:** E. NC south to s. FL, west to e. TX. **Phen:** Apr-May. **Comm:** Under study by H. Medford. **Syn:** = S, Coker (1944); = *Smilax hispida* Rafinesque – Tx; = *Smilax tamnoides* Linnaeus var. *tamnoides* – F; < *Smilax hispida* Rafinesque – K3, K4, RAB, Wilbur (2003); < *Smilax tamnoides* Linnaeus – ETx1, FNA26.

Smilax hispida Rafinesque *var*. ***hispida***. BRISTLY GREENBRIAR, HELLFETTER, CHINAROOT, CHANEYROOT. **Hab:** Bottomland, riparian, and mesic upland forests, especially along brownwater rivers, and in other situations with relatively high pH and nutrients. **Dist:** CT, NY, MN, and NE south to GA and ne. TX. **Phen:** Apr-May. **Tax:** Wilbur (2003) discusses the complicated nomenclatural problems involving this plant and concludes that *S. hispida* Rafinesque is the correct name. Infrataxa sometimes recognized in the past (see synonymy) need critical examination. Var. *australis* J.B. Norton, with auriculate or more usually pandurate leaves, does seem to be largely or completely limited to the Coastal Plain from e. NC southwards. **Comm:** When the whole plant is available (often not true in herbarium specimens), the species (both varieties) is easily distinguished from our other taxa by the usually abundant presence of dark bristles on the stems. **Syn:** = S, Coker (1944); = *Smilax tamnoides* var. *hispida* (Muhlenberg) Fernald – F, Il; < *Smilax hispida* Rafinesque – Ar, C, G, K3, K4, Mi, Mo1, NE, NY, Pa, RAB, Va, WV, Wilbur (2003); < *Smilax tamnoides* Linnaeus – ETx1, FNA26, GW1, K1, NcTx, Tn, W, WH3, Bullard & Allen (2013), Judd (1998), misapplied.

Smilax hugeri (Small) J.B. Norton ex Pennell. HUGER'S CARRIONFLOWER. **Hab:** Moist deciduous forests. **Dist:** S. NC and e. TN south through SC, GA, and AL to Panhandle FL. **Phen:** Mar-Apr; Aug-Oct. **Syn:** = FNA26, K1, K3, K4, Tn, W, Judd (1998), Mangaly (1968), Pennell (1916); = *Nemexia hugeri* Small – S; = *Smilax ecirrhata* (Engelmann ex Kunth) S. Watson var. *hugeri* (Small) H.E. Ahles – RAB; < *Smilax ecirrhata* – WH3; < *Smilax herbacea* Linnaeus – Li et al (2013).

Smilax lasioneura Hooker. MIDWESTERN CARRIONFLOWER. **Hab:** Moist deciduous forests, hammocks, bluff forests, pine-oak hickory submesic forests and woodlands, rich beech-magnolia forests on lower slopes, perhaps only over mafic or calcareous rocks. **Dist:** ON and MT south to w. VA (?), w. NC, Panhandle FL, MS, OK, and CO. **Phen:** Apr-May; Aug-Sep. **Tax:** Material from VA and NY is ambiguous. **Syn:** = Ar, ETx1, F, FNA26, K1, Mi, NY, Tn; = *Smilax herbacea* var. *lasioneura* (Hooker) A.L.P.P. de Candolle – C, G; = *Smilax herbacea* var. *lasioneuron* – Tx; = *Smilax lasioneuron* Hooker – Il, K3, K4, Mo1, WH3, Judd (1998), orthographic variant; > *Nemexia lasioneuron* (Hooker) Rydberg – S; < *Smilax herbacea* Linnaeus – Li et al (2013); > *Smilax lasioneuron* Hooker – Pennell (1916), orthographic variant; > *Smilax tenuis* Small – Pennell (1916).



Smilax laurifolia Linnaeus. BLASPHEME-VINE, BAMBOO-VINE, LAUREL-LEAF GREENBRIAR. **Hab:** Pocosins, swamp forests, wooded seeps and bogs, swamps, and other wetlands, often with groundwater influence. **Dist:** Primarily a Southeastern Coastal Plain species, from NJ south to s. FL, west to w. TN, AR, and e. TX, but with substantial distribution inland in the "hard-rock" provinces; Bahamas and Cuba. **Phen:** Jul-Aug; Sep-Oct of the second year (and persisting). **ID Notes:** This *Smilax* is especially vigorous and viciously armed, larger stems black and to over 1 cm in diameter, beset with stout prickles approaching 1 cm in length. **Syn:** = Ar, Bah, C, ETx1, F, FNA26, G, GW1, K1, K3, K4, RAB, S, Tn, Tx, Va, W, WH3, Bullard & Allen (2013), Coker (1944), Judd (1998). NatureServe G5 (Secure).

Smilax pulverulenta Michaux. DOWNY CARRIONFLOWER. **Hab:** Moist to dry deciduous forests, especially over mafic or calcareous rocks. **Dist:** Se. NY, se. and sc. PA, IN, MO, and e. KS south to NC, TN, and AR. **Phen:** May-Jun; Aug-Oct. **Syn:** = Ar, F, FNA26, Il, K1, K3, K4, Mo1, NY, Pa, Va, W, WV, Judd (1998), Mangaly (1968), Pennell (1916); = *Nemexia pulverulenta* (Michaux) Small – S; = *Smilax herbacea* var. *pulverulenta* (Michaux) A. Gray – C, G, RAB; < *Smilax herbacea* Linnaeus – Li et al (2013).

Smilax pumila Walter. SARSAPARILLA-VINE, DWARF SMILAX. **Hab:** Mesic to dryish hammocks and bluffs, sandy forests along streams, northward primarily in maritime-influenced mainland forests. **Dist:** Ne. SC (within a few hundred meters of Brunswick County, NC) to c. peninsular FL and west to TX. It occurs on Colkins Neck, along the NC-SC border, in maritime-influenced forests with southern affinities, now largely destroyed by golf-course development. **Phen:** Oct-Nov; Jan-Apr (and persisting). **Comm:** This unusual *Smilax* is sometimes cultivated as an

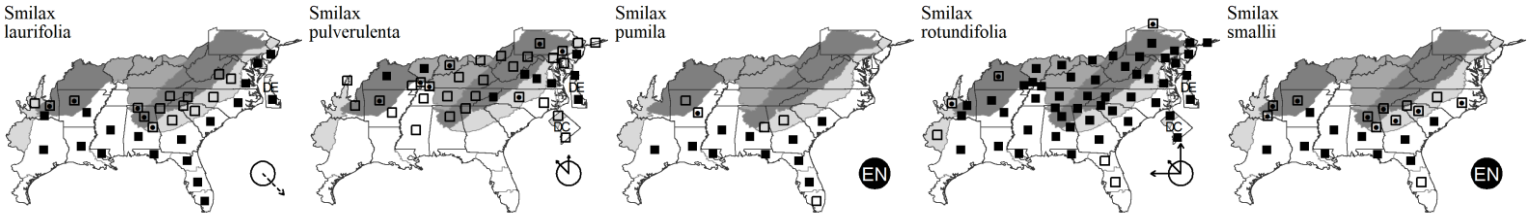
Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated

59. SMILACACEAE

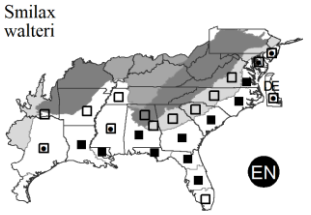
ornamental ground-cover. **Syn:** = Ar, ETx1, FNA26, K1, K3, K4, RAB, S, Tx, WH3, Bullard & Allen (2013), Coker (1944), Judd (1998). NatureServe G5? (Secure).

Smilax rotundifolia Linnaeus. COMMON GREENBRIAR, BULLBRIAR, HORSEBRIAR. **Hab:** Dry-mesic to mesic forests and woodlands, bottomland and riparian forests, swamps, pond margins, bluffs, flatwoods, prairies, old fields, fencerows, pastures, roadsides. **Dist:** NS, s. ON, nc. IL, and c. MO south to n. FL and e. TX. **Phen:** Apr-May; Sep-Nov (and persisting). **Syn:** = Ar, C, ETx1, F, FNA26, G, GW1, Il, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, RAB, S, Tx, Va, W, WH3, WV, Bullard & Allen (2013), Coker (1944), Judd (1998). NatureServe G5 (Secure).

Smilax smallii Morong. JACKSON-BRIAR. **Hab:** Bottomland and riparian forests, upland forests, hardwood flatwoods, pine flatwoods, wooded seeps, stream banks, roadsides. **Dist:** Ne. NC (se. VA?) to c. peninsular FL, west to s. AR and e. TX, primarily on the Coastal Plain. **Phen:** Jun-Jul; Apr-Jun of the next year. **Tax:** It has been suggested that *S. maritima* Feay ex Alph. Wood is the correct name for this species, predating *S. smallii* (1861 vs. 1894). The description of *S. maritima*, its geography, and its context relative to other species in Wood (1861) makes clear, however, that it is referring to *S. auriculata*, and no type or lectotype is available to fix its meaning contrary to a description inappropriate for *S. smallii* ("lvs. lanceolate, auriculate-hastate"). **Syn:** = Ar, ETx1, FNA26, G, GW1, K1, K3, K4, NcTx, RAB, Tx, W, WH3, Bullard & Allen (2013), Judd (1998); = *Smilax lanceolata* Linnaeus – S, Coker (1944), misapplied. NatureServe G5? (Secure).



Smilax walteri Pursh. CORAL GREENBRIAR, RED-BERRIED SWAMP SMILAX. **Hab:** Swamp forests, bogs, wooded seeps, often where submersed for at least part of the year. **Dist:** NJ south to c. peninsular FL and west to TN, AR, and TX. **Phen:** Late Apr-May; Sep-Nov (and persisting). **ID Notes:** In its relatively narrow leaves, *S. walteri* can resemble *S. smallii*; *S. walteri* has a thicker-textured leaf, and is almost always rounded at the base rather than cuneate. **Syn:** = Ar, C, ETx1, F, FNA26, G, GW1, K1, K3, K4, RAB, S, Tn, Tx, Va, W, WH3, Bullard & Allen (2013), Coker (1944), Judd (1998). NatureServe G5 (Secure).



60. LILIACEAE A.L. de Jussieu 1789 (LILY FAMILY) [in LILIALES]

As here interpreted narrowly, the Liliaceae constitutes about 11 genera and 550 species, of the Northern Hemisphere. Subfamilial classification follows Kim & Kim (2018). There has been much investigation and re-interpretation of evidence regarding the upper-level taxonomy of the Liliales, with strong suggestions that the broad Liliaceae recognized by Cronquist (1981) is artificial and polyphyletic. Cronquist (1981) himself concurs, at least to a degree: "we still await a comprehensive reorganization of the lilies into several families more comparable to other recognized families of angiosperms." Dahlgren & Clifford (1982) and Dahlgren, Clifford, & Yeo (1985) synthesized an early phase in the modern revolution of monocot taxonomy. Since then, additional research, especially molecular (Duvall et al. 1993, Chase et al. 1993, Bogler & Simpson 1995, and many others more recently), has strongly validated the general lines (and many details) of Dahlgren's arrangement. References: Angiosperm Phylogeny Group (1998, 2003, 2009); Chen et al (2013); Kim & Kim (2018); Peruzzi (2016); Tamura in Kubitzki (1998a); Utech (2002a) in FNA26 (2002a).

Our "liliaceous" genera (members of orders placed in the Lilianae) are therefore divided as shown below, largely following recent molecular analyses. [Bracketed families] are those not recently treated within the very broad interpretation of Cronquist and others supporting a very broad Liliaceae; all others have been at times in recent decades included in the "Liliaceae".

ALISMATALES
31. TOFIELDIACEAE: *Harperocallis, Pleea, Tofieldia, Triantha.*
DIOSCOREALES
44. NARTHECIACEAE: *Aletris, Lophiola, Narthecium.*
[45. BURMANNIACEAE: *Apteria, Burmannia.*]
[46. DIOSCOREACEAE: *Dioscorea.*]
PANDANALES
[49. STEMONACEAE: *Croomia.*]
LILIALES
53a. TRILLIACEAE: *Trillium.* (or included in MELANTHIACEAE)
53b. XEROPHYLLACEAE: *Xerophyllum.* (or included in MELANTHIACEAE)
53c. HELONIADACEAE: *Helonias.* (or included in MELANTHIACEAE)
53d. CHIONOGRAPHIDACEAE: *Chamaelirium.* (or included in HELONIADACEAE or further in MELANTHIACEAE)
53e. MELANTHIACEAE: *Amianthium, Anticlea, Schoenocaulon, Stenanthium, Melanthium, Veratrum, Toxicoscordion, Zigadenus.*
55. ALSTROEMERIACEAE: *Alstroemeria.*
56. COLCHICACEAE: *Colchicum, Uvularia.*
59. SMILACACEAE: *Smilax.*
61. LILIACEAE: *Clintonia, Erythronium, Lilium, Medeola, Prosartes, Streptopus, Tulipa.*
ASPARAGALES
[62. ORCHIDACEAE: *Aplectrum, Arethusa, Aspidogyne, Bletilla, Calopogon, Cleistesiopsis, Corallorhiza, Cyclopogon, Cypripedium,*

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated

Dactylorhiza, Encyclia, Epidendrum, Epipactis, Eulophia, Galearis, Goodyera, Habenaria, Hexalectris, Isotria, Liparis, Listera, Malaxis, Mesadenus, Oeceoclades, Orthochilus, Platanthera, Pogonia, Ponthieva, Sacoila, Spiranthes, Tipularia, Triphora, Zeuxine.]
67. HYPOXIDACEAE: *Hypoxis.*
[71. IRIDACEAE: *Alophia, Calydorea, Crocus, Crocosmia, Gladiolus, Herbertia, Iris, Nemastylis, Sisyrinchium*.]
73c. HEMEROCALLIDACEAE: *Hemerocallis.* (or included in ASPHODELACEAE [see Applequist 2014)])
74a. ALLIACEAE: *Allium, Nothoscordum, Ipheion.* (or included in AMARYLLIDACEAE)
74b. AMARYLLIDACEAE: *Crinum, Galanthus, Habranthus, Hippeastrum, Hymenocallis, Leucojum, Lycoris, Narcissus, Sternbergia, Zephyranthes*.
75a. ASPARAGACEAE: *Asparagus.*
75b. RUSCACEAE: *Aspidistra, Convallaria, Liriope, Maianthemum, Nolina, Ophiopogon, Polygonatum, Sansevieria*. (or included in a very broad ASPARAGACEAE)
75c. AGAVACEAE: *Agave (*including *Manfreda), Camassia, Chlorophytum, Hosta, Schoenolirion, Yucca*. (or included in a very broad ASPARAGACEAE)
75d. THEMIDACEAE: *Dichelostemma*. (or included in a very broad ASPARAGACEAE)
75e. HYACINTHACEAE: *Hyacinthoides, Hyacinthus, Muscari, Ornithogalum.* (or included in a very broad ASPARAGACEAE)

1 Leaves basal; flowers on a leafless scape; tepals yellow or white.
..... ***Erythronium***
1 Leaves on a stem; flowers not scapose; tepals orange, red, rose, yellow, or white.
3 Leaves whorled at 1 node or more.
4 Leaves occurring at several nodes, these variously whorled and/or alternate; flowers orange, red, or yellow; fruit a green to tan capsule; [subfamily *Lilioideae*; tribe *Lilieae*]..... ***Lilium***
4 Leaves occurring in a single whorl, with fertile plants with a second whorl of leaflike bracts subtending the flowers; flowers yellow; fruit a blue berry; [subfamily *Medeoloideae*]..... ***Medeola***
3 Leaves alternate at all nodes.
5 Leafy stem branched; fruit a red to whitish-tan berry; [subfamily *Streptopoideae*].
..... ***Prosartes***
5 Leafy stem unbranched; fruit a green to tan capsule; [subfamily *Lilioideae*].
7 Leaves at 7 or more nodes; flowers with tepals recurved; flowers orange, red, or yellow (rarely white); [tribe *Lilieae*] ..... ***Lilium***
7 Leaves at 1-6 nodes; flowers cup-shaped, the tepals incurved-erect; flowers of various colors; [tribe *Tulipeae*]..... ***Tulipa***

Erythronium Linnaeus 1753 (TROUT LILY)

A genus of about 25 species, north temperate and subarctic, of North America and Eurasia (especially diverse in w. North America). References: Allen & Robertson (2002) in FNA26 (2002a); Mathew (1992); Parks & Hardin (1963); Tamura in Kubitzki (1998a).

Identification Notes: Stolons are white shoots produced from the bulb. Most run horizontally, either underground or along the ground surface but beneath leaf litter. Flowering individuals often produce no stolons. The stolon characters in the key below are those of non-flowering individuals and refer to horizontal stolons only.

1 Perianth white (sometimes pinkish or bluish).
..... ***Erythronium albidum***
1 Perianth yellow.
3 Petals (inner tepals) lacking auricles near their bases; capsule and ovary distinctly indented (umbilicate) at apex (or rarely truncate in *E. umbilicatum* ssp. *monostolum*, or the ovary when young not yet displaying the apical indentation); mature capsules usually reclining on ground, with the apex downward; stolons 0-1 per bulb; anthers usually lavender, brown, cinnamon, or purple (sometimes yellow).
..... ***Erythronium umbilicatum ssp. umbilicatum***
3 Petals (inner tepals) with auricles near their bases (the auricles very small lobes, < 1 mm long, bent inwards); capsule and ovary truncate, rounded, apiculate, or beaked at apex; mature capsules usually held well off ground, the apex oriented horizontally or ascending; stolons usually (1-) 2-5 per bulb; anthers usually yellow (rarely brown or lavender).
5 Capsule distinctly beaked at the apex; petals (inner tepals) with well-developed auricles at the base, each encircling a filament .....
..... ***Erythronium rostratum***
5 Capsule truncate, rounded, or apiculate at the apex; petals (inner tepals) with small auricles at the base, not encircling a filament.
..... ***Erythronium americanum ssp. harperi***

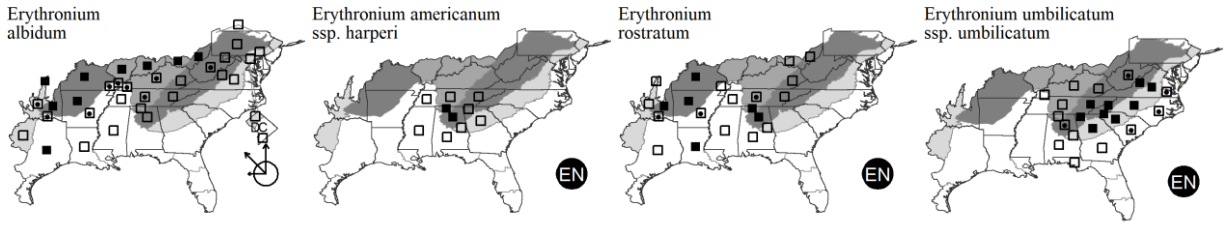
Erythronium albidum Nuttall. WHITE TROUT LILY, BLONDE LILIAN. **Hab:** Rich, mesic forests, over calcareous substrates or in very nutrient-rich alluvial soils. **Dist:** S. ON west to MN, south to n. VA, n. AL, MS, MO, OK, and ne. TX. Reports from nw. GA are erroneous (M. Medley, 2019, pers. comm.). **Phen:** Mar-May. **Syn:** = Ar, C, ETx1, Il, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, S, Tn, Tx, Va, W, WV, Mathew (1992); = *Erythronium albidum* var. *albidum* – F, G. NatureServe G5 (Secure).

Erythronium americanum Ker Gawler *ssp.* ***harperi*** (W. Wolf) C.R. Parks & Hardin. HARPER'S TROUT LILY. **Hab:** Moist forests. **Dist:** Ne. TN and nc. TN south to extreme se. TN, nw. GA, and nc. AL. **Syn:** = FNA26, GW1, K1, K3, K4, Mathew (1992), Parks & Hardin (1963); < *Erythronium americanum* – S, Tn. NatureServe G5T4T5 (Apparently Secure).

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Erythronium rostratum W. Wolf. BEAKED TROUT LILY. **Hab:** Moist bottomland or slope forests. **Dist:** C. TN, MO, and se. KS, south to c. AL, wc. LA, se. OK, and ne. TX. **Phen:** Feb-Apr. **Syn:** = ETx1, FNA26, GW1, K1, K3, K4, Mo1, Tn, Tx, Mathew (1992), Parks & Hardin (1963); < *Erythronium americanum* – S.

Erythronium umbilicatum C.R. Parks & Hardin *ssp*. ***umbilicatum***. DIMPLED TROUT LILY. **Hab:** Moist bottomland or slope forests, or in rather dry upland habitats. **Dist:** VA and e. WV south through NC, SC, and e. TN to c. GA, e. AL, and Panhandle FL. **Phen:** (Late Jan-) Feb-Apr (May?); Apr-Jun. **Tax:** *E. umbilicatum* ssp. *umbilicatum* is a diploid (2n = 24). Mathew (1992) suggests the possibility that an earlier name, *E. nuttallianum* Roemer & J.A. Schultes, may apply to this taxon; the two locations mentioned on the type, Pennsylvania and Albany, NY, are outside the known range of the species, however. **ID Notes:** Where sympatric with *Erythronium americanum* ssp. *americanum*, *Erythronium umbilicatum* ssp. *umbilicatum* blooms about 2 weeks earlier on average, has a slightly oranger, deeper yellow flower color, and can be distinguished in flower or fruit by the shape of the ovary summit (see key). **Syn:** = FNA26, GW1, K1, K3, K4, Va, Mathew (1992), Parks & Hardin (1963); < *Erythronium americanum* – F, G, RAB, S; < *Erythronium umbilicatum* – C, Tn, W, WH3, WV.



Lilium Linnaeus 1753 (LILY)

A genus of about 110 species, of temperate northern hemisphere (especially e. Asia). Many taxonomic problems remain in this genus of showy ornamentals. References: Adams & Dress (1982); Henry (1946); Roane & Henry (1980); Skinner & Sorrie (2002); Skinner (2002) in FNA26 (2002a); Tamura in Kubitzki (1998a); Wherry (1946).

Unkeyed waifs: *Lilium formosanum, Lilium regale*

1 Dark bulblets produced in many leaf axils; [exotic]..... ***Lilium lancifolium***
1 Dark bulblets never produced; [native (except *L. longiflorum* and *L. philippinense*), though some species also cultivated].
  2 Flowers white; leaves narrowly linear or lanceolate; [exotic].
    3 Leaves lanceolate, 10-30 mm wide; plants < 1 m tall; tepals 13-18 cm long, white or greenish externally; tepal surface glabrous internally near the base..... ***Lilium longiflorum***
    3 Leaves linear, 5-13 mm wide; plants 1-3 m tall; tepals 18-25 cm long, with reddish flush externally, especially on the main vein; tepal surface papillose internally near the base..... ***Lilium philippinense***
  2 Flowers orange or yellow; leaves lanceolate, oblanceolate, or obovate; [native].
    4 Flowers erect, facing upward; tepals clawed. ..... ***Lilium catesbyi***
    4 Flowers nodding or declined, facing downward or to the side; tepals narrowed to the base, but not clawed.
      7 Leaves oblanceolate to obovate, alternate and whorled, in many plants 50% or more of nodes bearing a single leaf; flowers 1-4 (rarely more), nodding to pendant, fragrant..... ***Lilium michauxii***
      7 Leaves lanceolate or narrowly elliptic, not broader distally, alternate and whorled, in most plants 10-30% of nodes bearing a single leaf; flowers 1-30+, oriented variously, not fragrant.
        8 Flowers at maturity campanulate (tepals with somewhat recurved tips); flowers borne horizontally to pendant or nodding; style and stamens included or barely exserted. ..... ***Lilium canadense***
        8 Tepals at maturity recurved fully to form a circular shape; flowers pendant to nodding; style and stamens long-exserted.
          10 Style reddish, more-or-less the same color as the tepals; [e. OH, e. KY, e. TN, and nw. GA westward and northwestward, west of the Blue Ridge].... ***Lilium michiganense***
          10 Style pale green, strongly contrasting with the tepals; [collectively widespread].
            11 Leaves 7-26 cm long, oriented horizontally, with the tips downward-arching; leaf whorls 6-24; plants 1.2-2.8 m tall; inflorescences (1-) 5-22 flowered, tepals orange to reddish; [Mountains, Piedmont, and Coastal Plain]..... ***Lilium superbum***
            11 Leaves 2-16 cm long, ascending or more or less horizontal, but with the tips not downward-arching; leaf whorls 1-12; plants 0.6-2.0 (-2.5) m tall; inflorescences 1-4 (-12) flowered, tepals yellow to orange (to dusky red); [Coastal Plain]. ..... ***Lilium iridollae***

Lilium canadense Linnaeus. CANADA LILY. **Hab:** Wet meadows, clearings, coves, seepages. **Dist:** NB west to s. ON, south to NC, SC, GA, AL, and MS. **Phen:** Jun-Jul; late Jul-Sep. **Comm:** Skinner in FNA (2002) summarizes efforts to separate two taxa at varietal or subspecific rank (see synonymy), based on flower color and leaf shape. The variation seems to defy taxonomic division. There has also been considerable confusion between *L. canadense* var. *editorum* (the red-flowered form) and *L. grayi*, with populations in sw. VA showing some intergradation between the two; these are best treated as *L.* ×*pseudograyi* Grove. **Syn:** = C, FNA26, G, GW1, K4, NE, NY, RAB, S, Tn, Va; > *Lilium canadense* ssp. *canadense* – K1, Pa, W, Adams & Dress (1982); > *Lilium canadense* ssp. *editorum* (Fernald) Wherry – K1, Pa, W, Adams & Dress (1982), Wherry (1946); > *Lilium canadense* ssp. *typicum* – Wherry (1946); > *Lilium canadense* var. *canadense* – F, WV; > *Lilium canadense* var. *editorum* – F, WV.

Lilium catesbyi Walter. PINE LILY, CATESBY'S LILY, LEOPARD LILY. **Hab:** Pine savannas, sandhill seeps. **Dist:** Se. NC south to s. FL and west to e. LA, on the Coastal Plain. **Phen:** Mid Jun-Sep (-Nov); Sep-Nov. **Tax:** Traditionally spelled '*catesbaei*', this is necessarily corrected to '*catesbyi*' under provisions of the Code. **Syn:** = *Lilium catesbaei* Walter – GW1, S, Va, WH3; > *Lilium catesbaei* ssp. *asperellum* Wherry – K1, K4, misspelling; > *Lilium*

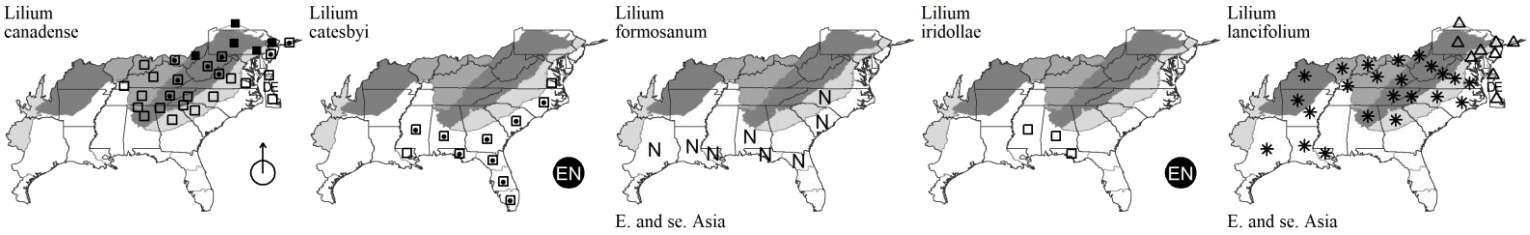
Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

catesbaei ssp. *asprellum* – Wherry (1946); > *Lilium catesbaei* ssp. *catesbaei* – K1, K4; > *Lilium catesbaei* ssp. *longii* (Fernald) Wherry – Wherry (1946); > *Lilium catesbaei* ssp. *typicum* – Wherry (1946); > *Lilium catesbaei* var. *catesbaei* – RAB; > *Lilium catesbaei* var. *longii* Fernald – C, F, G, RAB.

* ***Lilium formosanum*** A. Wallace. FORMOSA LILY. **Dist:** Native of e. Asia. There is no evidence of the naturalization of *Lilium formosanum* in our region. **Syn:** = K4. NatureServe GNR (Not Yet Ranked).

Lilium iridollae M.G. Henry. PANHANDLE LILY, POT-O'-GOLD LILY. **Hab:** Bogs, acidic organic soils along small blackwater streams and drains. **Dist:** Panhandle FL west to s. AL and s. MS. **Syn:** = FNA26, GW1, K4, WH3; < *Lilium iridollae* M.G. Henry – K1. NatureServe G3 (Vulnerable).

* ***Lilium lancifolium*** Thunberg. TIGER LILY. **Hab:** Roadsides, old homesites, disturbed areas, trash heaps. **Dist:** Native of Asia. **Phen:** Jul-Aug. **Tax:** The more familiar name, *L. tigrinum*, must be rejected in favor of the older *L. lancifolium* (Ingram 1968). **Syn:** = Ar, C, FNA26, Il, K1, K3, K4, Mi, Mo1, NE, NY, Pa, Va; = *Lilium tigrinum* Ker-Gawler – F, G, WV.



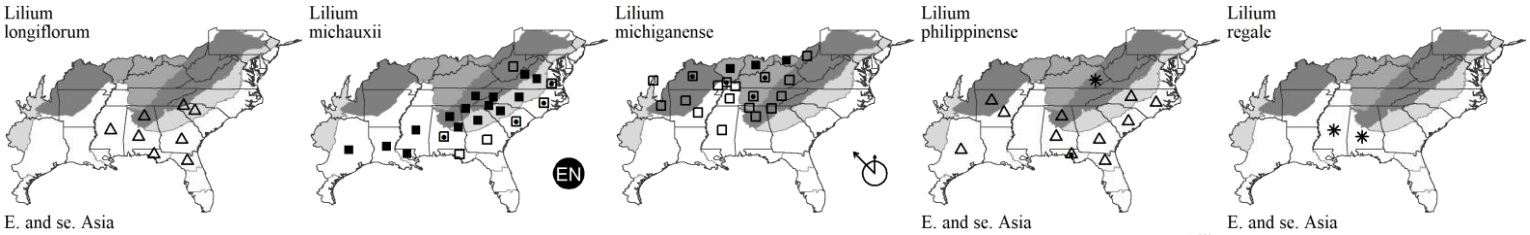
* ***Lilium longiflorum*** Thunberg. EASTER LILY, NOVEMBER LILY. **Hab:** Fields and other disturbed areas, persistent and rarely spreading from cultivation. **Dist:** Native of e. Asia (s. Japan and Ryukyu Islands). **Syn:** = FNA26, K1, K3, K4. NatureServe GNR (Not Yet Ranked).

Lilium michauxii Poiret. CAROLINA LILY, MICHAUX'S LILY. **Hab:** Dry upland forests, ridges, slopes, and ridges. **Dist:** S. VA, e. TN, n. AL, c. MS, and e. LA south to s. SC, Panhandle FL, s. AL, s. MS, s. LA, and e. TX. **Phen:** Jul-Aug; Sep-Oct. **Syn:** = C, ETx1, F, FNA26, G, GW1, K1, K3, K4, Tn, Tx, Va, W, WH3, WV, Adams & Dress (1982), Skinner & Sorrie (2002), Wherry (1946); = *Lilium carolinianum* Michaux – S; < *Lilium michauxii* Poiret – RAB, (also see L. pyrophilum).

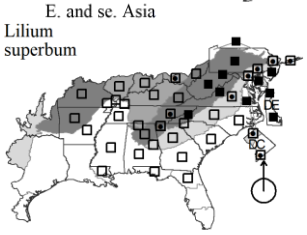
Lilium michiganense Farwell. MICHIGAN LILY. **Hab:** Wet prairies and calcareous hardwood flatwoods. **Dist:** ON and MN south to e. TN, KY, nw. GA, AL, AR, and e. OK. **Phen:** May-Jul. **Comm:** Leaf margins with whitish, elongate (longer than wide) enations. **Syn:** = Ar, C, F, FNA26, Il, K1, K3, K4, Mi, Mo1, NY; < *Lilium superbum* Linnaeus – G.

* ***Lilium philippinense*** Baker. PHILIPPINE LILY. **Hab:** Roadsides, disturbed areas, escaped from cultivation. **Dist:** Native of the Philippines. This species is introduced at various locations in the Southeast, including FL and LA (Kartesz 1999), and has been documented from Richmond Co. NC (B.A. Sorrie, pers. comm.). **Phen:** Jul-Aug. **Tax:** In North America there has been confusion between this species, *L. formosanum* A. Wallace, and *L. longiflorum* Thunberg (see Zomlefer et al. 2018). *L. longiflorum* is easily distinguished (see key). There appears to be no evidence of the naturalization of *L. formosanum* in our area. It can be distinguished from *L. philippinense* by its shorter stature (to 5.5 dm tall, vs. 10-30 dm), brown pollen (vs. yellow), and smaller tepals (11-15 cm long vs. 18-25 cm). **Syn:** = Ar, ETx1, FNA26, K1, K3, K4, WH3. NatureServe GNR (Not Yet Ranked).

* ***Lilium regale***. ROYAL LILY. **Dist:** Native of e. Asia. **Syn:** = K4.



Lilium superbum Linnaeus. TURK'S-CAP LILY, LILY-ROYAL, SUPERB LILY. **Hab:** Cove forests and moist forests, moist ravines, blackwater stream swamps, Coastal Plain bogs. **Dist:** MA and s. NY south to ne. NC, Panhandle FL, and c. MS, southward primarily in the Appalachians, but extending across the Piedmont to the Coastal Plain of VA and ne. NC, and with a similarly odd extension south of the southern terminus of the Appalachians into the Coastal Plain of GA, w. FL, AL, and MS. **Phen:** Jul-Aug; Sep-Oct. **Tax:** Isolated populations in the southeastern Coastal Plain are not straightforward matches with typical *L. superbum* of the Appalachians and need additional investigation. For instance, the plants of blackwater swamps of se. VA and ne. NC are very narrow-leaved and yellow-tepaled; this form, atypical in habitat, range, and morphology has been referred to speculatively as "*Lilium* species 1". Further study is needed to determine whether it is a distinct taxon (species, or variety of *L. superbum*) or only a form. Other taxa from Panhandle FL and s. GA were named by Roane & Henry (1980) and warrant consideration as having taxonomic merit. **Syn:** = Ar, C, F, FNA26, GW1, Il, K1, K3, K4, Mo1, NE, NY, Pa, RAB, S, Tn, Va, W, WH3, WV, Adams & Dress (1982), Skinner & Sorrie (2002), Wherry (1946); > *Lilium fortunofulgidum* Roane & J.N. Henry – Roane & Henry (1980), invalid name (no type designation); > *Lilium gazarubrum* Roane & J.N. Henry – Roane & Henry (1980); > *Lilium mary-henryae* Roane & J.N. Henry – Roane & Henry (1980), orthographic variant; < *Lilium superbum* Linnaeus – G; > *Lilium superbum* Linnaeus – Roane & Henry (1980).

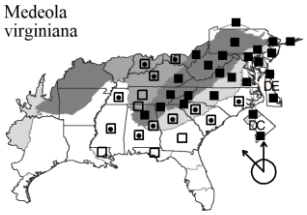


Medeola Linnaeus 1753 (INDIAN CUCUMBER-ROOT)

A monotypic genus, an herb of eastern North America. References: Tamura in Kubitzki (1998a); Utech (2002a) in FNA26 (2002a).

Identification Notes: *Medeola* is sometimes mistaken (when sterile) for *Isotria*; *Medeola* has a wiry stem, floccose-pubescent, *Isotria* a fleshy, glabrous stem.

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



Medeola virginiana Linnaeus. INDIAN CUCUMBER-ROOT. **Hab:** Moist forests, usually with acidic soils. **Dist:** QC and ON west to MN, south to GA, Panhandle FL and LA. **Phen:** Mid Apr-mid Jun; Sep-Oct. **Comm:** The tuber is white, crisp, tasting cucumber-like, usually about 5 cm long and 5 mm in diameter. Bell (1974) describes patterns of vegetative growth. Flowering plants have a second, smaller whorl of leaves; the flowers are borne on recurved pedicels beneath the top whorl of leaves. In fruit, however, the pedicels are ascending or erect, bringing the fruits above the top whorl. When the berries are ripe, the leaves of the upper whorl become scarlet at the base, presumably acting as an attractant to frugivorous animals. **Syn:** = C, F, FNA26, G, GW1, Il, K1, K3, K4, Mo1, NE, NY, Pa, RAB, S, Tn, Va, W, WH3, WV. NatureServe G5 (Secure).

Prosartes D. Don 1839 (FAIRYBELLS, MANDARIN)

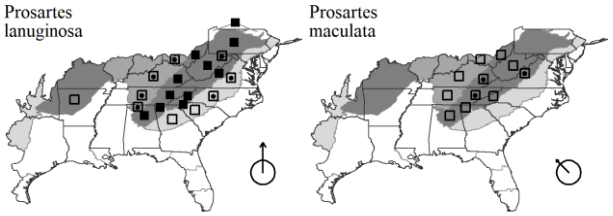
A genus of 6 species, of temperate e. North America, w. North America, and e. Asia. Dahlgren, Clifford, & Yeo (1985) suggest that American species of *Disporum* are generically distinct from Asiatic species and should be segregated in the genus *Prosartes*, a distinction made as long ago as 1839. Asian *Disporum* species lack the distinctly reticulate venation of our plants, have strictly glabrous foliage (vs. pubescent), have spurred tepals (vs. unspurred), blue or black berries (vs. red or straw-colored), tripartite stigma (vs. not), and other differences (Jones 1951). Further study of generic limits by Shinwari et al. (1994) shows that the separation into *Prosartes* of the American species often assigned to *Disporum* is clearly warranted, based on morphological and karyological grounds. *Prosartes* is much more closely related to *Streptopus* than to (Asian) *Disporum*; (Asian) *Disporum* is more closely related to *Uvularia*. References: Johnson (1968); Jones (1951); Shinwari et al (1994); Tamura in Kubitzki (1998a); Tamura, Utech, & Kawano (1992); Utech (2002h) in FNA26 (2002a).

1 Fruit glabrous, ellipsoid, weakly triangular in cross-section, the surface smooth and shiny, red when ripe; tepals greenish, unspotted; leaves relatively many and small; leaf glabrous on the surface above (except for sparsely pubescent on the midrib and main veins), densely pubescent on the midrib below, sparsely pubescent on the surface below; leaf pubescence weak, often twisted or curled apically (as seen at 10-20× magnification), the leaf therefore very soft to the touch ..... ***Prosartes lanuginosa***

1 Fruit pubescent, strongly 3-lobed (or 1- or 2-lobed by abortion), the surface textured and dull, whitish-tan when ripe; tepals whitish, spotted with purple; leaves relatively few and large; leaf sparsely pubescent on the surface and veins above and below; leaf pubescence stiff, generally straight and perpendicular to the surface (as seen at 10-20× magnification), the leaf therefore slightly rough to the touch ***Prosartes maculata***

Prosartes lanuginosa (Michaux) D. Don. YELLOW MANDARIN, YELLOW FAIRYBELLS. **Hab:** Deciduous forests, especially coves. **Dist:** Primarily an Appalachian species: NY and s. ON south to n. GA (Jones & Coile 1988) and AL; disjunct in the Interior Highlands of AR. **Phen:** Apr-May; Aug-Sep. **Syn:** = Ar, FNA26, K1, K3, K4, NY, Tn, Va, Shinwari et al (1994); = *Disporum lanuginosum* (Michaux) Nicholson – C, F, G, Pa, RAB, S, W, WV, Johnson (1968). NatureServe G5 (Secure).

Prosartes maculata (Buckley) A. Gray. SPOTTED MANDARIN, NODDING MANDARIN. **Hab:** Nutrient-rich deciduous forests, especially cove forests. **Dist:** AL, n. GA, KY, MI, w. NC, OH, TN, w. VA, and s. WV; its distribution is rather fragmented, and the species is considered rare or uncommon in every state in its range. **Phen:** Apr-May; Jul-Aug. **Comm:** The fruits are more reminiscent of *Uvularia* than of *Prosartes lanuginosa*. **Syn:** = FNA26, K1, K3, K4, Mi, Tn, Va, Shinwari et al (1994); = *Disporum maculatum* (Buckley) Britton – C, F, G, RAB, S, W, WV, Johnson (1968). NatureServe G4 (Apparently Secure).



Tulipa Linnaeus 1753 (TULIP)

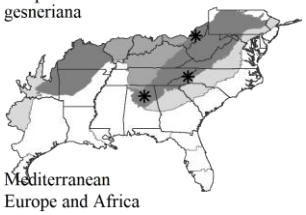
A genus of about 150 species, of temperate Eurasia (especially w. and c. Asia). References: Straley & Utech (2002a) in FNA26 (2002a); Tamura in Kubitzki (1998a).

* ***Tulipa gesneriana*** Linnaeus. DIDIER'S TULIP. **Hab:** Disturbed areas. **Dist:** Native of w. Turkey. **Syn:** = K3, K4, NE. NatureServe GNR (Not Yet Ranked).

* ***Tulipa sylvestris*** Linnaeus. TULIP, DUTCH-LILY. **Hab:** Very commonly cultivated, occasionally persistent or weakly naturalized. **Dist:** Native of w. Asia. "Occasionally naturalized in moist meadows, fields and roadsides" in se. PA (Rhoads & Block 2007) and MD (Kartesz 1999). **Phen:** Apr-May. **Syn:** = FNA26, Il, K1, K3, K4, NE, NY, Pa. NatureServe GNR (Not Yet Ranked).

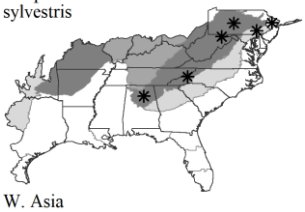
Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Tulipa gesneriana



Mediterranean Europe and Africa

Tulipa sylvestris



W. Asia

61. ORCHIDACEAE A.L. de Jussieu 1789 (ORCHID FAMILY) [in ASPARAGALES]

Scott G. Ward & Alan S. Weakley

A family of about 800 genera and 19,000 species, perennial (rarely annual), mycotrophic herbs (many epiphytic) and succulent-stemmed vines.
References: Brown (2003); Brown (2020); Correll (1937); Correll (1950); Homoya (1993); Luer (1972); Luer (1975); Pridgeon et al (1999a); Pridgeon et al (1999b); Pridgeon et al (1999c); Romero-González et al (2002) in FNA26 (2002a); Schuiteman & Chase (2015).

Identification Notes: Flowering plants are necessary for use of the key to genera. We attempt to be as specific as possible in our application of orchid morphology terms. Use of the term "flowers" refers to the entire flowering parts; however, we refer to specific portions of the flowers when necessary. Perianth segments refer collectively to the sepals and petals, which sometimes differ from one another. When crucial for identification, we also specifically refer to the dorsal sepals or lateral sepals. The lip refers to the labellum, which is a highly specialized median petal often modified for insect pollination, and is often a distinct feature used in orchid identification. Given the distinct nature (and function!) of the labellum, we also refer specifically to portions of this structure (e.g. middle lobe, lateral lobe) when applicable. Resupination in epiphytic orchids refers to the orientation of the flower in accordance with its main stem axis, thus while some flowers of epiphytic species may appear upright to the viewer (e.g. *Epidendrum nocturnum*), these flowers are technically resupinate given their opposing orientation to the main stems. Conversely, in some species (e.g. *Prosthechea cochleata*), the labellum is oriented upmost on the non-resupinate flower. For epiphytic orchids bearing pseudobulbs, inflorescences originate either basally (from the base of pseudobulb) or terminally (peduncles originate from the apex of pseudobulb). Pseudobulbs are non-root, vegetative structures often appearing as thickened basal structures on stems. Pseudobulbs are common on many species of orchid and their shape, level of compression, and size are often diagnostic, especially when plants are not flowering.

1 Plant epiphytic, growing on the branches or trunks of trees in swamps or hammocks (rarely epilithic). ..... ***Epidendrum***
1 Plant terrestrial, growing on soil. ..... ***Key to terrestrial orchids***

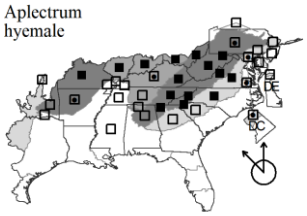
Key to terrestrial orchids - Key to Orchidaceae

1 Leaves absent at flowering, or with a solitary leaf with a purplish undersurface withering at about the time of flowering.
  2 Flowers with a spur.
    ..... ***Tipularia discolor***
  2 Flowers without a spur.
    4 Flowers white, the lip, sepals, and petals all predominantly white.
      ..... ***Spiranthes***
    4 Flowers pink, greenish, yellowish, or purplish, the lip sometimes white or marked with white, the sepals and petals colored.
      8 Lip with 2 fleshy keels near the base; pollinia 4; plants holomycotrophic (without chlorophyll) and never with leaves ..... ***Corallorhiza***
      8 Lip with 3-7 keels near the base or extending most of the length of the lip; pollinia 4 or 8; plants either holomycotrophic (without chlorophyll) and never with leaves, or with a plicate winter leaf withering shortly before flowering.
        9 Plants with a plicate winter leaf withering shortly before flowering (the withered remnant usually detectable); veins of the petals and sepals not strikingly different in color than the intervein areas; lip with 3 ridges; pollinia 4 ..... ***Aplectrum hyemale***
        9 Plants never with leaves, holomycotrophic (without chlorophyll); veins of the petals and sepals strikingly different in color than the intervein areas; lip with 5-7 ridges; pollinia 8 ..... ***Hexalectris***
1 Leaves present at flowering (*Cleistesiopsis* with a foliaceous bract at the summit of the stem).
  10 Plants with evident, above-ground pseudobulbs, sometimes enclosed by sheaths.
    12 Lip broadest near its apex; inflorescence typically a spicate raceme (prematurely umbellate in *M. spicata*); leaves to 10 cm long ..... ***Malaxis***
    12 Lip broadest near its apex; inflorescence typically a more open or lax raceme; leaves to 30 cm long.
      ..... ***Liparis***
  10 Plants without above-ground pseudobulbs (either absent or subterranean).
    20 Leaf solitary.
      21 Leaf basal.
        22 Flower with a spur.
          ..... ***Platanthera***
        22 Flower without a spur.
          25 Flowers relatively large, primarily pink, purple, or white; flowers arranged in loosely arranged racemes
            ..... ***Calopogon***
          25 Flowers relatively small, whitish; flowers arranged in densely (and sometimes also spirally) arranged spikes.
            ..... ***Spiranthes***
      21 Leaf cauline.
        28 Flowers in spikes or racemes, 5-many, reddish, yellowish, or greenish. ..... ***Platanthera***
        28 Flower solitary (-4), pink (rarely nearly white); [subfamily *Vanilloideae*; tribe *Pogonieae*].
          29 Sepals brown to purple, linear or narrowly oblanceolate, 3-6.5 cm long, about 5 mm wide; leaf coriaceous ..... ***Cleistesiopsis***
          29 Sepals pink (rarely white), elliptic or oblanceolate, 1.3-2.7 cm long, 3-11 mm wide; leaf herbaceous ..... ***Pogonia ophioglossoides***

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

20 Leaves 2-many.
30 Lip inflated, pouch-like or slipper-like, 2-6 cm long..... ***Cypripedium***
30 Lip not inflated, or if so, then 0.3-1.1 cm long.
31 Leaves cauline.
35 Leaves whorled, terminating the stem; [subfamily *Vanilloideae*; tribe *Pogonieae*]..... ***Isotria***
35 Leaves alternate or opposite, not terminating the stem.
36 Leaves 2, opposite, near the middle of the stem..... ***Neottia***
36 Leaves (2-) 3-many, alternate, variously distributed on the stem.
38 Lip without a spur; leaves 0.8-8.0 cm long.
39 Distal portion of lip not uniformly yellow; leaves ovate, 0.4-2.0 cm long..... ***Triphora***
39 Distal portion of lip uniformly yellow; leaves linear or narrowly lanceolate, 1-8 cm long..... ***Zeuxine strateumatica***
38 Lip with a spur; leaves linear, lanceolate, or narrowly elliptic, 5-40 cm long (at least the larger > 5 cm long, except in *Aspidogyne*, with lanceolate to ovate leaves 1.5-6.5 cm long).
41 Lip divided into 3 linear divisions, the divisions not further divided, fringed, or eroded..... ***Habenaria***
41 Lip not divided into 3 divisions, or divided into 3 divisions but the divisions not linear.
..... ***Platanthera***
31 Leaves basal (sometimes with bladeless sheaths upward on the stem).
43 Leaves plicate.
44 Lip oriented upward (not resupinate); flowers pink to white..... ***Calopogon***
44 Lip oriented downward (resupinate); flowers greenish, purplish-brown, maroon or yellowish.
..... ***Orthochilus ecristatus***
43 Leaves smooth, often creased at the midrib, but not plicate.
46 Lip with a spur.
48 Flowers bicolored, the lip white, the sepals and petals pink; leaves 2..... ***Galearis spectabilis***
48 Flowers not bicolored, the lip, petals, and sepals similarly colored; leaves 2-5
49 Lip deeply divided into 3 linear segments; leaves 3-5..... ***Habenaria***
49 Lip entire; leaves 2..... ***Platanthera***
46 Lip without a spur.
50 Leaf blade or leaves ascending.
..... ***Spiranthes***
50 Leaf blades more-or-less horizontally oriented, flat against the ground or 1-2 cm above it.
53 Lip oriented upward (flowers not resupinate).
..... ***Ponthieva***
53 Lip oriented downward (flowers resupinate).
56 Leaves with prominent white or pale green variegation on midrib and/or veins; [subtribe *Goodyerinae*]..... ***Goodyera***
56 Leaves without prominent variegation; [subtribe *Spiranthinae*].
..... ***Spiranthes***

Aplectrum (Nuttall) Torrey 1826 (PUTTYROOT, ADAM-AND-EVE)



A genus of 2 species, 1 in e. North America and 1 in Japan (Sheviak & Catling in FNA 2002a). References: Correll (1950); Sheviak & Catling (2002f) in FNA26 (2002a).

Identification Notes: Like *Tipularia*, *Aplectrum* has a single, overwintering leaf, purplish on the underside, and withering prior to the appearance of the flowering stalk; they are readily separable by leaf shape, texture, and veining (see *Tipularia*).

Aplectrum hyemale (Muhlenberg ex Willdenow) Torrey. PUTTYROOT, ADAM-AND-EVE. **Hab:** Rich, mesic forests. **Dist:** QC and MN, south to SC, GA, AL, AR, and OK. **Phen:** May-Jun. **ID Notes:** *Aplectrum* leaf blades are narrowly elliptic, 10-20 cm long, the blade > 2x as long as wide, tapering to both ends, and notably plicate along the very prominent, white, cartilaginous veins (vs. *Tipularia*, with leaf blades ovate, < 10 cm long, < 2x as long as wide, truncate to cordate at the base, acute-apiculate at the apex, and not notably plicate along the veins). **Syn:** = Ar, C, F, FNA26, G, GW1, Il, K1, K3, K4, Mi, Mo1, NE, NE, NY, Pa, RAB, S, Tn, Va, W, Correll (1950), Luer (1975). NatureServe G5 (Secure).

Calopogon R. Brown 1813 (GRASS-PINK)

A genus of 5 species (one with two varieties), endemic to e. North America. References: Correll (1950); Goldman et al (2004); Goldman, Magrath, & Catling (2002) in FNA26 (2002a); Goldman, van den Berg, & Griffith (2004); Trapnell, Hamrick, & Giannasi (2004).

Identification Notes: Unlike nearly all our orchid genera, the lip is oriented upward.

1 Petals wider toward the tip than toward the base; lip usually as wide as or wider than long; flowers strongly fragrant..... ***Calopogon multiflorus***
1 Petals equal or narrower toward the tip than toward the base; lip usually narrower than long; flowers scentless or mildly fragrant.
2 Leaf appressed to the inflorescence during flowering; flowers < 1 cm apart; flowers not fragrant; flowers on same plant opening simultaneously.....
..... ***Calopogon barbatus***
2 Leaf not appressed to the inflorescence during flowering; flowers > 1 cm apart; flowers faintly to distinctly fragrant; flowers on same plant opening nearly simultaneously to sequentially.
3 Lateral sepals 10-15 mm long, falcate, widely spreading..... ***Calopogon pallidus***
3 Lateral sepals 15-28 mm long, weakly falcate to straight.

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

4 Flowers of each plant opening nearly simultaneously; dilated distal portion of middle lip lobe usually much narrower than long, triangular to broadly rounded; stigma typically flat against column surface; corms elongate, forked ..... ***Calopogon oklahomensis***

4 Flowers of each plant opening sequentially; dilated distal portion of middle lip lobe usually much wider than long, typically anvil-shaped; stigma at angle to column surface; corms globose to elongate, not forked.
..... ***Calopogon tuberosus var. tuberosus***

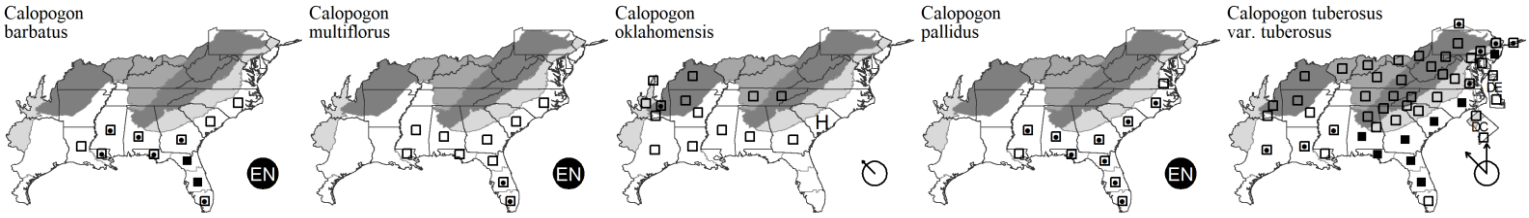
Calopogon barbatus (Walter) Ames. BEARDED GRASS-PINK. **Hab:** Pine savannas, sandhill seeps, pitcher plant bogs. **Dist:** A Southeastern Coastal Plain endemic: se. NC south to s. FL and west to e. LA. **Phen:** (Late Nov-) Jan-early May. **Syn:** = FNA26, GW1, K1, K3, K4, NcTx, RAB, Tx, WH3, Correll (1950), Goldman, van den Berg, & Griffith (2004), Luer (1975), Trapnell, Hamrick, & Giannasi (2004); = *Limodorum parviflorum* (Lindley) Nash – S. NatureServe G4? (Apparently Secure).

Calopogon multiflorus Lindley. MANY-FLOWERED GRASS-PINK. **Hab:** Moderately well-drained soils of pine savannas and pine flatwoods (often with *Serenoa repens*, within its distribution). **Dist:** A Southeastern Coastal Plain endemic: E. NC south to s. FL, west to e. LA. **Phen:** Mar-early May. **Syn:** = FNA26, GW1, K1, K3, K4, WH3, Correll (1950), Goldman, van den Berg, & Griffith (2004), Luer (1975), Trapnell, Hamrick, & Giannasi (2004); > *Limodorum multiflorum* (Lindley) C. Mohr – S; > *Limodorum pinetorum* Small – S. NatureServe G2G3 (Imperiled).

Calopogon oklahomensis D.H. Goldman. OKLAHOMA GRASS-PINK. **Hab:** Pine savannas, prairies. **Dist:** E. SC south to s. GA, west to e. TX, north in the eastern Great Plains to MN; disjunct eastward in the Eastern Highland Rim and Cumberland Plateau of TN (Tennessee Flora Committee 2015). **Phen:** Mar-Jul. **Syn:** = Ar, ETx1, FNA26, Il, K3, K4, Mo1, NcTx, Tn, Goldman, van den Berg, & Griffith (2004), Trapnell, Hamrick, & Giannasi (2004); < *Calopogon pulchellus* R. Brown – Tx. NatureServe G2 (Imperiled).

Calopogon pallidus Chapman. PALE GRASS-PINK. **Hab:** Pine savannas, sandhill seeps. **Dist:** A Southeastern Coastal Plain endemic: se. VA south to s. FL and west to LA. **Phen:** May-Jun (-Jul); Jul-Aug. **Syn:** = C, F, FNA26, G, GW1, K1, K3, K4, RAB, Va, WH3, Correll (1950), Goldman, van den Berg, & Griffith (2004), Luer (1975), Trapnell, Hamrick, & Giannasi (2004); = *Limodorum pallidum* (Chapman) C. Mohr – S. NatureServe G4G5 (Apparently Secure).

Calopogon tuberosus (Linnaeus) Britton, Sterns, & Poggenburg *var*. ***tuberosus***. COMMON GRASS-PINK. **Hab:** Pine savannas, wet pine flatwoods, sandhill seeps, floating peat mats, in the Piedmont and Mountains in bogs, westward in wet prairies. **Dist:** NL west to MT, south to s. FL and e. TX. **Phen:** Apr-Jul; Jul-Sep. **Syn:** = Ar, FNA26, K1, K3, K4, NE, NY, Pa, WH3, Goldman, van den Berg, & Griffith (2004), Luer (1975), Trapnell, Hamrick, & Giannasi (2004); = *Calopogon pulchellus* R. Brown – F, G, RAB, Correll (1950); = *Limodorum tuberosum* Linnaeus – S; < *Calopogon tuberosus* – C, ETx1, GW1, Il, Mi, Mo1, NcTx, Tn, Tx, Va, W. NatureServe G5T5 (Secure).



Cleistesiopsis Pansarin & F. Barros 2008 (SPREADING POGONIA, ROSEBUD ORCHID)

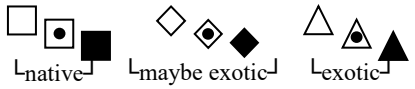
A genus of 3 species, endemic to e. North America. As traditionally circumscribed, *Cleistes* was a genus of about 55 species, primarily of tropical America. The circumscription of this genus has been uncertain (Cameron & Chase 1999; Cameron et al. 1999; Pridgeon et al. 1999c). North American "*Cleistes*" is not closely related to South American *Cleistes* (which includes the type of the genus), and two alternative treatments are possible: the North American species can be housed in a separate genus, or alternatively, *Pogonia*, *Isotria*, and N. American "*Cleistes*" could be combined into *Pogonia* (a generic disposition popular many decades ago). Pansarin & de Barros (2008) favor the former idea, and have named the new genus *Cleistesiopsis*; we follow that approach here. References: Catling & Gregg (1992); Correll (1950); Gregg & Catling (2002) in FNA26 (2002a); Gregg (1991); Pansarin & Brown (2009); Pansarin & de Barros (2008).

2 Fresh flowers odorless (or nearly so); [of the Mountains and Piedmont] ..... ***Cleistesiopsis bifaria***

2 Fresh flowers with strong vanilla scent; [of the Coastal Plain] ..... ***Cleistesiopsis oricamporum***

Cleistesiopsis bifaria (Fernald) Pansarin & F. Barros. APPALACHIAN DRAGONHEAD POGONIA. **Hab:** Moist to fairly dry meadows, dry ridgetops under pines (where seasonally moist). **Dist:** WV south through w. VA, e. KY, w. NC, and e. and c. TN to w. SC, n. GA and n. AL. **Phen:** May-Jul. **Tax:** Catling & Gregg (1992) make a convincing case for the recognition of *Cleistesiopsis bifaria* and *C. divaricata* as specifically distinct (as *Cleistes*), based on differences in morphology, range, phenology (in the sympatric portions of their ranges), and floral fragrance. **Syn:** = K3, K4, Pansarin & Brown (2009); < *Cleistes bifaria* (Fernald) Catling & Gregg – FNA26, K1, Tn, Catling & Gregg (1992), Gregg (1991); < *Cleistes divaricata* (Linnaeus) Ames – C, G, GW1, RAB, S, W, Correll (1950), Luer (1975); < *Cleistes divaricata* var. *bifara* – WV, misspelling; < *Cleistes divaricata* var. *bifaria* Fernald – F; < *Cleistesiopsis bifaria* (Fernald) Pansarin & F. Barros – Va, Pansarin & de Barros (2008).

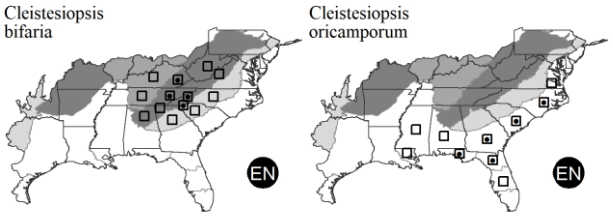
Cleistesiopsis oricamporum P.M. Brown. SMALL DRAGONHEAD POGONIA. **Hab:** Pine savannas, longleaf pine sandhill seepage bogs. **Dist:** Coastal Plain from se. VA to c. peninsular FL and west to e. LA (and e. TX?); possibly disjunct inland in the Eastern Highland Rim (Coffee County, TN). **Phen:** Apr-Jul. **Tax:** Catling & Gregg (1992) make a convincing case for the recognition of *Cleistesiopsis bifaria* (including *C. oricamporum*) and *C. divaricata* as specifically distinct (as *Cleistes*), based on differences in morphology, range, phenology (in the sympatric portions of their ranges), and floral fragrance. The co-occurrence of *C. divaricata* and *C. oricamporum* at such sites as the Green Swamp, Brunswick County, NC, where phenologically separated, supports their taxonomic status. Where co-occurring, *C. oricamporum* flowers on average about 10 days before *C. divaricata*. Studies by Smith et al. (2004) suggested the probability that montane and Coastal Plain populations of "*C. bifaria*" represent 2 different species, a taxonomic proposition formalized by Brown & Pansarin (2009); this conclusion needs additional study, but the taxa are provisionally accepted here to draw attention to them. **Syn:** = K3, K4, Pansarin & Brown (2009); < *Cleistes bifaria* (Fernald) Catling & Gregg – ETx1, FNA26, K1, Catling & Gregg (1992), Gregg (1991); < *Cleistes divaricata* (Linnaeus) Ames – C, G, GW1, RAB, S, Tx, W, Correll (1950), Luer (1975); < *Cleistes divaricata* var. *bifaria*

Key to Map Symbology:  ←rare ←uncommon ←common (see introduction for more)

* : waif EN : endemic H : historic
N : no P : planted ? : questionable
X : extirpated

61. ORCHIDACEAE

Fernald – F, WV; < *Cleistesiopsis bifaria* (Fernald) Pansarin & F. Barros – Va, Pansarin & de Barros (2008); < *Pogonia bifaria* (Fernald) P.M. Brown & Wunderlin – WH3.



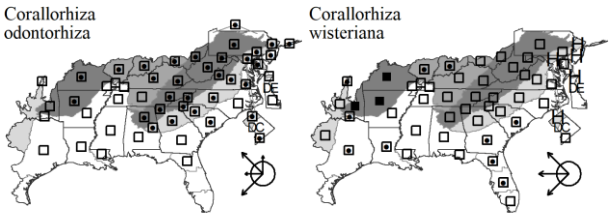
Corallorhiza Gagnebin 1755 (CORALROOT)

A genus of about 11-15 species, distributed in north temperate regions of the Old and New World. The closest relative of *Corallorhiza* in our flora is *Aplectrum* (Freudenstein 1992). The mycotrophic nature of *Corallorhiza* is well established, but the exact means of the transfer of nutrients from the fungal hyphae to the orchid is not yet understood. References: Correll (1950); Freudenstein (1992); Freudenstein (1997); Freudenstein (1999b); Magrath & Freudenstein (2002) in FNA26 (2002a).

4 Sepals and petals 3-4.5 mm long; dorsal sepal < 4.5 mm long, 1-nerved; flowering Aug-Oct..... ***Corallorhiza odontorhiza***
4 Sepals and petals 5-7.5 mm long; dorsal sepal > 4.5 mm long, 3-nerved; flowering either Apr-May or mid Jul-Aug.
..... ***Corallorhiza wisteriana***

Corallorhiza odontorhiza (Willdenow) Poiret. AUTUMN CORALROOT. **Hab:** Mesic to dry forests, especially under oaks. **Dist:** The cleistogamous form (or recognized as var. *odontorhiza*) is the more common, and is widespread in e. North America, from ME, NY, s. ON, MI, and MN south to SC, c. GA, ne. FL, c. AL, n. MS, c. AR, and e. OK. **Phen:** Aug-Sep; Oct. **Tax:** Freudenstein (1997) states that *Corallorhiza odontorhiza var. pringlei* can be distinguished from var. odontorhiza by the presence of a closed perianth, a narrowly obovate-spatulate lip, and a column with two prominent auricles on the ventral surface (vs. perianth open, lip similar to perianth, and a column poorly developed or lacking). The cleistogamy seems to be a popular proxy for varietal designation; however, both flower types apparently exist within the same populations with seemingly no ecological or phenological separation. Adding to the complications is the confusing gap in lip width between *C. odontorhiza var. pringlei f. pringlei* (2.1-3.7 mm) and *C. odontorhiza var. pringlei f. radia* (1.2-1.7 mm) conveniently coinciding with the lip width in *C. odontorhiza var. odontorhiza* (1.7-2.2 mm). Lastly, it seems unlikely that co-occurring plants in n. North America are less related than to the plants of sc. Mexico. Freudenstein (1997) states it is desirable to recognize different morphologies, but also states that it is not clear how each variety was related, an issue still not resolved as major gaps remain regarding the geography, ecology, and phenology of *Corallorhiza odontorhiza* across its far-reaching and disjunct range. The chasmogamous form is less common, and is scattered in ne. United States and adjacent Canada, in ON, CT, PA, MI, IA, IN, DC, NC, and TN, and in Mexico (Chiapas, Distrito Federal, Guerrero, Hidalgo, Jalisco, México, Michoacán, Morelos, Oaxaca, Puebla, Sonora), Guatemala, and Nicaragua. It is sometimes recognized as var. *pringlei* (see synonymy), but does not seem to breed true and so seems better regarded as a form. The rarer chasmogamous form "var. pringlei" has the perianth open (chasmogamous); lip 2.1-3.7 mm wide, bent downward at a nearly right angle; column with 2 prominent auricles at the base on the ventral surface; stigma 0.7-1.0 mm wide. The more common cleistogamous form ("var. odontorhiza") has the perianth closed or nearly so (cleistogamous); lip 1.7-2.2 mm wide, straight; column lacking or with only poorly developed basal ventral auricles; stigma 0.2-0.5 mm wide. **Syn:** = C, ETx1, F, G, Il, K3, K4, Mo1, Pa, RAB, Va, W, WH3, WV, Correll (1950), Luer (1975); > *Corallorhiza odontorhiza* var. *odontorhiza* – Ar, FNA26, K1, Mi, NE, NY, Tn, Freudenstein (1997); > *Corallorhiza odontorhiza* var. *pringlei* (Greenman) Freudenstein – FNA26, K1, Mi, NE, NY, Tn, Freudenstein (1997); > *Corallorrhiza micrantha* Chapman – S; > *Corallorrhiza odontorhiza* – S, orthographic variant.

Corallorhiza wisteriana Conrad. SPRING CORALROOT. **Hab:** Moist to dry forests, usually in base-rich soils. **Dist:** NJ, PA, OH, IN, IL, MO, and OK south to c. peninsular FL, and TX, and also in the Rockies from MT and w. SD south to s. Mexico. **Phen:** (Late Jan-) Feb-May; Mar-Jun. **Syn:** = Ar, C, ETx1, F, FNA26, G, Il, K1, K3, K4, Mo1, NcTx, Pa, RAB, Tn, Tx, Va, W, WH3, WV, Correll (1950), Freudenstein (1997), Luer (1975); = *Corallorrhiza wisteriana* – S, orthographic variant. NatureServe G5 (Secure).



Cypripedium Linnaeus 1753 (LADY'S-SLIPPER)

A genus of about 51 species, north temperate in distribution. References: Case et al (1998); Correll (1950); Pridgeon et al (1999c); Sheviak (1994); Sheviak (2002a) in FNA26 (2002a); Wallace & Case (2000).

1 Plant scapose, with 2 basal leaves; pouch-like lip of flower with a longitudinal fissure, pink (rarely nearly white); [section *Acaulia*]..... ***Cypripedium acaule***

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

61. ORCHIDACEAE

1 Plant caulescent, with (2) 3-7 leaves alternate on the stem; pouch-like lip of flower with a rounded orifice, yellow, pink, or white.
- 3 Pouch-like lip of flower white, 1.5-2.5 cm long; orifice margin acute on the apical margin; [of calcareous barrens]..... ***Cypripedium candidum***
- 3 Pouch-like lip of flower bright yellow, pale yellow, or creamy white, (2.0-) 2.2-6.3 cm long (if pale yellow or white, then > 4 cm long); orifice margin rounded-obtuse on the apical margin; [of various habitats].
  - 4 Dorsal sepal 3.5-5.0 cm wide; pouch orifice 2.7-4.5 cm long; pouch-like lip 4.5-6.3 cm long, pale yellow or creamy white; plants robust, typically 5-8 dm tall. ..... ***Cypripedium kentuckiense***
  - 4 Dorsal sepal 1.1-2.9 cm wide; pouch orifice 0.5-1.7 cm long; pouch-like lip 1.5-5.8 cm long, medium to rich yellow; plants not as robust, typically 2-5 (-6) dm tall.
    - 6 Pouch-like lip 2.2-3.4 cm long; sepals and lateral petals usually densely and minutely spotted with dark reddish brown or purple, thus appearing uniformly dark..... ***Cypripedium parviflorum var. parviflorum***
    - 6 Pouch-like lip (2.0-) 3.0-5.8 cm long; sepals and lateral petals unmarked (greenish-yellow), or more often streaked, blotched, striped or reticulately marked with dark reddish brown or purple (but generally not extensively blotched)..... ***Cypripedium parviflorum var. pubescens***

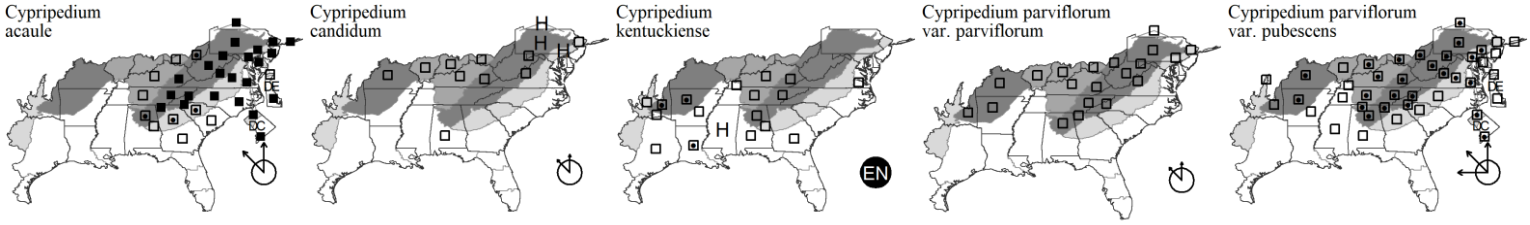
Cypripedium acaule Aiton. PINK LADY'S-SLIPPER, MOCCASIN-FLOWER. **Hab:** Dry to mesic, acid forests and woodlands, often under pine, other conifers, and/or oaks. **Dist:** NL (Newfoundland) west to n. AB, south to NC, SC, GA, TN, n. IN, and MN. **Phen:** Apr-Jun; Aug. **Syn:** = C, F, FNA26, G, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, Tn, Va, W, WV, Correll (1950), Luer (1975); = *Fissipes acaulis* (Aiton) Small – S. NatureServe G5 (Secure).

Cypripedium candidum Muhlenberg ex Willdenow. WHITE LADY'S-SLIPPER. **Hab:** Calcareous barrens, bluffs, and fens. **Dist:** NY and NJ west to ND, south to w. VA, nw. and sc. AL, and MO. **Phen:** May; Jun-Jul. **Syn:** = C, F, FNA26, G, Il, K1, K3, K4, Mi, Mo1, NY, Pa, Correll (1950), Luer (1975). NatureServe G4 (Apparently Secure).

Cypripedium kentuckiense C.F. Reed. KENTUCKY YELLOW LADY'S-SLIPPER. **Hab:** Sandy ravine bottoms and springhead seeps along small streams. **Dist:** KY, AR, and OK south to GA, AL, MS (ambiguous specimen), LA, and e. TX; disjunct in e. VA (Weldy et al. 1996). **Phen:** May; Jun-Aug. **Tax:** Case et al. (1998) studied isozymes of *C. kentuckiense* and related *Cypripedium spp*.; the recognition of *C. kentuckiense* as a species was supported. **Syn:** = Ar, C, ETx1, FNA26, K1, K3, K4, Tn, Va, Sheviak (1994), Wallace & Case (2000); < *Cypripedium calceolus* var. *pubescens* (Willdenow) Knight – F, G, Correll (1950); < *Cypripedium pubescens* Willdenow – S. NatureServe G3 (Vulnerable).

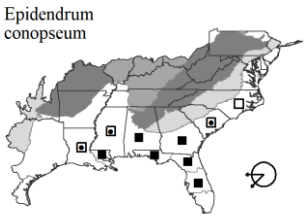
Cypripedium parviflorum Salisbury *var*. ***parviflorum***. SMALL YELLOW LADY'S-SLIPPER. **Hab:** Mesic forests, seepy forests over amphibolite, other habitats. **Dist:** VT, NY, OH, IN, IL, MO and KS, south to NC, GA, AL, AR, and OK. **Phen:** Apr-Jun; Jul-Aug. **Tax:** The exact range, abundance, and habitats of this variety in our area are obscure, because of confusion with the more northern var. *makasin* (Farwell) Sheviak and small-flowered forms of var. *pubescens*. See Sheviak (1994) for a discussion of why North American plants of yellow lady's-slippers are recognized as a species distinct from the European *C. calceolus* Linnaeus. **Syn:** = Ar, FNA26, Il, K3, K4, NE, NY, Pa, Va, Sheviak (1994), Wallace & Case (2000); = *Cypripedium calceolus* var. *parviflorum* (Salisbury) Fernald – Mo1, W, Luer (1975); = *Cypripedium parviflorum* – K1, S, Tn, WV; < *Cypripedium calceolus* var. *parviflorum* (Salisbury) Fernald – C, F; < *Cypripedium calceolus* var. *pubescens* (Willdenow) Knight – G, RAB, Correll (1950).

Cypripedium parviflorum Salisbury *var*. ***pubescens*** (Willdenow) Knight. LARGE YELLOW LADY'S-SLIPPER, WHIPPOORWILL SHOES. **Hab:** Rich mesic forests. **Dist:** NL (Labrador) and AK south to GA, AL, MS, NM, and AZ. **Phen:** Apr-Jun; Jul-Aug. **Syn:** = Ar, FNA26, Il, K3, K4, Mi, NE, NY, Pa, Va, Sheviak (1994), Wallace & Case (2000); = *Cypripedium calceolus* var. *pubescens* (Willdenow) Knight – C, Mo1, Tx, W, Luer (1975); = *Cypripedium pubescens* Willdenow – K1, S, Tn, WV; < *Cypripedium calceolus* var. *pubescens* (Willdenow) Knight – F, G, RAB, Correll (1950). NatureServe G5T5 (Secure).



Epidendrum Linnaeus 1759 (GREEN-FLY ORCHID)

A genus of about 1800-2400 species, epiphytic perennial herbs, of tropical (and rarely subtropical) America. References: Brown (2002); Correll (1950); Franck (2018a) in Weakley et al (2018a); Hágsater (2002b) in FNA26 (2002a); Pridgeon et al (2005).

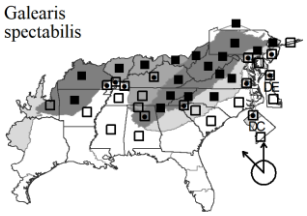


Epidendrum conopseum W.T. Aiton. GREEN-FLY ORCHID. **Hab:** Epiphytic on limbs of trees, especially *Magnolia grandiflora*, *Quercus virginiana*, and *Taxodium spp*., in blackwater river swamps and mesic hardwood hammocks, usually on relatively horizontal limbs mixed with *Pleopeltis michauxiana*, also rarely in crevices of Altamaha Grit outcrops. **Dist:** The northernmost epiphytic orchid: se. NC south to c. peninsular FL, west to w. LA; disjunct in ne. Mexico (Nuevo León, San Luis Potosí, Tamaulipas). All other species of *Epidendrum* in the flora are limited to c. and s. FL. **Phen:** Jul-Nov. **Tax:** Hágsater (2000) argued that *E. magnoliae* Muhlenberg has nomenclatural priority over *E. conopseum* R. Brown; Franck in Weakley et al. (2018a) rebuts that argument. Two varieties are sometimes recognized (Brown 2002): var. *conopseum*, with green or yellow flowers fragrant during the day, and var. *mexicanum*, with yellow flowers with bronze and green tints fragrant at night. They need additional study. **Comm:** It is locally rather common, but rarely seen as it occurs primarily in blackwater swamps, on upper limbs of *Taxodium*, *Nyssa*, *Planera*, and other trees, typically mixed with *Pleopeltis*. See Correll (1936) for additional discussion of this species at its northern limit. **Syn:** = K3, K4, RAB, WH3, Correll (1950), Franck (2018a) in Weakley et al (2018a), Luer (1975); = *Amphiglottis conopsea* (W.T. Aiton) Small – S; = *Epidendrum magnoliae* Muhlenberg – FNA26; > *Epidendrum conopseum* var. *conopseum* – K1; > *Epidendrum conopseum* var. *mexicanum* L.O. Williams – K1; > *Epidendrum magnoliae* var. *magnoliae* – Brown (2002); > *Epidendrum magnoliae* var. *mexicanum* (L.O. Williams) P.M. Brown – Brown (2002). NatureServe G4 (Apparently Secure).

Key to Map Symbology: □ native; ◇ maybe exotic; △ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Galearis Rafinesque 1833 (SHOWY ORCHIS)

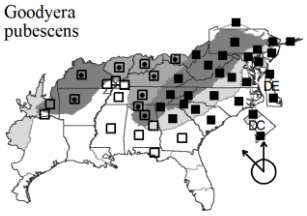
A genus of 3-6 species, of e. North America and e. Asia. References: Bateman et al (2009); Correll (1950); Pridgeon et al (1999b); Sheviak & Catling (2002a) in FNA26 (2002a).



Galearis spectabilis (Linnaeus) Rafinesque. SHOWY ORCHIS. **Hab:** Rich, deciduous forests, most typically over calcareous or mafic rocks. **Dist:** NB and QC west to MN, south to GA and AR. **Phen:** Apr-Jun; Jun-Jul. **Syn:** = Ar, FNA26, Il, K1, K3, K4, Mi, Mo1, NE, NY, Pa, Tn, Va, W, Bateman et al (2009), Luer (1975); = *Galeorchis spectabilis* (Linnaeus) Rydberg – S; = *Orchis spectabilis* Linnaeus – C, F, G, RAB, WV, Correll (1950). NatureServe G5 (Secure).

Goodyera R. Brown 1813 (RATTLESNAKE ORCHID)

A genus of about 55-100 species, widespread in distribution but primarily Northern Hemisphere. References: Correll (1950); Kallunki (2002) in FNA26 (2002a); Pridgeon et al (1999c).



Goodyera pubescens (Willdenow) R. Brown. DOWNY RATTLESNAKE-ORCHID. **Hab:** Dry to moist forests and woodlands. **Dist:** NB west to ON and MN, south to Panhandle FL, MS, and AR. **Phen:** Jun-Aug. **Comm:** One of the commonest of orchids in much of its extensive range in eastern North America. **Syn:** = Ar, C, F, FNA26, G, Il, K1, K3, K4, Mi, Mo1, NE, NY, Pa, RAB, Tn, Va, W, WH3, WV, Correll (1950), Luer (1975); = *Peramium pubescens* (Willdenow) MacMillan – S. NatureServe G5 (Secure).

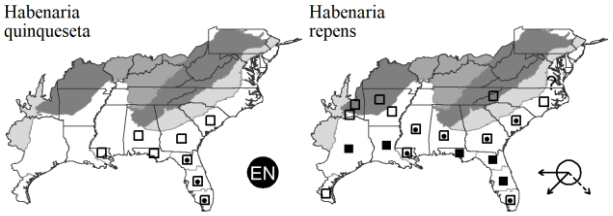
Habenaria Willdenow 1805 (LONGSPUR ORCHID, HABENARIA)

A genus of about 600 species, tropical and subtropical in the Old World and New World. References: Batista et al (2011); Brown (2002); Correll (1950); Pridgeon et al (1999b); Sheviak (2002c) in FNA26 (2002a).

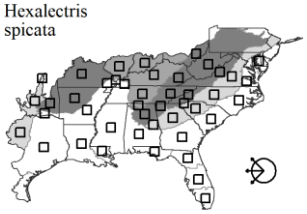
2 Spur 0.4-1.7 cm long.
.....***Habenaria repens***
2 Spur 5-25 cm long.
.....***Habenaria quinqueseta***

Habenaria quinqueseta (Michaux) A. Eaton. MICHAUX'S ORCHID. **Hab:** Wet to mesic pine flatwoods, moist hardwood hammocks, Altamaha Grit outcrops, pine rocklands, ditches. **Dist:** E. SC south to s. FL, west to se. LA (not known from MS). **Phen:** Aug-Oct. **Syn:** = ETx1, FNA26, K1, S, Batista et al (2011), Brown (2002); = *Habenaria quinqueseta* var. *quinqueseta* – Luer (1975); < *Habenaria quinqueseta* (Michaux) A. Eaton – GW1, K3, K4, RAB, Tx, WH3, WI, Correll (1950). NatureServe G4G5T4? (Apparently Secure).

Habenaria repens Nuttall. WATER-SPIDER ORCHID, FLOATING ORCHID. **Hab:** Blackwater swamps, pools, banks of creeks and rivers, marshes. **Dist:** NC south to s. FL and west to e. and s. TX; West Indies, Mexico, Central America, and n. South America. **Phen:** Apr-Nov. **Comm:** Reported from se. VA. **Syn:** = Ar, ETx1, FNA26, GW1, K1, K3, K4, NcTx, RAB, S, Tx, WH3, WI, Batista et al (2011), Brown (2002), Correll (1950), Luer (1975). NatureServe G5 (Secure).



Hexalectris Rafinesque 1825 (CRESTED CORALROOT)



A genus of about 9 species, mycotrophic herbs, of s. North America, especially sw. United States and Mexico. We decline to follow the suggested combining of *Hexalectris* into *Bletia* (Sosa 2007; Sosa et al. 2016); Sosa & Chase 2020); the published evidence does not provide clear and convincing support that *Hexalectris* and *Bletia* are not each monophyletic and morphologically well-supported genera. References: Catling & Engel (1993); Catling (2004); Correll (1950); Goldman et al (2002) in FNA26 (2002a); Kennedy & Watson (2010); Sosa & Chase (2020); Sosa (2007); Sosa et al (2016).

Hexalectris spicata (Walter) Barnhart. CRESTED CORALROOT, BRUNETTA. **Hab:** Dry forests and woodlands, especially over mafic or calcareous rocks, such as diabase, gabbro, calcareous siltstone, and dolomite (though sometimes in distinctly acid situations), shell middens. **Dist:** MD, OH, and MO south to s. FL and w. and s. TX. McAvoy (2021) documents the species' modern occurrence in e. MD. **Phen:** Apr-Aug. **ID Notes:** The yellow-orange and purple flowers borne on a brown stem present a very peculiar and distinctive color combination. **Syn:** = K4, Va, Kennedy & Watson (2010); = *Bletia spicata* (Walter) Sosa & M.W. Chase – Sosa & Chase (2020); = *Hexalectris spicata* var. *spicata* – Ar, ETx1, FNA26, Mo1, NcTx, Catling & Engel (1993),

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

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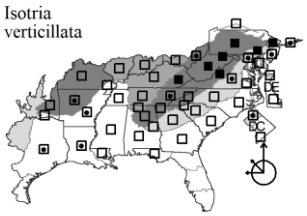
Catling (2004); < *Hexalectris spicata* (Walter) Barnhart – C, F, G, Il, K1, RAB, S, Tn, Tx, W, WH3, WV, Correll (1950), Luer (1975). NatureServe G5T4T5 (Apparently Secure).

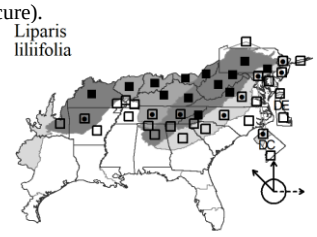


Isotria Rafinesque 1808 (WHORLED POGONIA, FIVE-LEAVES, FIVELEAF ORCHID)

A genus of 2 species, of e. North America. Cameron & Chase (1999) indicate that *Isotria* should perhaps be included in a more broadly circumscribed *Pogonia* (as was often done prior to 1922); Chase et al. (2015) retain it as a separate genus. References: Correll (1950); Mehrhoff & Homoya (2002) in FNA26 (2002a).

Identification Notes: Sterile *Isotria* is sometimes confused with *Medeola*. *Medeola* has a wiry stem, with floccose hairiness, at least toward the base. *Isotria* has a fleshier stem, lacking hairs.

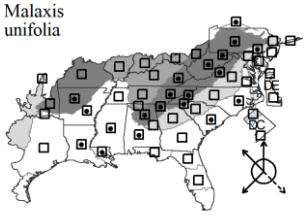
Isotria verticillata (Muhlenberg ex Willdenow) Rafinesque. LARGE WHORLED POGONIA, LARGE FIVE-LEAVES. **Hab:** Acidic, mesic to dry forests. **Dist:** ME and MI south to Panhandle FL and e. TX. **Phen:** Apr-Jul. **Syn:** = Ar, C, ETx1, F, FNA26, G, Il, K1, K3, K4, Mi, Mo1, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WV, Correll (1950), Luer (1975); = *Pogonia verticillata* (Muhlenberg ex Willdenow) Nuttall – WH3. NatureServe G5 (Secure).



Liparis L.C. Richard 1817 (WIDE-LIP ORCHID, TWAYBLADE)

A genus of about 250-350 species, cosmopolitan. References: Brown (2002); Correll (1950); Li et al (2020); Magrath (2002) in FNA26 (2002a).

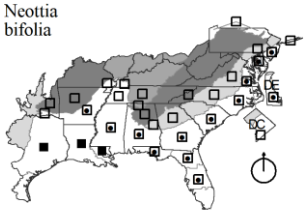
Liparis liliifolia (Linnaeus) L.C. Richard ex Lindley. LARGE TWAYBLADE, MAUVE SLEEKWORT, RUSSET-WITCH, BROWN WIDE-LIP ORCHID. **Hab:** Moist forests, floodplains. **Dist:** VT and ON west to MN, south to GA and AR; China. **Phen:** May-Jul. **Syn:** = Ar, C, F, FNA26, G, GW1, Il, K1, K3, K4, Mi, Mo1, NE, NY, Pa, RAB, S, Tn, Va, W, WV, Correll (1950), Luer (1975). NatureServe G5 (Secure).



Malaxis Solander ex Swartz 1788 (ADDER'S-MOUTH)

As circumscribed more narrowly (Radins et al. 2014; Cameron 2005), a genus of about 120 species, terrestrial herbs, mainly of the New World and temperate Eurasia. References: Brown (2002); Cameron (2005); Catling & Magrath (2002) in FNA26 (2002a); Catling (1991); Correll (1950); Radins et al (2014).

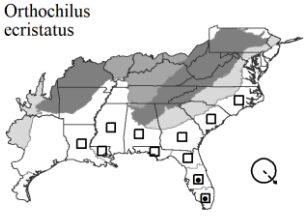
Malaxis unifolia Michaux. GREEN ADDER'S-MOUTH. **Hab:** Bogs, moist forested slopes, in the Sandhills in longleaf-oak-hickory forests, often rooted in moss. **Dist:** NL (Newfoundland) and FL west to MN, IA, MO, e. OK, and e. TX; also in Mexico, Cuba, the West Indies, and Central America. **Phen:** Apr-Aug. **Syn:** = Ar, ETx1, F, FNA26, Il, K1, K3, K4, Mi, Mo1, NE, Tn, Tx, Va, WH3, Catling (1991); < *Malaxis unifolia* Michaux – C, G, GW1, Pa, RAB, S, W, WV, Correll (1950), Luer (1975).



Neottia Guettard 1754 (TWAYBLADE)

A genus of about 60 species, mycotrophic or autotrophic herbs, of northern Eurasia and North America. Our species, all autotrophs with a pair of green leaves on the stem, have been traditionally treated in the genus *Listera*, but it appears to be phylogenetically embedded in the fully mycotrophic *Neottia*. References: Brown (2002); Chase et al (2015); Correll (1950); Magrath & Coleman (2002) in FNA26 (2002a); Pridgeon et al (2005).

Neottia bifolia (Rafinesque) Baumbach. SOUTHERN TWAYBLADE. **Hab:** Swamps, second terraces in floodplain forests, wet woods under *Rhododendron maximum*, Coastal Plain bogs. **Dist:** Mainly a Southeastern Coastal Plain species, from NJ south to wc. peninsular FL (Kunzer et al. 2009) and west to e. TX, but also scattered inland of the Coastal Plain and north into VT and s. Canada. **Phen:** Feb-Jul; Mar-Aug. **Syn:** = K3, K4, NE, NY; = *Listera australis* Lindley – Ar, C, ETx1, F, FNA26, G, GW1, K1, Pa, RAB, Tn, Tx, Va, W, WH3, Brown (2002), Correll (1950), Luer (1975); = *Ophrys australis* (Lindley) House – S. NatureServe G4 (Apparently Secure).



Orthochilus Hochstetter ex A. Richard 1850 (WILD COCO)

A genus of 30 (or more) species, of s. North America, Cuba, Colombia, and (mainly) tropical Africa (Martos et al. 2014). References: Brown (2002); Correll (1950); Martos et al (2014); Romero-González (2002b) in FNA26 (2002a).

Identification Notes: The long (to 7 dm), plicate leaves are distinctive among our orchids. Small individuals can be mistaken for *Calopogon* when not in bloom. *Orthochilus ecristatus* differs, however, in having the stem covered from node to node by a succession of sheaths (vs. the sheaths much shorter) and in having the leaves 2-3 on a separate shoot emerging from the corm before the bloom-stalk (vs. leaf 1, on the bloom-stalk).

Orthochilus ecristatus (Fernald) Bytebier. SPIKED MEDUSA, SMOOTH-LIPPED EULOPHIA. **Hab:** Mesic pinelands with blackjack oak, other sandhills and dry-mesic to mesic longleaf pinelands, also (southwards) in spodosol wet-mesic pine flatwoods, dry-prairies, and disturbed wet pastures. **Dist:** Se. NC south to FL, west to LA; West Indies (Cuba). **Phen:** Jun-Sep; Jul-Nov. **Syn:** = K4; = *Eulophia ecristata* (Fernald) Ames – RAB,

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

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Correll (1950), Luer (1975); = *Pteroglossaspis ecristata* (Fernald) Rolfe – FNA26, K1, WH3, WI, Brown (2002); = *Triorchos ecristatus* (Fernald) Small – S; > *Eulophia ecristata* (Fernald) Ames – K3; > *Orthochilus ecristatus* (Fernald) Bytebier – Martos et al (2014); > *Pteroglossaspis pottsii* P.M. Brown & DeAngelis – K3. NatureServe G2G3 (Imperiled).

Platanthera L.C. Richard 1817 (FRINGED ORCHID, FRINGELESS ORCHID)

A genus of about 200 species, largely of the temperate northern hemisphere, extending south into tropical Central America and tropical se. Asia. The genus is very diverse, and has sometimes been split into separate genera in the past and may warrant that. We here follow Efimov (2016) in (for now) retaining a broad *Platanthera*, and also agree with his uncertainty that that is the best course. "These clades are accepted as subgenera: *Platanthera*, *Tulotis*, *Limnorchis*, *Blephariglottis* and *Fimbriella*. This is a first classification of genus *Platanthera* into subgenera; the former authors either divided genus *Platanthera* into sections or split it into several genera (as discussed in more detail in the previous chapter). I think that subgeneric rank is more appropriate here than sections, because the discriminating differences between the groups (in gynostemium, lip and tuberoids) are clear. Comparable differences in tribe Orchideae are often used to discriminate between widely accepted genera. Also, it should be noted that the general habit of some subgenera is so clearly different that I feel myself not finally comfortable to accommodate them in one genus. Phylogenetic data also do not present arguments against this: existing data reveal that all subgenera are monophyletic groups with high support...". Our species fall into all five subgenera recognized by Efimov (2016), and an additional section: Subgenus *Platanthera* section *Lysias*: *hookeri, macrophylla, orbiculata* Subgenus *Limnorchis*: *aquilonis, dilatata, huronensis* Subgenus *Tulotis*: *flava, herbiola* Subgenus *Fimbriella*: *grandiflora, lacera, leucophaea, peramoena, praeclara, psycodes, shriveri* Subgenus *Blephariglottis* section *Blephariglottis*: *blephariglottis, chapmanii, ciliaris, cristata, conspicua, integrilabia* Subgenus *Blephariglottis* section *Gymnadeniopsis*: *clavellata, integra, nivea*. References: Ackerman & Morgan (2002) in FNA26 (2002a); Bateman et al (2009); Brown (2002); Butzin (1981); Correll (1950); Efimov (2016); Pridgeon et al (1999b); Reddoch & Reddoch (1993); Sheviak (2002b) in FNA26 (2002a); Wettewa, Bailey, & Wallace (2020).

Identification Notes: First generation hybrids are frequent and are not keyed; they are generally intermediate in characters and are found in mixed populations of the two parents.

4 Lip deeply divided into 3 similarly-sized lobes (these often further deeply fringed or sometimes merely toothed or jaggedly incised); [subgenus *Fimbriella*].
  5 Lobes of lip merely toothed or jaggedly incised, few (if any) of the segments > 1 mm long; flowers rose-purple ..... ***Platanthera peramoena***
  5 Lobes of lip shallowly or deeply fringed, most or all of the segments > 1 mm long; flowers rose-purple, white, cream, or greenish. ..... ***Platanthera lacera***
4 Lip unlobed or very shallowly 3-lobed at the apex only (the sinuses < 1 mm deep), the lip's margin entire, minutely toothed, or deeply fringed.
  11 Lip margin deeply fringed; flowers white, yellow, or orange; [subgenus *Blephariglottis*, section *Blephariglottis*].
    12 Flowers white; spur 15-50 mm long. ..... ***Platanthera conspicua***
    12 Flowers yellow to orange; spur 5-33 mm long.
      14 Spur 20-33 mm long, exceeding the 12-27 mm long ovary; undivided portion of lip 8-12 mm long ..... ***Platanthera ciliaris***
      14 Spur 4-17 mm long, equal to or shorter than the ovary; undivided portion of lip 4-6 mm long. ..... ***Platanthera cristata***
  11 Lip margin minutely denticulate or entire; flowers white, yellow-orange, green, or greenish-white.
    16 Spur 35-60 mm long; lip 10-15 mm long; flowers white; [subgenus *Blephariglottis*, section *Blephariglottis*] ..... ***Platanthera integrilabia***
    16 Spur 2-18 mm long; lip 3-12 mm long; flowers white, yellow-orange, green, or greenish-white.
      17 Lip uppermost (flowers not resupinate); spur 10-18 mm long, borne horizontally, parallel to the pedicel and in side view of the inflorescence crossing the rachis; [subgenus *Blephariglottis*, section *Gymnadeniopsis*]. ..... ***Platanthera nivea***
      17 Lip lowermost (flowers resupinate); spur 2-13 mm long, borne horizontally or descending, in side view crossing the rachis only in *P. clavellata*.
        19 Flowers orange- to golden-yellow; lip minutely crenulate; [subgenus *Blephariglottis*, section *Gymnadeniopsis*] ..... ***Platanthera integra***
        19 Flowers green, greenish-white, yellowish-green, or yellowish-white; lip entire, shallowly trilobed, proximally dilated, or eroded at the tip.
          22 Larger stem leaves usually 1, rarely 2, near the middle of the stem; raceme 2-9 cm long, 2-3.5 cm in diameter; lip without a tubercle on the upper surface near the base, also lacking lateral auricles near the base; [subgenus *Blephariglottis*, section *Gymnadeniopsis*] ..... ***Platanthera clavellata***
          22 Larger stem leaves usually 2 (-5), near the middle of the stem or toward its base; raceme 5-20 cm long, 1.2-2 cm in diameter; lip with a tubercle on the upper surface near the base, also usually with 2 lateral auricles; [subgenus *Tulotis*]. ..... ***Platanthera flava***

Platanthera ciliaris (Linnaeus) Lindley. YELLOW FRINGED ORCHID. **Hab:** Pine savannas, moist roadbanks, meadows, pastures, bogs. **Dist:** NH, MI, IL, MO, and OK south to c. peninsular FL and e. TX. **Phen:** Jun-Aug. Jun-Sep. **Comm:** *P. ciliaris* is probably our most common and least habitat-specific *Platanthera*. **Syn:** = Ar, ETx1, FNA26, Il, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, Tn, Va, W, WH3, Brown (2002), Efimov (2016), Luer (1975); = *Blephariglottis ciliaris* (Linnaeus) Rydberg – S; = *Habenaria ciliaris* (Linnaeus) R. Brown – C, F, G, GW1, RAB, Tx, WV, Correll (1950). NatureServe G5 (Secure).

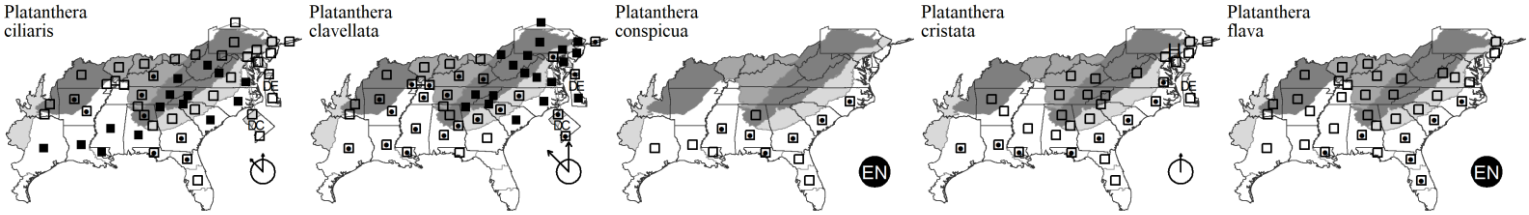
Platanthera clavellata (Michaux) Luer. SMALL GREEN WOOD ORCHID. **Hab:** Seepages, bogs, swamps, other wet places. **Dist:** NL (Newfoundland) and ND south to Panhandle FL and TX. **Phen:** Jun-Sep. **Syn:** = Ar, ETx1, FNA26, Il, K1, K3, K4, Mi, Mo1, NE, NY, Pa, Tn, Va, W, WH3, Brown (2002), Efimov (2016), Luer (1975); = *Gymnadeniopsis clavellata* (Michaux) Rydberg – S; = *Habenaria clavellata* (Michaux) Sprengel – C, G, GW1, Tx, WV, Correll (1950); > *Habenaria clavellata* (Michaux) Sprengel var. *clavellata* – F, RAB; > *Habenaria clavellata* var. *wrightii* Olive – RAB. NatureServe G5 (Secure).

Platanthera conspicua (Nash) P.M. Brown. LARGE WHITE FRINGED ORCHID. **Hab:** Pine savannas, seepages, longleaf pine sandhill-pocosin ecotones. **Dist:** NC south to c. peninsular FL, west to e. TX. **Phen:** Jul-Sep. **Tax:** Brown (2006b) and Sheviak in FNA (2002a) clarify the taxonomy of this complex; previous studies (such as Hardin 1961) used different characters, and interpreted the white-fringed orchid taxa differently. **Syn:** = K3, K4; = *Blephariglottis conspicua* (Nash) Small – S; = *Habenaria blephariglottis* var. *conspicua* (Nash) Ames – C, F; = *Platanthera blephariglottis* (Willdenow) Lindley var. *conspicua* (Nash) Luer – ETx1, FNA26, K1, WH3, Brown (2002), Luer (1975); < *Habenaria blephariglottis* – GW1, Tx; < *Habenaria blephariglottis* (Willdenow) Hooker var. *blephariglottis* – RAB, Correll (1950); < *Platanthera blephariglottis* (Willdenow) Lindley – Efimov (2016). NatureServe G5T4 (Apparently Secure).

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Platanthera cristata (Michaux) Lindley. CRESTED FRINGED ORCHID, GOLDEN FRINGED ORCHID. **Hab:** Pine savannas, bogs, moist roadsides. **Dist:** *P. cristata* is more limited to the Coastal Plain than the related *P. ciliaris*, ranging from s. MA south to FL and west to e. TX, and also inland in KY, TN, AR, SC, and NC. **Phen:** Jun-Sep. **Syn:** = Ar, ETx1, FNA26, K1, K3, K4, NE, NY, Pa, W, WH3, Brown (2002), Efimov (2016), Luer (1975); = *Blephariglottis cristata* (Michaux) Rafinesque – S; = *Habenaria cristata* (Michaux) R. Brown – C, F, G, GW1, RAB, Tx, Correll (1950). NatureServe G5 (Secure).

Platanthera flava (Linnaeus) Lindley. SOUTHERN REIN ORCHID, SOUTHERN GYPSY-SPIKE. **Hab:** Shaded wet places, such as swampy forests. **Dist:** NJ, IN, IL, MO, and OK, south to c. peninsular FL and e. TX; remarkably disjunct in s. NS, where it occurs associated with other disjuncts from the Southeastern Coastal Plain. **Phen:** Mar-Sep. **Comm:** See Homoya (1993) for additional discussion of the two taxa usually treated as varieties of *P. flava*. Reported for MD (Longbottom, Naczi, & Knapp 2016). **Syn:** = *Habenaria flava* – Tx; = *Habenaria flava* (Linnaeus) R. Brown var. *flava* – Ar, C, F, G, RAB, Correll (1950); = *Platanthera flava* (Linnaeus) Lindley var. *flava* – ETx1, FNA26, Il, K1, K3, K4, Mo1, Tn, Va, Brown (2002), Efimov (2016), Luer (1975); < *Habenaria flava* – GW1; > *Perularia bidentata* (Elliott) Small – S; > *Perularia scutellata* (Nuttall) Small – S; < *Platanthera flava* (Linnaeus) Lindley – WH3. NatureServe G4?T4?Q (Apparently Secure).



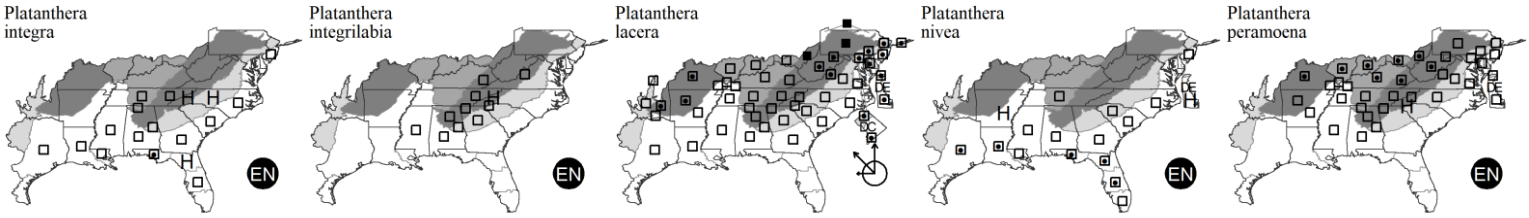
Platanthera integra (Nuttall) A. Gray ex Beck. GOLDEN FRINGELESS ORCHID, YELLOW FRINGELESS ORCHID. **Hab:** Wet pine savannas in the Coastal Plain, bogs in the Mountains and Piedmont. **Dist:** Essentially endemic to the Southeastern Coastal Plain, ranging from s. NJ south to FL and west to se. TX, with disjunct occurrences in TN (Eastern Highland Rim) and in bogs at low elevations of the Blue Ridge of NC. It is apparently now extirpated in the Mountains and Piedmont of NC. **Phen:** Jul-Sep. **Syn:** = ETx1, FNA26, K1, K3, K4, Tn, WH3, Brown (2002), Efimov (2016), Luer (1975); = *Gymnadeniopsis integra* (Nuttall) Rydberg – S; = *Habenaria integra* (Nuttall) Sprengel – C, F, G, GW1, RAB, Tx, Correll (1950). NatureServe G3G4 (Vulnerable).

Platanthera integrilabia (Correll) Luer. MONKEY-FACE ORCHID, WHITE FRINGELESS ORCHID. **Hab:** Bogs, red maple-gum swamps, seeps and streambanks. **Dist:** Endemic to KY, e. TN, sw. VA (Lee County, documentation uncertain), w. NC, nw. SC, n. and wc. GA, n. AL, and n. MS, primarily in the Cumberland Plateau. **Phen:** Jul-Sep. **Comm:** See Zettler, Ahuja, & McInnis (1996) for a discussion of pollination. **Syn:** = FNA26, K1, K3, K4, W, Efimov (2016), Luer (1975); = *Habenaria blephariglottis* (Willdenow) Hooker var. *integrilabia* Correll – F, RAB, Correll (1950); = *Habenaria correlliana* Cronquist – C. NatureServe G2G3 (Imperiled); USESA T.

Platanthera lacera (Michaux) G. Don. GREEN FRINGED ORCHID, RAGGED FRINGED ORCHID, RAGGED ORCHID. **Hab:** Swamps, bogs, seepages. **Dist:** NL (Newfoundland) west to MB, south to SC, GA, s. AL, w. LA, and ne. TX. **Phen:** Jun-Aug. **Tax:** Var. *terrae-novae* (Fernald) Luer is not distinct, and is based on hybrid swarms involving *P. lacera* and *P. psycodes* (Catling 1997). **Syn:** = Ar, ETx1, FNA26, Il, K1, K3, K4, Mi, NE, NY, Pa, Va, W; = *Blephariglottis lacera* (Michaux) Farwell – S; = *Fimbriella lacera* (Michaux) Butzin var. *lacera* – Butzin (1981); = *Habenaria lacera* (Michaux) R. Brown – C, G, GW1, RAB, Tx, WV, Correll (1950); > *Habenaria lacera* var. *lacera* – F; > *Platanthera lacera* var. *lacera* – Mo1, Luer (1975).

Platanthera nivea (Nuttall) Luer. SNOWY ORCHID, BOG-SPIKE. **Hab:** Wet pine savannas, acid seepages. **Dist:** Essentially a Southeastern Coastal Plain endemic, *P. nivea* ranges from s. NJ and DE (at least formerly) south to FL and west to e. TX and e. AR; disjunct inland in Coffee County, TN (Eastern Highland Rim) and w. SC (in the uppermost Piedmont in the Blue Ridge Escarpment edge). **Phen:** May-Sep. **Comm:** This species is even more irregular than most *Platanthera* in its flowering, whole populations sometimes not flowering for a number of years. This species was once locally abundant in the outer Coastal Plain of the Carolinas and farther south; Correll (1950) describes "large colonies of this species which form a blanket of white over the landscape." Also see the picture in B.W. Wells's Natural Gardens of North Carolina. **ID Notes:** The flowers are so white as to seem illuminated from within. **Syn:** = Ar, ETx1, FNA26, K1, K3, K4, Tn, Brown (2002), Luer (1975); = *Gymnadeniopsis nivea* (Nuttall) Rydberg – S; = *Habenaria nivea* (Nuttall) Sprengel – C, F, G, GW1, RAB, Tn, Tx, WH3, Correll (1950). NatureServe G5 (Secure).

Platanthera peramoena (A. Gray) A. Gray. PURPLE FRINGELESS ORCHID, PURPLE SPIRE ORCHID, PRIDE-OF-THE-PEAK. **Hab:** Bogs, seepages, moist forests, moist meadows. **Dist:** NJ, s. PA, OH, c. IL, and se. MO south to nw. SC, n. GA, n. AL, c. MS, and c. AR. **Phen:** Jun-Oct. **Comm:** See Spooner & Shelly (1983) for a review of information about this species. **Syn:** = Ar, FNA26, Il, K1, Mo1, Pa, Tn, Va, W, Luer (1975); = *Blephariglottis peramoena* (A. Gray) Rydberg – S; = *Fimbriella peramoena* (A. Gray) Butzin – Butzin (1981); = *Habenaria peramoena* A. Gray – C, F, G, GW1, RAB, Correll (1950); = *Platanthera fissa* Lindley – K3, K4, misapplied. NatureServe G5 (Secure).



Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more)

* : waif
EN : endemic
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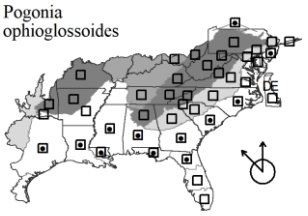
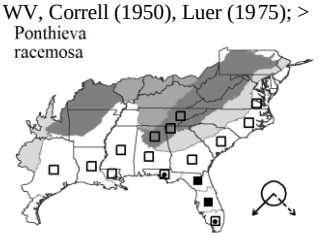


Pogonia A.L. de Jussieu 1789 (ROSE POGONIA, POGONIA)

A genus of 3 species, of temperate e. North America and e. Asia. Cameron & Chase (1999) indicate that molecular analyses indicate that there may be merit in the traditional broad circumscription of *Pogonia* to include *Isotria* and N. American taxa of *Cleistes*; alternatively, North American "*Cleistes*" can be segregated as *Cleistesiopsis*, as done here. References: Correll (1950); Sheviak & Catling (2002b) in FNA26 (2002a).

Pogonia ophioglossoides (Linnaeus) Ker Gawler. ROSE POGONIA, SNAKEMOUTH, BEARDFLOWER, ETTERCAP, ADDERMOUTH. **Hab:** Savannas, bogs, especially in open peaty or gravelly situations. **Dist:** NL (Newfoundland) and MB south to s. FL and e. TX. **Phen:** Mar-Jun. **Syn:** = Ar, C, ETx1, FNA26, G, GW1, Il, K1, K3, Mi, Mo1, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV, Correll (1950), Luer (1975); > *Pogonia ophioglossoides* var. *ophioglossoides* – F. NatureServe G5 (Secure).



Ponthieva R. Brown 1813 (SHADOW WITCH)

A genus of about 30-53 species, of tropical and warm temperate America. References: Ackerman (2002k) in FNA26 (2002a); Brown (2002); Correll (1950); Pridgeon et al (1999b).

Ponthieva racemosa (Walter) C. Mohr. SHADOW WITCH. **Hab:** Bottomlands, floodplains, moist ravines, nearly always over calcareous rock ('marl' or coquina limestone). **Dist:** Se. VA south to s. FL and west to se. TX; disjunct in the Eastern Highland Rim, TN; West Indies; Mexico and Central America to South America. **Phen:** Sep-Mar. **ID Notes:** The basal rosette of leaves, white (suffused with green) flowers in fall to winter, and habitat are distinctive. **Syn:** = C, ETx1, F, FNA26, G, GW1, K1, K3, K4, RAB, S, Tx, Va, WH3, WI, Brown (2002), Correll (1950); = *Ponthieva racemosa* var. *racemosa* – Luer (1975). NatureServe G4G5 (Apparently Secure).

Spiranthes L.C. Richard 1817 (LADIES'-TRESSES, PEARL-TWIST, SPIRAL ORCHID)

A genus of about 30-40 species, mainly north temperate, but with species scattered in other areas. The *Spiranthes* flora of our region is still rather poorly understood, and the treatment here will undoubtedly change further. References: Brown (2002); Dueck & Cameron (2007); Dueck & Cameron (2008); Hough & Young (2021); Luer (1975); Pace & Cameron (2016); Pace & Cameron (2017); Pace (2021); Pace et al (2017); Pridgeon et al (1999c); Sheviak & Brown (2002) in FNA26 (2002a); Sheviak (1991); Ward (2012a).

Identification Notes: With few exceptions, the species cannot be identified when not in flower. Particular attention must be paid to the curvature and orientation of the lateral sepals, and various characteristics of the lip (color, papillae presence, gland shape).

1 Rachis of inflorescence with all hairs not glandular, tapering to a pointed tip; flowering Mar-Sep ..... ***Spiranthes vernalis***
1 Rachis of inflorescence either glabrous or with some or all hairs gland-tipped (capitate or clavate).
  3 Viscidium ovoid; column white; lip bright yellow or orange-yellow, with greenish veins; sepals and petals pure white; flowering May-Jul.....
  ..... ***Spiranthes lucida***
  3 Viscidium linear; column green; lip either white, or lip yellowish and lacking greenish veins; sepals and petals creamy, ivory, yellow, or greenish; collectively flowering Jan-Dec.
    4 Lip centrally green or white with green veins.
      5 Lip not papillate on the upper surface near the middle.
      ..... ***Spiranthes praecox***
      5 Lip papillate on the upper surface near the middle.
        9 Leaves oblanceolate, withering at anthesis; lateral sepals spatulate, green at base; flowering Feb-May ..... ***Spiranthes eatonii***
        9 Leaves ovate to obovate or elliptic, spreading, present or absent at anthesis; lateral sepals acuminate, white throughout; flowering Jul-Sep.
        ..... ***Spiranthes lacera var. gracilis***
    4 Lip centrally yellow, cream, or entirely white.
      11 Flowers < 4.5 mm long; rachis glabrous; flowers gaping from near middle, the tubular portion < 3 mm long; lip pure white; flowering Jun-Sep .....
      ..... ***Spiranthes tuberosa***
      11 Flowers > 5.0 mm long; rachis glabrous or pubescent; flowers gaping only from beyond the middle, the tubular portion > 3 mm long; lip white, creamy, or yellow.
        12 Lip papillate on the upper surface near the middle.
          13 Leaves basal, ovate.
          ..... ***Spiranthes floridana***
          13 Leaves upright, linear-lanceolate (or fugacious).
          ..... ***Spiranthes magnicamporum***
        12 Lip lacking papillae on the upper surface near the middle.
          17 Lateral sepals cupped (concave).
            18 Lip centrally white.
              19 Rostellum and viscidium absent; sepals 3.5-5 mm long ..... ***Spiranthes ovalis var. erostellata***
              19 Rostellum and viscidium present; sepals 4-6.1 mm long ..... ***Spiranthes ovalis var. ovalis***
            18 Lip centrally yellowish.
            ..... ***Spiranthes laciniata***
          17 Lateral sepals flat (not concave).
            21 Lip margin undulate.
              22 Flowers fragrant.

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

23 Callosities reduced and mounded, 0.2-0.6 mm long; leaves usually absent at flowering.....***Spiranthes magnicamporum***
23 Callosities pronounced, incurved or conical, 1-2.5 mm long; leaves present at flowering.....***Spiranthes odorata***
22 Flowers lacking fragrance.
.....***Spiranthes longilabris***
21 Lip margin crisped and lacerate.
.....***Spiranthes cernua***

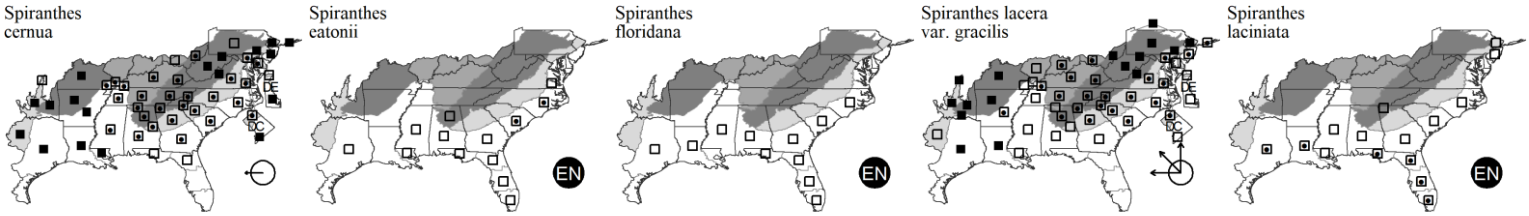
Spiranthes cernua (Linnaeus) L.C. Richard. NODDING LADIES'-TRESSES. **Hab:** Bogs, swamps, ditches, usually in acidic, sphagnous situations. **Dist:** NS west to s. OH, MO, and OK, south to Panhandle FL and c. TX. **Phen:** Jul-Nov. **Tax:** *Spiranthes parksii* was shown to be an apomictic regional floral morph with little to no clear molecular, ecological, or phenological distinction from *Spiranthes cernua*. Recognition of *S. parksii* would render *S. cernua* paraphyletic. See Dueck and Cameron (2008) and Pace and Cameron (2017) for more details. **Syn:** = K4, Hough & Young (2021), Pace & Cameron (2017); < *Ibidium cernuum* (Linnaeus) House – S; < *Spiranthes cernua* (Linnaeus) L.C. Richard – G, Il, K1, K3, Mo1, NcTx, NY, Pa, Tn, Va, W, WH3, WV; >< *Spiranthes cernua* (Linnaeus) L.C. Richard – FNA26; < *Spiranthes cernua* var. *cernua* – C, F, GW1, RAB, Luer (1975); >< *Spiranthes cernua* var. *cernua* – ETx1, Tx, Correll (1950); > *Spiranthes parksii* Correll – ETx1, FNA26, Tx, Correll (1950), Hough & Young (2021), Luer (1972).

Spiranthes eatonii Ames ex P.M. Brown. EATON'S LADIES'-TRESSES. **Hab:** Pine savannas, dry to moist pine flatwoods. **Dist:** Se. VA south to s. FL, west to se. TX. **Phen:** Feb-May. **Comm:** Apparently previously confused with *S. lacera*, *S. floridana*, *S. brevilabris*, and *S. tuberosa*, but distinctive in the combination of spring blooming season, white flowers, and basal, narrowly oblanceolate leaves (Brown 1999). **Syn:** = ETx1, FNA26, K1, K3, Va, WH3, Brown (2002); = *Spiranthes lacera* var. *eatonii* (P.M. Brown) D.B. Ward – K4, Ward (2012a). NatureServe G3Q (Vulnerable).

Spiranthes floridana (Wherry) Cory. FLORIDA LADIES'-TRESSES. **Hab:** Wet pine savannas, other moist sites. **Dist:** Se. NC south to sc. peninsular FL and west to TX. **Phen:** Apr-May. **Syn:** = ETx1, FNA26, K1, K3, K4, WH3, Brown (2002); = *Ibidium floridanum* Wherry – S; = *Spiranthes brevilabris* Lindley var. *floridana* (Wherry) Luer – Luer (1975); = *Spiranthes gracilis* (Bigelow) Beck var. *floridana* (Wherry) Correll – GW1, RAB, Tx, Correll (1950). NatureServe G1 (Critically Imperiled).

Spiranthes lacera (Rafinesque) Rafinesque *var.* ***gracilis*** (Bigelow) Luer. SOUTHERN SLENDER LADIES'-TRESSES. **Hab:** Fields, meadows, pastures, woodlands. **Dist:** ME, MI, WI, and KS south to GA and TX. **Phen:** Aug-Sep. **Syn:** = Ar, C, ETx1, FNA26, K1, K3, K4, Mi, NcTx, NE, NY, Pa, Tn, Va, W, Luer (1975); = *Ibidium gracile* (Bigelow) House – S; = *Spiranthes gracilis* – F, Il, WV; = *Spiranthes gracilis* (Bigelow) Beck var. *gracilis* – GW1, RAB, Tx, Correll (1950); < *Spiranthes gracilis* – G; < *Spiranthes lacera* – Mo1. NatureServe G5T4T5 (Apparently Secure).

Spiranthes laciniata (Small) Ames. LACE-LIP LADIES'-TRESSES. **Hab:** Pond cypress depressions and savannas, swamps. **Dist:** A Southeastern Coastal plain endemic: NJ south to s. FL and west to se. TX. **Phen:** May-Aug. **Syn:** = C, ETx1, FNA26, K1, K3, K4, RAB, WH3, Brown (2002), Correll (1950), Luer (1975); = *Ibidium laciniatum* (Small) House – S; = *Spiranthes* ×*laciniata* – F, GW1, Tx. NatureServe G4G5 (Apparently Secure).



Spiranthes longilabris Lindley. GIANT SPIRAL ORCHID, LONGHORN LADIES'-TRESSES. **Hab:** Wet pine savannas. **Dist:** A Southeastern Coastal Plain endemic: se. NC south to s. FL and west to e. TX. **Phen:** Late Oct-Dec. **Syn:** = ETx1, FNA26, GW1, K1, K3, K4, NcTx, RAB, Tx, WH3, Brown (2002), Correll (1950), Luer (1975); = *Ibidium longilabre* (Lindley) House – S. NatureServe G3 (Vulnerable).

Spiranthes lucida (H.H. Eaton) Ames. SHINING LADIES'-TRESSES. **Hab:** Sunny seepage over amphibolite or other basic rock, moist banks and shores. **Dist:** NS and ON south to NC, e. TN, sc. TN (Chester et al. 1993), c. AL, MO, and KS. **Phen:** May-Jul. **Comm:** The species was reported for NC by Fernald (1950) and by Small (1933), but was not treated by RAB; its occurrence in NC was verified in 1992 by its discovery in a seepage area in Ashe County. **Syn:** = Ar, C, F, FNA26, G, Il, K1, K3, K4, Mi, Mo1, NE, NY, Pa, Tn, Va, W, WV, Correll (1950), Luer (1975); = *Ibidium plantagineum* (Rafinesque) House – S. NatureServe G4 (Apparently Secure).

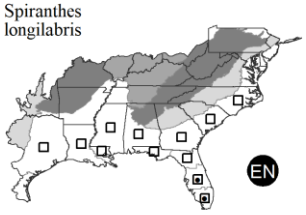
Spiranthes magnicamporum Sheviak. GREAT PLAINS LADIES'-TRESSES. **Hab:** Grassy barrens and glades over limestone or serpentine. **Dist:** Primarily in the Great Plains, from ND south to TX, east (often as widely disjunct populations) to sw. ON, NY, se. PA, sw. VA (Ludwig 1999), KY, w. TN (Jones 2006), and nw. GA. **Phen:** Sep-Oct. **Syn:** = Ar, C, ETx1, FNA26, Il, K1, K3, K4, Mi, Mo1, NcTx, NY, Pa, Tn, Hough & Young (2021), Luer (1975); < *Spiranthes cernua* (Linnaeus) L.C. Richard – G; < *Spiranthes cernua* var. *cernua* – F, Correll (1950).

Spiranthes odorata (Nuttall) Lindley. FRAGRANT LADIES'-TRESSES, MARSH LADIES'-TRESSES. **Hab:** Swamps and marshes, often emergent at the time of flowering in *Taxodium* and *Nyssa* swamps. **Dist:** Se. VA south to FL and west to se. TX; disjunct in c. NY (Onondaga County; McMullen et al. 2021). **Phen:** Sep-Nov. **Syn:** = Ar, ETx1, F, FNA26, G, K1, K3, K4, Tn, Va, WH3, Brown (2002), Hough & Young (2021), Luer (1975); = *Ibidium odoratum* (Nuttall) House – S; = *Spiranthes cernua* var. *odorata* (Nuttall) Correll – C, GW1, RAB, Tx, Correll (1950), Luer (1975).

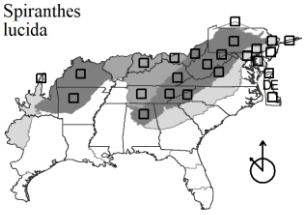
Spiranthes ovalis Lindley *var.* ***erostellata*** Catling. OVAL LADIES'-TRESSES. **Hab:** Swamp forests, bottomland forests, hammocks, ravine forests. **Dist:** Var. *erostellata* is fairly widespread in se. North America, ranging from sc. PA, NY, MI, and IL south to Panhandle FL, s. MS, s. LA, and e. TX. **Phen:** Aug-Nov. **Syn:** = Ar, C, ETx1, FNA26, Il, K1, K3, K4, Mi, Mo1, NY, Pa, Tn, Va, W, WH3, Brown (2002); < *Ibidium ovale* (Lindley) House – S; < *Spiranthes ovalis* – F, G, GW1, NcTx, RAB, Tx, WV, Correll (1950), Hough & Young (2021), Luer (1975). NatureServe G5?T4? (Apparently Secure).

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated

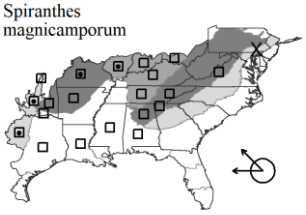
Spiranthes longilabris



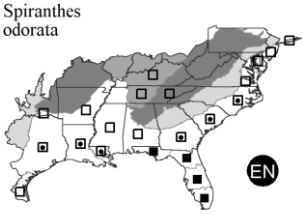
Spiranthes lucida



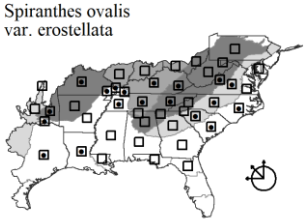
Spiranthes magnicamporum



Spiranthes odorata



Spiranthes ovalis var. erostellata



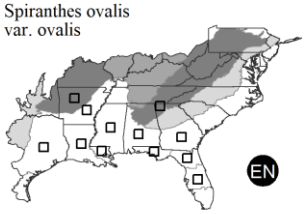
Spiranthes ovalis Lindley *var*. ***ovalis***. OVAL LADIES'-TRESSES. **Hab:** Swamp forests, mesic ravines. **Dist:** GA, TN, AR, and TX, south to n. peninsular FL, LA, and e. TX. **Phen:** Oct-Nov. **Syn:** = Ar, ETx1, FNA26, K1, K3, K4, WH3, Brown (2002); < *Ibidium ovale* (Lindley) House – S; < *Spiranthes ovalis* – GW1, NcTx, Tx, Correll (1950), Hough & Young (2021), Luer (1975). NatureServe G5?T3T4 (Vulnerable).

Spiranthes praecox (Walter) S. Watson. GRASS-LEAVED LADIES'-TRESSES, GIANT LADIES'-TRESSES. **Hab:** Pine savannas, swamps, bogs. **Dist:** A Southeastern Coastal Plain endemic: NY (Long Island, ?), NJ (?), DE (?), MD (?), south to s. FL and west to TX. The more northern occurrences have been questioned as to identification. **Phen:** Mar-May (-Jun). **ID Notes:** Plants in c. and s. FL often lack green veins on the lip. **Syn:** = Ar, K4, Tx, Va, WH3, Brown (2002); < *Ibidium praecox* (Walter) House – S, (also see S. sylvatica); < *Spiranthes praecox* (Walter) S. Watson – C, ETx1, F, FNA26, G, GW1, K1, NcTx, RAB, W, Correll (1950), Luer (1975), (also see S. sylvatica).

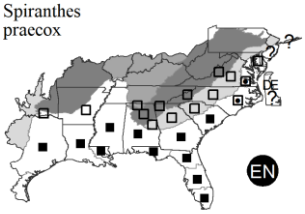
Spiranthes tuberosa Rafinesque. LITTLE LADIES'-TRESSES, LITTLE PEARL-TWIST. **Hab:** In a wide variety of habitats, especially relatively well-drained woodlands and fields, longleaf pine sandhills, dry hammocks, dry pine flatwoods. **Dist:** MA, OH, and MO south to c. peninsular FL and TX. **Phen:** Jun-Sep. **Syn:** = Ar, C, ETx1, FNA26, G, Il, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, Tn, Va, W, WH3, WV, Brown (2002), Luer (1975); = *Ibidium beckii* (Lindley) House – S, misapplied; > *Spiranthes grayi* Ames – RAB, Tx, Correll (1950), Luer (1972); > *Spiranthes tuberosa* var. *grayi* (Ames) Fernald – F; > *Spiranthes tuberosa* var. *tuberosa* – F.

Spiranthes vernalis Engelmann & A. Gray. SPRING LADIES'-TRESSES. **Hab:** Pine savannas, bogs, marshes, fairly dry fields. **Dist:** MA to s. FL and west to TX and SD; West Indies; Mexico and Central America. **Phen:** Mar-Jul (-early Sep in the mountains). **Syn:** = Ar, Bah, C, ETx1, F, FNA26, G, GW1, Il, K1, K3, K4, Mo1, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, W, WH3, Brown (2002), Correll (1950), Luer (1975); = *Ibidium vernale* (Engelmann & A. Gray) House – S. NatureServe G5 (Secure).

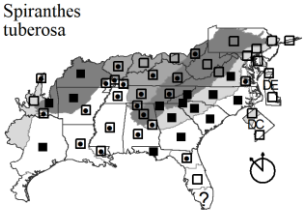
Spiranthes ovalis var. ovalis



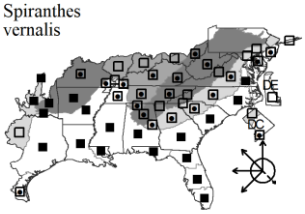
Spiranthes praecox



Spiranthes tuberosa

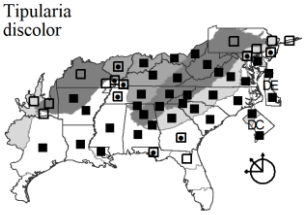


Spiranthes vernalis



Tipularia Nuttall 1818 (CRANEFLY ORCHID)

Tipularia discolor



A genus of 3 species; the other species of the genus are e. Asian (1 in Japan and 1 in the Himalayas) (Catling & Sheviak in FNA 2002). References: Brown (2002); Correll (1950); Sheviak & Catling (2002e) in FNA26 (2002a).

Identification Notes: The leaves are present during the winter, withering before the flowering stalk appears, the plant thus occasionally mistaken for one of the saprophytic orchids. The leaves are usually purple underneath, a characteristic shared with *Aplectrum*, but *Tipularia* leaf blades are ovate, < 10 cm long, < 2× as long as wide, truncate to cordate at the base, acute-apiculate at the apex, and are not notably plicate along the veins (vs. *Aplectrum*, with leaf blades narrowly elliptic, 10-20 cm long, the blade > 2× as long as wide, tapering to both ends, and notably plicate along the very prominent, white, cartilaginous veins).

Tipularia discolor (Pursh) Nuttall. CRANEFLY ORCHID. **Hab:** In a wide variety of mesic to rather dry forests. **Dist:** Se. MA, s. NY, OH, IN, and s. MI south to n. peninsular FL and TX. **Phen:** Jul-Sep. **Comm:** Hughes et al. (2019, 2021) studied the anthocyanins and their distributions in the leaves, describing 4 types: solid green above and solid purple beneath, green with raised purple spots above and solid purple beneath, dark purple above and bright purple below, and brownish purple above and below. **ID Notes:** *Tipularia discolor* is one of the commonest orchids in e. North America, a familiar and easy to identify species through the fall, winter, and spring by its ovate leaves with acute-acuminate apex, and solid purple (rarely brownish-purple or greenish-purple) leaf undersurface. **Syn:** = Ar, C, ETx1, F, FNA26, G, Il, K1, K3, K4, Mi, Mo1, NE, NY, Pa, RAB, Tn, Tx, Va, W, WH3, WV, Brown (2002), Correll (1950), Luer (1975); = *Tipularia unifolia* (Muhlenberg) Britton, Sterns, & Poggenburg – S. NatureServe G4G5 (Apparently Secure).

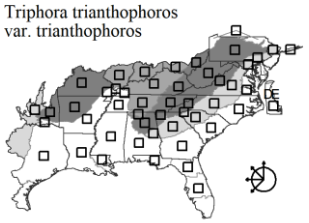
Triphora Nuttall 1818 (THREE BIRDS ORCHID, NODDING-CAPS)

A genus of about 25 species, of e. North America, the West Indies, and Central and South America (Medley in FNA 2002). References: Brown & Pike (2006); Correll (1950); Medley (2002) in FNA26 (2002a).

Triphora trianthophoros (Swartz) Rydberg *var*. ***trianthophoros***. THREE BIRDS ORCHID, NODDING POGONIA, NODDING ETTERCAP. **Hab:** Humid forests and swamps, rhododendron thickets, especially on rotten logs or on humus, in the mountains often under hemlock. **Dist:** The species is widespread (but scattered) in e. North America, and south into Central America. Var. *trianthophoros* occurs from ME and ON west to WI, south to c. peninsular FL and e. TX; disjunct in nc. Mexico; var. *mexicana* (S. Watson) P.M. Brown occurs from Mexico south to Central America. **Phen:** Jul-Sep. **Tax:** Var. *texensis* P.M. Brown & R.B. Pike was named in 2006 (Brown & Pike (2006) and needs additional evaluation before being accepted.

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

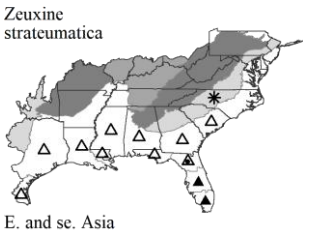
61. ORCHIDACEAE



The correct spelling of the epithet of this species is "*trianthophoros*." **ID Notes:** The flowers are extremely ephemeral, making the species very difficult to locate. **Syn:** = NY; = *Triphora trianthophora* ssp. *trianthophora* – Ar, FNA26, orthographic variant; < *Triphora trianthophora* – C, ETx1, F, G, GW1, Il, K1, Mi, Mo1, Pa, RAB, S, Tn, W, WV, Correll (1950), Luer (1975); < *Triphora trianthophora* ssp. *trianthophora* – NE, Va, orthographic variant; > *Triphora trianthophora* var. *schaffneri* Camp – Tx; > *Triphora trianthophora* var. *texensis* – Brown & Pike (2006); < *Triphora trianthophora* (Swartz) Rydberg var. *trianthophora* – Pa, orthographic variant; > *Triphora trianthophora* (Swartz) Rydberg var. *trianthophora* – Tx, Brown & Pike (2006), orthographic variant; < *Triphora trianthophoros* – K3, K4, WH3.

Zeuxine Lindley 1826 (SOLDIER ORCHID)

A genus of about 26 species, of tropical and subtropical Old World (introduced elsewhere). References: Ackerman (2002c) in FNA26 (2002a); Correll (1950).



* ***Zeuxine strateumatica*** (Linnaeus) Schlechter. LAWN ORCHID, SOLDIER ORCHID. **Hab:** Lawns, landscaped areas, roadsides, potted plants, moving into natural communities, such as hydric hammocks. **Dist:** Native of Asia. Correll (1950) reports that *Zeuxine* was first documented in the United States on 27 January 1936 in Indian River County, FL. **Phen:** (Sep-) Dec-Feb. **Syn:** = Bah, ETx1, FNA26, GW1, K1, K3, K4, WH3, WI, Correll (1950), Luer (1972). NatureServe GNR (Not Yet Ranked).

66. HYPOXIDACEAE R. Brown 1814 (STARGRASS FAMILY) [in ASPARAGALES]

A family of about 9 genera and ca. 155 species, tuberous or rhizomatous perennial herbs, subcosmopolitan (though not well distributed in the northern hemisphere of the Old World, and especially diverse in South Africa). The recognition of Hypoxidaceae at the family level is supported by a variety of authors, on morphologic and molecular grounds (Kocyan et al. 2011; Judd 2000). References: Herndon (2002) in FNA26 (2002a); Judd (2000); Kocyan et al (2011); Liu et al (2012); Nordal in Kubitzki (1998a).

Hypoxis Linnaeus 1759 (STARGRASS)

A genus of about 50-150 species, herbs, of tropical and warm temperate regions of the Old and New World, with a center of diversity in South Africa. See Zona et al. (2009) for detailed images of the seedcoat character states of the species. References: Herndon (2002) in FNA26 (2002a); Judd (2000); Nordal in Kubitzki (1998a); Zona et al (2009).

1 Leaves glabrous, or with a few trichomes near the base; seeds black.
  2 Leaves filiform, 0.3-1.2 mm wide, stiff; seeds pebbled (the exposed portion of each cell rounded); floral bracts 1-7 (-12) mm, > 2× as long as the pedicels; ovaries densely pubescent; [of Coastal Plain pinelands]..... ***Hypoxis juncea***
  2 Leaves over 2 mm wide, soft and flexible; seeds coarsely muricate (the exposed portion of each cell pointed-conical); floral bracts (1-) 2-20 (-80) mm; ovaries sparsely to densely pubescent; [collectively widespread].
    3 Ovaries longer than broad, cylindric, with scattered trichomes; floral bracts (3-) 5-20 (-80) mm long; pedicels usually shorter than the floral bracts; tepals equaling or shorter than ovaries; [of Coastal Plain bottomlands]..... ***Hypoxis curtissii***
    3 Ovaries as broad as long or nearly so, deltate, densely pubescent; floral bracts (1-) 2-10 (-17) mm long; pedicels usually >2× as long as the floral bracts; tepals much longer than ovaries; [widespread]..... ***Hypoxis hirsuta***
1 Leaves evenly pubescent, at least near the base; seeds black or brown.
  4 Pedicels usually >2× as long as the bracts; seeds black; [collectively widespread].
    5 Leaves flattened, > 1 mm wide; seeds coarsely muricate (the exposed portion of each cell pointed-conical); [widespread]..... ***Hypoxis hirsuta***
    5 Leaves filiform, 0.3-1.2 mm wide; seeds pebbled (the exposed portion of each cell rounded); [of Coastal Plain pinelands]..... ***Hypoxis juncea***
  4 Pedicels usually < 2× as long as subtending bracts; seeds black or brown; [of Coastal Plain pinelands].
    6 Anthers > 2 mm long; tepals longer than the pedicels; floral bracts longer than the pedicels; seeds black, pebbled with round pebbling (the exposed portion of each cell rounded)..... ***Hypoxis rigida***
    6 Anthers < 2 mm long; tepals shorter than to longer than the pedicels; floral bracts shorter than to longer than the pedicels; seeds brown, with detached, wrinkled cuticle.
      7 Tepals 1.5-2× as long as ovaries; seed coats iridescent..... ***Hypoxis sessilis***
      7 Tepals ca. 1 (-1.5)× the length of the ovaries; seed coats not iridescent..... ***Hypoxis wrightii***

Hypoxis curtissii Rose. SWAMP STARGRASS, CURTISS'S STARGRASS. **Hab:** Swamp forests, alluvial forests, water courses, hydric hammocks. **Dist:** E. NC south to c. peninsular FL, west to e. TX. **Phen:** (Late Jan-) Mar-Jun; May-Jul. **Syn:** = Ar, ETx1, FNA26, K1, K3, K4, Va, WH3, Judd (2000); = *Hypoxis hirsuta* (Linnaeus) Coville var. *leptocarpa* (Engelmann & A. Gray) Fernald – RAB, S; = *Hypoxis leptocarpa* (Engelmann & A. Gray) Small – GW1, Tx; < *Hypoxis hirsuta* (Linnaeus) Coville – C, G.

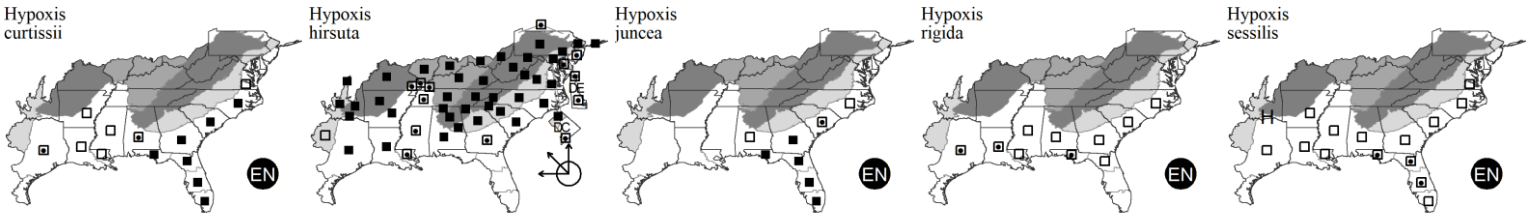
Hypoxis hirsuta (Linnaeus) Coville. COMMON STARGRASS, EASTERN STARGRASS. **Hab:** In a wide variety of dry to moist forests. **Dist:** S. ME west to SK and ND, south to GA and e. TX. **Phen:** Mar-Jun; May-Jul. **Syn:** = Ar, ETx1, FNA26, GW1, Il, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, S, Tn, Tx, Va, WV, Judd (2000); = *Hypoxis hirsuta* var. *hirsuta* – RAB; < *Hypoxis hirsuta* (Linnaeus) Coville – C, G, K1.

Hypoxis juncea J.E. Smith. FRINGED STARGRASS. **Hab:** Wet pine savannas. **Comm:** (Dec-) Apr-May (-later, especially in response to fire); May-Jun (-later, especially in response to fire). Se. NC south to s. FL, west to s. AL. **Syn:** = FNA26, GW1, K1, K4, RAB, S, WH3, Judd (2000). NatureServe G4? (Apparently Secure).

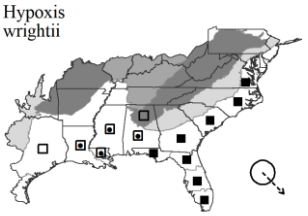
Hypoxis rigida Chapman. SAVANNA STARGRASS. **Hab:** Wet pine savannas. **Dist:** Se. NC south to Panhandle FL, west to e. TX. **Phen:** Apr (-later, especially in response to fire); May (-later, especially in response to fire). **Syn:** = ETx1, FNA26, GW1, K3, K4, RAB, S, Tx, WH3, Judd (2000); < *Hypoxis hirsuta* (Linnaeus) Coville – K1.

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Hypoxis sessilis Linnaeus. GLOSSY-SEED STARGRASS. **Hab:** Wet pine savannas. **Dist:** NC south to s. FL, west to e. TX, s. AR, and se. OK. **Phen:** Apr (-later, especially in response to fire); May (-later, especially in response to fire). **Tax:** The potential recognition of *H. longii* needs additional assessment as its lumping is presumptive; see Weakley, Ludwig, and Townsend (2013) for discussion. **Syn:** = Ar, ETx1, FNA26, GW1, K1, K3, K4, RAB, S, Tx, Va, WH3, Judd (2000); > *Hypoxis longii* Fernald – C, F, G; > *Hypoxis sessilis* Linnaeus – C, F, G.



Hypoxis wrightii (Baker) Brackett. BRISTLESEED STARGRASS. **Hab:** Wet pine savannas. **Dist:** Se. VA south to s. FL, west to TX; disjunct in the West Indies (Cuba, Bahamas, Jamaica, Hispaniola, Puerto Rico). **Phen:** Mar-Apr (-later, especially in response to fire); Apr-May (-later, especially in response to fire). **Syn:** = Bah, FNA26, K1, K4, Va, WH3, Judd (2000); = *Hypoxis micrantha* Pollard – C, F, G, GW1, RAB, S, Tx, misapplied. NatureServe G4 (Apparently Secure).

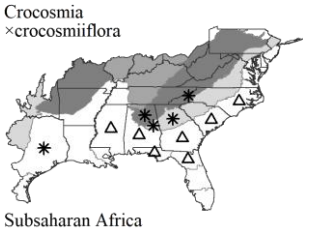


70. IRIDACEAE A.L. de Jussieu 1789 (IRIS FAMILY) [in ASPARAGALES]

A family of about 65-82 genera and 1700-1810 species, herbs, of cosmopolitan distribution (most diverse in s. Africa). References: Goldblatt (2002a) in FNA26 (2002a); Goldblatt, Manning, & Rudall in Kubitzki (1998a).

1 Inflorescence a spike or panicle of spikes; plants from corms; flowers slightly zygomorphic.
  2 Stem usually branched, the inflorescence appearing paniculate; tepals orange to red ..... ***Crocosmia ×crocosmiiflora***
  2 Stem unbranched, the inflorescence a spike; tepals any of a wide range of colors (including orange and red) ..... ***Gladiolus***
1 Inflorescence an umbellate 1-sided cyme; plants from rhizomes or bulbs; flowers actinomorphic.
  4 Leaves planar; plants from rhizomes (or indistinct) or a bulb (in *Iris xiphium*).
    5 Style branches broad, petaloid, terminating in paired crests ..... ***Iris***
    5 Style branches not broad or petaloid.
      6 Tepals 16-35 mm long, orange or red; seeds 4-6 mm in diameter ..... ***Iris domestica***
      6 Tepals 6-15 mm long, blue, purple, lavender, pink, magenta, white, or yellowish-white; seeds 0.6-1.3 mm in diameter ..... ***Sisyrinchium***
  4 Leaves plicate; plants from bulbs. ..... ***Nemastylis***

Crocosmia Planchon 1851 (MONTBRETIA)



A genus of 8-9 species, herbs, native of sub-Saharan Africa. References: Goldblatt (2002g) in FNA26 (2002a); Goldblatt, Manning, & Dunlop (2004); Goldblatt, Manning, & Rudall in Kubitzki (1998a).

* ***Crocosmia ×crocosmiiflora*** (Lemoine) N.E. Brown [aurea × pottsii]. MONTBRETIA. **Hab:** Disturbed areas, ditches, especially in moist to wet sites, including salt marshes; the parents of the hybrid both native to sub-Saharan Africa. **Dist:** Reported for Lowndes and Thomas counties, GA (Carter, Baker, & Morris 2009). **Phen:** Late Jun-Jul. **Tax:** A hybrid of *C. aurea* × *pottsii*. **Syn:** = ETx1, FNA26, K1, K3, K4, Meso6, WH3; = *Crocosmia* ×*crocosmiflora* – RAB, orthographic variant.

Gladiolus Linnaeus 1754 (GLADIOLUS)

A genus of about 255 species, largely of Africa. References: Goldblatt (2002i) in FNA26 (2002a); Goldblatt, Manning, & Rudall in Kubitzki (1998a).

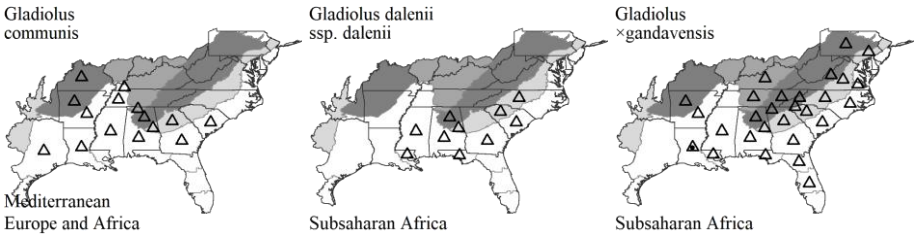
1 Inner tepals 60-70 mm long ..... ***Gladiolus ×gandavensis***
1 Inner tepals < 60 mm long.
  2 Tepals white, cream, orange, or red; perianth tube plus dorsal sepal 60-95 mm long ..... ***Gladiolus dalenii ssp. dalenii***
  2 Tepals pink, reddish, or light purple, with white markings on the outer 3 tepals; perianth tube plus dorsal sepal 30-65 mm long. ..... ***Gladiolus communis***

* ***Gladiolus communis*** Linnaeus. FALSE CORN-FLAG. **Hab:** Commonly cultivated as ornamentals, rarely persisting or weakly spreading. **Dist:** Native of Mediterranean Europe and n. Africa. **Syn:** = Ar, ETx1, FNA26; > *Gladiolus communis* Linnaeus – K4; > *Gladiolus communis* Linnaeus ssp. *byzantinus* (P. Miller) A. Hamilton – K1, K3; > *Gladiolus papilio* Hooker – K1, K3, K4, RAB, misapplied.

* ***Gladiolus dalenii*** Van Geel *ssp*. ***dalenii***. **Hab:** Sometimes cultivated, rarely persisting or spreading. **Dist:** Native of s. Africa. Persisting and/or naturalizing at scattered locations in the se. United States (Zomlefer et al. 2018). **Syn:** = FNA26; < *Gladiolus dalenii* Van Geel – K4. NatureServe GNRTNR (Not Yet Ranked).

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

* ***Gladiolus ×gandavensis*** Van Houtte. **Hab:** Commonly cultivated as ornamentals, rarely persisting or weakly spreading. **Dist:** Native of s. Africa. **Tax:** Goldblatt suggests that as many as 5 species are involved in the origin of the large-flowered garden gladiolus. **Syn:** = FNA26, K1, K3, K4, RAB, WH3; = *Gladiolus ×ganvadensis* – Il, orthographic error; ? *Gladiolus hortulanus* L.H. Bailey – S.



Iris Linnaeus 1753 (IRIS, FLAG, FLEUR-DE-LIS, BLACKBERRY-LILY)

A genus of about 225 species, herbs, of Eurasia, n. Africa, and North America. Wilson (2004) suggests that *Belamcanda* is phylogenetically nested within *Iris* and should be included there; Goldblatt & Mabberley (2005) make the appropriate nomenclatural combination. Alternatively, *Iris* may be broken up into multiple genera (Mavrodiev et al. 2014; Crespo, Martínez-Azorín, & Mavrodiev 2015; Mavrodiev et al. 2021). References: Boltenkov et al (2020); Crespo, Martínez-Azorín, & Mavrodiev (2015); Fernald (1947); Goldblatt & Mabberley (2005); Goldblatt (2002b) in FNA26 (2002a); Goldblatt, Manning, & Rudall in Kubitzki (1998a); Henderson (2002) in FNA26 (2002a); Mavrodiev et al (2014); Mavrodiev et al (2021); Wilson (2004).

Identification Notes: the petals are usually erect, smaller than the petaloid sepals (which are brightly colored, generally reflexed, and marked with a "signal"). The styles are also petaloid, arched over the sepals, and 2-cleft at the tip (except in *I. domestica*).

Belamcanda: *Belamcanda chinensis*
Iris: *Iris germanica, Iris pallida, Iris pumila*
Gattenhofia: *Gattenhofia verna var. smalliana, Gattenhofia verna var. verna*
Lophiris: *Lophiris cristata*
Xiphion: *Xiphion xiphium*
Limniris: *Limniris prismatica, L. tridentata, L. sanguinea, L. sibirica, L. pseudacorus, L. ensata, L. versicolor, L. virginica, L. shrevei*
Phaeiris: *Phaeiris albispiritus, Phaeiris brevicaulis, Phaeiris fulva, Phaeiris hexagona, Phaeiris giganticaerulea, Phaeiris kimballiae, Phaeiris savannarum*

2 Style branches not broad, petaloid, or crested; seeds black, shiny, in a blackberry-like cluster (the seeds exposed at maturity by dehiscence of the papery to chartaceous capsule walls); [genus *Belamcanda*] ..... ***Iris domestica***
2 Style branches broad, petaloid, terminating in paired crests; seeds tan to brown, in a capsule.
3 Sepal "signal" (see above) of multicellular hairs (the "beard"), along the midrib of the claw and the base of the blade; [subgenus *Iris*; or genus *Iris*]. ..... ***Iris germanica***
3 Sepal "signal" consisting of contrasting color, ridges, small unicellular hairs, and/or a cockscomb-like crest.
6 Rhizome branches cord-like, with scale-like leaves, enlarging at the apex to produce vegetative leaves, additional branches, and flowering stems.
7 Stems 30-80 cm tall; leaves 30-60 cm long, 0.2-0.7 cm wide; cordlike portions of rhizomes to 4 dm long; [of wetlands]; [section *Limniris*, series *Prismaticae*; or genus *Limniris*] ..... ***Iris prismatica***
7 Stems 2-15 cm tall; leaves 10-45 cm long, 0.3-2.5 cm wide; cordlike portions of rhizomes to 2 dm long; [of dry to mesic uplands].
8 Sepal "signal" a 3-ridged, toothed crest; leaves 10-25 mm wide, green, falcate; flowers not or only slightly fragrant; rhizomes surficial (one can "pull" them off the ground by gently tugging on the leaves); [generally of mesic and fertile soils]; [section *Lophiris*; or genus *Lophiris*] ..... ***Iris cristata***
8 Sepal "signal" merely a primarily orange color patch (not a crest); leaves 3-13 mm wide, blue-green, straight or nearly so; flowers strongly fragrant; rhizomes deeply buried (not easily "pulled"); [generally of dry and acid soils]; [section *Limniris*, series *Vernae*; or genus *Gattenhofia*]. ..... ***Iris verna var. smalliana***
6 Rhizome branches like the primary rhizome, not as above.
10 Petals 1-2 cm long; [section *Limniris*; series *Tripetalae*; or genus *Limniris*] ..... ***Iris tridentata***
10 Petals 2-9.5 cm long.
11 Stems hollow; [section *Limniris*; series *Sibirica*; or genus *Limniris*]. ..... ***Iris sibirica***
11 Stems solid.
13 Capsules 3-angled or nearly round in cross-section; [section *Limniris*; series *Laevigatae*; or genus *Limniris*].
14 Perianth yellow ..... ***Iris pseudacorus***
14 Perianth blue-violet (rarely white).
15 Flowers 8-15 cm in diameter; leaves 0.5-1.5 cm wide; [alien, cultivated, rarely escaped] ..... ***Iris ensata***
15 Flowers 6-8 cm in diameter; leaves 1-4 cm wide; [native].
17 Plants to 10 dm tall, usually with 1-2 well-developed branches; capsule 7-11 cm long ..... ***Iris shrevei***
17 Plants to 6 dm tall, little or not at all branched; capsule 4-7 cm long ..... ***Iris virginica***
13 Capsules 6-angled or ridged in cross-section; [section *Limniris*, series *Hexagonae*; or genus *Phaeiris*].
18 Perianth dull copper or orange-brown (or dark yellow) (fading in nature or drying in the herbarium to a bluish or purplish color); petals spreading or declining ..... ***Iris fulva***
18 Perianth blue-violet (rarely white); petals erect to spreading.
19 Stems declining or semi-erect, sharply zigzag ..... ***Iris brevicaulis***
19 Stems erect, slightly if at all zigzag.
21 Capsules with 6 broad rounded lobes, indehiscent ..... ***Iris giganticaerulea***
21 Capsules with 6 sharp or winglike ridges, dehiscent.

Key to Map Symbology: □ native; ◇ maybe exotic; △ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

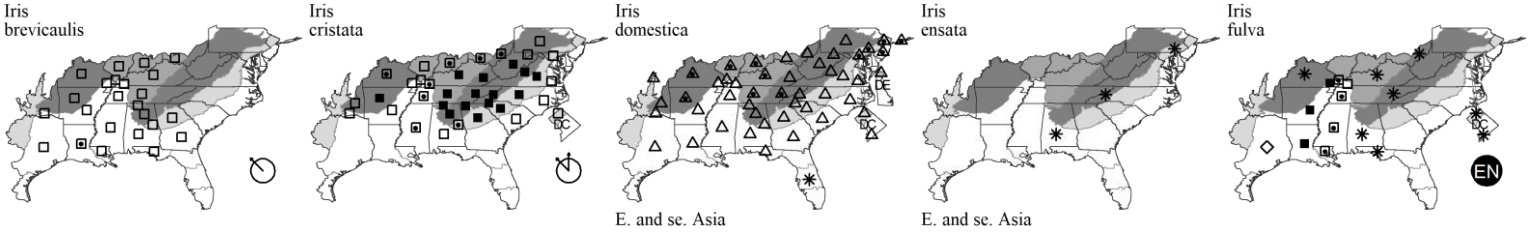
Iris brevicaulis Rafinesque. SHORT-STEMMED IRIS, LAMANCE IRIS, ZIGZAG IRIS. **Hab:** Swamps, bottomlands, bogs, seeps, marshes. **Dist:** OH west to KS, south to Panhandle FL and TX. **Syn:** = Ar, C, ETx1, F, FNA26, G, GW1, Il, K1, K3, K4, Mo1, Tn, Tx, WH3; = *Phaeiris brevicaulis* (Rafinesque) M.B.Crespo, Martínez-Azorín, & Mavrodiev – Crespo, Martínez-Azorín, & Mavrodiev (2015); > *Iris foliosa* Mackenzie & Bush – S; > *Iris mississippiensis* Small – S. NatureServe G4 (Apparently Secure).

Iris cristata Aiton. DWARF CRESTED IRIS. **Hab:** Moist forests, rich woods, roadbanks, streambanks. **Dist:** MD west to IN and MO, south to NC, AL, MS, AR, and e. OK. **Phen:** Apr-May; Jun-Jul. **Syn:** = C, F, FNA26, G, Il, K1, K3, K4, Mo1, NE, NY, Pa, RAB, Tn, Va, W, WV; = *Lophiris cristata* (Aiton) M.B. Crespo, Martínez-Azorín, & Mavrodiev – Crespo, Martínez-Azorín, & Mavrodiev (2015); = *Neubeckia cristata* (Aiton) Alefani – S. NatureServe G5 (Secure).

* ***Iris domestica*** (Linnaeus) Goldblatt & Mabberley. BLACKBERRY-LILY, LEOPARD-LILY. **Hab:** Dry woodlands, forests, edges of granitic flatrocks, suburban areas. **Dist:** Native of e. Asia. **Phen:** Jun-Aug. **Syn:** = Ar, K4, Mi, NE, NY, Tn, Va, WH3, Goldblatt & Mabberley (2005); = *Belamcanda chinensis* (Linnaeus) Medikus – C, ETx1, F, FNA26, G, Il, K1, K3, Mo1, Pa, RAB, S, Tx, W, WV. NatureServe GNR (Not Yet Ranked).

* ***Iris ensata*** Thunberg. JAPANESE IRIS. **Hab:** Roadsides; cultivated and rarely escaped. **Dist:** Native of Japan, n. China, and Sakhalin. Also reported from se. PA (Rhodes & Klein 1993) and s. AL (H. Horne, pers. comm. 2013). **Syn:** = K1, K3, K4, NE; = *Limniris ensata* (Thunberg) Rodionenko – Crespo, Martínez-Azorín, & Mavrodiev (2015). NatureServe GNR (Not Yet Ranked).

Iris fulva Ker Gawler. RED FLAG, COPPER IRIS. **Hab:** Swamp forests, wet hammocks, usually in shallow water. Become somewhat popular as a native wildflower in cultivation. **Dist:** S. IL, MO, and w. TN south to w. Panhandle FL, AL, and LA (introduced elsewhere). **Phen:** May-Jun. **Syn:** = C, ETx1, F, FNA26, G, GW1, Il, K1, K3, K4, Mo1, S, Tn, Tx, WH3; = *Phaeiris fulva* (Ker-Gawler) M.B. Crespo, Martínez-Azorín, & Mavrodiev – Crespo, Martínez-Azorín, & Mavrodiev (2015), Mavrodiev et al (2021). NatureServe G5 (Secure).



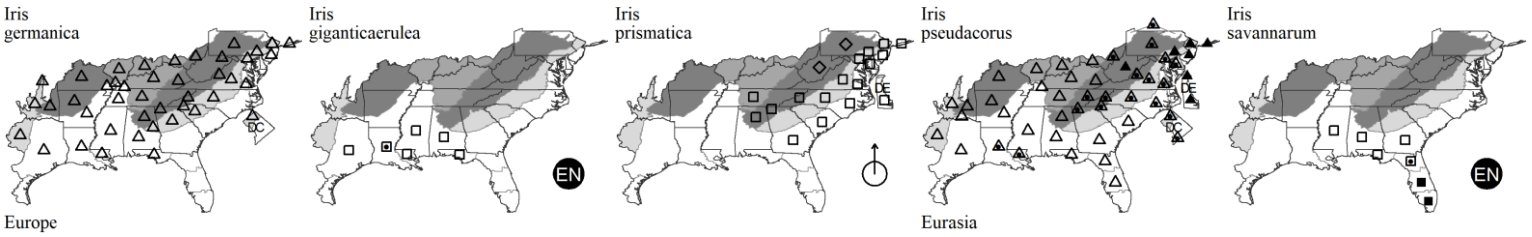
* ***Iris germanica*** Linnaeus. GERMAN IRIS, FLEUR-DE-LYS. **Hab:** Roadsides, old homesites, ditches; cultivated and rarely persistent or escaped. **Dist:** Native of Europe. **Phen:** Apr-Jun. **Syn:** = Ar, C, ETx1, F, FNA26, G, K4, Mi, Mo1, NcTx, NE, NY, Pa, RAB, Tn, Crespo, Martínez-Azorín, & Mavrodiev (2015); > *Iris ×germanica* – Il, K1, WH3; > *Iris flavescens* Delile – K1, K3; > *Iris germanica* Linnaeus – K1.

Iris giganticaerulea Small. GIANT BLUE IRIS. **Hab:** Marshes and swamps. **Dist:** Panhandle FL (L. Anderson, pers.comm., 2021) west to e. TX. **Syn:** = FNA26, K1, K3, K4; = *Phaeiris giganticaerulea* (Small) M.B. Crespo, Martínez-Azorín, & Mavrodiev – Crespo, Martínez-Azorín, & Mavrodiev (2015); > *Iris alticristata* Small – S; > *Iris aurilinea* Alexander – S; > *Iris citricristata* Small – S; > *Iris elephantina* Small – S; > *Iris fluviatilis* Small – S; > *Iris miraculosa* Small – S; > *Iris paludicola* Alexander – S; > *Iris parvicaerulea* Alexander – S; > *Iris rivularis* – S; > *Iris venulosa* Alexander – S; > *Iris wherryana* Small – S.

Iris prismatica Pursh. SLENDER BLUE IRIS, SLENDER BLUE FLAG. **Hab:** Bogs, wet acidic barrens, marshes, ditches, pools. **Dist:** NS south to GA, disjunct in w. NC (Henderson County) and sc. TN (Coffee County). **Phen:** May-Jun; Jun-Jul. **Syn:** = C, FNA26, G, GW1, K1, K3, K4, NE, NY, Pa, RAB, S, Tn, Va, W; = *Limniris prismatica* (Pursh) Rodionenko – Crespo, Martínez-Azorín, & Mavrodiev (2015); > *Iris prismatica* var. *austrina* Fernald – F; > *Iris prismatica* var. *prismatica* – F. NatureServe G4G5 (Apparently Secure).

* ***Iris pseudacorus*** Linnaeus. WATER FLAG, YELLOW FLAG. **Hab:** Swamps, marshes, streams, ponds, streambanks, tidal wetlands, cultivated as a water plant. **Dist:** Native of Eurasia and Africa. **Phen:** May-Jul; Aug-Oct. **Syn:** = Ar, C, ETx1, F, FNA26, G, GW1, Il, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV; = *Limniris pseudacorus* (Linnaeus) Fuss – Crespo, Martínez-Azorín, & Mavrodiev (2015). NatureServe GNR (Not Yet Ranked).

Iris savannarum Small. PRAIRIE IRIS. **Hab:** Pine savannas, Florida prairies, strand swamps, freshwater marshes. **Dist:** GA and AL south to s. FL. **Syn:** = *Phaeiris savannarum* (Small) M.B. Crespo, Martínez-Azorín, & Mavrodiev – Crespo, Martínez-Azorín, & Mavrodiev (2015); > *Iris alabamensis* Small – S; < *Iris hexagona* Walter – WH3; < *Iris hexagona* Walter var. *savannarum* (Small) R.C. Foster – K1; < *Iris savannarum* Small – FNA26; > *Iris savannarum* Small – S; < *Iris savannarum* var. *savannarum* – K3, K4.



Iris shrevei Small. **Hab:** Marshes, swamps, streams. **Dist:** Sw. QC to MN, south to w. NC, n. AL, e. TN, AR, e. TX, and e. KS. **Phen:** May-Jul; Jul-Sep. **Syn:** = G, Il, S; = *Iris virginica* Linnaeus var. *shrevei* (Small) E. Anderson – C, F, K1, K3, K4, Mo1, Tx, WV; = *Limniris shrevei* (Small) M.B. Crespo, Martínez-Azorín, & Mavrodiev – Crespo, Martínez-Azorín, & Mavrodiev (2015); < *Iris virginica* Linnaeus – ETx1, FNA26, Mi, Pa, RAB, Tn, Va, W.

* ***Iris sibirica*** Linnaeus. SIBERIAN IRIS. **Hab:** Cultivated and escaping or persisting near plantings. **Dist:** Native of Eurasia (c. and e. Europe west to Lake Baikal, Japan, n. China, Korea, Japan, and e. Russia). Reported for Cleburne County, AL by Spaulding & Triplett (2022), as *I. sanguinea*. **Phen:** Jun-Jul. **Syn:** = Boltenkov et al (2020); > *Iris sanguinea* Hornemann ex Donn – K1, K3, K4; > *Iris sibirica* Linnaeus – FNA26, Il, K1, K3, K4, Mi, NE, NY; > *Limniris sanguinea* (Donn ex Hornemann) Rodionenko – Crespo, Martínez-Azorín, & Mavrodiev (2015); > *Limniris sibirica* (Linnaeus) Fuss – Crespo, Martínez-Azorín, & Mavrodiev (2015).

Key to Map Symbology: □ native; ◇ maybe exotic; △ exotic; ←rare ←uncommon ←common (see introduction for more)

* : waif
EN : endemic
H : historic

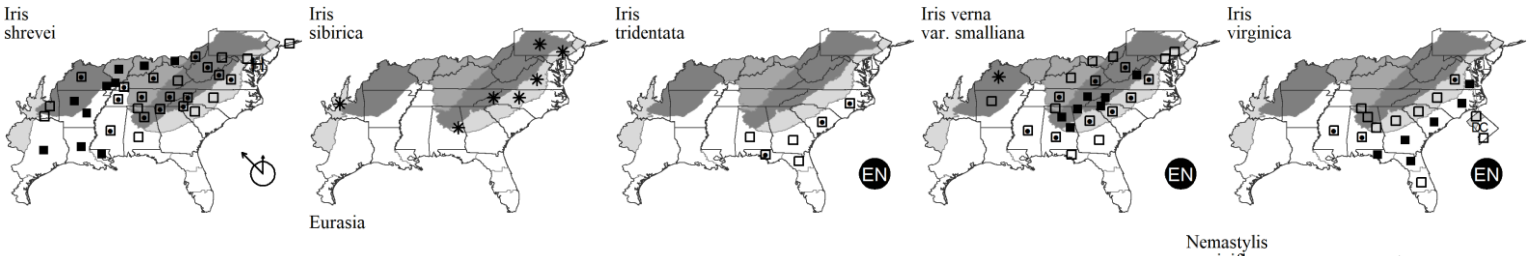
N : no
P : planted
? : questionable

X : extirpated

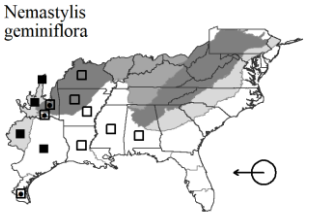
Iris tridentata Pursh. SAVANNA IRIS. **Hab:** Wet savannas, pine flatwoods, margins of pineland pools. **Dist:** Se. NC south to ne. FL and Panhandle FL and AL (Mobile County). **Phen:** Late May-Jun; Aug-Oct. **Syn:** = FNA26, GW1, K1, K3, K4, RAB, Tn, WH3; = *Limniris tridentata* (Pursh) Rodionenko – Crespo, Martínez-Azorín, & Mavrodiev (2015); ? *Iris tripetala* – S, misapplied. NatureServe G3G4 (Vulnerable).

Iris verna Linnaeus *var*. ***smalliana*** Fernald ex M.E. Edwards. UPLAND DWARF IRIS. **Hab:** Dry to somewhat moist, rocky or sandy woodlands and forests. **Dist:** Sc. PA and WV south to w. NC, e. TN, n. GA, se. GA, Panhandle FL, and AL; disjunct in Ouachita Mountains of AR. **Phen:** Apr-May; Jun-early Aug. **Tax:** See Fernald (1947) and Small (1931) for discussion of these two taxa, treated as varieties but warranting species rank. **Syn:** = Ar, F, FNA26, K1, K3, K4, Pa, RAB, Tn, Va, W, WH3, WV; = *Gattenhofia verna* (Linnaeus) Medikus var. *smalliana* (Fernald ex M.E. Edwards) M.B. Crespo, Martínez-Azorín, & Mavrodiev – Crespo, Martínez-Azorín, & Mavrodiev (2015); < *Iris verna* – C, G, Mo1; < *Neubeckia verna* (Linnaeus) Alefani – S. NatureServe G5T4T5 (Apparently Secure).

Iris virginica Linnaeus. SOUTHERN BLUE FLAG. **Hab:** Tidal and nontidal marshes and swamps, stream margins, flatwoods, wet meadows, bogs. **Dist:** Se. VA south to c. peninsular FL, west to MS, north in the interior to w. TN; disjunct in sc. TN. **Phen:** Apr-May; Jul-Sep. **Syn:** = G, S; = *Iris virginica* Linnaeus var. *virginica* – C, F, K1, K3, K4; = *Limniris virginica* (Linnaeus) Rodionenko – Crespo, Martínez-Azorín, & Mavrodiev (2015); < *Iris virginica* Linnaeus – FNA26, NY, RAB, Tn, Va, W, WH3.



Nemastylis Nuttall 1835 (CELESTIAL-LILY)



A genus of about 5 species, herbs, of s. North America and Central America. The circumscription of *Nemastylis* relative to *Calydorea* remains uncertain. References: Goldblatt (2002e) in FNA26 (2002a); Goldblatt, Manning, & Rudall in Kubitzki (1998a).

Nemastylis geminiflora Nuttall. PRAIRIE CELESTIAL, PRAIRIE PLEATLEAF. **Hab:** Prairies. **Dist:** MO and e. KS south to w. LA and TX; disjunct eastward in AL and MS. **Phen:** Apr-Jun. **Syn:** = Ar, ETx1, FNA26, K1, K3, K4, Mo1, NcTx, Tx; ? *Nemastylis acuta* Herbert – S. NatureServe G4 (Apparently Secure).

Sisyrinchium Linnaeus 1753 (BLUE-EYED-GRASS, IRISETTE)

Contributed by B.A. Sorrie and A.S. Weakley

A genus of about 80 or more species, herbs, of the Americas. *Sisyrinchium* is a very difficult genus, with a number of taxonomic questions remaining in our area. References: Bicknell (1896); Bicknell (1899a); Bicknell (1899b); Cholewa & Henderson (2002) in FNA26 (2002a); Goldblatt, Manning, & Rudall in Kubitzki (1998a); Hornberger (1991); Keith (2022).

Identification Notes: For confident identification, it is necessary to collect underground parts; fibrous remains of leaves, and rhizomes (if any), are critical characters. Stem width includes wings.

Unkeyed taxa: *Sisyrinchium species 2 [chalk]*

1 Perianth with tepals campanulate basally, flaring distally; annual; plants usually < 2 dm tall; tepals lavender, pink, white, magenta, or yellow, with a maroon blaze near the base (*S. rosulatum*) or the base wholly yellow (*S. minus*).
  2 Stems with 3-6 nodes; tepals yellow basally; mature capsules broadly fusiform, elliptical, or barrel-shaped, uniformly light brown; [of MS to TX] ..... ***Sisyrinchium minus***
  2 Stems with 1-2 (-3) nodes; tepals with maroon blaze near base; mature capsules globose, tan with purple sutures; [widespread] ..... ***Sisyrinchium rosulatum***
1 Perianth with tepals abruptly spreading in a plane; perennial, plants usually > 2 dm tall; tepals blue, violet, or white.
  3 Inflorescences paired (each inflorescence composed of 1-several flowers, their pedicels emanating from within 2 chartaceous scales; thus, there are 2 pairs of scales within the 2 outer, leaflike, green spathe bracts); outer spathe bract connate 0-1 mm.
    5 Stems mostly 0.7-1.3 mm wide; corolla medium blue; [calcareous glades, n. AL and sc. TN] ..... ***Sisyrinchium calciphilum***
    5 Stems mostly 1.0-2.5 mm wide; corolla pale blue to whitish; [of various habitats and collectively widespread]. ..... ***Sisyrinchium albidum***
  3 Inflorescence solitary, not paired (within the 2 green spathe bracts there is only one pair of chartaceous scales); outer spathe bract connate 2-6 mm (except 0-1 mm in *S. campestre*).
    8 Stems simple, unbranched (rarely branched). ..... ***Sisyrinchium mucronatum***
    8 Stems branched, with 1-5 nodes.
      14 Plant bases with fibrous remains of leaves (usually abundant).
        15 Main stems 0.5-2.1 mm wide (usually < 2 mm wide).
          16 Stems mostly 1.5-2.1 mm wide, scabrous; plants drying dark brown or blackish; spathe bracts 15-20 (-25) mm long ..... ***Sisyrinchium fuscatum***
          16 Stems 0.5-1.2 mm wide, not scabrous; plants drying pale brown or greenish brown; spathe bracts 12-14 (-15) mm long ..... ***Sisyrinchium rufipes***
        15 Main stems 1.5-6 mm wide (usually >2 mm wide).

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

18 Stems and branches smooth on margins; stems mostly 2.3-4.5 mm wide; plants dry dull green or brownish green; [widespread] ..... ***Sisyrinchium nashii***

18 Stems and branches scabrous on margins at least distally; stems 1.5-3.0 (-3.5) mm wide; plants dry dark brown or blackish; [of the Coastal Plain]. ..... ***Sisyrinchium fuscatum***

14 Plant bases without fibrous remains of leaves

20 Main stems usually < 2 mm wide.

21 Rhizome present and obvious (although not longer than about 3 cm), about 2 mm thick, hard, blackish; hyaline margins of inner spathe bract acute (contra *S. atlanticum*) ..... ***Sisyrinchium miamiense***

21 Rhizome absent or at least not evident; hyaline margins of inner spathe bract various.

22 Ovaries and capsules black, strongly contrasting with foliage (which dries pale yellowish or tan); hyaline margins of inner spathe bract obtuse or truncate apically, sometimes projecting as lobes ..... ***Sisyrinchium atlanticum***

22 Ovaries and capsules pale to medium brown; foliage drying dull green or brownish; hyaline margins of inner spathe bract acute, never projecting as lobes.

23 Spathe bracts and stems without spicules or papillae; outer spathe bract usually > inner by 1-2.7 mm; spathe bracts purple tinged basally and sometimes also on margins; plants usually densely cespitose ..... ***Sisyrinchium langloisii***

23 Spathe bracts and stems with abundant white spicules or papillae, sometimes these +/- flattened like lenticels; outer spathe bract usually > inner by 2.5-5.5 mm; spathe bracts green; plants usually with few-several stems, not densely cespitose ..... ***Sisyrinchium pruinosum***

20 Main stems usually > 3 mm wide.

24 Plants light green when fresh and drying yellowish, light green, green or olive; relatively fewer stems from base, rarely to 32 stems, but averaging 5.5 stems or less; blooming from early April through October

25 Stem body mostly broader than the margins, thus whole stem appears somewhat rounded with sides tapering to scarcely discernable wings; plants drying yellowish or light olive-green; stem and wings drying about the same color; ovaries and capsules dark brown or black and contrasting with the much lighter dried foliage; stems averaging 3.3 from base; blooming early April through May; occurring in moist to wet sandy or silty soils in open areas, bogs, and marshes ..... ***Sisyrinchium atlanticum***

25 Stem body as wide or narrower than the margins (body looks more like a midvein), stems appear flattened with easily discernible wings, plants drying olive or green; stem body often drying slightly lighter than wings, forming a pale "stripe" down the center; ovaries and capsules not strongly contrasting with dried foliage. ..... ***Sisyrinchium angustifolium***

24 Plants dark green when fresh, drying olive to dark brown; mature plants with numerous stems from base (to 55), averaging 7.3 or more; blooming from late February through April, rarely into May.

27 Plant 30-70 cm tall; nodes not geniculate, nodes purplish; mature capsules dark brown to black ..... ***Sisyrinchium corymbosum***

27 Plant <45 cm tall; nodes usually geniculate and green (occasionally purplish); mature capsules tan to brown. ..... ***Sisyrinchium pruinosum***

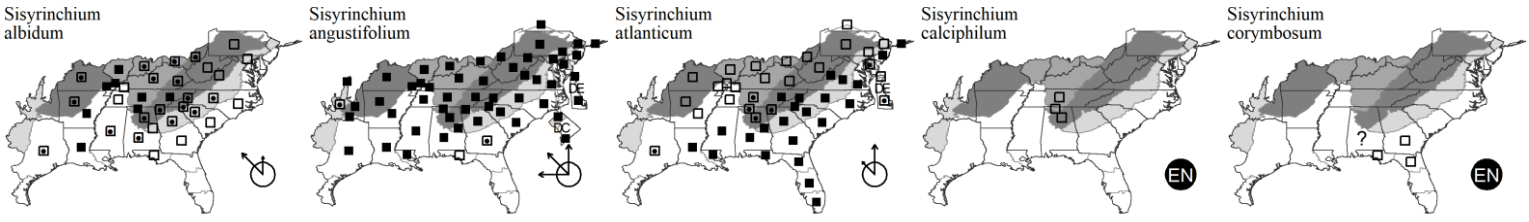
Sisyrinchium albidum Rafinesque. WHITE BLUE-EYED-GRASS. **Hab:** Woodlands, mesic longleaf pine sandhills, open limestone barrens, prairies. **Dist:** S. NY west to s. WI, south to Panhandle FL and e. TX. **Phen:** Mar-May; May-Jun. **Syn:** = Ar, C, ETx1, F, FNA26, G, Il, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, Tn, Tx, Va, Hornberger (1991); < *Sisyrinchium albidum* Rafinesque – RAB, W, WH3, (also see S. capillare); > *Sisyrinchium albidum* Rafinesque – S; > *Sisyrinchium scabrellum* E.P. Bicknell – S.

Sisyrinchium angustifolium P. Miller. NARROW-LEAVED BLUE-EYED-GRASS. **Hab:** Woodlands, forests, meadows, sandhill swales. **Dist:** VT, NH, and s. ON west to WI, e. KS, and OH, south to GA, AL, LA, and e. TX. **Phen:** Mar-Jun; May-Jul. **Syn:** = Ar, C, ETx1, F, FNA26, GW1, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, W, WV, Hornberger (1991); = *Sisyrinchium graminoides* E.P. Bicknell – G, S.

Sisyrinchium atlanticum E.P. Bicknell. ATLANTIC BLUE-EYED-GRASS, EASTERN BLUE-EYED GRASS. **Hab:** Dry, sandy or rocky places. **Dist:** NS and ME west to OH, IN, and MO, south to s. FL and e. TX. **Phen:** Mar-Jun; Jun-Aug. **Syn:** = Ar, ETx1, F, FNA26, G, GW1, Il, K1, K3, K4, Mi, Mo1, NE, NY, Pa, S, Tn, Tx, Va, W, Hornberger (1991); = *Sisyrinchium mucronatum* var. *atlanticum* (E.P. Bicknell) H.E. Ahles – RAB; < *Sisyrinchium angustifolium* P. Miller – WH3.

Sisyrinchium calciphilum Sorrie. GLADE BLUE-EYED-GRASS. **Hab:** Calcareous glades. **Dist:** N. AL and sc. TN. **Tax:** See Sorrie et al. (2012) for additional information. Material of this taxon has sometimes been labeled as *S. capillare*. **Syn:** = K4.

Sisyrinchium corymbosum E.P. Bicknell. **Hab:** Pinelands. **Dist:** Se. GA and ne. FL west to s. AL. **Comm:** See Ward (2005a) for its resurrection. **Syn:** = K4; < *Sisyrinchium angustifolium* P. Miller – WH3; < *Sisyrinchium atlanticum* E.P. Bicknell – FNA26, K1.



Sisyrinchium fuscatum E.P. Bicknell. COASTAL PLAIN BLUE-EYED-GRASS. **Hab:** Xeric to dry soils of pine barrens, Carolina bay rims, longleaf pine sandhills, fluvial sand ridges. **Dist:** E. VA south to n. FL, west to LA. **Phen:** Late Apr-Jun; Jun-Oct. **Syn:** = F, G, GW1, Mi, RAB, Va; < *Sisyrinchium fuscatum* E.P. Bicknell – C, FNA26, K1, K3, K4, NE, NY; > *Sisyrinchium fuscatum* E.P. Bicknell – S; > *Sisyrinchium incrustatum* E.P. Bicknell – S; < *Sisyrinchium nashii* E.P. Bicknell – WH3.

Sisyrinchium langloisii Greene. PALE BLUE-EYED-GRASS. **Hab:** Sandy woodlands. **Dist:** AR and OK south to w. LA and s. TX; allegedly disjunct eastward in AL, GA, MS, TN, and nw. GA, but some of these records at least are suspect. **Phen:** Apr-May. **Syn:** = Ar, ETx1, FNA26, K3, K4, NcTx, Tx; < *Sisyrinchium langloisii* Greene – K1, (also see S. pruinosum).

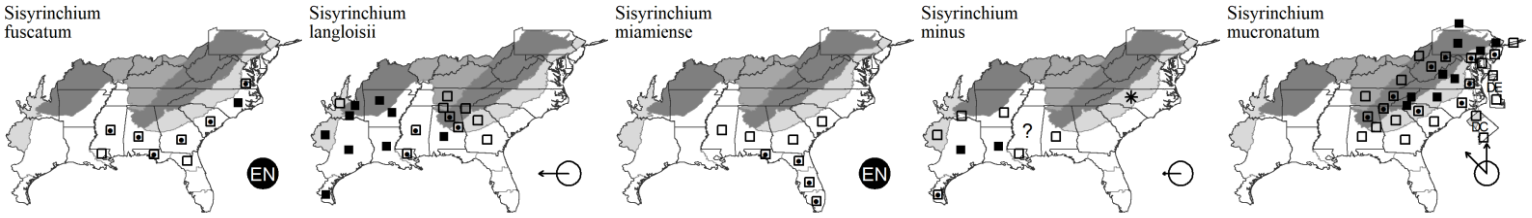
Sisyrinchium miamiense E.P. Bicknell. **Hab:** Moist disturbed areas. **Dist:** Ne. FL and s. GA south to s. FL and west to s. MS. **Syn:** = Bah, FNA26, K1, K3, K4; < *Sisyrinchium angustifolium* P. Miller – S, WH3.

Sisyrinchium minus Engelmann & A. Gray. LEAST BLUE-EYED-GRASS. **Hab:** Floodplains, mudflats, ditches, oak flatwoods, oak savannas, prairies. **Dist:** E. LA, n. LA, se. AR, west to c. TX and n. Mexico; disjunct in sw. AL (Black Belt) and reportedly MS. The AL occurrences are

Key to Map Symbology: native, maybe exotic, exotic; ←rare, ←uncommon, ←common (see introduction for more); * : waif, EN : endemic, H : historic; N : no, P : planted, ? : questionable; X : extirpated

reported and discussed by England & Keener (2017). Reported for NC (Sida 1962) and MS {check}. **Phen:** (Mar-) Apr-May. **Syn:** = Ar, ETx1, FNA26, K1, K3, K4, NcTx, Tx. NatureServe G5? (Secure).

Sisyrinchium mucronatum Michaux. NEEDLE-TIP BLUE-EYED-GRASS. **Hab:** Forests, woodlands, fields. **Dist:** ME west to SK, south to SC, GA, TN, MI, and MN. **Phen:** Apr-Jun; Jun-Jul. **Syn:** = C, F, FNA26, G, GW1, Il, K1, K4, Mi, NE, NY, Pa, S, Tn, Va, W, WV; = *Sisyrinchium mucronatum* var. *mucronatum* – RAB. NatureServe G5 (Secure).



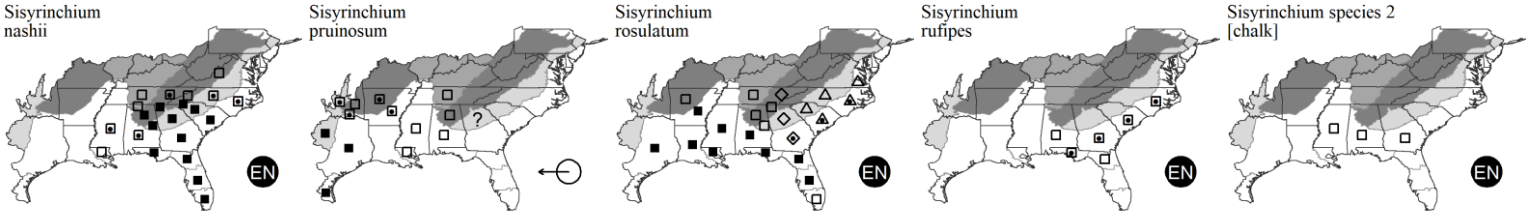
Sisyrinchium nashii E.P. Bicknell. NASH'S BLUE-EYED-GRASS. **Hab:** Dryish woodlands and forests, longleaf pine sandhills, pine rocklands, scrubby flatwoods. **Dist:** NC and TN (sw. VA?) south to s. FL and MS. **Phen:** Apr-Jun. **Syn:** = FNA26, K1, K3, K4, Tn, W; > *Sisyrinchium fibrosum* E.P. Bicknell – S; < *Sisyrinchium nashii* E.P. Bicknell – WH3.

Sisyrinchium pruinosum E.P. Bicknell. **Hab:** Prairies and calcareous glades and barrens. **Dist:** AR south to w. LA and AR; disjunct at scattered localities eastward in e. LA, MS, AL, and sc. TN. **Phen:** (Mar-) Apr (-May). **Comm:** {add to synonymy}. **Syn:** = Ar, ETx1, FNA26, K3, K4, NcTx, Tn, Tx; < *Sisyrinchium langloisii* Greene – K1.

Sisyrinchium rosulatum E.P. Bicknell. LAWN BLUE-EYED-GRASS, FAIRY STARS, ANNUAL BLUE-EYED-GRASS. **Hab:** Lawns, roadsides, prairies, pinelands. **Dist:** Se. VA south to s. FL, west to e. TX. **Phen:** Apr-May; May-Jun. **Syn:** = ETx1, FNA26, GW1, K1, K3, K4, RAB, Va, WH3, Hornberger (1991); > *Sisyrinchium browneii* Small – S; > *Sisyrinchium exile* E.P. Bicknell – Bah; > *Sisyrinchium rosulatum* E.P. Bicknell – S, Tx. NatureServe G5 (Secure).

Sisyrinchium rufipes E.P. Bicknell. **Hab:** Xeric-dry longleaf pine sandhills, fluvial sand ridges. **Dist:** Se. NC to n. FL, west to s. AL. **Syn:** = S; < *Sisyrinchium fuscatum* E.P. Bicknell – FNA26, K1, K4; < *Sisyrinchium nashii* E.P. Bicknell – WH3.

Sisyrinchium species 2 [chalk]. CHALK BELT BLUE-EYED-GRASS. **Hab:** Limestone outcrops and other calcareous woodlands, Jackson prairies. **Dist:** Coastal Plain of GA, AL, and MS. **Tax:** Under study by Brian Keener, Bruce Sorrie, Wes Knapp, and Brenda Wichmann.



72c. HEMEROCALLIDACEAE R. Brown 1810 (DAY-LILY FAMILY) [in ASPARAGALES]

A family of about 19 genera and 85 species, herbs, largely of the Old World and especially Australia and s. Africa. APG IV (2016) recommended that Hemerocallidaceae and Xanthorrhoeaceae be included within a very broadly circumscribed Asphodelaceae, but I here follow Seberg et al. (2012) in recognizing somewhat smaller monophyletic families that are more easily circumscribed, characterized, and described. References: APG (2016); Chase, Reveal, & Fay (2009); Clifford, Henderson, & Conran in Kubitzki (1998a); Seberg et al (2012); Zomlefer (1998); Zomlefer (1999).

Hemerocallis Linnaeus 1753 (DAY-LILY)

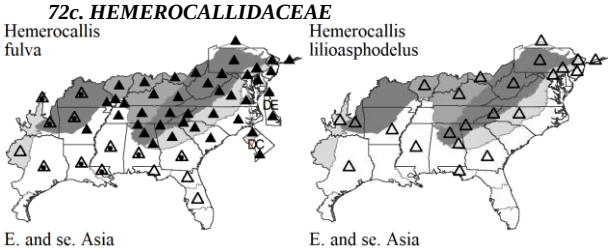
A genus of about 15-30 species, temperate, of e. Asia. References: Straley & Utech (2002c) in FNA26 (2002a); Zomlefer (1998).

1 Flowers tawny-orange (or many variants thereof), not fragrant; inner tepal margins wavy; tepal veins prominently reticulate..... ***Hemerocallis fulva***
1 Flowers lemon-yellow, fragrant; inner tepal margins planar; tepal veins parallel..... ***Hemerocallis lilioasphodelus***

* ***Hemerocallis fulva*** (Linnaeus) Linnaeus. ORANGE DAY-LILY, TAWNY DAY-LILY. **Hab:** Commonly cultivated, frequently escaping to forests, streambanks, suburban woodlands, lawns, waste places. **Dist:** Native of Asia. **Phen:** Apr-Jul. **Syn:** = Ar, C, ETx1, FNA26, G, Il, K1, K3, K4, Meso6, Mi, Mo1, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, W, WH3, WV, Zomlefer (1998); > *Hemerocallis fulva* var. *fulva* – F; > *Hemerocallis fulva* var. *kwanso* Regel – F.

* ***Hemerocallis lilioasphodelus*** Linnaeus. YELLOW DAY-LILY, LEMON DAY-LILY. **Hab:** Roadsides, bottomlands, less commonly cultivated, only rarely escaping. **Dist:** Native of Asia. Reported for the Piedmont and Mountains of AL (Cleburne, Cullman, Macon, and Randolph counties) by Spaulding & Triplett (2022). **Phen:** May-Jul. **Syn:** = C, ETx1, FNA26, K1, K3, K4, NE, NY, Pa, WH3, Zomlefer (1998); = *Hemerocallis flava* (Linnaeus) Linnaeus – F, G, WV; = *Hemerocallis lilio-asphodelus* – Il, Mi.

72c. HEMEROCALLIDACEAE



73a. ALLIACEAE Borkhausen 1797 (ONION FAMILY) [in ASPARAGALES]

A family of about 13 genera and 800 species, herbs, especially diverse in South America, n. North America, and n. Eurasia. Although included in Amaryllidaceae by APG III (2009), Seberg et al. (2012) and others make a strong case for the benefits of recognizing smaller families in the Asparagales, a course followed here. References: Dahlgren, Clifford, & Yeo (1985); Fay & Chase (1996); Meerow & Snijman in Kubitzki (1998a); Müller-Doblies & Müller-Doblies (1996); Rahn in Kubitzki (1998a).

1 Inflorescence a solitary flower; flowers blue, lavender, or white; fresh plant with an onion odor; [tribe *Gillesieae*]..... ***Ipheion***
1 Inflorescence an umbel; flowers white, greenish white, cream, pink, or magenta-purple; fresh plant with or without an onion odor.
2 Tepals 2-9 mm long; ovary 3-celled, each with 1-2 ovules; fresh plant with an onion odor; anthers < 1.5 mm long; [tribe *Allieae*]..... ***Allium***
2 Tepals 10-15 mm long; ovary 3-celled, each with 6-10 ovules; fresh plant usually without an onion odor; anthers ca. 2 mm long; [tribe *Gillesieae*] ..... ***Nothoscordum***

Allium Linnaeus 1753 (ONION, GARLIC, LEEK, RAMPS, CHIVES)

A genus of 500-700 species, herbs, of Eurasia, n. Africa, and North America (especially diverse in c. Asia). References: Mathew (1996); McNeal & Jacobsen (2002) in FNA26 (2002a); Poindexter, Weakley, & Williams (2017) in Weakley et al (2017); Rahn in Kubitzki (1998a).

Unkeyed taxa: *Allium species 4*

1 Leaves appearing before the flowers and withering before anthesis; leaves lanceolate to elliptic (the margins not parallel for most of the length), mostly > 2 cm wide; [subgenus *Rhizirideum*].
2 Leaves (1.5-) 2-4 (-4.5) cm wide, without a distinct petiolar base, the basal portion white; flowers (6-) 10-18 (-25) per umbel (fruits often fewer by abortion); spathe bracts 1-2 cm long; fruiting pedicels (8-) 10-15 (-18) mm long ..... ***Allium burdickii***
2 Leaves (3-) 5-8 (-9) cm wide, with a distinct petiolar base, the petioles usually red or pink; flowers (15-) 30-55 (-63) per umbel (fruits often fewer by abortion); spathe bracts 2-3 cm long; fruiting pedicels (10-) 15-25 (-30) mm long..... ***Allium tricoccum***
1 Leaves present at flowering; leaves linear (the margins parallel for most of the length), mostly < 2 cm wide.
3 Leaves cylindric (round or channeled-indented in cross section), hollow.
..... ***Allium vineale***
3 Leaves variously flattened or keeled (flat or V-shaped in cross section), not hollow.
7 Stem leafy for 1/5-2/3 its length; [subgenus *Allium*].
9 Tepals 4-5.5 mm long, white, pink, or purplish-red..... ***Allium ampeloprasum***
9 Tepals7-12 mm long, white ..... ***Allium neapolitanum***
7 Stem scapose, leafy only at its base (lowermost 1/4 or less of stem); leaves < 1.4 cm wide; [subgenus *Amerallium*].
11 Inflorescence nodding, the peduncle bent 30-150 degrees in its uppermost several cm (at least in bud – in *A. stellatum* becoming erect in flower or fruit).
..... ***Allium cernuum***
11 Inflorescence erect, the peduncle not bent.
16 Ovary or capsule crested with projections about 1 mm long; tepals acuminate.
18 Spathe bracts 1-nerved; ovary crests plane, flattened, spreading; tepals spreading; leaves 1-2 mm wide..... ***Allium speculae***
18 Spathe bracts usually 5-nerved; ovary crests contorted, ascending; tepals reflexed; leaves 3-10 mm wide
..... ***Allium cuthbertii***
16 Ovary or capsule not crested with projections; tepals acute to obtuse.
23 Inflorescence partly or entirely of bulblets..... ***Allium canadense***
23 Inflorescence entirely of normal flowers.
25 Plant rhizomatous, with bulbs attached; leaf blade keeled ..... ***Allium tuberosum***
25 Plant from ovoid bulbs; leaf blades not keeled.
..... ***Allium mobilense***

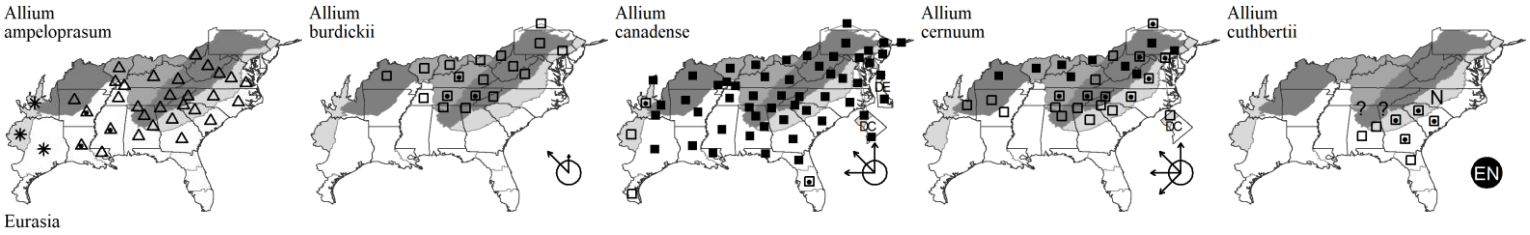
* ***Allium ampeloprasum*** Linnaeus. WILD LEEK, YORKTOWN ONION, ELEPHANT GARLIC. **Hab:** Roadsides and other disturbed areas. **Dist:** Native of Eurasia. **Phen:** Late May-early Jul; Jul-Aug. **Syn:** = C, ETx1, F, FNA26, G, K4, NcTx, RAB, Va, W, Mathew (1996); > *Allium ampeloprasum* var. *ampeloprasum* – K1; > *Allium ampeloprasum* var. *atroviolaceum* (Boissier) Regel – Il, K1.

Allium burdickii (Hanes) A.G. Jones. NARROW-LEAF RAMPS, WHITE RAMPS. **Hab:** Northern hardwood forests, primarily at higher elevations than *A. tricoccum*, also in cove forests and rich slopes. **Dist:** ME west to ND and south to NJ, and in the Mountains to w. VA, w. NC, and n. GA (but see note about taxonomic complexity within what is being for now treated as *Allium burdickii*). **Phen:** Jun; Aug. **Tax:** Populations attributed to *A. burdickii* in the broader area of this flora probably represent several different taxa (H. Ballard, pers. comm., 2018); they are here treated under *A. burdickii* pending clarification. **Syn:** = Il, K1, Mi, Mo1, W; = *Allium tricoccum* var. *burdickii* Hanes – C, FNA26, K3, K4, NE, NY; < *Allium tricoccum* Aiton – F, G, Pa, Va.

Allium canadense Linnaeus. WILD ONION. **Hab:** Bottomland forests, pastures, roadsides. **Dist:** NB west to ND, south to c. peninsular FL and TX. **Phen:** Mid Apr-Jun; late May-Jul. **Comm:** Though native, often appearing weedy. **Syn:** = F, G, Mi, Pa, S, W; = *Allium canadense* Linnaeus var. *canadense* – Ar, C, ETx1, FNA26, Il, K1, K3, K4, Mo1, NcTx, NE, NY, RAB, Tx, Va, WH3. NatureServe G5T5 (Secure).

Allium cernuum Roth. NODDING ONION. **Hab:** Generally in open woodlands or around outcrops of shale, mafic, ultramafic, or calcareous rocks, in the mountains at low elevations. **Dist:** NY, MI, MN, and BC, south to GA and AZ; the distribution is oddly fragmented into largely Rocky Mountain, Ozarkian, and Appalachian segments, and it is quite possible that cryptic taxa are involved. **Phen:** Jun-early Aug; Aug-Oct. **Tax:** See discussion of *Allium oxyphilum*. **Syn:** = K3, K4, S, Va; < *Allium cernuum* Roth – C, F, FNA26, G, Il, Mi, Mo1, NY, Pa, RAB, Tx, W; > *Allium cernuum* var. *cernuum* – K1.

Allium cuthbertii Small. CUTHBERT'S ONION. **Hab:** Longleaf pine sandhills, other dry sandy areas. **Dist:** C. SC south through GA and AL to ne. FL. Previous reports from NC are based on misidentifications or populations now recognized as *Allium keeverae*. **Phen:** May-Jun; Jun-Jul. **Comm:** The bright emerald green ovary of the fresh flowers is a striking and distinctive character for distinguishing *A. cuthbertii* and *A. keeverae* from some similar taxa. **Syn:** = K4, Poindexter, Weakley, & Williams (2017) in Weakley et al (2017); < *Allium cuthbertii* Small – FNA26, K1, K3, RAB, S, W, WH3.



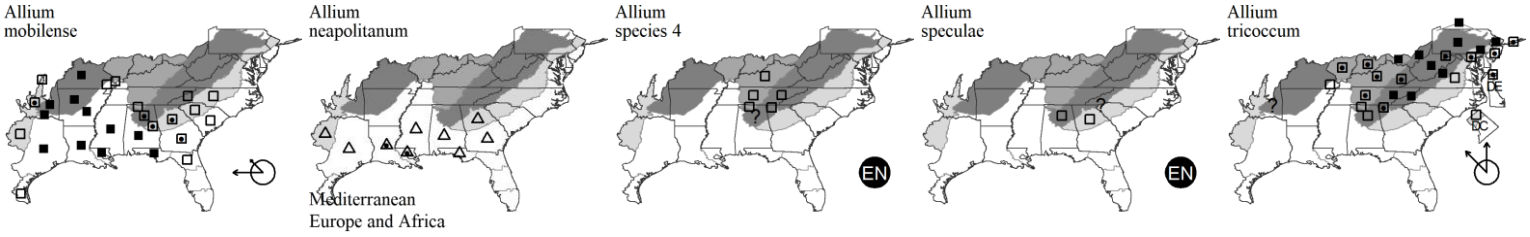
Allium mobilense Regel. MOBILE ONION. **Hab:** Dry woodlands, prairies. **Dist:** C. NC south to ne. FL and Panhandle FL, west to TX. **Phen:** Mid Apr-May; Late May-Jun. **Tax:** This taxon is better treated as a species distinct from *Allium canadense*. The nomenclature and taxonomy within *Allium mobilense* needs additional research. It appears that the name *Allium mutabile* Michaux applies to a form of *Allium canadense* s.s. **Syn:** = *Allium canadense* Linnaeus var. *mobilense* (Regel) Ownbey – Ar, ETx1, FNA26, K1, K3, K4, Mo1, NcTx, RAB, Tx, WH3; = *Allium mutabile* Michaux – F, Il; > *Allium arenicola* Small – S; > *Allium microscordion* Small – S. NatureServe G5T4T5 (Apparently Secure).

* ***Allium neapolitanum*** Cirillo. WHITE GARLIC, DAFFODIL GARLIC, NAPLES GARLIC. **Hab:** Suburban woodlands, other disturbed areas. **Dist:** Native of Eurasia. Reported from Franklin County, FL (Wunderlin & Hansen 2011), Marengo County, AL (Keener 2012), and other Gulf Coast states (Kartesz 2010). **Phen:** Mar-Apr. **Syn:** = ETx1, FNA26, K3, K4, NY, WH3. NatureServe GNR (Not Yet Ranked).

Allium species 4. **Hab:** Limestone glades and barrens. **Dist:** Sc. KY south through c. and e. TN to nw. GA and n. AL. **Phen:** Aug-Nov. **Syn:** < *Allium stellatum* Nuttall ex Ker Gawler – C, F, FNA26, G, K1, K3, K4.

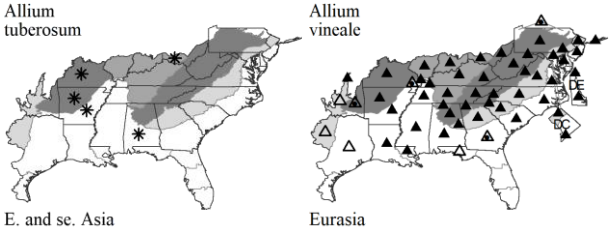
Allium speculae F.M. Ownbey & Aase. FLATROCK ONION. **Hab:** Seepy edges of vegetation mats on Lithonia granitic gneiss and on sandstone in ne. AL. **Dist:** Endemic to wc. GA and ne. AL. **Phen:** May-Jun; mid Jun-mid Jul. **Comm:** See Patrick, Allison & Krakow (1995) for additional information. **Syn:** = FNA26, K1, K3, K4. NatureServe G2 (Imperiled).

Allium tricoccum Aiton. RAMPS, RED RAMPS, WILD LEEK, RAMPSCALLIONS. **Hab:** Cove forests and mesic slope forests. **Phen:** Jun-Jul: Aug-Sep. **Comm:** See *A. burdickii* for a discussion of the two taxa of ramps. NS and ND south to n. GA, n. AL, and MO. **Syn:** = Il, K1, Mi, Mo1, RAB, W; = *Allium tricoccum* var. *tricoccum* – C, FNA26, K3, K4, NE, NY; = *Validallium tricoccum* (Aiton) Small – S; < *Allium tricoccum* Aiton – F, G, Pa, Va. NatureServe G5 (Secure).

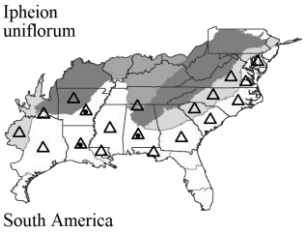


* ***Allium tuberosum*** Rottler ex Sprengel. CHINESE CHIVES, ORIENTAL GARLIC. **Hab:** Dunes, disturbed areas. **Dist:** Native of e. Asia. See Barger et al. (2012) for additional information on the AL occurrence. **Phen:** Jul-Aug. **Syn:** = Ar, FNA26, K3, K4, Mi, NY. NatureServe GNR (Not Yet Ranked).

* ***Allium vineale*** Linnaeus. FIELD GARLIC, ONION-GRASS, WILD ONION. **Hab:** Lawns, pastures, other disturbed places. **Dist:** Native of Eurasia. **Phen:** Late May-Jun; Jun-Aug. **Comm:** This is the common weed, often known as "onion-grass". **Syn:** = Ar, C, ETx1, F, FNA26, G, Il, Mi, NE, NY, Pa, RAB, S, Va, W; > *Allium vineale* ssp. *compactum* – K1, K3, K4; > *Allium vineale* ssp. *vineale* – K1, K3, K4; > *Allium vineale* var. *capsuliferum* Syme – Mathew (1996); > *Allium vineale* var. *compactum* (Thuillier) Lejeune & Courtois – Mathew (1996); > *Allium vineale* var. *vineale* – Mathew (1996).



Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



Ipheion Rafinesque 1836 [1837] (STAR-OF-BETHLEHEM)

A genus of 3 species, perennial herbs, native of South America. Souza, Crosa, & Guerra (2010), Sassone, Arroyo-Leuenberger, & Giussani (2014), and Arroyo-Leuenberger & Sassone (2016) separated *Ipheion* from *Tristagma*, *Nothoscordum*, and other related genera. References: Arroyo-Leuenberger & Sassone (2016); Rahn in Kubitzki (1998a); Sassone, Arroyo-Leuenberger, & Giussani (2014); Sassone, Giussani, & Arroyo-Leuenberger (2017); Souza, Crosa, & Guerra (2010).

* ***Ipheion uniflorum*** (Graham) Rafinesque. STAR-OF-BETHLEHEM, SPRING STAR. **Hab:** Commonly cultivated, escaping to lawns, suburban woodlands, bottomlands, disturbed places. **Dist:** Native of South America. Reported for SC by Hill & Horn (1997). **Phen:** Mar-Apr. **Tax:** The complicated nomenclature was explained by Sassone, Giussani, & Arroyo-Leuenberger (2017). **Syn:** = ETx1, K4, NcTx, RAB, Tx, WH3, Sassone, Arroyo-Leuenberger, & Giussani (2014), Sassone, Giussani, & Arroyo-Leuenberger (2017), Souza, Crosa, & Guerra (2010); = *Tristagma uniflorum* (Lindley) Traub – Ar, K1, K3, Va. NatureServe GNR (Not Yet Ranked).

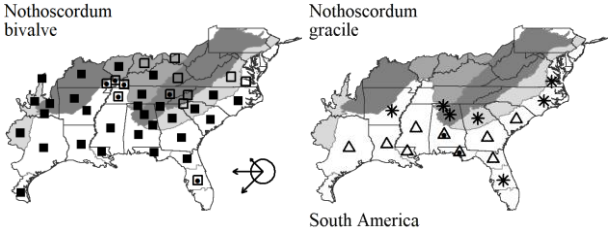
Nothoscordum Kunth 1843 (GRACE GARLIC, FALSE GARLIC)

A genus of about 25 species, herbs, of the Americas (primarily South America). References: Jacobsen & McNeal (2002) in FNA26 (2002a); Rahn in Kubitzki (1998a).

1 Leaves 1-4 (-5) mm wide; tepals distinct or only slightly connate at the base; flowers 3-6 (-10) per umbel; flowers not fragrant (or sweetly fragrant) ..... ***Nothoscordum bivalve***
1 Leaves 4-12 mm wide; tepals connate up to 1/3 of their length; flowers 10-20 per umbel; flowers fragrant (similar to cocoa)..... ***Nothoscordum gracile***

Nothoscordum bivalve (Linnaeus) Britton. GRACE GARLIC, FALSE GARLIC, CROW POISON. **Hab:** Around granite flatrocks, in glades and barrens of various kinds, in open woodlands, prairies, and also weedy in fields and along roadsides. **Dist:** Se. VA west to s. OH and KS, south to c. peninsular FL, TX, and South America. **Phen:** Mid Mar-mid May, and again in Sep-Dec; May-Jun, and again in Oct-Jan. **ID Notes:** An onion-like plant in general appearance (with a membrane-coated, onion-like bulb), but lacking the odor of onion. **Syn:** = Ar, C, ETx1, F, FNA26, G, Il, K1, K3, K4, NcTx, S, Tx, W, WH3, Rahn in Kubitzki (1998a); = *Allium bivalve* (Linnaeus) Kuntze – RAB; > *Nothoscordum bivalve* var. *bivalve* – Mo1. NatureServe G4 (Apparently Secure).

* ***Nothoscordum gracile*** (Dryander ex Aiton) Stearn. FRAGRANT FALSE GARLIC. **Hab:** Disturbed areas, lawns. **Dist:** Native of South America. **Comm:** Reported as (barely) naturalized in Arkadelphia, AR (Serviss et al. 2020). **Syn:** = ETx1, FNA26, K1, K3, K4, Meso6; = *Allium inodorum* Aiton – RAB; = *Nothoscordum borbonicum* Kunth – WH3, Rahn in Kubitzki (1998a), misapplied?; = *Nothoscordum fragrans* (Ventenat) Kunth – S.



73b. AMARYLLIDACEAE J. Saint-Hilaire 1805 (AMARYLLIS FAMILY) [in ASPARAGALES]

A family of about 59 genera and 850 species, nearly cosmopolitan (especially diverse in the tropics). References: Dahlgren, Clifford, & Yeo (1985); Fay & Chase (1996); García et al (2019); Meerow & Snijman in Kubitzki (1998a); Müller-Doblies & Müller-Doblies (1996); Rahn in Kubitzki (1998a).

1 Corona present (a fused tubular or flattened petaloid structure in the center of the flower, above the tepals).
  2 Filaments fused with the corona; corona very membranous in texture, distinctly thinner than the tepals; flowers white; [native, of riverine or tidal shores and marshes]; [tribe *Hymenocallideae*, subtribe *Hymenocallidinae*]..... ***Hymenocallis***
  2 Filaments not fused with the corona; corona membranous in texture, but similar to the tepals (in texture, though sometimes of a different color); flowers usually at least partly yellow or orange (sometimes purely white); [alien, naturalized in primarily upland and disturbed habitats]; [tribe *Narcisseae*, subtribe *Narcissinae*]. ..... ***Narcissus***
1 Corona absent.
  3 Flowers red; stamens about 2-2.5× as long as the tepals; [tribe *Lycoridae*]..... ***Lycoris***
  3 Flowers white, yellow, copper, or white-pink; stamens shorter than or about as long as the tepals.
    4 Flowers yellow to copper. ..... ***Zephyranthes***
    4 Flowers white or white-pink.
      6 Tepals 0.4-2.5 cm long, white, with small green or yellow spots; [tribe *Galantheae*].
        7 Inner 3 tepals distinctly shorter and blunter than the outer 3 tepals, only the inner 3 with a green spot near the tip..... ***Galanthus***
        7 Inner 3 tepals and outer 3 tepals of similar size and shape, all 6 white with a green spot near the tip..... ***Leucojum***
      6 Tepals 3-16 cm long, white, white-pink, or pink.
        8 Tepals spreading, separate, the perianth rotate; inflorescence a several-flowered umbel terminating the stem; leaves arranged spirally; leaf margins finely toothed; [tribe *Amaryllideae*, subtribe *Crininae*]..... ***Crinum***

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

8 Tepals ascending, overlapping, the perianth tubular; inflorescence either of a single flower or a several-flowered umbel terminating the stem; leaves either arranged distichously or spirally; leaf margins smooth
9 Inflorescence a several-flowered umbel terminating the stem; leaves arranged spirally; [tribe *Lycoridae*]..... ***Lycoris squamigera***
9 inflorescence of a single flower; leaves arranged distichously; [tribe *Hippeastreae*, subtribe *Zephyranthinae*]..... ***Zephyranthes***

Crinum Linnaeus 1753 (SWAMP LILY, STRING LILY)

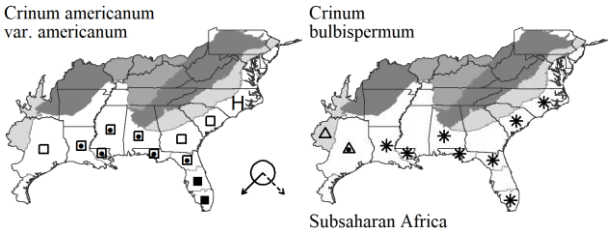
A genus of about 65 species, pantropical, extending locally into warm temperate regions. References: Holmes (2002b) in FNA26 (2002a); Meerow & Snijman in Kubitzki (1998a).

Identification Notes: *Crinum* can be distinguished vegetatively from *Hymenocallis* by its spiral (vs. distichous) leaf arrangement and leaf margins finely toothed (vs. entire).

2 Umbels 2-7-flowered; perianth white; [native]
..... ***Crinum americanum var. americanum***
2 Umbels 8-13-flowered; perianth usually at least in part reddish; [exotic].
..... ***Crinum bulbispermum***

Crinum americanum Linnaeus *var*. ***americanum***. SWAMP-LILY, STRING-LILY, SEVEN-SISTERS. **Hab:** Swamp forests, freshwater marshes. **Dist:** Se. NC south to s. FL and west to e. TX; Mexico, Central America to South America; West Indies. **Phen:** Jun-Oct (-Jan). **Syn:** = ETx1, FNA26, K3; < *Crinum americanum* – GW1, K1, S, WH3; > *Crinum americanum* – Tx; > *Crinum strictum* Herbert var. *strictum* – Tx.

* ***Crinum bulbispermum*** (Burman f.) Milne-Redhead & Schweickerdt. MILK-AND-WINE LILY, GRASS-LILY, AFRICAN SWAMP-LILY. **Hab:** Commonly cultivated, occasional in waste areas. **Dist:** Native of s. Africa. **Phen:** Jun-Jul. **Syn:** = ETx1, FNA26, K1, K3, K4, Tx, WH3; ? *Crinum longifolium* (Linnaeus) Thunberg – S. NatureServe GNR (Not Yet Ranked).



Galanthus Linnaeus 1753 (SNOWDROP)

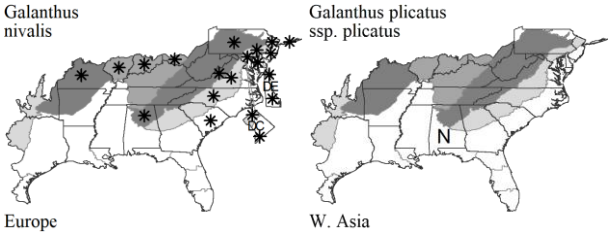
A genus of about 17 species, of Europe and w. Asia. Other species, hybrids, and cultivars derived from them may be present in our region. See Bishop, Davis, & Grimshaw (2001) for detailed information on the genus, especially on cultivars. References: Bishop, Davis, & Grimshaw (2001); Meerow & Snijman in Kubitzki (1998a); Stace (2021); Straley & Utech (2002d) in FNA26 (2002a).

Identification Notes: *Galanthus* is sometimes mistaken for *Leucojum*, but has the inner tepals much shorter than the outer, and only the inner green-spotted (the outer are immaculate white), while *Leucojum* has all 6 tepals similar in size and green-spotted.

1 Leaves with margins revolute along their length ..... ***Galanthus plicatus ssp. plicatus***
1 Leaves with margins flat, or folded under only when young or towards the base of mature leaves.
..... ***Galanthus nivalis***

* ***Galanthus nivalis*** Linnaeus. SNOWDROP. **Hab:** Persistent after cultivation. **Dist:** Native of s. and c. Europe. **Phen:** Feb-Mar. **Syn:** = F, FNA26, K1, K3, K4, Mi, NY, Pa, Stace (2021); > *Galanthus nivalis* ssp. *nivalis* – NE. NatureServe GNR (Not Yet Ranked).

* ***Galanthus plicatus*** M. Bieberstein *ssp*. ***plicatus***. CRIMEAN SNOWDROP, PLEATED SNOWDROP. **Hab:** Floodplains, disturbed areas, apparently naturalizing. **Dist:** Native of e. Europe and w. Asia. Barger et al. (2012) reported this species for AL; the record was later determined to be erroneous. **Phen:** Jan-Feb. **Syn:** = Stace (2021).



Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more)

* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable

X : extirpated

Hymenocallis Salisbury 1812 (SPIDER-LILY)

A genus of about 50 species, from s. North America and the West Indies south to ne. South America. The appropriate systematics and nomenclature of *Hymenocallis* in se. United States are still unstable and uncertain. Recent publications by Smith and co-workers (e.g. Smith & Garland 1996, 2003; Smith & Flory 1990; Smith & Flory in FNA (2002a) have revolutionized our understanding of southeastern United States *Hymenocallis*. References: Garland, Smith, & Anderson (2013); Meerow & Snijman in Kubitzki (1998a); Smith & Flory (2002) in FNA26 (2002a); Smith & Garland (2003); Smith & Garland (2009); Ward (2012a).

Identification Notes: *Hymenocallis* can be distinguished vegetatively from *Crinum* by its distichous (vs. spiral) leaf arrangement and leaf margins entire (vs. finely toothed).

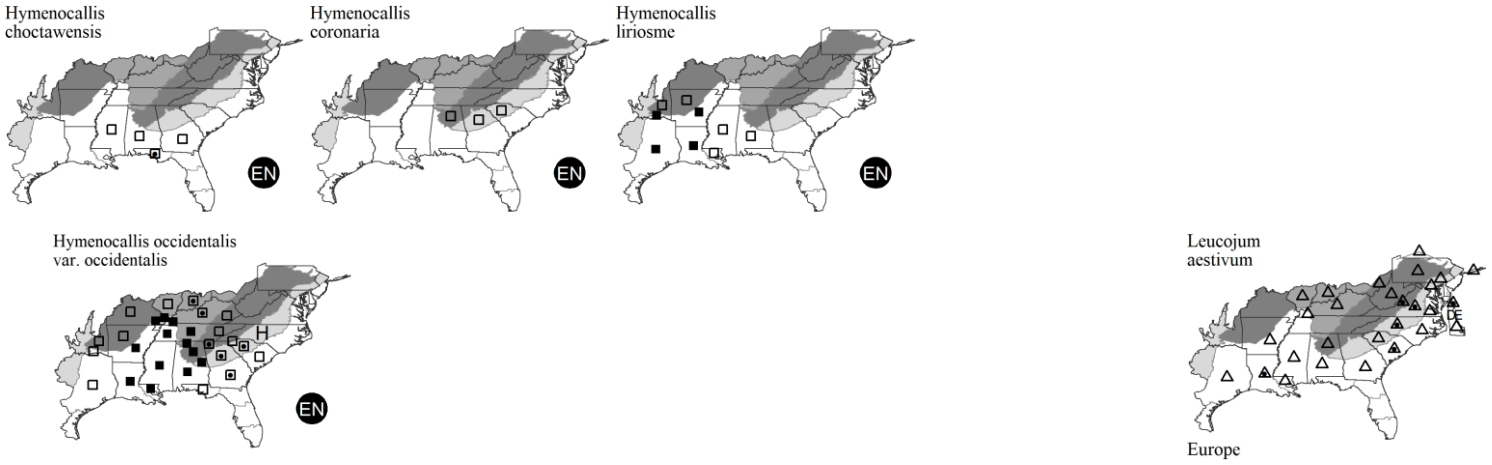
8 Staminal cup > 4.5 cm long; [rocky river shoals of the Piedmont of AL, GA, and SC, and the Ridge and Valley of AL]**.....*Hymenocallis coronaria***
8 Staminal cup < 4.5 cm long; [Coastal Plain, Piedmont floodplains, and the GA Ridge and Valley].
  9 Leaves oblanceolate, slightly to distinctly wider toward the tip.
    10 Leaves not coriaceous, distinctly glaucous; scape bracts 4-7 cm long, the tip long-acuminate; bulbs non-rhizomatous; [of moist but not mucky habitats]
    .....*Hymenocallis occidentalis var. occidentalis*
    10 Leaves coriaceous, not glaucous; scape bracts 3-4 (-6) cm long, the tip acute; bulbs rhizomatous; [of wet habitats].
    .....*Hymenocallis choctawensis*
  9 Leaves liguliform, not wider toward the tip, the margins parallel throughout.
    .....*Hymenocallis liriosme*

Hymenocallis choctawensis Traub. FLORIDA PANHANDLE SPIDERLILY, CHOCTAW SPIDERLILY. **Hab:** Floodplains. **Dist:** GA (floodplain of the Ochlockonee River) and Panhandle FL west to LA. **Syn:** = FNA26, K1, K3, K4, WH3, Smith & Garland (2003), Smith & Garland (2009); < *Hymenocallis sp. ?* – GW1.

Hymenocallis coronaria (LeConte) Kunth. SHOALS SPIDERLILY, CAHABA LILY. **Hab:** Rocky river shoals, usually with *Justicia americana* and *Podostemum ceratophyllum*. **Dist:** Nc. SC south and west to wc. AL. **Phen:** Jul-Aug; Sep-Oct. **Tax:** Many previous reports of this species from areas other than the inland (non-Coastal Plain) provinces, and from habitats other than rocky river shoals, reflect misapplication of the name. **Comm:** Notable stands of this spectacular plant occur at Landsford Canal State Park (on the Catawba River south of Rock Hill, SC), on the Saluda River (SC), on the Savannah River below I-20 (GA-SC border), Flat Shoals Creek and Flint River (GA), on the Cahaba River (Bibb County, AL), on the Coosa River (AL), on the Locust Fork of the Warrior River (AL), Tallapoosa River (AL), Blackburn fork of the Black Warrior River (Blount County, AL), and Choccolocco Creek (AL). **ID Notes:** This is the only *Hymenocallis* species that will be encountered in rocky river shoals of the interior provinces (inland from the Coastal Plain). **Syn:** = FNA26, K3, K4, Smith & Garland (2003); >< *Hymenocallis caroliniana* Herbert – K1, misapplied; >< *Hymenocallis occidentalis* (Le Conte) Kunth – RAB, S, misapplied; < *Hymenocallis sp. ?* – GW1.

Hymenocallis liriosme (Rafinesque) Shinners. WESTERN MARSH SPIDERLILY; LOUISIANA MARSH SPIDERLILY. **Hab:** Swamps, bottomlands, ditches. **Dist:** AR and OK south to s. AL and TX. **Phen:** Mar-May. **Syn:** = ETx1, FNA26, K3, K4, NcTx, Tx, Smith & Garland (2003); > *Hymenocallis liriosme* (Rafinesque) Shinners – K1. NatureServe G4? (Apparently Secure).

Hymenocallis occidentalis (LeConte) Kunth *var.* ***occidentalis***. HAMMOCK SPIDERLILY, WOODLAND SPIDERLILY, NORTHERN SPIDERLILY. **Hab:** Mesic soils of slopes and floodplain forests, gabbro glades and other calcareous upland flats. **Dist:** W. NC south to Panhandle FL, west to AR, LA, and extreme e. TX. **Phen:** Jul-Sep. **Syn:** = Ar, ETx1, FNA26, K3, K4, Smith & Garland (2003); = *Hymenocallis caroliniana* Herbert – Il, K1, Mo1, NcTx, Tn, Tx, misapplied; < *Hymenocallis occidentalis* (Le Conte) Kunth – S, WH3, Smith & Garland (2009); < *Hymenocallis sp. ?* – GW1.



Leucojum Linnaeus 1753 (SNOWFLAKE)

A genus of about 10 species, of Europe, n. Africa, and w. Asia. References: Meerow & Snijman in Kubitzki (1998a); Straley & Utech (2002e) in FNA26 (2002a).

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated

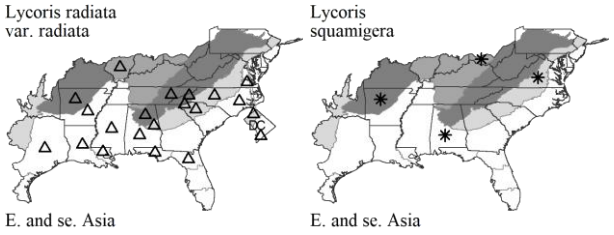
* ***Leucojum aestivum*** Linnaeus. SUMMER SNOWFLAKE. **Hab:** Naturalizing aggressively in alluvial areas, also long persistent after cultivation in upland situations. **Dist:** Native of Europe. Reported naturalized in NC by Leonard (1971b). **Phen:** Mar-Apr. **Syn:** = Ar, C, ETx1, F, FNA26, G, Il, Mo1, NcTx, NE, NY, RAB, Va; > *Leucojum aestivum* ssp. *aestivum* – K1, K3, K4.

Lycoris Herbert 1819 (MAGIC LILY)

A genus of about 20 species, primarily e. Asian. References: Hsu et al (1994); Meerow & Snijman in Kubitzki (1998a).

1 Tepals pink to rose, 6-7 cm long, 1.2-1.8 cm wide, only slightly crisped-margined at the base; stamens 0.8-1.2× as long as the tepals; leaves 18-25 mm wide; [subgenus *Symmanthus*]..... ***Lycoris squamigera***
1 Tepals bright red, 4-4.5 cm long, 0.5-0.6 cm wide, strongly crisped-margined and reflexed; stamens 2-2.5× as long as the tepals; leaves 3-8 mm wide; [subgenus *Lycoris*].
..... ***Lycoris radiata var. radiata***

* ***Lycoris radiata*** (L'Héritier) Herbert *var*. ***radiata***. HURRICANE LILY, RED SPIDER LILY, SURPRISE LILY, NAKED LADIES. **Hab:** Cultivated and persistent (or slowly spreading locally). **Dist:** Native of China. **Phen:** Sep-Oct. **Tax:** This taxon is a sterile triploid, reproducing vigorously by asexual means. **Syn:** = Hsu et al (1994); < *Lycoris radiata* (L'Héritier) Herbert – Ar, ETx1, K1, K3, NcTx, RAB, WH3.
* ***Lycoris squamigera*** Maximowicz. MAGIC LILY. **Hab:** Cultivated as an ornamental, sometimes persistent. **Dist:** Native of China. **Phen:** Aug. **Comm:** Reported for AR (Serviss & Peck 2017). **Syn:** = K3, K4, Hsu et al (1994).



Narcissus Linnaeus 1753 (DAFFODIL, JONQUIL, NARCISSUS, BUTTERCUP)

A genus of about 40-60 species, of Europe, n. Africa, and w. Asia. References: Hanks (2002); Jefferson-Brown (1969); Jefferson-Brown (1991); Meerow & Snijman in Kubitzki (1998a); Spaulding & Barger (2014); Stace (2010); Straley & Utech (2002f) in FNA26 (2002a).

Identification Notes: The familiar flower consists of 6 tepals spreading in more or less a plane, and a fused, tubular, corona. The hypanthial tube is below the perianth lobes. Other taxa are under cultivation and may be expected as persistent or escaped in our area. Manuals of cultivated plants and the extensive horticultural literature on *Narcissus* (such as the references listed above) should be consulted by those interested in more information on members of this genus.

1 Perianth lobes 10-15 mm long; corona 3-5 mm long; leaves dark green, either cylindrical and hollow or somewhat flattened and grooved; umbel (or spathe, or stem) with 3-10 flowers.
  2 Leaves somewhat flattened, grooved, 3-10 mm wide; tepals light lemon-yellow; corona yellow-orange, distinctly darker than the tepals .....
  ..... ***Narcissus ×intermedius***
  2 Leaves cylindrical (terete), 2-4 mm wide; tepals golden-yellow; corona golden-yellow, the same as the tepals or only slightly darker .....
  ..... ***Narcissus jonquilla***
1 Perianth lobes 20-50 mm long; corona 5-50 mm long; leaves usually glaucous, flattened, solid; umbel (or spathe, or stem) with 1-4 flowers.
  3 Hypanthial tube (below the tepals) parallel-sided (though sometimes suddenly expanded at its apex); corona < 10 mm long, usually wider than high; corona < 0.5× as long as the perianth lobes; corona rarely undulate; umbel (or spathe, or stem) with 1-10 flowers; stamens of 2 distinct lengths.
    4 Corona rim red, contrasting with the white or yellow corona (though sometimes fading when dried); umbel (or spathe, or stem) with 1 flower .....
    ..... ***Narcissus poeticus***
    4 Corona of a single color, all white or yellow; umbel (or spathe, or stem) with (1-) 2-8 (-20) flowers.
      5 Umbel (or spathe, or stem) with (1-) 2 (-3) flowers; pollen sterile..... ***Narcissus ×medioluteus***
      5 Umbel (or spathe, or stem) with (2-) 3-8 (-20) flowers; pollen fertile.
        6 Corona white; umbel (or spathe, or stem) with <20 flowers..... ***Narcissus papyraceus***
        6 Corona yellow; umbel (or spathe, or stem) with (2-) 3-8 (-15) flowers..... ***Narcissus tazetta***
  3 Hypanthial tube (below the tepals) distinctly widening toward its apex; corona usually > 10 mm long, usually as long as wide or longer than wide; corona > 0.5× as long as the perianth lobes; corona margin undulate; umbel (or spathe, or stem) with 1 flower; stamens of the same length or nearly so.
    7 Tepals linear to lanceolate, < 5 mm wide..... ***Narcissus bulbocodium***
    7 Tepals ovate, triangular-ovate, or suborbicular, > 10 mm wide.
      8 Corona 30-50 mm long, about as long as the perianth lobes..... ***Narcissus pseudonarcissus***
      8 Corona 10-25 mm long, distinctly shorter than the perianth lobes.
        9 Umbel (or spathe, or stem) with 1 flower; corona usually conspicuously darker in color than the tepals; leaves somewhat glaucous, > 8 mm wide; stem distinctly2-edged..... ***Narcissus ×incomparabilis***
        9 Umbel (or spathe, or stem) with (1-) 2-4 flowers; corona and tepals the same color; leaves green, < 8 mm wide; stem nearly terete .....
        ..... ***Narcissus ×odorus***

* ***Narcissus bulbocodium*** Linnaeus. HOOP-PETTICOAT DAFFODIL. **Hab:** Grassy roadsides, established. **Dist:** Native of Mediterranean Europe. **Phen:** Mar. **Syn:** = K4, Jefferson-Brown (1991), Spaulding & Barger (2014), Stace (2010).

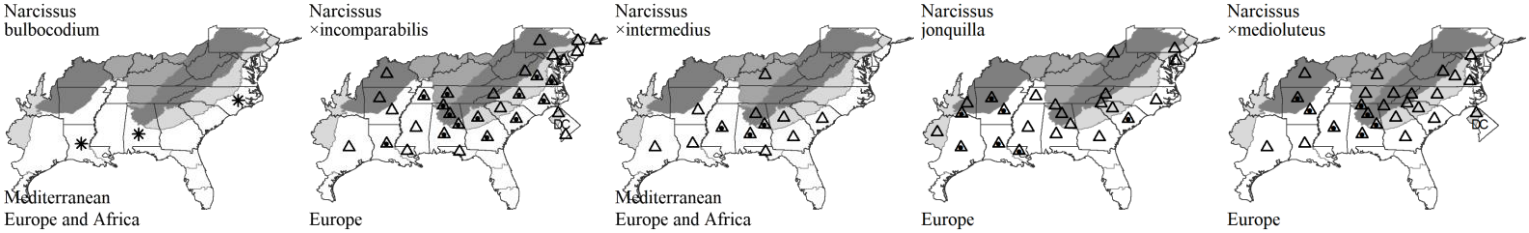
Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated

* ***Narcissus ×incomparabilis*** P. Miller. NONESUCH DAFFODIL. **Hab:** Cultivated as an ornamental, persistent and naturalized in lawns, roadsides, woodland borders, and disturbed areas. **Dist:** Native of Europe. **Phen:** Mar-Apr. **Syn:** = Ar, C, ETx1, FNA26, K1, K3, K4, Mo1, NcTx, Spaulding & Barger (2014), Stace (2010); = *Narcissus incomparabilis* – F, G, RAB; = *Narcissus poeticus* × *pseudonarcissus* – NY.

* ***Narcissus ×intermedius*** Loiseleur-Deslongchamps. STAR DAFFODIL, STAR JONQUIL. **Hab:** Cultivated as an ornamental, persistent and naturalized in lawns, roadsides, woodland borders, and disturbed areas. **Dist:** Native of Europe. **Syn:** = Ar, FNA26, K3, K4, Spaulding & Barger (2014), Stace (2010).

* ***Narcissus jonquilla*** Linnaeus. JONQUIL, APODANTHUS DAFFODIL. **Hab:** Cultivated as an ornamental, persistent and naturalized in lawns, roadsides, woodland borders, and disturbed areas. **Dist:** Native of Europe. **Phen:** Mar-Apr. **Syn:** = Ar, C, ETx1, F, FNA26, G, Il, K1, K3, K4, NcTx, RAB, Tx, Spaulding & Barger (2014), Stace (2010). NatureServe GNR (Not Yet Ranked).

* ***Narcissus ×medioluteus*** P. Miller. PRIMROSE-PEERLESS, TWIN-SISTERS; TWO-FLOWER NARCISSUS. **Hab:** Cultivated as an ornamental, persistent and naturalized in lawns, roadsides, woodland borders, and disturbed areas. **Dist:** Native of Europe. **Phen:** Mar-May. **Syn:** = FNA26, Il, K1, K4, Spaulding & Barger (2014), Stace (2010); = *Narcissus tazetta* × *poeticus* – RAB.



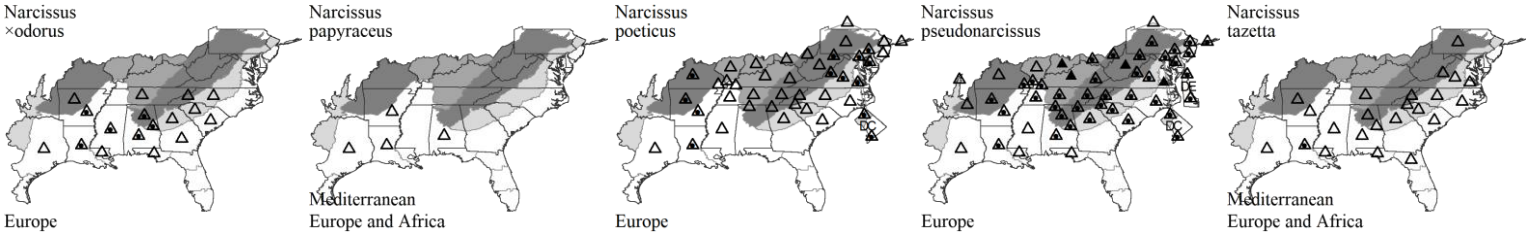
* ***Narcissus ×odorus*** Linnaeus (pro sp.). CAMPERNELLE JONQUIL, SWEET-SCENTED JONQUIL. **Hab:** Cultivated as an ornamental, persistent and naturalized in lawns, roadsides, and disturbed areas. **Dist:** Native of Europe. **Syn:** = FNA26, K1, K4, WH3, Spaulding & Barger (2014), Stace (2010); \ *Narcissus* ×*odorus* Linnaeus (pro sp.) – ETx1.

* ***Narcissus papyraceus*** Ker Gawler. PAPER-WHITE DAFFODIL. **Hab:** Cultivated as an ornamental, persistent and naturalized in lawns, roadsides, and disturbed areas. **Dist:** Native of Mediterranean Europe. **Syn:** = ETx1, FNA26, K1, K4, Spaulding & Barger (2014), Stace (2010). NatureServe GNR (Not Yet Ranked).

* ***Narcissus poeticus*** Linnaeus. POET'S NARCISSUS, PHEASANT'S-EYE DAFFODIL. **Hab:** Cultivated as an ornamental, persistent and naturalized in lawns, roadsides, woodland borders, and disturbed areas. **Dist:** Native of Europe. **Phen:** Mar-May. **Syn:** = Ar, C, ETx1, F, FNA26, G, Il, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, RAB, Va, Spaulding & Barger (2014), Stace (2010). NatureServe GNR (Not Yet Ranked).

* ***Narcissus pseudonarcissus*** Linnaeus. DAFFODIL, BUTTERCUP. **Hab:** Cultivated as an ornamental, persistent and naturalized in lawns, roadsides, woodland borders, and disturbed areas. **Dist:** Native of Europe. **Phen:** Feb-Apr. **Syn:** = Ar, C, ETx1, FNA26, K1, K3, K4, Mo1, NcTx, NE, NY, Pa, RAB, Va, Spaulding & Barger (2014), Stace (2010); = *Narcissus pseudo-narcissus* – F, G, Il, Mi, Tx, orthographic variant. NatureServe GNR (Not Yet Ranked).

* ***Narcissus tazetta*** Linnaeus. BUNCH-FLOWERED DAFFODIL. **Hab:** Cultivated as an ornamental, persistent and naturalized in lawns, roadsides, and disturbed areas. **Dist:** Native of Mediterranean Europe. **Syn:** = Ar, ETx1, FNA26, K1, K3, K4, NcTx, Tx, WH3, Spaulding & Barger (2014), Stace (2010). NatureServe GNR (Not Yet Ranked).



Zephyranthes Herbert 1821 (ATAMASCO-LILY, ZEPHYR-LILY, RAIN-LILY)

A genus of about 180 species, from s. North America and the West Indies south to s. South America. Circumscription follows García et al. (2019).
References: Christenhusz, Fay, & Byng (2018); Flagg, Smith, & Flory (2002a) in FNA26 (2002a); Flagg, Smith, & Flory (2002b) in FNA26 (2002a); García et al (2019); Hume (1938); Meerow & Snijman in Kubitzki (1998a).

2 Stigma 1, capitate.
  3 Perianth white (to pinkish).
    4 Perianth 3-4.5 cm long; perianth tube 1-4 mm long, shorter than the spathe; perianth tube shorter than the filaments ..... ***Zephyranthes candida***
    4 Perianth (7.3-) 9-14 (-16) cm long; perianth tube 70-130 mm long, longer than the spathe; perianth tube longer than the filaments. ..... ***Zephyranthes chlorosolen***
  3 Perianth yellow. ..... ***Zephyranthes citrina***
2 Stigmas 3 (trifid).
  10 Stamen filaments of 4 different lengths; flowers slightly bilaterally symmetrical. ..... ***Zephyranthes tubispatha***
  10 Stamen filaments of 2 lengths, or equal; flowers radially symmetrical
    15 Anthers 13-22 mm long ..... ***Zephyranthes minuta***
    15 Anthers 3-6 (-8) mm long.

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

16 Style and stigma as long as or shorter than the anthers; perianth segments erect-ascending at full anthesis, (4-) 4.3-8.5 (-10) cm long..... ***Zephyranthes simpsonii***

16 Style and stigmas extending beyond the anthers; perianth segments spreading at full anthesis, (5.5-) 6.6-9.5 (-11) cm long. ***Zephyranthes atamasco***

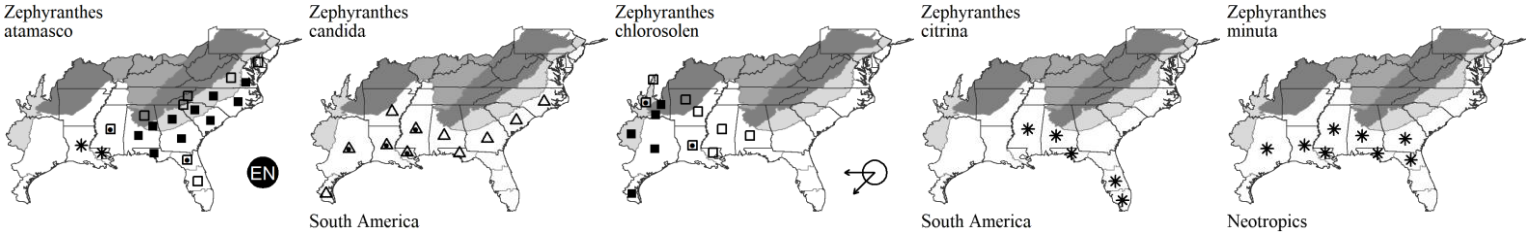
Zephyranthes atamasco (Linnaeus) Herbert. COMMON ATAMASCO-LILY. **Hab:** Bottomland forests and adjacent road shoulders, wet meadows, sometimes in upland forests over mafic rocks. **Dist:** Se. and sc. VA south to n. FL, west to s. MS. **Phen:** Feb-Apr; Apr-Jun. **Comm:** The correct spelling of the epithet is apparently '*atamasco*'; a conservation proposal (to resolve the uncertainty) has been made and will likely be accepted. **Syn:** = C, F, G, GW1, RAB; = *Atamosco atamasco* (Linnaeus) Greene – S; = *Hippeastrum atamasco* (Linnaeus) Christenhusz & Byng – Christenhusz, Fay, & Byng (2018); = *Zephyranthes atamasca* – FNA26, K3, K4, Va, orthographic variant; = *Zephyranthes atamasca* var. *atamasca* – K1, WH3, orthographic variant. NatureServe G4G5T4 (Apparently Secure).

* ***Zephyranthes candida*** (Lindley) Herbert. FALL RAIN-LILY. **Hab:** Cultivated, persistent or spreading from cultivation. **Dist:** Native of South America. **Phen:** Late Sep-Oct. **Syn:** = Ar, ETx1, FNA26, K1, K4, RAB, WH3; = *Atamosco candida* (Lindley) Small – S; = *Hippeastrum zephyranthum* Christenhusz & Byng – Christenhusz, Fay, & Byng (2018). NatureServe G4G5 (Apparently Secure).

Zephyranthes chlorosolen (Herbert) D. Dietrich. BRAZOS RAIN-LILY, EVENING RAIN-LILY, CEBOLLETA. **Hab:** Prairies and other moist to dry habitats. **Dist:** AL, MS, AR, s. KS, n. TX, and s. NM south into n. Mexico. **Phen:** May-Oct. **Syn:** = FNA26, K4; = *Cooperia chlorosolen* Herbert – K1, K3; = *Cooperia drummondii* Herbert – ETx1, GW1, NcTx, S, Tx, Hume (1938); = *Hippeastrum chlorosolen* (Herbert) Christenhusz & Byng – Christenhusz, Fay, & Byng (2018). NatureServe G5 (Secure).

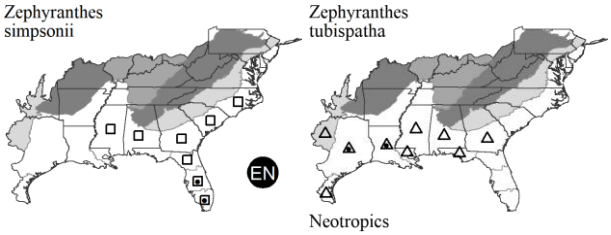
* ***Zephyranthes citrina*** Baker. YELLOW ZEPHYR-LILY, CITRON RAIN-LILY. **Hab:** Disturbed areas, waif from horticultural use. **Dist:** Native of South America. **Syn:** = Bah, FNA26, K1, K3, K4, WH3; = *Hippeastrum citrinum* (Baker) Christenhusz & Byng – Christenhusz, Fay, & Byng (2018). NatureServe GNR (Not Yet Ranked).

* ***Zephyranthes minuta*** (Kunth) D. Dietrich. PINK RAIN-LILY. **Hab:** Disturbed areas. **Dist:** Native of Mexico. **Phen:** Apr-Jun. **Syn:** = *Hippeastrum minutum* (Kunth) Christenhusz & Byng – Christenhusz, Fay, & Byng (2018); = *Zephyranthes grandiflora* Lindley – ETx1, FNA26, K1, K3, WH3; ? *Zephyranthes carinata* Herbert – K4. NatureServe GNR (Not Yet Ranked).



Zephyranthes simpsonii Chapman. FLORIDA ATAMASCO-LILY, RED-MARGINED ATAMASCO-LILY. **Hab:** Dry to dry-mesic sandy soils (usually with admixture of shell hash) of coastal fringe sandhills or mainland maritime forests, usually associated with *Quercus hemisphaerica*, on barrier islands or within about 10 km of the ocean (NC, SC), pine flatwoods (FL, GA). **Dist:** Se. NC (Brunswick and Columbus counties) and ne. SC (Horry and Georgetown counties); s. GA, c. and s. peninsular FL. **Phen:** Apr-May; May-Jun. **Comm:** The disjunct populations in NC and SC may differ from *Z. simpsonii* (sensu stricto) of s. GA and c. and s. peninsular FL, and need additional study. **Syn:** = FNA26, GW1, K1, K4, RAB, WH3; = *Atamosco simpsonii* (Chapman) Greene – S; = *Hippeastrum simpsonii* (Chapmen) Christenhusz & Byng – Christenhusz, Fay, & Byng (2018). NatureServe G2G3 (Imperiled).

* ***Zephyranthes tubispatha*** (L'Héritier) Herbert. RIO GRANDE COPPERLILY. **Hab:** Road shoulders, lawns, disturbed areas. **Dist:** Native of s. Brazil. Reported for Coastal Plain of AL (Woods & Diamond 2006), GA (Carter, Baker, & Morris 2009), MS (Barbour 2017), and FL. **Phen:** Jun-Jul (-Oct). **Syn:** = K4; = *Habranthus tubispathus* (L'Héritier) Traub – ETx1, FNA26, K1, K3, NcTx, WH3; > *Habranthus texanus* (Herbert) Steudel – Tx.



74a. ASPARAGACEAE A.L. de Jussieu 1789 (ASPARAGUS FAMILY) [in ASPARAGALES]

A family of a single genus and 170-300 species, widespread in Europe, Africa, Asia, and Australia (introduced elsewhere). APG IV (2016) recommends a much larger Asparagaceae, including other families recognized here (Asparagaceae, Ruscaceae, Agavaceae, Themidaceae, Hyacinthaceae). Stevens (2012) comments about the broader circumscription of Asparagaceae: "this is a highly unsatisfactory family – nothing characterises it, some of the subfamilies are difficult to recognise while others are highly apomorphic". We choose to follow Seberg et al. (2012), Nordal & Sletten Bjorå (2016), Eggli & Nyffeler (2020), and others in recognizing smaller monophyletic families that are more homogeneous and easier to characterize. References: APG (2016); Dahlgren, Clifford, & Yeo (1985); Eggli & Nyffeler (2020); Kubitzki & Rudall in Kubitzki (1998a); Nordal & Sletten Bjorå (2016).

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

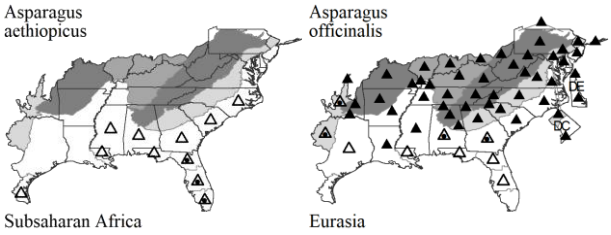
Asparagus Linnaeus 1753 (ASPARAGUS)

A genus of 170-300 species, widespread in Europe, Africa, Asia, and Australia (introduced elsewhere). References: Kubitzki & Rudall in Kubitzki (1998a); Straley & Utech (2002b) in FNA26 (2002a).

1 Cladophylls ("leaves") flattened, 1-2 mm wide ..... ***Asparagus aethiopicus***
1 Cladophylls ("leaves") filiform, < 0.7 mm wide. ..... ***Asparagus officinalis***

* ***Asparagus aethiopicus*** Linnaeus. SPRENGER'S ASPARAGUS-FERN, EMERALD-FERN. **Hab:** Disturbed areas, seeding down especially around plantings, especially commonly planted in coastal areas; sometimes epiphytic in palm boots. **Dist:** Native of s. Africa. Found in SC by R. Stalter (pers. comm. 2009). Kunzer et al. (2009) report several locations for Panhandle FL. Naturalization along the southeastern US coast from se. NC south to s. FL, and west to TAM is also documented on iNaturalist and in Bradley et al. [in prep]. **Comm:** This species has small axillary spines. **Syn:** = FNA26, K3, K4, WH3; ? *Asparagus densiflorus* (Kunth) Jessop – Bah, misapplied.

* ***Asparagus officinalis*** Linnaeus. ASPARAGUS, SPARROWGRASS, GARDEN ASPARAGUS. **Hab:** Commonly cultivated, commonly escaped to fencerows, roadsides, disturbed areas. **Dist:** Native of Eurasia. **Phen:** Apr-Jun; Jul-Oct. **Syn:** = Ar, C, ETx1, F, FNA26, G, Il, K1, K3, K4, Meso6, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3; > *Asparagus officinalis* ssp. *officinalis* – Mo1. NatureServe G5? (Secure).



74b. RUSCACEAE M. Roemer 1840 (RUSCUS FAMILY) [in ASPARAGALES]

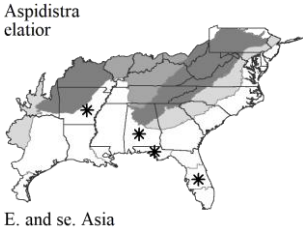
As here circumscribed, a family of about 28 genera and 500 species, of North America, Central America, Europe, Africa, and Asia. Following the "breakup of the Liliaceae", Ruscaceae was often defined very narrowly to include a few genera with cladodes. In APG I (1998), it was recognized more broadly as Convallariaceae. In APG II (2003), Ruscaceae was listed as an "acceptable, monophyletic alternative to the broader circumscription favoured here". In APG III (2009) and APG IV (2016), Ruscaceae was simply merged into a very broad Asparagaceae. We favor and here use a 'middle ground' that recognizes at family rank major clades (in our region: Asparagaceae s.s., Ruscaceae, Agavaceae, Themidaceae, and Hyacinthaceae) in Asparagaceae sensu APG III and APG IV. References: Bogler in Kubitzki (1998a); Bogler & Simpson (1995); Conran & Tamura in Kubitzki (1998a); Yamashita & Tamura (2000); Yeo in Kubitzki (1998a).

1 Plant with an upright or arching stem with alternate cauline leaves.
  3 Inflorescence terminal, a raceme or panicle; tepals separate leaves with 3 main parallel veins, acute to acuminate at the apex; leaves acute to acuminate at the apex; foliage green, not glaucous ..... ***Maianthemum***
  3 Inflorescence of 1-several axillary flowers; tepals fused; leaves with > 7 main parallel veins, obtuse to acute at the apex; foliage blue-green, glaucous ..... ***Polygonatum***
1 Plant tufted, the leaves essentially basal (although the sheathing bases form a 'false' stem in *Convallaria*).
  4 Leaves 2-3, narrowly elliptic, often variegated with light and dark green; tepals fused, white, greenish, or purplish.
    5 Leaves deciduous, narrowly elliptic, the blades < 30 cm long; flowers in a raceme; the tepals not fleshy; [tribe *Convallarieae*] ..... ***Convallaria***
    5 Leaves evergreen, linear-lanceolate, the blades > 40 cm long; flower either solitary, axillary, the tepals fleshy, or flowers in a raceme, the tepals not fleshy. ..... ***Aspidistra elatior***
  4 Leaves many, linear, not variegated with light and dark green; tepals separate (or fused basally), white or violet.
    8 Flowers erect, the pedicel strict; ovary superior ..... ***Liriope***
    8 Flowers nodding, the pedicel recurved; ovary inferior or half-inferior ..... ***Ophiopogon japonicus***

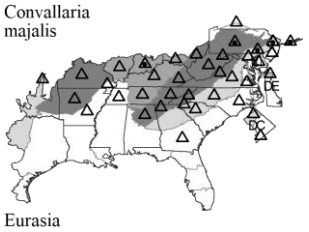
Aspidistra Ker Gawler 1823 (ASPIDISTRA)

A genus of ca. 11 species, of e. Asia. References: Conran & Tamura in Kubitzki (1998a).

* ***Aspidistra elatior*** Blume. ASPIDISTRA, CAST-IRON PLANT. **Hab:** Maritime forests, suburban woodlands, vacant lots. **Dist:** Native of Japan. See Barger et al. (2012) for additional details about its occurrence in s. AL and Franck et al. (2016) for additional details about its known occurrences in FL. Also reported for AR (Serviss et al. 2019). **Syn:** = K3, K4.



Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



Convallaria Linnaeus 1753 (LILY-OF-THE-VALLEY)

A genus of 3 species, of north temperate n. Eurasia and e. North America. References: Conran & Tamura in Kubitzki (1998a); Gandhi, Reveal, & Zarucchi (2012); Judd (2003); Utech (2002l) in FNA26 (2002a).

* ***Convallaria majalis*** Linnaeus. EUROPEAN LILY-OF-THE-VALLEY. **Hab:** Old homesites, roadsides, persistent after cultivation, and casually escaping to nearby woodlands and forests. **Dist:** Native of Eurasia. **Phen:** Apr-early Jun; Jul-Aug. **Syn:** = Ar, F, Il, K1, K3, K4, Mi, Mo1, NE, Pa, Va, W, WV; = *Convallaria majalis* ssp. *majalis* – NY, Gandhi, Reveal, & Zarucchi (2012); = *Convallaria majalis* var. *majalis* – FNA26, RAB, Tn; < *Convallaria majalis* Linnaeus – C, G, S, Judd (2003).

Liriope Loureiro 1790 (LIRIOPE, LILYTURF)

A genus of 9 species, herbs, of e. and se. Asia. References: Conran & Tamura in Kubitzki (1998a); Floden & Avent (2019); Judd (2003); Nesom (2010); Roling, Howlett, & Brown (2011); Serviss et al (2016); Spaulding, Barger, & Nesom (2010).

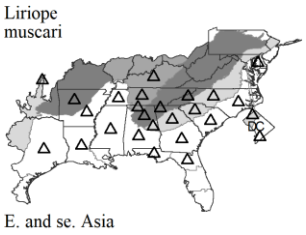
Identification Notes: additional species are likely naturalized in our area. See references.

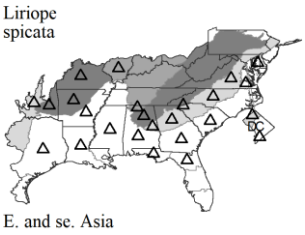
1 Plants cespitose, without stolons or weakly stoloniferous or rhizomatous; leaves 6-12 (-23) mm wide; flowers purple, lilac-purple, or lavender ..... ***Liriope muscari***

1 Plants colonial, from slender stolons; leaves 3-6 (-8) mm wide; tepals white to very pale violet. ..... ***Liriope spicata***

* ***Liriope muscari*** (Decaisne) L.H. Bailey. LIRIOPE, BIG BLUE LILYTURF. **Hab:** Commonly planted, persistent and escaping, locally abundant. **Dist:** Native of China, Japan, and Taiwan. **Syn:** = K1, K3, K4, Judd (2003), Nesom (2010), Serviss et al (2016). NatureServe GNR (Not Yet Ranked).

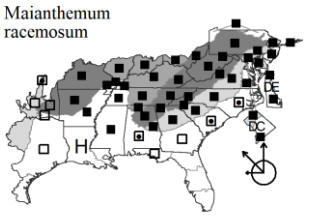
* ***Liriope spicata*** Loureiro. CREEPING LILYTURF. **Hab:** Commonly planted, persistent and escaping, locally abundant. **Dist:** Native of China, Taiwan, Japan, Korea, and Vietnam. **Phen:** Aug-Oct. **Syn:** = Ar, K3, K4, WH3, Judd (2003), Nesom (2010), Serviss et al (2016); = *Liriope spicatum* – Il, K1, orthographic variant. NatureServe GNR (Not Yet Ranked).





Maianthemum F.H. Wiggers 1780 (MAYFLOWER, SOLOMON'S-PLUME)

A genus of about 28 species, herbs, of n. Europe, e. Asia, North America, and Central America. The inclusion of the traditional *Smilacina* in *Maianthemum* remains uncertain. References: Conran & Tamura in Kubitzki (1998a); Floden (2017b) in Weakley et al (2017); Judd (2003); LaFrankie (1986); LaFrankie (2002) in FNA26 (2002a); Meng, Wang, & Nie (2016).



Maianthemum racemosum (Linnaeus) Link. EASTERN SOLOMON'S-PLUME, MAY-PLUME, TREACLEBERRY, "FALSE SOLOMON'S-SEAL". **Hab:** Moist to dry forests. **Dist:** The species (as here circumscribed narrowly to exclude the western *M. amplexicaule*) ranges from NS west to MB, south to GA, FL Panhandle, OK, and ne. TX. **Phen:** Mid Apr-Jun; Aug-Oct. **Tax:** The circumscription of this taxon has varied, from separate taxa at species, subspecies, or varietal rank in eastern vs. western North America, to recognizing a single polymorphic species. Recent evidence supports recognition of two taxa at species rank (Floden 2017b). A variety of chromosome races are known (2n = 36, 72, 144). The eastern *M. racemosum* is tetraploid; *M. amplexicaule* (Nuttall) W.A. Weber is diploid and more western. Under the generic name *Smilacina*, two varieties had been described for our area, *Smilacina racemosa* var. *racemosa* and *S. racemosa* var. *cylindrata* Fernald, the former larger in nearly all respects and more northern than the latter, smaller, and more southern form (see F for details). **Syn:** = K4, Floden (2017b) in Weakley et al (2017); = *Maianthemum racemosum* (Linnaeus) Link ssp. *racemosum* – Ar, FNA26, K1, K3, Mo1, NE, NY, Va, Judd (2003), LaFrankie (1986); = *Smilacina racemosa* var. *racemosa* – Tx; < *Maianthemum racemosum* (Linnaeus) Link – ETx1, Mi, Pa, Tn, WH3; < *Smilacina racemosa* (Linnaeus) Desfontaines – C, G, Il, RAB, W; > *Smilacina racemosa* var. *cylindrata* Fernald – F, WV; > *Smilacina racemosa* var. *racemosa* – F, WV; > *Vagnera australis* Rydberg – S; > *Vagnera racemosa* (Linnaeus) Morong – S. NatureServe G5T5 (Secure).

Ophiopogon Ker Gawler 1807 (MONDO GRASS)

A genus of 54 species, perennial herbs, of e. Asia. References: Conran & Tamura in Kubitzki (1998a); Nesom (2010); Roling, Howlett, & Brown (2011); Serviss et al (2016); Spaulding, Barger, & Nesom (2010).

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more)

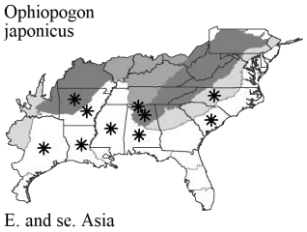
* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable

X : extirpated

74b. RUSCACEAE

* ***Ophiopogon japonicus*** (Thunberg) Ker Gawler. MONDO GRASS, BLACK MONDO. **Hab:** Suburban forests. **Dist:** Native of China, Taiwan, Japan, and Korea. **Syn:** = K1, K3, K4, Nesom (2010), Serviss et al (2016).



Polygonatum P. Miller 1754 (SOLOMON'S-SEAL)

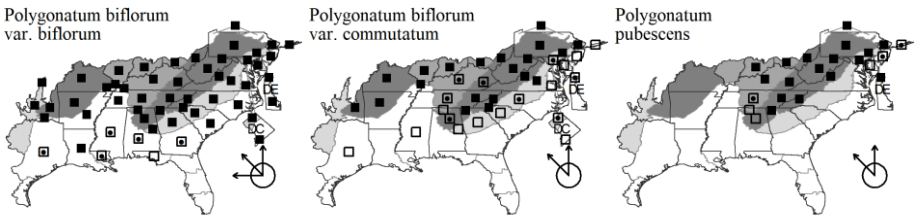
A genus of about 57 species, of temperate Eurasia and North America (most diverse in e. Asia). The *P. biflorum* complex is in need of further study. References: Conran & Tamura in Kubitzki (1998a); Eigsti (1942); Floden & Schilling (2018c); Judd (2003); Kawano & Iltis (1963); Ownbey (1944); Therman (1950); Therman (1953); Utech (2002m) in FNA26 (2002a).

1 Leaves pubescent on the veins beneath; flowers 7-13 mm long ..... ***Polygonatum pubescens***
1 Leaves glabrous; flowers 12-21 mm long.
  2 Stem robust, 5-13 mm thick below the leaves; plants to 20 dm tall; lower axillary peduncles strongly flattened, with (2-) 3-6 (-15) flowers; lowest peduncle in the axil of the (3rd-) 4th-5th (-8th) leaf; larger leaves 9-25 cm long, 3.5-13 cm wide; lower leaves clasping to 300° ..... ***Polygonatum biflorum var. commutatum***
  2 Stem slender, 1.5-5 mm in diameter; plants to 9 dm tall; lower axillary peduncles terete or nearly so, with (1-) 2-3 (-5) flowers; lowest peduncle in the axil of the (1st-) 3rd (-5th) leaf; larger leaves 5.5-15 cm long, 1.2-6 cm wide; lower leaves clasping to 90 (-180)°.
  ..... ***Polygonatum biflorum var. biflorum***

Polygonatum biflorum (Walter) Elliott *var*. ***biflorum***. SMALL SOLOMON'S-SEAL. **Hab:** Moist to dry forests. **Dist:** CT, NY, and s. ON west to MI, NE, and IN, south to n. FL, s. AL, and e. TX. **Phen:** Apr-Jun; Aug-Oct. **Tax:** In addition to the varieties recognized for our area, *P. biflorum* includes two additional varieties: var. *melleum* (Farwell) R. Ownbey of MI and ON, and var. *necopinum* R. Ownbey from the Black Hills of SD. The complex needs additional study. See var. *commutatum* for discussion of its distinction from var. *biflorum*. **Syn:** = NY, Pa, Va, Ownbey (1944); = *Polygonatum biflorum* – F, G, Il, K4, WV; < *Polygonatum biflorum* – Ar, C, ETx1, FNA26, NcTx, NE, RAB, Tn, Tx, W, WH3, Judd (2003); >< *Polygonatum biflorum* (Walter) Elliott var. *biflorum* – K3; >< *Polygonatum biflorum* (Walter) Elliott var. *commutatum* (Schultes f.) Morong – K1, Mo1; < *Polygonatum commutatum* (J.A. & J.H. Schultes) A. Dietrich – S.

Polygonatum biflorum (Walter) Elliott *var*. ***commutatum*** (Schultes f.) Morong. LARGE SOLOMON'S-SEAL, KING SOLOMON'S-SEAL. **Hab:** Moist forests, roadbanks. **Dist:** NH west to s. MB, south to SC, GA, MS, LA, and TX. **Phen:** May-Jun; Sep-Oct. **Tax:** There has been a wide divergence of opinion regarding the merits (and practicality) of distinguishing this taxon from typical *P. biflorum*, and the characters considered most reliable; the two taxa may differ in chromosome number and geographical distribution; they are not, however, always readily distinguished morphologically. I prefer to recognize this taxon as a variety. See references for additional discussion. **Syn:** = Mi, NY, Va; = *Polygonatum canaliculatum* (Muhlenberg ex Willdenow) Pursh – F, G, WV, misapplied; = *Polygonatum commutatum* (J.A. & J.H. Schultes) A. Dietrich – Il, Ownbey (1944); < *Polygonatum biflorum* – Ar, C, FNA26, K4, NE, RAB, Tn, Tx, W, Judd (2003); < *Polygonatum biflorum* (Walter) Elliott var. *biflorum* – K3; < *Polygonatum biflorum* (Walter) Elliott var. *commutatum* (Schultes f.) Morong – K1, Pa; < *Polygonatum commutatum* (J.A. & J.H. Schultes) A. Dietrich – S.

Polygonatum pubescens (Willdenow) Pursh. DOWNY SOLOMON'S-SEAL, HAIRY SOLOMON'S-SEAL. **Hab:** Moist forests, especially cove forests, but also in montane oak forests. **Dist:** S. QC west to s. MB, south to nw. SC, WV, KY, IN, WI, and IA. **Phen:** Late Apr-Jun; Aug-Oct. **Syn:** = C, F, FNA26, G, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, Tn, Va, W, WV, Judd (2003), Ownbey (1944); = *Polygonatum biflorum* – S, misapplied.



74c. AGAVACEAE Dumortier 1829 (AGAVE FAMILY) [in ASPARAGALES]

A family of about 25 genera and 640 species, herbs and rosette shrubs, of temperate and tropical America. The placement of *Camassia*, *Schoenolirion*, and *Hastingsia*, sometimes grouped as Hyacinthaceae subfamily Chlorogaloideae, has been uncertain; they are better placed in the Agavaceae, a position supported by molecular, serological, and biogeographic evidence. Hostaceae is included here based on recent molecular analyses (Steele et al. 2012). References: Bogler & Simpson (1995); Bogler & Simpson (1996); Kubitzki (1998a); Speta in Kubitzki (1998a); Steele et al (2012); Verhoek in Kubitzki (1998a); Verhoek & Hess (2002) in FNA26 (2002a).

1 Plants with erect stems; leaves cauline.
  2 Plant an herb, the arching stems producing a whorl of leaves at the tip, which can root down and form a new plant ..... ***Chlorophytum comosum***
  2 Plant woody, a shrub or small tree.
    3 Ovary inferior; leaves to 25 cm wide, the margin with stout spinose teeth or entire ..... ***Agave***
    3 Ovary superior; leaves to 6 cm wide, the margin fibrous, entire (cartilaginous), or serrulate ..... ***Yucca***
1 Plants acaulescent; leaves in basal rosettes or crowded very low on a short stem.
  4 Margins of leaves fraying into coarse, whitish, curly fibers; tepals about 4 cm long; leaves stiff and > 15 mm wide ..... ***Yucca***
  4 Margins of leaves entire, not fraying; tepals < 2 cm long; leaves stiff and wiry (and < 5 mm wide), herbaceous, or fleshy.
    5 Leaves oblong-acute, 2-25 cm wide, 2-20× as long as wide, fleshy or leathery.
    ..... ***Agave***
    5 Leaves linear, 0.3-1.8 cm wide, 20-100× as long as wide, herbaceous or wiry.
      7 Leaves with an expanded ovate blade; perianth segments 40-130 mm long ..... ***Hosta***

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

7 Leaves linear; perianth segments 5-18 mm long.
8 Perianth segments 13-18 mm long, blue or nearly white ..... ***Camassia***
8 Perianth segments 5-7 mm long, white, cream, or yellow ..... ***Schoenolirion***

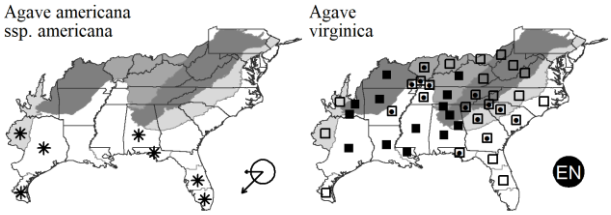
Agave Linnaeus 1753 (CENTURY PLANT, MAGUEY)

A genus of ca. 225 species, rosette shrubs, of tropical and neotropical New World. The separation of *Manfreda* and Polianthes is likely not warranted, based on phylogenetic data. References: Flores-Abreu et al (2019); Franck (2012); Reveal & Hodgson (2002) in FNA26 (2002a); Speta in Kubitzki (1998a); Verhoek (2002b) in FNA26 (2002a).

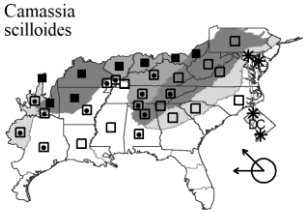
1 Leaves 0.6-10 cm wide; inflorescence a spike or raceme; leaf tip soft; [collectively widespread in dry habitats in our region] ..... ***Agave virginica***
1 Leaves 5-25 cm wide; inflorescence a panicle; leaf tip spinose; [aliens planted and rarely persistent or spreading usually on barrier islands, or natives of s. peninsular FL]. ..... ***Agave americana ssp. americana***

* ***Agave americana*** Linnaeus *ssp. **americana***. CENTURY-PLANT. **Hab:** Disturbed areas, dunes, spread weakly from cultivation. **Dist:** Native of Mexico. **Tax:** There are various horticultural forms of this species, sometimes accorded taxonomic rank. One has longitudinally striped leaves that have recurved tips. Others are solid blue-green with straight leaves. **Syn:** < *Agave americana* Linnaeus – Meso6, S, WH3; > *Agave americana* ssp. *americana* var. *americana* – FNA26, K3, K4, Franck (2012); > *Agave americana* ssp. *americana* var. *expansa* – FNA26, K3, K4, Franck (2012); > *Agave americana* var. *americana* – Tx; > *Agave americana* var. *marginata* Trelease – Tx; > *Agave americana* var. *medio-picta* Trelease – Tx; > *Agave americana* var. *striata* Trelease – Tx. NatureServe GNRTNR (Not Yet Ranked).

Agave virginica Linnaeus. EASTERN AGAVE, RATTLESNAKE-MASTER, EASTERN FALSE-ALOE. **Hab:** Granite flatrocks, diabase glades, limestone and dolomite barrens and glades, xeric woodlands over mafic or calcareous rocks, sandhill woodlands, dry roadbanks. **Dist:** E. SC, c. NC, sw. VA, w. WV, s. OH, s. IN, s. IL, and c. MO south to c. peninsular FL and TX. **Phen:** Late May-Aug; Aug-Oct. **Syn:** = C, F, RAB, WV; = *Manfreda virginica* (Linnaeus) Salisbury ex Rose – Ar, ETx1, Il, K1, Mo1, Mo1, Va, W, WH3; = *Manfreda virginica* ssp. *virginica* – K3, K4, NcTx; = *Polianthes virginica* (Linnaeus) Shinners – Tx; > *Manfreda tigrina* (Engelmann) Small – S; < *Manfreda virginica* (Linnaeus) Salisbury ex Rose – FNA26; > *Manfreda virginica* (Linnaeus) Salisbury ex Rose – S.

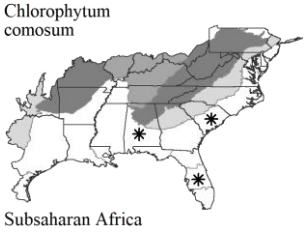


Camassia Lindley 1832 (WILD HYACINTH, QUAMASH LILY, CAMAS LILY)



A genus of 6 species, of North America. The affinities of *Camassia* are with the Agavaceae, rather than the Hyacinthaceae (Fay & Chase 1996, Bogler & Simpson 1996, Speta in Kubitzki 1998a). References: Ranker & Hogan (2002) in FNA26 (2002a); Speta in Kubitzki (1998a).

Camassia scilloides (Rafinesque) Cory. WILD HYACINTH, QUAMASH LILY, EASTERN CAMAS LILY. **Hab:** Moist forests, over circumneutral soils, in GA, VA, and WV on limestone, in NC on slopes and natural levees along the Roanoke River, in SC over gabbro, and westward in circumneutral prairies, oak savannas, calcareous glades and woodlands. **Dist:** W. PA and s. ON west to s. WI and e. KS, south to nw. GA (Jones & Coile 1988) and TX, nearly entirely west of the Blue Ridge, with only a few disjunct occurrences in the Piedmont and Coastal Plain. **Phen:** Apr-May (-Jun). **Syn:** = Ar, C, F, FNA26, G, Il, K1, K3, K4, Mi, Mo1, NcTx, Pa, RAB, Va, W; = *Quamasia hyacintha* (Rafinesque) Britton – S; < *Camassia scilloides* (Rafinesque) Cory – ETx1, Tx.

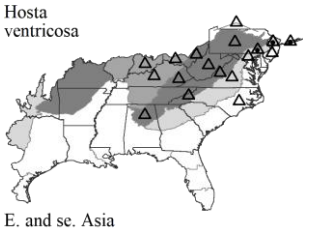


Chlorophytum Ker Gawler 1807 (SPIDER-PLANT)

A genus of 150-190 species, perennial herbs, of tropical and subtropical Africa and Asia. References: Conran in Kubitzki (1998a).

* ***Chlorophytum comosum*** (Thunberg) Jacques. SPIDER-PLANT, AIRPLANE-PLANT. **Hab:** Suburban woodlands. **Dist:** Native of s. Africa. Weakly naturalized in s. AL (Diamond 2014). **Phen:** Jun-Sep. **Syn:** = K4, WH3. NatureServe GNR (Not Yet Ranked).

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



Hosta Trattinnick 1812 (HOSTA, PLANTAIN-LILY)

A genus of about 25-40 herbs, of temperate Asia, widely cultivated (since at least the 8th century), and with numerous cultivars. References: Kubitzki (1998a); Utech (2002o) in FNA26 (2002a).

* ***Hosta ventricosa*** (Salisbury) Stearn. BLUE PLANTAIN-LILY. **Hab:** Widely planted as a shade ornamental. **Dist:** Native of China. Reported for AL by Diamond (2014). **Phen:** Jun-Jul. **Syn:** = FNA26, K1, K3, K4, Mi, NE, NY, Pa. NatureServe GNR (Not Yet Ranked).

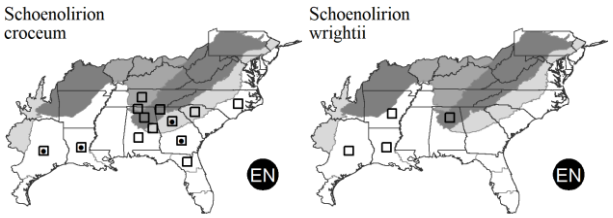
Schoenolirion Torrey ex Durand 1855 (SUNNYBELL)

A genus of 3 species, herbs, of s. North America. References: Sherman (2002) in FNA26 (2002a).

2 Perianth golden-yellow ..... ***Schoenolirion croceum***
2 Perianth white ..... ***Schoenolirion wrightii***

Schoenolirion croceum (Michaux) Alph. Wood. YELLOW SUNNYBELL. **Hab:** Wet pine savannas, bogs, seepage slopes, seepages on granite flatrocks. **Dist:** SC (and apparently NC) south to ne. FL, west to se. TX; and in c. TN on limestone glades (Chester et al. 1993). The occurrence in NC in "wet pinelands" in Richmond County referred to in RAB has not been relocated or further documented. **Phen:** Late Mar-May; May-Jun. **Syn:** = ETx1, FNA26, GW1, K1, K3, K4, RAB, Tx, WH3; = *Oxytria crocea* (Michaux) Rafinesque – S. NatureServe G4 (Apparently Secure).

Schoenolirion wrightii Sherman. TEXAS SUNNYBELL. **Hab:** Saline prairies, seepage over sandstone, Catahoula barrens. **Dist:** Se. AR and w. LA west to e. TX; disjunct eastward in ne. AL. **Phen:** Apr-early May. **Syn:** = Ar, ETx1, FNA26, K1, K3, K4; = *Oxytria texana* (Scheele) Pollard – S; = *Schoenolirion texanum* (Scheele) A. Gray – Tx. NatureServe G3 (Vulnerable).



Yucca Linnaeus 1753 (YUCCA, ADAM'S-NEEDLE, ROCK-LILY)

A genus of about 40 species, of sw. North America, n. Mexico, se. United States, and the West Indies. Many issues remain in our understanding of Southeastern United States *Yucca*. References: Clary & Adams (2021); Hess & Robbins (2002) in FNA26 (2002a); Keith (2003); Speta in Kubitzki (1998a); Ward (2004c); Ward (2006a).

Identification Notes: The taxonomy and key presented is particularly conjectural.

1 Plants caulescent when fully developed (an erect shrub or small tree), the lower parts of the stem readily visible because no longer clothed with leaves.
  4 Leaf margins minutely notched-serrulate, particularly toward the base; seeds 2.5 mm thick, marginless ..... ***Yucca aloifolia***
  4 Leaf margins entire, smooth, hyaline-brown or hyaline-yellow; seeds ca. 1 mm thick, margined.
    ..... ***Yucca recurvifolia***
1 Plants acaulescent (with a cluster of basal leaves) or with a short stem < 3 dm tall above ground level and clothed with numerous leaves (no part of the aerial stem nonleafy and obviously visible).
  7 Inflorescence branches glabrous; tepals 5-7 cm long; leaves 2-6 cm wide, stiff, the apex acute-acuminate to obtuse, often concave upward at the apex, the marginal fibrils usually elongate (to 20 cm long) ..... ***Yucca filamentosa***
  7 Inflorescence branches scurfy-pubescent; tepals 3-5 cm long; leaves 1.5-4 cm wide, pliable, the apex attenuate-acuminate, not notably concave, the marginal fibrils usually short (to 4 cm long).
    ..... ***Yucca flaccida***

Yucca aloifolia Linnaeus. SPANISH DAGGER. **Hab:** Dunes; also cultivated and persistent. **Dist:** Se. VA south to s. FL and west to LA; Bahamas; also in Mexico (Villaseñor 2016). **Phen:** Jun-Aug; Oct-Dec. **Syn:** = Bah, FNA26, K1, K3, K4, Meso6, RAB, S, Va, WH3, Clary & Adams (2021). NatureServe G5 (Secure).

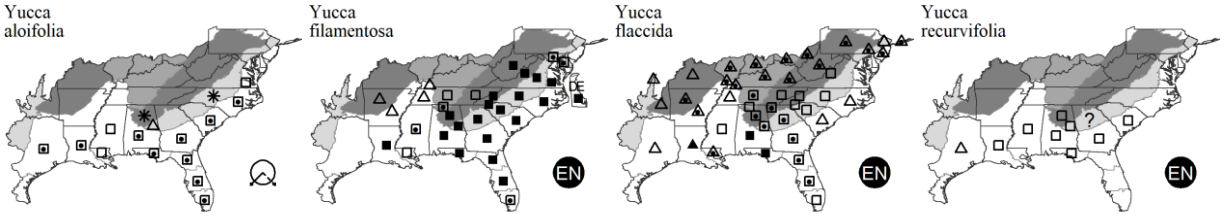
Yucca filamentosa Linnaeus. CURLYLEAF YUCCA, SPOONLEAF YUCCA. **Hab:** Woodlands, forests, dunes, roadsides, disturbed areas. **Dist:** S. NJ south to GA, west to MS; escaped from cultivation over a broader area of e. United States. **Phen:** Late Apr-early Jun; Sep-Oct. **Syn:** = Ar, F, FNA26, K3, K4, Mi, NE, NY, S, Va, W, WV, Ward (2004c); = *Yucca filamentosa* var. *filamentosa* – RAB; = *Yucca smalliana* Fernald – Il; > *Yucca concava* Haworth – S; < *Yucca filamentosa* Linnaeus – C, G, K1; > *Yucca filamentosa* Linnaeus – S.

Yucca flaccida Haworth. WEAKLEAF YUCCA. **Hab:** Thin soils around rock outcrops, woodlands, roadsides, disturbed areas. **Dist:** Sw. VA, c. NC and TN south to s. FL and AL. **Phen:** Late Apr-Jul; Sep-Oct. **Tax:** Whether or not this taxon is valid (and if so, as a variety or as a species) has been unclear; further research is needed. **Syn:** = Ar, Il, K3, K4, Mi, S, Tx, Va, W; = *Yucca filamentosa* var. *smalliana* (Fernald) H.E. Ahles – RAB; = *Yucca*

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated

smalliana Fernald – F, Mo1, WV; < *Yucca filamentosa* Linnaeus – C, G, K1, WH3; < *Yucca flaccida* Haworth – FNA26, Pa; > *Yucca flaccida* var. *flaccida* – Ward (2004c); > *Yucca flaccida* var. *smalliana* (Fernald) D.B. Ward – Ward (2004c).

Yucca recurvifolia Salisbury. CURVE-LEAF YUCCA. **Hab:** Dunes, dry sandy soils. **Dist:** GA and Panhandle FL west to w. LA (introduced in e. TX). **Syn:** = S; = *Yucca gloriosa* Linnaeus var. *recurvifolia* (Salisbury) Engelmann – ETx1, FNA26, K3; < *Yucca gloriosa* Linnaeus – K4, WH3, Clary & Adams (2021).



74e. HYACINTHACEAE Batsch ex Borkhausen 1797 (HYACINTH FAMILY) [in ASPARAGALES]

A family of about 67 genera and 900 species, herbs, nearly cosmopolitan. References: Pfosser et al (2003); Speta in Kubitzki (1998a).

1 Tepals united into a perianth tube longer than the free portion; [subfamily *Hyacinthoideae*, tribe *Hyacintheae*]. ..... ***Muscari***
1 Tepals separate or fused only at the extreme base. ..... ***Ornithogalum***

Muscari P. Miller 1754 (GRAPE-HYACINTH)

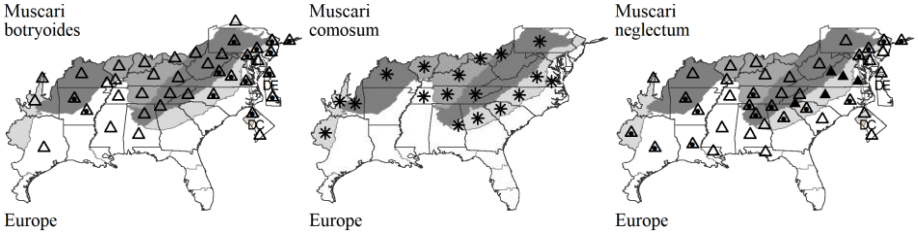
A genus of about 50 species, herbs, of Europe, Mediterranean areas, and w. Asia. References: Speta in Kubitzki (1998a); Stace (2010); Straley & Utech (2002g) in FNA26 (2002a).

1 Raceme 10-20 cm long; pedicels of the terminal flowers > 5 mm long; flowers brown (the lower and fertile) and blue (the upper and sterile); leaves flat, mostly 8-20 mm wide ..... ***Muscari comosum***
1 Raceme 1-5 cm long in flower (somewhat longer in fruit); pedicels < 5 mm long; flowers all blue to blue-black; leaves flat, channeled, or terete, mostly 1-8 mm wide.
2 Leaves flat or channeled, 3-8 mm wide; corolla nearly spherical, the lobes strongly recurved ..... ***Muscari botryoides***
2 Leaves nearly terete, 1-3 mm wide; corolla ellipsoid-ovoid, distinctly longer than wide, the lobes erect. ..... ***Muscari neglectum***

* ***Muscari botryoides*** (Linnaeus) P. Miller. COMPACT GRAPE-HYACINTH. **Hab:** Cultivated as an ornamental, persistent and naturalized in lawns, old fields, suburban woodlands, and disturbed areas. **Dist:** Native of Europe. **Phen:** Mar-Apr; May-Jun. **Syn:** = Ar, C, ETx1, F, FNA26, G, Il, K1, K3, K4, Mi, Mo1, NE, NY, Pa, RAB, S, Tn, Va, WV, Stace (2010). NatureServe GNR (Not Yet Ranked).

* ***Muscari comosum*** (Linnaeus) P. Miller. TASSEL GRAPE-HYACINTH. **Hab:** Cultivated as an ornamental, persistent and naturalized in lawns, old fields, suburban woodlands, and disturbed areas. **Dist:** Native of Europe. **Phen:** Mar-Apr; May-Jun. **Syn:** = C, F, FNA26, G, Il, K1, K3, K4, Mo1, Tn, Stace (2010). NatureServe GNR (Not Yet Ranked).

* ***Muscari neglectum*** Gussone ex Tenore. GRAPE-HYACINTH. **Hab:** Cultivated as an ornamental, persistent and naturalized in lawns, old fields, suburban woodlands, and disturbed areas. **Dist:** Native of Europe. **Phen:** Mar-May; May-Jun. **Syn:** = Ar, ETx1, FNA26, K1, K3, K4, Mi, NcTx, NE, NY, Pa, Tn, Va, WH3, Stace (2010); = *Muscari racemosum* (Linnaeus) Lamarck & A.P. de Candolle – C, F, G, Mo1, RAB, S, Tx, WV; ? *Muscari atlanticum* Boissier & Reuter – W. NatureServe GNR (Not Yet Ranked).



Ornithogalum Linnaeus 1753 (STAR-OF-BETHLEHEM)

A genus of about 50 species, herbs, of Mediterranean s. Europe, n. Africa, east to w. Asia. References: Martínez-Azorín et al (2011); Speta in Kubitzki (1998a); Stace (2010); Straley & Utech (2002h) in FNA26 (2002a).

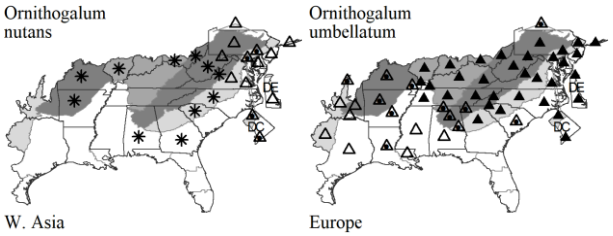
1 Lower pedicels < 1 cm long, about as long as the upper pedicels (and shorter than the perianth segments), the inflorescence thus racemose and cylindrical in outline; leaves mostly 8-15 mm wide; scape 2-5 dm tall; tepals bicolored, green-gray down the center and white near the edges ..... ***Ornithogalum nutans***

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

1 Lowest pedicels 2-6 cm long, longer than the upper pedicels (and longer than the perianth segments), the inflorescence thus corymbose, rounded or flat-topped in profile; leaves mostly 2-5 mm wide; scape 1-3 dm tall; tepals white..... ***Ornithogalum umbellatum***

* ***Ornithogalum nutans*** Linnaeus. DROOPING STAR-OF-BETHLEHEM. **Hab:** Lawns and suburban woodlands, commonly cultivated. **Dist:** Native of w. Asia. **Phen:** Mar-Apr (-May). **Syn:** = Ar, C, F, FNA26, G, Il, K1, K3, K4, Mi, Mo1, NE, Pa, RAB, Va, WV, Stace (2010); = *Honorius nutans* (Linnaeus) S.F. Gray – Martínez-Azorín et al (2011). NatureServe GNR (Not Yet Ranked).

* ***Ornithogalum umbellatum*** Linnaeus. STAR-OF-BETHLEHEM, SNOWFLAKE, NAP-AT-NOON. **Hab:** Lawns, old fields, bottomlands, forests, commonly cultivated. **Dist:** Native of Europe. **Phen:** Mar-May (-Jun). **Syn:** = Ar, C, ETx1, F, FNA26, G, Il, K1, K3, K4, Mi, Mo1, NcTx, NE, Pa, RAB, S, Tn, Va, W, WV, Martínez-Azorín et al (2011); > *Ornithogalum umbellatum* ssp. *campestre* Rouy – Stace (2010); > *Ornithogalum umbellatum* ssp. *umbellatum* – Stace (2010). NatureServe G3G5 (Apparently Secure).



76. ARECACEAE Berchtold & J. Presl 1820 (PALM FAMILY) [in ARECALES]

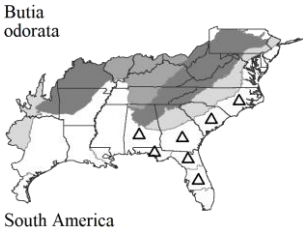
Scott Zona and Alan S. Weakley

A family of about 181 genera and 2600 species, trees and shrubs, of tropical and subtropical regions of both hemispheres. References: Baker & Dransfield (2016); Dransfield & Uhl in Kubitzki (1998b); Dransfield et al (2008); Zona (2000) in FNA22 (2000).

Identification Notes: In palmate and costapalmate palms, the hastula is the triangle of tissue where the petiole joins the leaf blade, as seen on the upper (adaxial) surface.

1 Leaves palmate or costapalmate (lacking a central axis or with a short central axis, the outline of the leaf blade about as long as wide); [subfamily *Coryphoideae*].
2 Petioles armed with sharp recurved teeth; [tribe *Trachycarpeae*].
..... ***Serenoa repens***
2 Petioles unarmed (though the leaf sheaths are strongly armed with long needle-like spines in *Rhapidophyllum*).
7 Leaves costapalmate (a hastula extending at least several cm into the leaf blade, especially visible on the leaf underside); [tribe *Sabaleae*] .....
..... ***Sabal***
7 Leaves palmate; [tribe *Cryosophileae*].
..... ***Rhapidophyllum hystrix***
1 Leaves pinnate or bipinnate (with a well-developed central axis, the outline of the leaf blade much longer than wide).
12 Leaf segments induplicate (V-shaped in ×-section, the midrib lowest, like the keel of a boat); [subfamily *Coryphoideae*; tribe *Phoenicinae*] ..... ***Phoenix***
12 Leaf segments reduplicate (Λ-shaped in ×-section, the midrib highest, like the summit of a pitched roof)
..... ***Butia odorata***

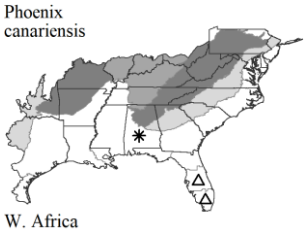
Butia (Beccari) Beccari 1916 (BUTIA)



A genus of about 22 species, trees, native of subtropical regions of South America. References: Dransfield & Uhl in Kubitzki (1998b); Dransfield et al (2008); Noblick (2011).

* ***Butia odorata*** (Barbosa Rodrigues) Noblick. BRAZILIAN BUTIA, SOUTH AMERICAN JELLY PALM, PINDO PALM. **Hab:** Widely planted in the outer Coastal Plain of se. NC, e. SC, e. GA, and FL, persistent in apparently semi-natural situations, and now showing signs of naturalizing into natural areas. **Dist:** Native of s. Brazil and Uruguay. **Comm:** See Noblick (2011) for an account of the nomenclature. See Byrd & Diamond (2018) for the first report in AL and Zomlefer et al. (2018) for report from GA. **Syn:** = K4, Noblick (2011); = n/a – RAB; < *Butia capitata* (Martius) Beccari – K3, WH3, misapplied. NatureServe GNR (Not Yet Ranked).

Phoenix Linnaeus 1753 (DATE PALM)

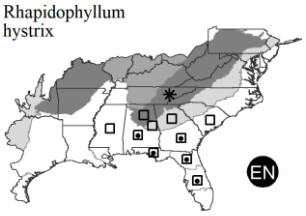


A genus of 12-14 species, trees, of tropical Asia, Africa, and s. Europe. References: Barrow (1998); Dransfield & Uhl in Kubitzki (1998b); Dransfield et al (2008); Zona (1997); Zona (2000) in FNA22 (2000).

* ***Phoenix canariensis*** Chabaud. CANARY ISLAND DATE PALM. **Hab:** Disturbed hammocks and maritime forests. **Dist:** Native of the Canary Islands. **Syn:** = FNA22, K3, K4, Barrow (1998). NatureServe G1G3 (Imperiled).

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Rhapidophyllum H. Wendland & Drude 1876 (NEEDLE PALM)



A monotypic genus, a shrub of se. North America (Henderson, Galeano, & Bernal 1995). The closest relatives to *Rhapidophyllum* are apparently *Maxburretia* of se. Asia and *Chamaerops* of the Mediterranean Basin (Bacon et al. 2012). References: Clancy & Sullivan (1990); Dransfield & Uhl in Kubitzki (1998b); Dransfield et al (2008); Zona (1997); Zona (2000) in FNA22 (2000).

Rhapidophyllum hystrix (Pursh) H. Wendland & Drude. NEEDLE PALM, BLUE PALMETTO. **Hab:** Moist to wet soils of small blackwater stream swamps, especially where underlain with coquina limestone ("marl"), hydric hammocks and rich, wetland-upland transitions. **Dist:** Se. SC (Beaufort and Jasper counties) south to c. peninsular FL, and west to s. MS. Becoming somewhat popular as a hardy palm that can be grown in the Southeast, well north of its natural range. As a result, records of it naturalizing northwards should be anticipated; reported for the mountains of TN (J. Shaw., 2020, iNaturalist and pers.comm.). **Syn:** = FNA22, GW1, K1, K3, K4, S, WH3, Zona (1997); = n/a – RAB. NatureServe G4 (Apparently Secure).

Sabal Adanson 1763 (PALMETTO)

A genus of about 16 species, trees and shrubs, primarily distributed around the Caribbean Basin. References: Dransfield & Uhl in Kubitzki (1998b); Dransfield et al (2008); Goldman et al (2011); Zona (1990); Zona (1997); Zona (2000) in FNA22 (2000).

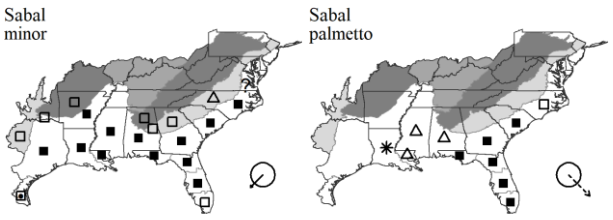
Identification Notes: The hastula is the triangle of tissue where the petiole joins the leaf blade, as seen on the upper (adaxial) surface.

1 Tree, with erect trunk (though young plants appear as trunkless shrubs, similar in habit to *S. minor*); leaves 15-30 per plant; hastula 5.3-18 cm long, acute to acuminate; margins of leaf segments with filamentose fibrils; leaf segment apices 2-cleft. ..... ***Sabal palmetto***

1 Shrub, with subterranean, rhizomatous "trunk" (very rarely emerging as much as 1 meter from the ground); leaves 3-10 per plant; hastula 0.8-7.7 cm long, obtuse to acute; margins of leaf segments with or without filamentose fibrils; leaf segment apices either 2-cleft (*S. etonia* and *S. miamiensis*) or entire (*S. minor*). ..... ***Sabal minor***

Sabal minor (Jacquin) Persoon. DWARF PALMETTO. **Hab:** Swamps, maritime forests, low moist woods, especially in calcareous soils developed from shell limestone (marl), hardwood flatwoods, marshes, saline barrens, also rarely planted as an ornamental farther inland, where persisting (and appearing native) or possibly naturalizing. **Dist:** Ne. NC (Currituck County)(or possibly se. VA?) south to c. peninsular FL, west to e. TX, c. TX, se. OK, and s. AR; disjunct in Nuevo León (Goldman 1999). This palm reaches its northern limit at Monkey Island, Currituck County, NC, and other more inland sites just a few miles south of the VA border (L. Musselman, J. Boggan, pers. comm., 2006); no other New World palm has a native range extending so far north. **Phen:** May-Jul; Sep-Nov. **Syn:** = Ar, FNA22, GW1, K1, K3, K4, NcTx, RAB, WH3; > *Sabal deeringiana* Small – S; < *Sabal minor* (Jacquin) Persoon – ETx1, Tx, Zona (1990), Zona (1997); > *Sabal minor* (Jacquin) Persoon – S.

Sabal palmetto (Walter) Loddiges ex Schultes & Schultes f. CABBAGE PALMETTO. **Hab:** Maritime forests, marsh edges, and other near-coastal communities. **Dist:** Native from se. NC south to s. FL, west to w. Panhandle FL, and in the West Indies in Cuba and the Bahamas; planted beyond that range, especially on the Gulf Coast. **Phen:** Jul; Oct-Nov. **Comm:** This palm is the state tree of South Carolina and is common and conspicuous (both as a native tree and in plantings) along the South Carolina coast; it currently reaches its northern limit as a native species in Brunswick County, NC, where it is a conspicuous part of the forest on Smith Island complex (Bald Head Island, Middle Island, Bluff Island). It is planted elsewhere (and farther north) on the coast. Periodic disturbance by hurricanes helps maintain populations of *Sabal palmetto*, which survives winds and flooding that topple or kill *Quercus virginiana*. Curtis (1883) reports that "Cape Hatteras is, or was, the northern limit of this Palm… It is to be deeply regretted, however, that a reckless indifference to the future, which has been charged as a characteristic of Americans, is likely to efface, at no very distant time, every vestige of this interesting ornament of our coast. The inner portion of the young plant is very tender and palatable, somewhat resembling the Artichoke and Cabbage in taste (hence its name of *Cabbage Tree*), and is often taken for pickling, and the stock is ruined by the process. Thus for a pound or two of pickles, no better either than many other kinds, the growth of half a century is destroyed in a moment, and posterity left to the wretched inheritance of vain mourning for the loss of the greatest beauty of our maritime forest." **Syn:** = Bah, FNA22, GW1, K1, K3, K4, RAB, WH3, Zona (1990), Zona (1997); > *Sabal jamesiana* Small – S; > *Sabal palmetto* (Walter) Loddiges ex Schultes & Schultes f. – S. NatureServe G5 (Secure).



Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more)

* : waif
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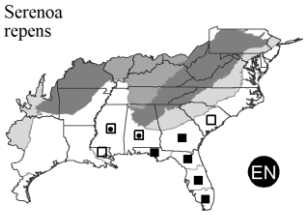


Serenoa Hooker f. 1883 (SAW PALMETTO)

A monotypic genus, a shrub, endemic to the se. United States. *Serenoa* is closely related to *Acoelorraphe*, of the West Indies, including s. FL (Zona in FNA 2000). References: Dransfield & Uhl in Kubitzki (1998b); Dransfield et al (2008); Zona (1997); Zona (2000) in FNA22 (2000).

Serenoa repens (Bartram) Small. SAW PALMETTO. **Hab:** Pine flatwoods, maritime forests, pine rocklands (in FL). **Dist:** Se. SC (in maritime forests in Charleston and Colleton counties, and in spodosolic flatwoods in Beaufort and Jasper counties) south to s. FL and west to e. LA. **Phen:** May-Jul; Oct-Nov. **Tax:** The species has variation in leaf color caused by differences in epicuticular waxiness, with green and gray forms. **Comm:** *Serenoa* forms extensive clonal patches, connected by underground rhizomes, and is a dominant plant in many parts of FL, in pine flatwoods or scrub. **Syn:** = FNA22, GW1, K1, K3, RAB, S, WH3, Zona (1997). NatureServe G4G5 (Apparently Secure).

78. COMMELINACEAE Mirbel 1804 (SPIDERWORT FAMILY) [in COMMELINALES]

A family of about 41 genera and 650 species, herbs, of tropical and warm temperate regions of both hemispheres. References: Bergamo (2003); Burns, Faden, & Steppan (2011); Faden in Kubitzki (1998b); Faden (2000b) in FNA22 (2000); Tucker (1989).

Identification Notes: Monocot herbs with alternate leaves with closed sheaths, the leaf blade relatively broad in most species, parallel-veined, and often slightly to strongly thickened and succulent. The flowers have 3 petals (one sometimes dwarf) in colors of white, pink, blue, or purple.

1 Spathes absent; inflorescence open and repeatedly branched; [tribe *Tradescantieae*] ..... ***Gibasis pellucida***
1 Spathes present, single or paired; inflorescence compact, unbranched.
  2 Spathes paired, terminating the stem, resembling foliage leaves in size, shape, texture, and coloration; [tribe *Tradescantieae*] ..... ***Tradescantia***
  2 Spathes single (or paired in *Callisia*), either terminal or axillary, differing from the foliage leaves (in *Commelina* folded, heart-shaped when spread, and usually pale-green, in *Cuthbertia* and *Murdannia* scale-like, scarious, and inconspicuous, sometimes hidden by foliage leaves in *Murdannia*).
    3 Spathe folded, heart-shaped when unfolded, usually pale-green, closely subtending and surrounding the flower pedicels; petals unequal, the 2 upper petals larger and usually more deeply colored than the lower petal (which is sometimes absent); [tribe *Commelineae*] ..... ***Commelina***
    3 Spathe scale-like, scarious, and inconspicuous, not closely subtending and surrounding the flower pedicels; petals equal, in both size and coloration.
      5 Leaves linear, > 20× as long as wide; petals bright pink (rarely white); [tribe *Tradescantieae*] ..... ***Cuthbertia***
      5 Leaves lanceolate, < 20× as long as wide; petals white, pink, purplish, or bluish. ..... ***Murdannia***

Commelina Linnaeus 1753 (DAYFLOWER)

A genus of about 170 species, herbs, cosmopolitan. The key is adapted in part from Brashier (1966), Faden (1993), and Tucker (1989). References: Brashier (1966); Faden in Kubitzki (1998b); Faden (1993); Faden (2000b) in FNA22 (2000); Tucker (1989).

Identification Notes: *Commelina* has bilateral flowers, with 2 large petals (usually blue or white, but peach-colored in one species) and 1 smaller petal (often paler, and sometimes translucent). The flowers emerge from a folded spathe (very different than the leaves) which is heart-shaped if opened and spread. Only *Tinantia* (restricted to TX) is similar in these features; it differs in having 6 rather then 3) fertile stamens, and the filaments being bearded with hairs (rather than glabrous).

1 Spathes with margins free to the base; [introduced species, usually in weedy habitats].
  2 Spathes generally whitish or pale green toward the peduncle, with contrasting dark green veins; middle petal white or paler than the others; capsules with 2 locules (the third aborting); seeds rugose foveate-reticulate ..... ***Commelina communis***
  2 Spathes lacking contrasting veins; middle petal about the same color as the others; capsules with 3 locules; seeds reticulate or smooth to faintly alveolate.
    3 Spathes not at all to slightly falcate (the lower margin straight or very nearly so); upper cyme usually vestigial (rarely well-developed and 1-flowered); seeds smooth to faintly alveolate; peduncles of the spathes with hairs to 0.5 mm long ..... ***Commelina caroliniana***
    3 Spathes usually distinctly falcate (the lower margin curved); upper cyme in larger spathes usually well-developed and 1-several-flowered; seeds deeply reticulate; peduncles of the spathes with hairs to 0.1 mm long. ..... ***Commelina diffusa***
1 Spathes with margins fused basally; [native species, usually in natural habitats, or introduced and weedy].
  6 Leaf sheaths not auriculate at the summit, ciliate with coarse reddish-brown, white, or colorless hairs; middle petal blue, lilac, or lavender; [mostly of moist or wet soils].
    7 Perennial from horizontal rhizomes, often forming clonal patches of erect stems; leaf blades lance-oblong, 6-20 cm long, the apex acuminate; leaf margin and upper surface scabrous; plants lacking subterranean, cleistogamous flowers; [native, mostly of moist floodplain forests] ..... ***Commelina virginica***
    7 Annual from fibrous roots, the stem decumbent; leaf blades broadly elliptic-ovate, 1-9 cm long, the apex acute to obtuse; leaf margin and upper surface pubescent or glabrous; plants often bearing subterranean, cleistogamous flowers; [alien, weedy]. ..... ***Commelina benghalensis***
  6 Leaf sheaths prolonged upwards into auricles, ciliate with white hairs; middle petal white; plant perennial from thickened, fibrous roots, not forming clonal patches; [mostly of dry, sandy or rocky soil].
    9 Larger leaves (6-) 10-15 cm long, (1.1-) 1.5-4.0 cm wide (typically 3-6× as long as wide); spathes (2.0-) 2.5-3.6 cm long ..... ***Commelina erecta var. erecta***
    9 Larger leaves 4-15 cm long, 0.4-1.4 cm wide (typically 5-12× as long as wide); spathes 1-3 cm long. ..... ***Commelina erecta var. angustifolia***

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

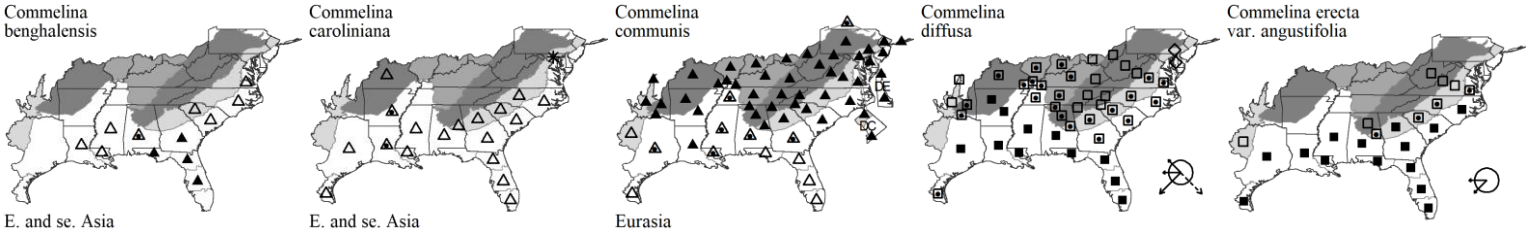
* ***Commelina benghalensis*** Linnaeus. TROPICAL SPIDERWORT, BENGAL DAYFLOWER. **Hab:** Fields. **Dist:** Native of tropical s. Asia and becoming a serious weed. This annual, pantropical weed is well established in FL and s. GA (Faden 1993). **Comm:** Spot infestations have been reported in NC (Wayne County), SC (Beaufort, Dorchester, Edgefield, Orangeburg, Pickens counties), AL (Barger et al. 2012), and MS as well. "This annual species can be recognized by: its funnelform spathes that are often clustered; relatively broad leaves that frequently have red hairs at the summit of the sheath; and cleistogamous flowers that are borne at the base of the plant and are usually subterranean (in addition to normal, aerial, chasmogamous flowers)" (Faden 1993). **Syn:** = FNA22, K1, K4, WH3, Faden (1993). NatureServe G5 (Secure).

* ***Commelina caroliniana*** Walter. INDIAN DAYFLOWER. **Hab:** Moist disturbed areas, fields. **Dist:** Native of India and Bangladesh. **Phen:** Jun-Oct. **Tax:** Faden (1989, 1993) discusses in detail the taxonomy and history of this species. It was apparently introduced to our area early (perhaps as early as the late 17th century), probably as a weed in rice. **Syn:** = Ar, C, ETx1, FNA22, G, K1, K3, K4, Mo1, RAB, S, WH3, Faden (1993); < *Commelina diffusa* Burman f. – GW1, Brashier (1966), Tucker (1989).

* ***Commelina communis*** Linnaeus. COMMON DAYFLOWER. **Hab:** Gardens, bottomlands, disturbed ground, and a common invader of rocky glades. **Dist:** Native of the Old World. **Phen:** May-Oct. **Tax:** Var. *communis* and var. *ludens* are sometimes distinguished (see synonymy): var. *communis* has flowers with larger petals pale blue and sterile anthers completely yellow, var. *ludens* has larger petals intense violet blue and sterile anthers with a brownish-purple spot. **Syn:** = Ar, C, ETx1, FNA22, GrPl, GW1, Il, K3, K4, Mi, Mo1, NcTx, NE, NY, RAB, S, Tn, Tx, Va, W, WH3, Brashier (1966), Faden (1993); > *Commelina communis* var. *communis* – F, G, K1, Pa, WV, Tucker (1989); > *Commelina communis* var. *ludens* – F, G, K1, Pa, WV, Tucker (1989).

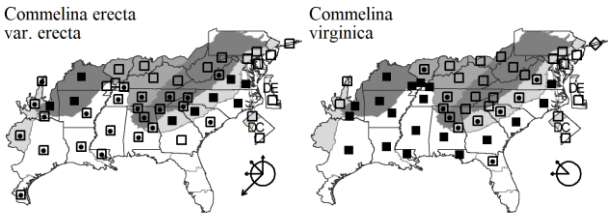
Commelina diffusa Burman f. CREEPING DAYFLOWER. **Hab:** Mudflats, alluvial margins, bottomlands, also fields and disturbed ground. **Dist:** VA west to MO, south to s. FL and s. TX, Mexico, Ceantral America, South America, and the West Indies. Probably native in our area, but sometimes regarded as an Old World species. Encountered very early inland, so plausible as native or as an early introduction. **Phen:** Jun-Oct. **Syn:** = Bah, C, ETx1, F, G, GrPl, Il, Meso6, Mo1, NcTx, Pa, RAB, Tn, Tx, Va, W, WI; = *Commelina diffusa* var. *diffusa* – Ar, FNA22, K1, K3, K4, NE, WH3, Faden (1993); = *Commelina longicaulis* Jacquin – S; < *Commelina diffusa* Burman f. – GW1, Brashier (1966), Tucker (1989). NatureServe G5T5 (Secure).

Commelina erecta Linnaeus *var*. ***angustifolia*** (Michaux) Fernald. SAND DAYFLOWER. **Hab:** Dunes and dry sand flats on barrier islands, longleaf pine sandhills, other dry sandy sites, shale barrens, other dry rocky sites. **Dist:** E. NC south to s. FL, west to TX, and north and west in the interior to IA, nw. NE, CO, and NM; also apparently in Central and South America. **Phen:** Jun-Oct. **Tax:** The taxonomy and distribution of the varieties here recognized need further study. **ID Notes:** Contrary to the specific epithet, *C. erecta* var. *angustifolia* is a trailing plant, the stems sometimes as long as 1.3 m. **Syn:** = C, ETx1, F, G, Il, K1, NcTx, Tx, WV, Brashier (1966); > *Commelina angustifolia* Michaux – S; > *Commelina crispa* Wooton – S; > *Commelina elegans* Kunth – Bah; < *Commelina erecta* Linnaeus var. *angustifolia* (Michaux) Fernald – FNA22, K3, K4, Meso6, RAB, Tn, W, WH3, Faden (1993), Tucker (1989); < *Commelina erecta* Linnaeus var. *angustifolia* (Michaux) Fernald – GrPl. NatureServe G5T5 (Secure).

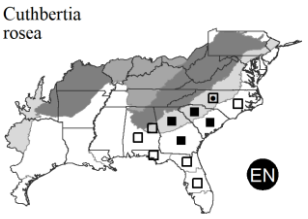


Commelina erecta Linnaeus *var*. ***erecta***. ERECT DAYFLOWER. **Hab:** Dry openings and woodlands, especially in thin soil around rock outcrops, streambanks, riverbanks, mesic forests. **Dist:** PA west to MO and e. KS, south to FL and TX; also apparently in Central and South America. **Phen:** Jun-Oct. **Syn:** = C, ETx1, F, G, GrPl, Il, K1, Brashier (1966); = *Commelina erecta* Linnaeus var. *angustifolia* (Michaux) Fernald – S; > *Commelina elegans* Kunth – Tx; < *Commelina erecta* Linnaeus var. *angustifolia* (Michaux) Fernald – FNA22, K4, Mi, Mo1, NY, Pa, RAB, Tn, Va, W, WH3, Faden (1993), Tucker (1989); > *Commelina erecta* Linnaeus var. *erecta* – Tx. NatureServe G5T5 (Secure).

Commelina virginica Linnaeus. VIRGINIA DAYFLOWER. **Hab:** Bottomlands, swamp forests, tidal swamp forests, other moist to wet forests and forest edges. **Dist:** NJ west to KS and OK, south to FL and TX. **Phen:** Jul-Oct. **ID Notes:** Our most robust species of *Commelina*. ***Syn:*** *= Ar, C, ETx1, F, FNA22, G, GrPl, GW1, Il, K1, K3, K4, Mo1, NcTx, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV, Brashier (1966), Faden (1993), Tucker (1989).* NatureServe G5 (Secure).



Cuthbertia Small 1903 (ROSELING)



A genus of 3 species, herbs, of se. North America. Over the last several decades, *Cuthbertia* has often been reduced to a component within *Callisia* (as by Hunt 1983; Hunt 1986; Tucker 1989; Faden in Kubitzki 1998b; Faden in FNA 2000); recent molecular analyses do not support such a course, however, and Cuthbertia should be given generic rank (Bergamo 2003; Burns, Faden, & Steppan 2011). References: Bergamo (2003); Burns, Faden, & Steppan (2011); Faden in Kubitzki (1998b); Faden (2000b) in FNA22 (2000); Giles (1942); Giles (1943); Lakela (1972); Tucker (1989).

Identification Notes: *Cuthbertia* species are clumped small herbs of dry habitats, with linear leaves and pink radial flowers with 3 petals, the stamens 6 and bearded.

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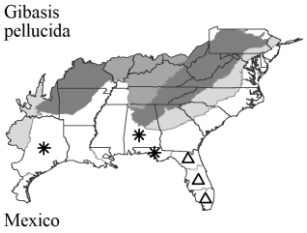
Cuthbertia rosea (Ventenat) Small. COMMON ROSELING. **Hab:** Longleaf pine sandhills, other dry woodlands. **Dist:** MD south to peninsular FL, west to s. AL. **Phen:** May-Jul. **Syn:** = S, Bergamo (2003); = *Callisia rosea* (Ventenat) D.R. Hunt – FNA22, K1, K4, WH3, Tucker (1989); = *Tradescantia rosea* Ventenat var. *rosea* – RAB. NatureServe G5 (Secure).



Gibasis Rafinesque 1837 (BRIDAL-VEIL)

A genus of 11 species, annual and perennial herbs, of the American tropics (especially Mexico). References: Faden in Kubitzki (1998b); Faden (2000b) in FNA22 (2000).

Identification Notes: *Gibasis* has small white flowers typical of Commelinaceae, but differs from our other genera in its diffuse and repeatedly branched inflorescence.

* ***Gibasis pellucida*** (M. Martens & Galeotti) D.R. Hunt. TAHITIAN BRIDAL-VEIL. **Hab:** Disturbed areas, invasive in peninsular FL. **Dist:** Native of Mexico (contrary to the common name). **Phen:** Apr-Oct. **Syn:** = FNA22, K4, Meso6, WH3.

Murdannia Royle 1839 (MURDANNIA, DEWFLOWER)

A genus of about 50 species, herbs, of tropical and warm temperate regions. References: Faden in Kubitzki (1998b); Faden (2000b) in FNA22 (2000); Pellegrini, Faden, & Almeida (2016); Tucker (1989).

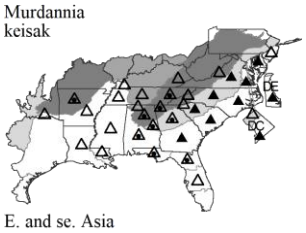
Identification Notes: *Murdannia* has radial, blue or lavender (to white) flowers, not borne from spathes. The flowers have 2 or 3 fertile stamens with bearded filaments, and 4 or 3 staminodes. Our species are annuals, often forming dense patches in wetlands.

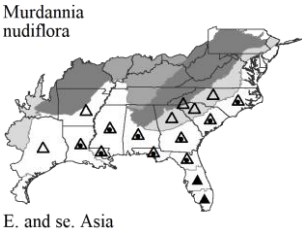
1 Flowers solitary or in 2-4-flowered racemes borne in the upper leaf axils; capsules 8-10 mm long; seeds ca. 3 mm long; pedicels much longer than the capsule ..... ***Murdannia keisak***

1 Flowers in stalked cymose racemes borne terminally or in the uppermost leaf axil; capsules 4-5 mm long; seeds 1.0-1.5 mm long; pedicels about as long as the capsule. ***Murdannia nudiflora***

* ***Murdannia keisak*** (Hasskarl) Handel-Mazzetti. MUD-ANNIE, MARSH DEWFLOWER. **Hab:** Stream banks, canals, ditches, freshwater marshes (tidal and non-tidal), swamp forests, wet disturbed places. **Dist:** Native of Asia, now widespread in the se. United States. *M. keisak* was introduced to SC and LA in the 1920s and 1930s, probably as a contaminant in rice seed, but the seeds now distributed by water and waterfowl; it is now a very serious invasive in a wide range of wetland habitats (Dunn & Sharitz 1990). **Phen:** Sep-Oct. **Syn:** = Ar, C, FNA22, G, GW1, K1, K3, K4, Tn, Va, W, WH3, Pellegrini, Faden, & Almeida (2016), Tucker (1989); = *Aneilema keisak* Hasskarl – F, RAB. NatureServe GNR (Not Yet Ranked).

* ***Murdannia nudiflora*** (Linnaeus) Brenan. NAKED-STEM DEWFLOWER. **Hab:** Moist sands, ditches, wet disturbed places. **Dist:** Native of Asia, now widespread in the tropics and subtropics of both hemispheres. This species apparently arrived in our region earlier than *M. keisak* (Small 1933, for instance, treats this species and not *M. keisak*), but has naturalized less aggressively and is distinctly less common. **Phen:** May-Oct. **Comm:** Flowers open from about 11 a.m. to 3 p.m. **Syn:** = Ar, ETx1, FNA22, GW1, K1, K3, K4, Meso6, NY, WH3, Pellegrini, Faden, & Almeida (2016), Tucker (1989); = *Aneilema nudiflorum* (Linnaeus) Sweet – RAB, S, Tx. NatureServe G5 (Secure).





Tradescantia Linnaeus 1753 (SPIDERWORT)

A genus of about 70 species, herbs, of the New World. References: Anderson & Woodson (1935); Faden in Kubitzki (1998b); Faden (2000b) in FNA22 (2000); Pellegrini (2017); Pellegrini (2018); Tucker (1989).

2 Flowers nearly sessile; petals clawed, the claws fused basally; stamens epipetalous.
  3 Leaf blade longitudinally striped with dark green and silver; leaves tending to be 2-ranked; [subgenus *Campelia*] ..... ***Tradescantia zebrina***
  3 Leaf blade not variegated, purple, purplish-green, or green on upper surface; leaves spirally arrayed; [subgenus *Setcreasea*] ..... ***Tradescantia pallida***

2 Flowers distinctly pedicelled; petals neither clawed nor connate; stamens not adnate to the petals.
  5 Plant sprawling, rooting at the nodes; leaves 2.5-5 cm long, < 4× as long as wide; [exotic]; [subgenus *Austrotradescantia*].
    6 Stems glabrous; leaf-sheaths glabrous (except the densely setose margin); leaf blades membranous to slightly fleshy, abaxially light to medium green; pedicels glabrous to distally sparsely glandular-pubescent; sepals with hairs restricted to the keels; petals plicate ..... ***Tradescantia fluminensis***
    6 Stems finely strigose; leaf-sheaths strigose (and the margin setose); leaf blades chartaceous, abaxially completely to partially wine-red; pedicels velutinous, sometimes with some odd glandular hairs; sepals evenly velutinous (hairs sometimes deciduous in dried specimens); petals flat..... ***Tradescantia mundula***
  5 Plant erect or ascending, not rooting at the nodes; leaves > 4 cm long, > 5× as long as wide; [native]; [subgenus *Tradescantia*].

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

7 Leaf blades of the upper stem constricted at their bases to a narrower subpetiolar sheath, the opened sheath narrower than the leaf blade; leaf blades 6-27 cm long, 1.0-5.0 cm wide, mostly < 10× as long as wide; stomates much more abundant on the lower leaf surface than on the upper, giving the lower surface a much paler color.
8 Pedicels 10-17 mm long; proximal leaves petiolate; stems frequently flexuous, usually obviously zigzag; sepals 4-10 mm long; plants flowering mainly May--Sep; [WV, OH, IN, IL, MO south to e. SC, s. GA, Panhandle FL, s. AL, s. MS, and s. LA] ..... ***Tradescantia subaspera***
8 Pedicels (15-32 mm long; proximal leaves narrowed directly into sheath; stems not flexuous, usually straight or subtly zigzag; sepals 8-16 mm long; plants flowering mainly Feb--May; [MO, AR, OK, TX; disjunct eastwards in n. and c. AL and nw. MS].
..... ***Tradescantia ernestiana***
7 LLeaf blades of the upper stem not constricted to a subpetiolar sheath, the opened sheath about as wide or wider than the leaf blade; leaf blades 4-45 cm long, 0.2-2.8 (-4.5) cm wide, mostly > 10× as long as wide; stomates slightly more abundant on the lower leaf surface than on the upper, or about equally distributed on the two surfaces, the lower surface slightly to not at all paler than the upper.
11 Sepals glabrous or the tip with a tuft of eglandular hairs (use 10× magnification).
12 Plants distinctly glaucous; leaves 5-45 cm long, arcing, at an acute angle to the stem ..... ***Tradescantia ohiensis***
12 Plants green or slightly glaucous; leaves 4-11 cm long, straight, at nearly right angles to the stem..... ***Tradescantia paludosa***
11 Sepals pubescent (use 10× magnification).
13 Sepals covered with eglandular hairs.
16 Stems usually hirsute or pilose throughout; roots 1.0-1.5 (-2.0) mm thick; sepals not inflated-turgid..... ***Tradescantia hirsutiflora***
16 Stems glabrous, or sparsely puberulent on the upper stem only; roots (1.5-) 2.0-4.0 mm thick; sepals usually inflated-turgid.....
..... ***Tradescantia virginiana***
13 Sepals pubescent with glandular hairs.
17 Sepals with mostly glandular pubescence.
..... ***Tradescantia roseolens***
17 Sepals with glandular and eglandular pubescence.
23 Sepal hairs mainly eglandular, glandular hairs few, inconspicuous ..... ***Tradescantia hirsutiflora***
23 Sepal hairs mainly glandular or eglandular, glandular hairs numerous, conspicuous.
24 Sepals puberulent, hairs all less than 1 mm long; roots relatively thin, 0.5-1(-2) mm thick..... ***Tradescantia roseolens***
24 Sepals pilose-puberulent, longer hairs 1.5-6 mm long; roots relatively stout, 1-3 mm thick.
..... ***Tradescantia hirsuticaulis***

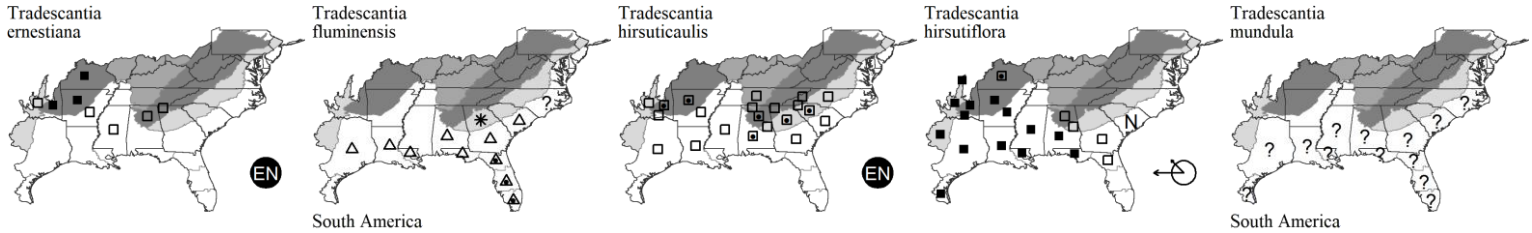
Tradescantia ernestiana E.S. Anderson & Woodson. ERNEST'S SPIDERWORT. **Hab:** Dry woodlands. **Dist:** Primarily Ozarkian (AR, MO, OK, disjunct east to nw. GA and ne. AL, and west to n. TX (Faden in FNA 2000). **Phen:** Apr-May. **Syn:** = Ar, FNA22, K1, K3, Mo1, Anderson & Woodson (1935), Pellegrini (2017), Tucker (1989); < *Tradescantia pilosa* J.G.C. Lemaire – S. NatureServe G3G4Q (Vulnerable).

* ***Tradescantia fluminensis*** Vellozo. WANDERING JEW, SMALL-LEAF SPIDERWORT, SMALL-LEAF WANDERING JEW. **Hab:** Disturbed areas, lawns, vacant lots, moist suburban woods, along streams. **Dist:** Native of tropical America. Reported for Beaufort Co. SC (Daniel C. Payne 2009, pers. comm.). **Tax:** A member of subgenus *Austrotradescantia* (Pellegrini 2017). **Syn:** = Pellegrini (2018); < *Tradescantia fluminensis* Vellozo – ETx1, FNA22, K1, K3, K4, S, WH3, Tucker (1989).

Tradescantia hirsuticaulis Small. HAIRY SPIDERWORT. **Hab:** Dry rocky woodlands, and rock outcrops (especially granitic flatrocks and domes). **Dist:** W. NC and wc. TN south to sc. SC, s. GA, s. AL, and sc. MS; west of the Mississippi River in AR, e. OK, and nw. LA. **Phen:** Apr-Jun. **Syn:** = FNA22, K1, K3, K4, RAB, Tn, W, Anderson & Woodson (1935), Pellegrini (2017), Tucker (1989).

Tradescantia hirsutiflora Bush. **Hab:** Longleaf pine sandhills, dry hammocks. **Dist:** S. and e. GA and FL Panhandle, west to TX. **Syn:** = Ar, ETx1, FNA22, NcTx, Tx, WH3, Anderson & Woodson (1935), Pellegrini (2017), Tucker (1989); >< *Tradescantia hirsuticaulis* Small – S, misapplied; < *Tradescantia hirsutiflora* Bush – K3, K4.

* ***Tradescantia mundula*** Kunth. WANDERING JEW, SMALL-LEAF SPIDERWORT, SMALL-LEAF WANDERING JEW. **Hab:** Disturbed areas; probably at least casually escaping in the Southeast. **Dist:** Native of South America. **Tax:** Often included in *T. fluminensis*; southeastern US records of *T. fluminensis* need to be evaluated to see which are actually of *T. mundula* (Pellegrini 2018). A member of subgenus *Austrotradescantia* (Pellegrini 2017). **Syn:** = Pellegrini (2018); < *Tradescantia fluminensis* Vellozo – FNA22, K1, K3, K4, S, WH3, Tucker (1989).



Tradescantia ohiensis Rafinesque. SMOOTH SPIDERWORT, OHIO SPIDERWORT. **Hab:** Woodlands and forests, alluvial bottoms, disturbed areas, roadsides. **Dist:** MA west to MN, south to c. peninsular FL and TX, some of that range likely the result of naturalization from cultivation. **Phen:** Feb-Jul. **Syn:** = Ar, C, ETx1, F, FNA22, G, GrPl, Il, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, W, WH3, WV, Pellegrini (2017), Tucker (1989); ? *Tradescantia canaliculata* Rafinesque – Anderson & Woodson (1935); > *Tradescantia foliosa* Small – S; > *Tradescantia incarnata* Small – S; > *Tradescantia reflexa* Rafinesque – S. NatureServe G5 (Secure).

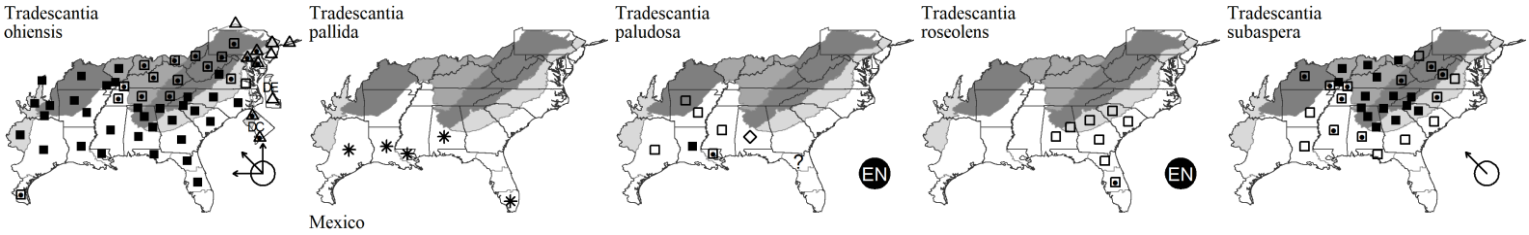
* ***Tradescantia pallida*** (Rose) D.R. Hunt. PURPLEQUEEN, PURPLEHEART, "WANDERING JEW". **Hab:** Disturbed areas. **Dist:** Native of Mexico. The AL report is detailed in Barger et al. (2012). **Tax:** A member of subgenus *Setcreasea* (Pellegrini 2017). **Syn:** = FNA22, K1, K3, K4, Meso6, WH3, Pellegrini (2017); = *Setcreasea pallida* Rose – Bah. NatureServe GNR (Not Yet Ranked).

Tradescantia paludosa E.S. Anderson & Woodson. SWAMP SPIDERWORT, CONFEDERATE SPIDERWORT. **Hab:** Swamps and bottomlands. **Dist:** Coastal Plain of MS and LA west to TX and c. and sw. AR. **Phen:** Mar-May. **Syn:** = ETx1, FNA22, K1, K3, K4, Anderson & Woodson (1935), Tucker (1989). NatureServe G4?Q (Apparently Secure).

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

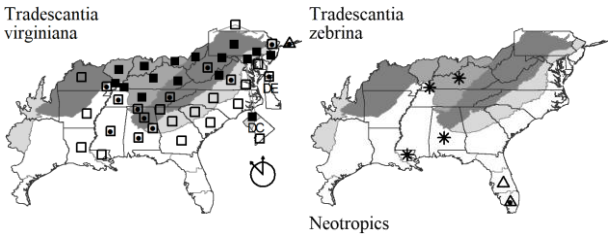
Tradescantia roseolens Small. SANDHILL SPIDERWORT. **Hab:** Dry sandy woodlands. **Dist:** SC south through GA to c. peninsular FL, west to AL. **Phen:** May-Jun. **Syn:** = FNA22, K1, K3, K4, RAB, WH3, Anderson & Woodson (1935), Pellegrini (2017), Tucker (1989); = *Tradescantia longifolia* Small – S. NatureServe G5 (Secure).

Tradescantia subaspera Ker Gawler. WIDE-LEAVED SPIDERWORT, ZIGZAG SPIDERWORT. **Hab:** Dry to mesic woodlands and forests, hammocks. **Dist:** Nc. NC, w. VA, WV, OH, IN, IL, and MO, south to NC, SC, sw. GA, Panhandle FL, and AL. **Phen:** Jun-Jul. **Tax:** Two questionable varieties are sometimes recognized. Var. *subaspera* may be distinguished by the stem conspicuously zigzag above, except on depauperate or juvenile plants (vs. the stems straight or only slightly zigzag), uppermost lateral cymes sessile or short-pedunculate (vs. pedunculate throughout), uppermost internodes very reduced, crowding the upper leaves (vs. internodes less reduced), leaves much broader than the sheath (vs. only slightly broader), and its generally greater size than var. *montana*. *T. subaspera* var. *montana* ranges from sw. VA and c. WV south to nw. SC, n. GA, and se. TN, with disjunct occurrences in c. AL and Panhandle FL. Var. *subaspera* ranges from WV west to n. IL, south to se. TN, ne. AR, and s. MO, with disjunct occurrences in NC. **Syn:** = Ar, FNA22, NY, RAB, Tn, Va, W, WH3, Pellegrini (2017); < *Tradescantia pilosa* J.G.C. Lemaire – S; > *Tradescantia subaspera* Ker-Gawler var. *montana* (Shuttleworth ex Britton) E.S. Anderson & Woodson – C, F, G, Il, K1, K3, K4, WV, Anderson & Woodson (1935), Tucker (1989); > *Tradescantia subaspera* var. *subaspera* – C, F, G, Il, K1, K3, K4, Mo1, WV, Anderson & Woodson (1935), Tucker (1989).



Tradescantia virginiana Linnaeus. VIRGINIA SPIDERWORT. **Hab:** Nutrient-rich forests and woodlands. **Dist:** ME west to MI and WI, south to n. GA, MO, and e. AR. **Phen:** Apr-Jul. **Comm:** Very variable in flower color, including deep blue, purple, pink, light pink, and pure white. **Syn:** = Ar, C, F, FNA22, G, Il, K1, K3, K4, Mi, Mo1, NE, NY, Pa, RAB, S, Tn, Va, W, WV, Anderson & Woodson (1935), Pellegrini (2017), Tucker (1989); ? *Tradescantia brevicaulis* Rafinesque – S. NatureServe G5 (Secure).

* ***Tradescantia zebrina*** Bosse. ZEBRA PLANT, "WANDERING JEW", CREEPING CHARLIE. **Hab:** Hammocks, disturbed areas; suburban woodlands. **Dist:** Native of tropical America. **Phen:** Sep-Feb. **Tax:** A member of subgenus *Campelia* (Pellegrini (2017). **Syn:** = FNA22, K3, K4, Pellegrini (2017); = *Zebrina pendula* W. Schnizlein – Bah, S; < *Tradescantia zebrina* var. *zebrina* – Meso6. NatureServe G5 (Secure).



80. PONTEDERIACEAE Kunth 1815 [1816] (PICKERELWEED FAMILY) [in COMMELINALES]

A family of about 13 genera and 33 species, primarily of the tropics, but with some temperate representatives. References: Cook in Kubitzki (1998b); Haines (2021); Horn (2002a) in FNA26 (2002a); Pellegrini, Horn, & Almeida (2018); Rosatti (1987a).

1 Inflorescence with > 30 flowers; fruit 1-seeded, indehiscent, a utricle; seeds smooth; leaves lanceolate to ovate, 1.5-10× as long as wide, the base cordate, truncate, or cuneate ..... ***Pontederia***
1 Inflorescence with < 30 flowers; fruit 10-200-seeded, a capsule; seeds longitudinally winged; leaves either reniform or ovate, 0.5-1.5× as long as wide, the base cordate or rounded, or narrowly linear, 20-50× as long as wide, the base attenuate.
  2 Leaves membranous; petioles never expanded into air-filled floats; perianth lobes linear to oblanceolate, 0.4-2.0 cm long; stamens 3 ..... ***Heteranthera***
  2 Leaves coriaceous; petioles either expanded into air-filled floats or not; perianth lobes ovate, 1.3-3.7 cm long; stamens 6.
  ..... ***Oshuna crassipes***

Heteranthera Ruiz & Pavón 1794 (MUD-PLANTAIN)

A genus of 11-14 species, of tropical and temperate America and tropical Africa. References: Cook in Kubitzki (1998b); Horn (1998); Horn (2002c) in FNA26 (2002a); Horn (2020); Pellegrini, Horn, & Almeida (2018).

1 Plant producing only sessile leaves, these linear, 1-6 mm wide, > 10× as long as wide.
  ..... ***Heteranthera dubia***
1 Plant producing linear to oblanceolate sessile leaves, and also petiolate leaves, reniform, orbicular or oblong, 0.7-2× as long as wide.
  3 Inflorescences 1-flowered; perianth either radially or bilaterally symmetrical; leaf blades mostly 1-2× as long as wide.
  ..... ***Heteranthera limosa***
  3 Inflorescences 2-16-flowered (opening each day); perianth bilaterally symmetrical; leaf blades mostly 0.7-1× as long as wide.
    5 Inflorescences 5-16-flowered, the axis elongating well beyond the spathe tip, thus many of the flowers borne well beyond the spathe; perianth lobes lavender to purple; [s. IL, s. IA, se. NE south to MS, LA, and s. TX; rarely adventive eastwards, as in n. AL and c. NC] ..... ***Heteranthera missouriensis***

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

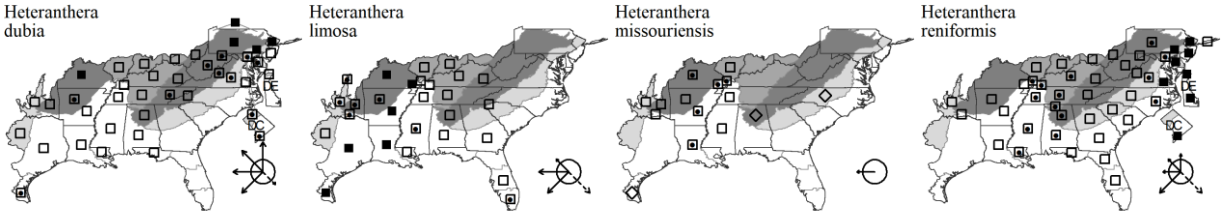
5 Inflorescences 2-8-flowered, the axis mostly enclosed in the spathe, only 0-2 flowers of the flowers borne outside the spathe; perianth lobes white to pale lavender; [collectively widespread in our region].
..... ***Heteranthera reniformis***

Heteranthera dubia (Jacquin) MacMillan. WATER STARGRASS. **Hab:** Streams, rivers, lakes, reservoirs, especially in areas with calcareous substrates. **Dist:** QC west to WA, south to Cuba and Central America, but rare or absent in much of the se. United States. The attribution of this species to SC is in error (as by Kartesz 1999), based on a misidentified specimen (C. Horn, pers. comm.). **Phen:** (Apr-) Jul-Oct. **Syn:** = Ar, ETx1, F, FNA26, GW1, K1, K3, K4, Mo1, NcTx, NE, NY, Pa, RAB, Tn, Va, W, WH3, WI, WI, WV, Horn (2020); = *Zosterella dubia* (Jacquin) Small – C, G, Il, S; > *Heteranthera dubia* (Jacquin) MacMillan – Tx; > *Heteranthera liebmannii* (Buchenau ex Magnus) Shinners – Tx. NatureServe G5 (Secure).

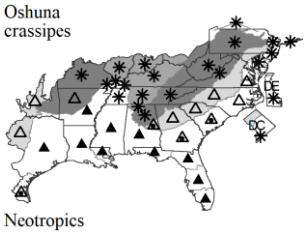
Heteranthera limosa (Swartz) Willdenow. BLUE MUD-PLANTAIN. **Hab:** Shallow water and muddy shores of rivers, ponds, lakes, and reservoirs, wet ditches, agricultural fields, other wet areas. **Dist:** KY, MN, SD, and CO, south to AL (Diamond & Woods 2009), MS, LA, TX, and AZ; Mexico, Central and South America, West Indies. **Phen:** Jun-Oct. **Comm:** Attributed to VA in Small (1933), but the documentation is not known. **Syn:** = Ar, C, ETx1, F, FNA26, G, Il, K1, K3, K4, Meso6, Mo1, NcTx, S, Tn, Tx, WH3, WI, Horn (1998), Horn (2020). NatureServe G5 (Secure).

Heteranthera missouriensis C.N. Horn. MISSISSIPPI MUD-PLANTAIN, MISSOURI MUD-PLANTAIN. **Hab:** In shallow, stagnant water in floodplains, or emersed on mud. **Dist:** IL west to NE, south to MS, centered in the Mississippi River Alluvial Plain. **Phen:** Jun-Oct. **Tax:** Formerly included in a broad concept of *H. multiflora*, which was considered to have three disjunct areas of distribution: *H. multiflora* s.s. (Argentina and Paraguay), *H. missouriensis* (centered in the Mississippi River Alluvial Plain), and *H. pauciflora* (Atlantic Coastal Plain from s. NJ to ne. NC). **Syn:** = K4, Horn (2020); < *Heteranthera multiflora* (Grisebach) Horn – Ar, C, FNA26, Il, K1, K3, Mo1, Tn, Horn (1998).

Heteranthera reniformis Ruiz & Pavón. KIDNEYLEAF MUD-PLANTAIN. **Hab:** In shallow, stagnant water in floodplains, or emersed on mud. **Dist:** CT west to NE, south to FL and TX and into South America; West Indies. First reported for SC by Hill & Horn (1997). **Phen:** Jun-Oct. **Syn:** = Ar, C, F, FNA26, G, GW1, Il, K1, K3, K4, Meso6, Mo1, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV, Horn (1998), Horn (2020). NatureServe G5 (Secure).



Oshuna Haines 2021 (WATER-HYACINTH)



A monotypic genus, a floating aquatic herb, native of South America. Often included in *Eichhornia* and recently proposed to alternatively be merged into a broad *Pontederia* (Pellegrini, Horn, & Almeida 2018). Haines (2021) resolved that *Piaropus* is invalid, and a treatment (as here) which recognizes the "water-hyacinth" as generically distinct from *Pontederia* and *Eichhornia* needed a new name, which he provided. References: Haines (2021); Rosatti (1987a).

* ***Oshuna crassipes*** (Martius) A. Haines. WATER HYACINTH. **Hab:** Ponds, ditches, sluggish water. **Dist:** Native of tropical America. **Phen:** Jun-Sep. **Comm:** *O. crassipes* is "generally considered the world's most serious aquatic weed" (Rosatti 1987). Originally native to tropical South America, *O. crassipes* is now a widespread naturalized weed throughout the tropics and subtropics. In the northern part our area, water hyacinth is rare, probably not long persisting. Farther south, it can be an aggressive aquatic weed. **Syn:** = Haines (2021); = *Eichhornia crassipes* (Martius) Solms-Laubach – Ar, Bah, C, ETx1, F, FNA26, G, GW1, Il, K1, K3, K4, Meso6, Mo1, NcTx, NE, NY, RAB, Tx, WH3, WI, Rosatti (1987a); = *Piaropus crassipes* (Martius) Rafinesque – S, Haines (2020b); = *Pontederia crassipes* Martius – Pellegrini, Horn, & Almeida (2018). NatureServe G5 (Secure).

Pontederia Linnaeus 1753 (PICKERELWEED)

A genus of 6-8 species, perennial and annual herbs, from North America to South America. References: Cook in Kubitzki (1998b); Horn (2002d) in FNA26 (2002a); Lowden (1973); Pellegrini, Horn, & Almeida (2018).

2 Floral tube villous when young, essentially glabrous to sparsely glandular in maturity; leaves primarily ovate to triangular-lanceolate, 2.2-21 cm wide, the base generally cordate or truncate (rarely cuneate)..... ***Pontederia cordata var. cordata***
2 Floral tube persistently pubescent with short glandular hairs; leaves lanceolate, 0.4-8.3 cm wide, the base generally cuneate to truncate.....
..... ***Pontederia cordata var. lancifolia***

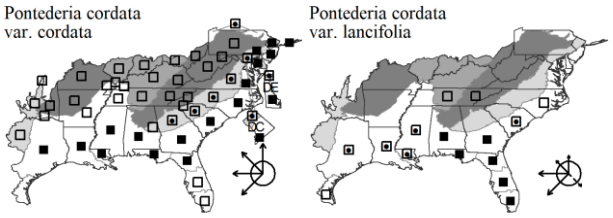
Pontederia cordata Linnaeus *var.* ***cordata***. HEARTLEAF PICKERELWEED. **Hab:** Swamps, seepage areas, marshes, pond-shores, lake-shores. **Dist:** NS west to MN, south to s. FL and TX; Belize; s. Brazil, Argentina, Paraguay, and Uruguay. **Phen:** May-Oct. **Tax:** The recognition of infraspecific taxa in *Pontederia cordata* is controversial and requires additional study. **Comm:** *P. cordata* exhibits tristyly, an interesting breeding system. Each plant has one of 3 types of flowers: (a) a short style, 3 medium and 3 long stamens, (b) a medium style, 3 short and 3 long stamens, or (c) a long style, 3 short and 3 medium stamens. **Syn:** = GW1, Meso6, Mo1, Tx, Va, Lowden (1973); = *Pontederia cordata* – F, G, S, WV; < *Pontederia cordata* – Ar, C, ETx1, FNA26, Il, K1, K3, K4, NcTx, NE, NY, Pa, RAB, Tn, W, WH3.

Pontederia cordata Linnaeus *var.* ***lancifolia*** (Muhlenberg ex Elliott) Torrey. LANCELEAF PICKERELWEED. **Hab:** Marshes, pond-shores, lake-shores. **Dist:** S. MA (alleged to occur as far north as ME, but these reports may be entirely based on misidentifications of var. *cordata*) to s. FL, west to e. TX, mostly on the Coastal Plain, with a few records around the Great Lakes; Cuba; s. Brazil, Argentina, Paraguay, and Uruguay. **Phen:** May-

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

80. PONTEDERIACEAE

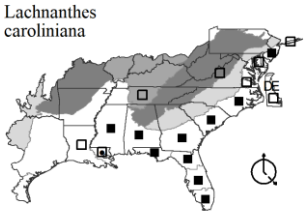
Oct. **Comm:** A third variety of *P. cordata*, var. *ovalis* (Martens in Roemer & J.A. Schultes) Solms, is restricted to South America. **Syn:** = GW1, Lowden (1973); = *Pontederia cordata* var. *lanceolata* (Nuttall) Grisebach – Tx; = *Pontederia lanceolata* Nuttall – F, G, S; < *Pontederia cordata* – C, ETx1, FNA26, K1, K3, K4, NcTx, NE, Pa, RAB, Tn, W, WH3.



81. HAEMODORACEAE R. Brown 1810 (BLOODWORT FAMILY) [in COMMELINALES]

A family of about 14 genera and 100 species, herbs, of semicosmopolitan distribution, but centered in Australia. The Haemodoraceae is primarily a family of the Southern Hemisphere; *Lachnanthes* is the only member native to e. North America. *Lophiola* has often been treated in the Haemodoraceae; it is better placed in the Nartheciaceae (or Liliaceae *sensu lato*), see *Lophiola* (Nartheciaceae) for additional details. References: Pellegrini et al (2020); Robertson (1976); Robertson (2002) in FNA26 (2002a); Simpson in Kubitzki (1998b).

Lachnanthes Elliott 1816 (REDROOT)



A monotypic genus, a perennial herb, of se. North America and the West Indies. References: Gandhi (1999); Pellegrini et al (2020); Reid (2021); Robertson (1976); Robertson (2002) in FNA26 (2002a); Simpson in Kubitzki (1998b).

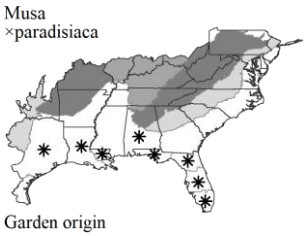
Identification Notes: A very distinctive plant when in flower, with its densely woolly inflorescence and flowers. When not in flower, recognizable by its equitant (iris-like) base and bright red roots.

Lachnanthes caroliniana (Lamarck) Dandy. REDROOT. **Hab:** Wet savannas, pocosin edges, shores of Coastal Plain depression ponds (and similar ponds in the mountains of Virginia), ditches, wet disturbed ground. **Dist:** The range is almost strictly on the Coastal Plain, and rather disjunct: s. NS, from MA to DE, from se. VA south to s. FL and west to e. LA (the Florida parishes), with inland disjunctions in w. VA, sc. TN (Coffee County), and w. LA (Vermilion Parish; Reid 2021); e. Cuba. **Phen:** Jun-early Sep; Sep-Nov. **Tax:** The correct spelling of the specific epithet has been disputed; the original spelling was "*caroliana*," but Gandhi (1999) argues convincingly that this is a correctable typographic error. **Syn:** = C, FNA26, GW1, K3, K4, NE, NY, RAB, Tn, Va, W, Gandhi (1999); = *Gyrotheca tinctoria* (J.F. Gmelin) Salisbury – S; = *Lachnanthes caroliana* – K1, Meso6, WH3, Robertson (1976), orthographic variant (correctable typographic error); = *Lachnanthes tinctoria* (J.F. Gmelin) Elliott – F, G. NatureServe G4 (Apparently Secure).

85. MUSACEAE A.L. de Jussieu 1789 (BANANA FAMILY) [in ZINGIBERALES]

A family of 2 genera and 40-50 species, robust herbs, of the Paleotropics. References: Andersson in Kubitzki (1998b); Whittemore (2000a) in FNA22 (2000).

Musa Linnaeus 1753 (BANANA)



A genus of 30-40 species, robust herbs, of the Paleotropics. References: Andersson in Kubitzki (1998b); Whittemore (2000a) in FNA22 (2000).

* ***Musa ×paradisiaca*** Linnaeus (pro sp.). EDIBLE BANANA. **Hab:** Disturbed suburban woodlands, persisting (weakly spreading vegetatively) where dumped from cultivation. **Comm:** See Barger et al. (2012) for additional information. **Syn:** = FNA22, K3, K4, WH3; < *Musa sapientum* Linnaeus – S.

86. CANNACEAE A.L. de Jussieu 1789 (CANNA FAMILY) [in ZINGIBERALES]

A family of a single genus, herbs, of tropical and warm temperate America. References: Kress & Prince (2000) in FNA22 (2000); Kubitzki (1998b).

Canna Linnaeus 1753 (CANNA)

A genus of about 10-25 species, of tropical and warm temperate America. References: Kress & Prince (2000) in FNA22 (2000); Kubitzki (1998b).

Identification Notes: The petals are generally sepaloid (but sometimes brightly colored); the showy, colored portions of the flower are the staminodes.

1 Flowers not tubular at the base (or with a short tube to 2 cm long); petals erect ..... ***Canna ×generalis***
1 Flowers tubular at the base (the tube 1-4.5 cm long); petals reflexed (or ascending to erect in *C. glauca*).
2 Flowers red, orange, or mixed red-and-yellow; capsule 1.5-2 cm wide; leaves green ..... ***Canna indica***

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

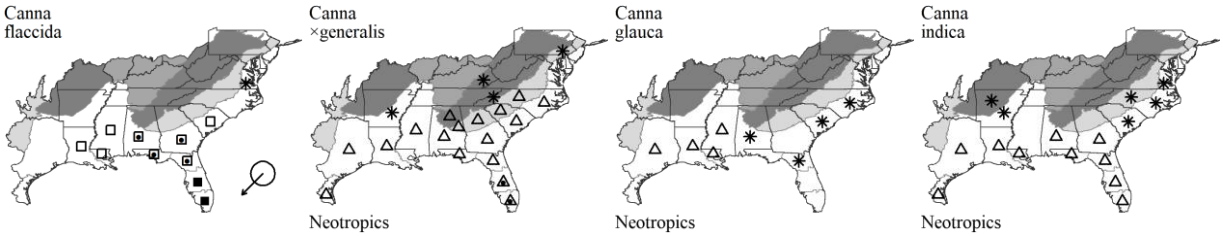
2 Flowers yellow; capsule 2-4.5 cm wide; leaves glaucous.
3 Inflorescence with < 5 flowers; seeds 6-6.5 mm long ..... ***Canna flaccida***
3 Inflorescences with > 10 flowers; seeds 7-10 mm long ..... ***Canna glauca***

Canna flaccida Salisbury. GOLDEN CANNA, YELLOW CANNA. **Hab:** Wet pine savannas, marshes, ditches. **Dist:** E. SC south to FL, west to LA; Central America. **Phen:** May-early Jul; Jul-Aug. **Syn:** = FNA22, K1, K3, K4, RAB, S, Tx, WH3. NatureServe G4? (Apparently Secure).

* ***Canna ×generalis*** L.H. Bailey & E.Z. Bailey. COMMON GARDEN CANNA. **Hab:** Cultivated and persisting. **Dist:** Native of tropical America. Reported as naturalizing (weakly) in AR (Seerviss, Hardage, & Serviss 2021). **Phen:** Jun-Sep; Aug-Oct. **Syn:** = FNA22, K1, K3, K4, RAB, WH3; = *Canna glauca* × *indica* – NY.

* ***Canna glauca*** Linnaeus. MARACA AMARILLA, BRAZILIAN ARROW-WOOD. **Hab:** Moist disturbed areas. **Dist:** Native of tropical America. **Phen:** Jun-Sep. **Syn:** = FNA22, K2, K4, Tx, WH3. NatureServe G5? (Secure).

* ***Canna indica*** Linnaeus. INDIAN-SHOT, PLATANILLO. **Hab:** Cultivated and spreading or persisting. **Dist:** Native of tropical America. **Phen:** Jun-Sep; Aug-Oct. **Syn:** = Bah, ETx1, FNA22, GW1, K1, K3, K4, S, Tx, WH3. NatureServe G4? (Apparently Secure).



87. MARANTACEAE R. Brown 1814 (ARROWROOT FAMILY) [in ZINGIBERALES]

A family of about 31 genera and 550 species, herbs and vines, nearly pantropical (absent from Australia), and rarely extending into subtropical and warm temperate regions. References: Andersson in Kubitzki (1998b); Kennedy (2000) in FNA22 (2000).

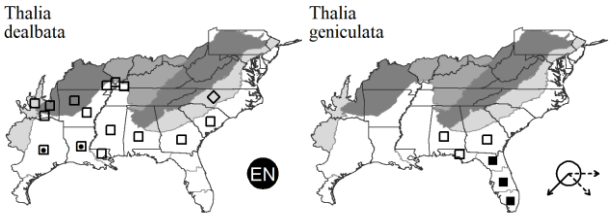
Thalia Linnaeus 1753 (THALIA)

A genus of 6-7 species, in subtropical and tropical America. References: Andersson in Kubitzki (1998b); Kennedy in FNA22 (2000).

1 Flowers crowded on the rachis, the zigzag internodes 2-3 mm long; leaves pilose at the base on the upper surface; bracts of the inflorescence white-pruinose ..... ***Thalia dealbata***
1 Flowers separated on the rachis, the zigzag internodes 5-10 mm long; leaves glabrous at the base on the upper surface; bracts of the inflorescence green or purple, not pruinose ..... ***Thalia geniculata***

Thalia dealbata Fraser ex Roscoe. POWDERY THALIA, POWDERY ALLIGATOR-FLAG. **Hab:** Swamp forests, wet ditches, brackish marshes. **Dist:** Ne. SC south to GA, west to c. TX and e. OK, north in the Mississippi Embayment to w. KY, s. IL, and se. MO. **Phen:** May-Sep; Jun-Oct. **Syn:** = Ar, ETx1, FNA22, GW1, Il, K1, K3, K4, Mo1, NcTx, RAB, S, Tx. NatureServe G4 (Apparently Secure).

Thalia geniculata Linnaeus. BENT ALLIGATOR-FLAG, LILIES, BENT THALIA. **Hab:** Ponds, sloughs, marshes, strand swamps, cypress domes. **Dist:** FL, s. AL, and se. GA; Central and South America; West Indies; w. Africa. **Syn:** = FNA22, GW1, K1, K3, K4, S, WH3. NatureServe G4 (Apparently Secure).



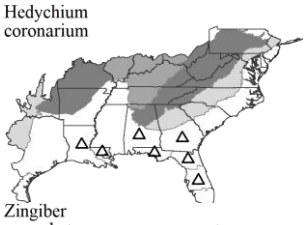
89. ZINGIBERACEAE Martinov 1820 (GINGER FAMILY) [in ZINGIBERALES]

A family of about 50 genera and 1200 species, rhizomatous herbs, of tropical and subtropical areas, especially se. Asia. References: Larsen, Lock, Maas, & Maas in Kubitzki (1998b); Whittemore (2000b) in FNA22 (2000).

3 Inflorescence terminal on long pseudostems with normal, well-developed leaves; [tribe *Hedychieae*] ..... ***Hedychium***
3 Inflorescence terminal on short stems with scale leaves, distinct from the main leafy stems ..... ***Zingiber***

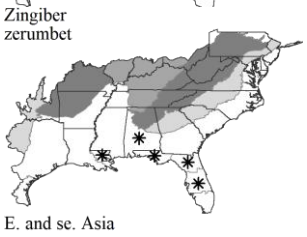
Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Hedychium J. Koenig 1783 (GINGER-LILY)



A genus of about 40 species, rhizomatous herbs, native of the Old World tropics. References: Larsen, Lock, Maas, & Maas in Kubitzki (1998b); Whittemore (2000b) in FNA22 (2000).

* ***Hedychium coronarium*** J. Koenig. WHITE GINGER-LILY. **Hab:** Suburban woodlands, commonly cultivated, rarely persisting and spreading. **Dist:** Native of India. **Syn:** = K2, K4, WH3. NatureServe GNR (Not Yet Ranked).



Zingiber Boehmer 1760 (GINGER)

A genus of ca. 100 species, rhizomatous perennial herbs, of tropical Asia. References: Larsen, Lock, Maas, & Maas in Kubitzki (1998b); Whittemore (2000b) in FNA22 (2000).

* ***Zingiber zerumbet*** (Linnaeus) Roscoe ex Smith. BITTER GINGER. **Hab:** Suburban woodlands, escaped from cultivation. **Dist:** Native of se. Asia. **Syn:** = K2, K4, WH3. NatureServe GNR (Not Yet Ranked).

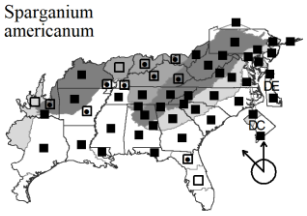
90. TYPHACEAE A.L. de Jussieu 1789 (CATTAIL FAMILY) [in POALES]

A family of 2 genera with 16-30 species, wetland herbs, cosmopolitan. The combination of the traditional families Typhaceae and Sparganiaceae is controversial; while there is no doubt of their sister relationship, they are amply distinct and arguably best and conservatively retained as separate families. References: Kaul (2000) in FNA22 (2000); Kubitzki (1998b); Smith (2000) in FNA22 (2000); Thieret & Luken (1996).

1 Inflorescences headlike, globular..... ***Sparganium***
1 Inflorescences spikelike, cylindrical..... ***Typha***

Sparganium Linnaeus 1753 (BUR-REED)

A genus of about 14 species, wetland and aquatic herbs, primarily circumboreal in arctic and temperate regions, but also in the tropics of Asia, and temperate Australia. References: Beal (1960); Cook & Nicholls (1986); Cook & Nicholls (1987); Crow & Hellquist (2000b); Ito et al (2015); Kaul (2000) in FNA22 (2000); Kubitzki (1998b); Sulman et al (2013); Thieret (1982).



Sparganium americanum Nuttall. AMERICAN BUR-REED. **Hab:** Streams, marshes, ponds, pools, spring branches, often submerged. **Dist:** NL (Newfoundland) west to MN, south to c. peninsular FL and c. TX. **Phen:** May-Sep. **Tax:** Beal (1960) discusses the interesting variation in *S. americanum*, perhaps worthy of taxonomic recognition. The 'Appalachian Race' has stigmas 0.6-0.9 mm long, inflorescence branches 0-3, and relatively narrow leaves; in our area it is montane in distribution, and in general is Appalachian, Ozarkian, and northern. The 'Coastal Race' has stigmas 1.5-2.8 mm long, 2-5 inflorescence branches, and relatively wide leaves; in our area it is primarily of the Coastal Plain, disjunct to the mountains of NC and SC south of the Asheville Basin (like many Coastal Plain taxa), and in general is nearly limited to the Coastal Plain, ranging from MA south to FL, west to e. TX, and north in the interior to sc. TN, s. IN, and s. MO. The 'Ubiquitous Race' is intermediate, with stigmas 1.0-1.4 m long; it occurs throughout the range of the species. The pattern is suggestive of imperfect evolutionary separation of two taxa and needs additional study and likely taxonomic recognition of entities. **Syn:** = Ar, C, ETx1, F, FNA22, G, GW1, Il, K1, K4, Mi, Mo1, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV, Beal (1960), Cook & Nicholls (1986), Crow & Hellquist (2000b), Thieret (1982). NatureServe G5 (Secure).

Typha Linnaeus 1753 (CATTAIL)

A genus of 8-13 species, wetland herbs, cosmopolitan. References: Kubitzki (1998b); Smith (2000) in FNA22 (2000); Ward (2007a).

1 Pistillate bracteoles absent, or if present then narrower than stigmas and generally not evident at spike surface; stigmas ovate to lanceolate, persistent on mature spikes; pistillate spikes green in flower when fresh, in fruit mostly 19-36 mm thick; carpodia concealed among pistil hairs; compound pedicels on denuded axis 0.6-3.5 mm; staminate scales colorless to brown.
  2 Pistillate bracteoles absent; stigmas ovate to ovate-lanceolate, often blackish when dry; {add}..... ***Typha latifolia***
  2 Pistillate bracteoles present (but generally evident only at 20-30× after removal from spike, resembling perigonial hairs, with brown, enlarged tips narrower than stigmas); stigmas lanceolate, brown when dry; pistillate spikes usually separated from staminate spikes by gap, in fruit mostly 19-25 mm thick; compound pedicels on denuded axis 0.6-2 mm; seeds absent or few; staminate scales brownish; pollen a mixture of tetrads, triads, dyads, and single grains, sometimes mostly single grains.
..... ***Typha angustifolia × latifolia***
1 Pistillate bracteoles present, many as wide as or wider than stigmas, evident at spike surface; stigmas linear (to narrowly lanceolate), sometimes deciduous and thus absent from mature spikes; pistillate spikes brown at all stages (or whitish when flowering and fresh) (*T. angustifolia* sometimes greenish in fruit when fresh), in fruit mostly 13-25 mm thick; carpodia often evident at spike surface among pistil-hair tips; compound pedicels on denuded axis 0.5-0.9 mm; staminate scales brown or straw-colored.
  4 Mucilage glands absent from adaxial surface of blade and generally from central part of sheath near sheath summit; pistillate bracteole tips darker than (or as dark as) stigmas, very dark to medium brown, rounded (to acute), in mature spikes about equaling pistil hairs; pistil-hair tips medium brown, distinctly enlarged at 10-20× magnification; pistillate spikes medium to dark brown; leaf sheath summits with membranous auricles (often disintegrating late in season) .....
..... ***Typha angustifolia***

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

4 Mucilage glands present on adaxial surface of all of sheath and usually about 1-10 cm of adjacent blade; pistillate bracteole tips much paler than to about same color as stigmas, straw-colored to light brown, mostly acute to acuminate, in mature spikes exceeding pistil hairs; pistil-hair tips colorless to usually orangish (or slightly brownish in hybrids), not evidently enlarged, or often with 1 subapical, orange, swollen cell evident at 20-30×; pistillate spikes bright cinnamon- to orange- or medium brown; leaf sheath summits tapered to blade or sometimes with membranous auricles.
5 Pistillate bracteole blades much paler than to nearly same color as stigmas, straw-colored to mostly bright orange-brown, usually many acuminate; pistillate spikes usually bright cinnamon- to orange-brown; mucilage glands numerous on proximal 1-10 cm of leaf blade ..... ***Typha domingensis***
5 Pistillate bracteole blades usually about same color as stigmas, light- to medium brown, usually acute; pistillate spikes usually medium brown; mucilage glands often few or absent from leaf blade ..... ***Typha angustifolia × domingensis***

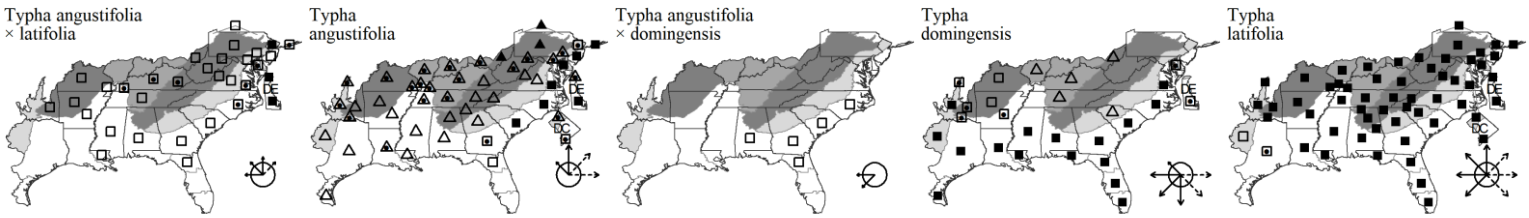
Typha angustifolia Linnaeus. HYBRID CATTAIL. **Hab:** Fresh to brackish waters of lakes, ponds, and rivers. **Phen:** May-Jul; Jun-Nov. **Comm:** C, K1, K3, and K4 apply this name to two different hybrids: *T. angustifolia* × *latifolia* and *T. domingensis* × *latifolia*. The name properly applies to *T. angustifolia* × *latifolia* (Smith in FNA 2000). **Syn:** = NY; = *Typha glauca* Godron (pro sp.) – GW1, Il, Mi, NE, Pa, Ward (2007a); = *Typha glauca* Godron – F, RAB; < *Typha glauca* Godron (pro sp.) – C, K1, K3, K4.

Typha angustifolia Linnaeus. NARROWLEAF CATTAIL. **Hab:** Brackish to fresh waters of marshes and swamps, usually tidal, and also inland in non-tidal wetlands (where probably only introduced). **Dist:** NS west to ND, south to SC, FL (?), LA, and TX (?); Eurasia. **Phen:** May-Jul; Jun-Nov. **Comm:** Stuckey & Salamon (1987) considered *T. angustifolia* an invasive alien in North America, but later studies suggest that it was native at least in coastal areas of ne. and Mid-Atlantic North America, and has expanded its range westward in recent decades (Shih & Finkelstein 2008). **Syn:** = Ar, C, F, FNA22, G, GW1, Il, K1, K3, K4, Mi, Mo1, NE, NY, Pa, RAB, Tn, Tx, Va, W, WH3, WV, Ward (2007a); < *Typha angustifolia* Linnaeus – S, (also see T. domingensis).

Typha angustifolia* × *domingensis. **Hab:** Brackish to nearly fresh waters of marshes and swamps, usually tidal. **Phen:** Jun-Jul; Jul-Nov. **Syn:** = K3, Mo1; < *Typha glauca* Godron (pro sp.) – K4.

Typha domingensis Persoon. SOUTHERN CATTAIL. **Hab:** Brackish to nearly fresh waters of marshes and swamps, usually tidal. **Dist:** DE south to s. FL, west to TX; north inland to NE and UT; and south into tropical America; Eurasia; Africa; Oceania. **Phen:** (Apr-) Jun-Jul; Jul-Nov. **Syn:** = Ar, C, ETx1, F, FNA22, G, GW1, Il, K1, K3, K4, Mo1, NcTx, RAB, Tx, Va, WH3, Ward (2007a); < *Typha angustifolia* Linnaeus – S.

Typha latifolia Linnaeus. COMMON CATTAIL. **Hab:** Fresh waters of ponds, lakes, ditches, marshes, including in tidal freshwater marshes. **Dist:** NL (Newfoundland) west to AK, south to FL, TX, CA, and Mexico; Central America; South America; Eurasia. **Phen:** (Apr-) May-Jul; Jun-Nov. **Syn:** = Ar, C, ETx1, F, FNA22, G, GW1, Il, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV, Ward (2007a). NatureServe G5 (Secure).



91. BROMELIACEAE A.L. de Jussieu 1789 (BROMELIAD OR PINEAPPLE FAMILY) [in POALES]

A family of about 56 genera and 2600 species, herbs, shrubs, and trees, of the New World tropics and subtropics (very rarely warm temperate). References: Luther & Brown (2000a) in FNA22 (2000); Smith & Till in Kubitzki (1998b).

Tillandsia Linnaeus 1753 (AIRPLANT, WILD-PINE, SPANISH-MOSS, BALL-MOSS)

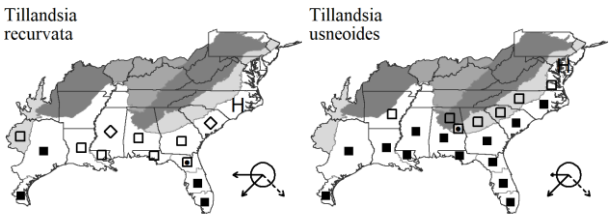
A genus of more than 650 species, herbs (mainly epiphytic or epilithic), of s. North America south to s. South America. References: Barfuss et al (2016); Donadío, Pozner, & Giussani (2015); Franck & Weakley (2018) in Weakley et al (2018a); Luther & Brown (2000b) in FNA22 (2000); Pinzón et al (2019); Smith & Till in Kubitzki (1998b).

2 Plants in dense, more or less spherical clusters; inflorescence scapose, exserted from the cluster, of (1-) 2 (-3) flowers; corolla violet ..... ***Tillandsia recurvata***
2 Plants in elongate, pendulous festoons; inflorescence sessile, of a single flower; corolla yellowish green ..... ***Tillandsia usneoides***

Tillandsia recurvata (Linnaeus) Linnaeus. BALL-MOSS, BUNCH-MOSS, GALLITOS. **Hab:** On tree branches in maritime forests (northwards) or southwards epiphytic in a wide range of situations and also on utility wires and rock faces. **Dist:** Se. GA (Duncan 1985) west to s. AL, south to s. FL; LA to AZ and south through Mexico, Central America , and South America; West Indies. Introduced in e. SC (Beaufort, Jasper, Charleston, Georgetown counties) via landscaping plants (Gramling 2010; P. McMillan, pers. comm. 2005). Plants on landscaping trees in s. MS may also be from introduction via this means. **Phen:** Jan-Dec. **Syn:** = Bah, ETx1, FNA22, K3, K4, Meso6, NcTx, Tx, WH3; = *Diaphoranthema recurvata* (Linnaeus) Beer – S. NatureServe G5 (Secure).

Tillandsia usneoides (Linnaeus) Linnaeus. SPANISH-MOSS, LONG-MOSS, PASTLE. **Hab:** Branches of trees, especially in swamps, but elsewhere where air humidity is high enough, often even in dry forests (for instance, *Tillandsia* is abundant on *Quercus laevis* in an extensive very dry longleaf pine sandhills near Wilmington, NC, which receives frequent fog from the Cape Fear, Brunswick, and Northeast Cape Fear rivers). **Dist:** S. MD (historically), se. VA south to s. FL, west to s. AR, TX, and Mexico; West Indies; Central and South America. **Phen:** Feb-Aug. **Comm:** *T. usneoides* is the only member of a very large genus to occur north of s. GA. The epithet *'usneoides'* refers to its (very general and superficial) resemblance to the common epiphytic lichen *Usnea*. The inconspicuous yellowish-green flowers are intensely fragrant at night. **Syn:** = Ar, Bah, C, ETx1, F, FNA22, G, K3, K4, Meso6, NcTx, RAB, Tx, Va, WH3; = *Dendropogon usneoides* (Linnaeus) Rafinesque – S. NatureServe G5 (Secure).

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



93. XYRIDACEAE C. Agardh 1823 (YELLOW-EYED GRASS FAMILY) [in POALES]

As recognized more narrowly (excluding *Abolboda*, *Aratitiyopea*, and *Orectanthe* into the Abolbodaceae), a family of 2 genera and about 300-325 species, nearly cosmopolitan (most diverse in tropical and subtropical regions, and especially South America). References: Kral in Kubitzki (1998b); Kral (2000a) in FNA22 (2000).

Xyris Linnaeus 1753 (YELLOW-EYED-GRASS)

A genus of about 300-325 species, nearly cosmopolitan (most diverse in tropical and subtropical regions, and especially South America). This 'technical' genus is known well by only a few botanists, and additional undescribed taxa are possible. References: Anderson & Kral (2008); Bridges & Orzell (1987); Bridges & Orzell (1990); Bridges & Orzell (2003); Bridges & Orzell (2020b) in Weakley et al (2020); Campbell (2011); Kral in Kubitzki (1998b); Kral & Moffett (2009); Kral (1966a); Kral (1978b); Kral (1983b); Kral (1999); Kral (2000a) in FNA22 (2000); Malme (1937); Ward (2007b).

Key adapted from Bridges & Orzell (2003), Godfrey & Wooten (1979), Kral (1966a), and Kral & Moffett (2009).

Identification Notes: In vegetative condition, *Xyris* is often confused with other monocots with equitant leaves, such as *Iris* (Iridaceae), *Lachnanthes* (Haemodoraceae), and *Tofieldia*, *Triantha*, and *Pleea* (Tofieldiaceae).

1 Keel of the lateral sepals shortly ciliate-scabrid (or sometimes entire in *X. brevifolia*, and then the bract tips purplish-tinged).
- 2 Plants small, usually < 30 cm tall; principal leaves usually < 10 cm long; mature spikes < 1 cm long when mature.
  - 3 Leaves filiform, with expanded brownish lustrous bases, usually exceeding the sheath of the scape; [plants of s. AL and the FL Panhandle] ..... ***Xyris isoetifolia***
  - 3 Leaves linear, the bases not expanded, shorter than, equaling, or slightly exceeding the sheath of the scape; [plants collectively more widespread].
    - 4 Keel of the lateral sepals straight to slightly curved, remotely ciliate or entire; spikes broadly ovoid to subglobose, the bracts loose, bicolored, the distal portions maroon or purplish and often with erose margins ..... ***Xyris brevifolia***
    - 4 Keel of the lateral sepals strongly curved, densely ciliate; spikes lance-ovoid to ovoid, the bracts entire, not purple-tinged, and lacking erose borders.
      - 5 Plants perennial; leaves ascending, green with a distinct brown patch at the base; fruiting spikes ovoid, blunt, somewhat 2-edged from the strongly keeled outer bracts ..... ***Xyris drummondii***
      - 5 Plants annual; leaves flabellate arranged, spreading to recurved against the substrate, usually maroon; fruiting spikes often elongated and acute, not 2-edged ..... ***Xyris flabelliformis***
- 2 Plants large, usually > 30 cm tall; principal leaves > 10 cm long; mature spikes > 1 cm long when mature.
  - 6 Leaves ascending, twisted, strongly grooved; spikes ovoid, the bracts and lateral sepals with a small tuft of short, reddish-brown hairs; bases of leaves abruptly expanded, pinkish or purplish (dark brown in age), the outermost leaves often scale-like, the plant base therefore appearing bulbous; [of the Mountains, Piedmont, and Coastal Plain] ..... ***Xyris torta***
  - 6 Leaves spreading, not twisted or only slightly so; spikes narrowly ovoid, ellipsoidal, or oblong; bracts and sepals without a small apical tuft of hairs; bases of leaves whitish, tan, pink, purplish, maroon, or dark brown, the outermost leaves not scale-like, the plant base not appearing bulbous; [typically of the Coastal Plain, rarely disjunct inland].
    - 7 Seeds lustrous, translucent, broadly ovoid; spike pale brown or tan, the scales loosely imbricate; plant bases pinkish, purplish, or tan, with dark longitudinal striations on the inner leaf bases; leaves 3-20 mm wide; petal blades obovate, 6-7 mm long, opening in early morning, usually closing by mid-day ..... ***Xyris ambigua***
    - 7 Seeds farinose, dark brown (*X. stricta*) or pale (*X. louisianica*) at maturity, narrowly ellipsoid to ovoid; spike dark brown, the scales tightly imbricate; plant bases maroon, purplish, dark-brown, or reddish-brown; leaves 2-5 mm wide; petal blades triangular-cuneate, 3-5 mm long, opening at mid-day.
      - 8 Seeds pale when mature; plant bases maroon to maroon-brown, solitary or in small clumps; upper end of scape somewhat flattened, but not nearly as broad as the spike; spike narrowly ovoid to ellipsoid, slightly pointed ..... ***Xyris louisianica***
      - 8 Seeds dark brown when mature; plant bases dark maroon to dark brown, densely cespitose; upper end of the scape conspicuously flattened, almost as broad as the spike; spike oblong-cylindrical, obtuse ..... ***Xyris stricta***

1 Keel of the lateral sepals irregularly lacerate or fimbriate, or if entire then the bract tips not purplish.
- 9 Leaves 0.5-2.0 (-2.5) mm wide, not twisted (or scarcely so); leaf bases expanded, lustrous, hard, tan to brown, neither bulbous nor deeply set in the substrate; spikes ovoid or ellipsoid, 4-15 mm long.
  - 10 Bract tips smooth-edged to denticulate, not curled away from the spike, the spike thus appearing smooth; staminodia beardless ..... ***Xyris baldwiniana***
  - 10 Bract tips ragged-lacerate, the tips curling away from the head, giving it a ragged appearance; staminodia bearded. ..... ***Xyris elliottii***
- 9 Leaves (1.5-) 2.0-25 mm wide, strongly twisted to straight, the leaf bases either not expanded, lustrous, hard, and tan to brown, or, if so, then the base also either bulbous and/or deeply seated in the substrate; spikes narrowly lanceolate, ellipsoid, to broadly ovoid, 4-40 mm long.
  - 12 Keel of the lateral sepals long-fimbriate toward its apex, the fimbriate tip conspicuously exserted from the subtending bract (sometimes eroded and less conspicuous on older spikes).
    - 13 Leaves strongly twisted, 2-5 mm wide; leaf bases hardened, swollen, bulbous, dark lustrous brown; scape ridges smooth; petal blades white or yellow; [of moist to dry pinelands] ..... ***Xyris caroliniana***

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

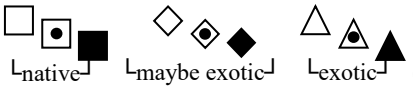
13 Leaves not twisted or slightly twisted, 3-25 mm wide; leaf bases either soft, not swollen, not bulbous, and pale green (*X. fimbriata*) or somewhat hardened and bulbous, deep red (*X. panacea*); scape ridges strongly scabrous or smooth; petal blades yellow; [of aquatic to very wet peaty, mucky, or sandy ponds, marshes, or other wetlands].
..... ***Xyris fimbriata***

12 Keel of the lateral sepals lacerate, or if very shortly fimbriate, then not conspicuously exserted from the subtending bract.
15 Lateral sepals longer than and exserted from the subtending bracts (or if nearly hidden, the plants strongly rhizomatous).
17 Leaf blades 5-15 mm wide, (20-) 30-50 (-60) cm long; spikes 10-20 (-25) mm long; seeds (0.6-) 0.7 (-0.8) mm long; [more widespread in our area].....
..... ***Xyris smalliana***
17 Leaf blades 1-2 (-3) mm wide, 6-30 cm long; spikes 10-16 mm OR 20-32 mm long; seeds 0.4-0.6 mm long; [of FL and s. AL].
..... ***Xyris longisepala***
15 Lateral sepals shorter than the subtending bracts, and therefore hidden (except when the spikes open to shed seeds) AND plants never rhizomatous.
19 Scapes flexuous, usually spirally twisted; upper portion of leaf blades conspicuously twisted; plant bases pinkish, purplish, or dark brown, bulbous or deeply set in the substrate.
20 Seeds opaque; seed surfaces slightly to densely farinose; scape 1.5-8 (-8.5) dm tall; [calcareous habitats of FL, AL, and TN].
22 Scape 3-7 dm tall; leaf sheaths and blade surfaces mostly smooth or slightly rough-papillose only along the keels and edges; scapes with 5-7 sharply angled ridges, densely papillose on the ridges and in the grooves; stem base with or without short-ascending rhizomes .....
..... ***Xyris spathifolia***
22 Scape 1.5-4 dm tall; leaf sheaths and blade surfaces rough-papillose on the surfaces and along the keels and edges; scapes with 2 ridges, somewhat flattened and winglike upwards, slightly papillose on the ridges only (the grooves smooth); stem base lacking rhizomes .....
..... ***Xyris tennesseensis***
20 Seeds translucent; seed surfaces not farinose; scape 2-11 dm tall, but usually > 5 dm tall; [collectively widespread in acidic habitats of the Coastal Plain (and rarely Piedmont), NJ south to s. FL, west to e. TX)].
23 Base of plant deeply set in the substrate, without distinct outer scale leaves; leaf bases not noticeably expanded, the plant base therefore not bulbous; leaves smooth, 2-4 mm wide; petal blades ca. 3 mm long..... ***Xyris chapmanii***
23 Base of plant shallowly set on the substrate, often with short, black outer scale leaves; leaf bases noticeably expanded, the plant base therefore appearing bulbous; leaves either smooth and 5-10 mm wide, or scabrous and 2-10 mm wide; petal blades ca. 5 mm long.
24 Leaf and scape surfaces smooth (or scabrous only along margins and ridges); petal blades obovate, white or yellow; seeds ovoid or ellipsoid, 0.5-0.6 mm long ..... ***Xyris platylepis***
24 Leaf and scape surfaces prominently papillose or tuberculate-scabrid; petal blades suborbicular, yellow; seeds narrowly ovoid or narrowly ellipsoidal, ca. 1.0 mm long..... ***Xyris scabrifolia***
19 Scapes usually not flexuous, usually not spirally twisted; upper portion of leaf blades not conspicuously twisted; plant bases variously colored, flabellate or equitant and set at ground level.
25 Summit of the scape distinctly flattened and broad relative to the spike; scape ridges 2-3, the 2 most prominent comprising the flattened edge of the scape.
27 The 2 principal scape ridges noticeably and abruptly flattened and winglike below the spike, their combined width (on fresh material) broader than the scape proper; fruiting spikes mostly 8-15 mm long; seeds 0.4-0.6 mm long, translucent, ovoid or ellipsoidal, about 1.5× as long as wide, with lines of very fine papillae, not farinose; petals yellow ..... ***Xyris difformis***
27 The 2 principal scape ridges not abruptly flattened and winglike below the spike, their combined width < the scape proper, which is itself flattened (narrowly elliptic in cross-section); fruiting spikes mostly (10-) 20-25 mm long; seeds 0.8-1.0 mm long, dark when ripe, fusiform to narrowly elliptic, 2-3× as long as wide, with lines of very fine papillae, these however obscured by a farinose covering; petals yellow or white ....
..... ***Xyris iridifolia***
25 Summit of the scape nearly terete or somewhat flattened, much narrower than the spike; scape ridges several (usually > 3), at least on the mid to lower portion of the scape.
28 Seeds farinose, very dark; surfaces of leaves tuberculate-scabrid, the leaves strongly ascending, linear, generally > 10 cm long; leaves generally dull-colored.
29 Mature spikes ovoid, sharply acute; plants solitary or in small clumps; leaves 10-30 (-50) cm long, 1.5-6.0 mm wide, dark maroon or purplish at the base..... ***Xyris floridana***
29 Mature spikes ovoid to ellipsoid, acute to obtuse; plants typically in large dense tufts; leaves 20-50 cm long, 3-12 mm wide, the older ones with dark-brown to gray bases, the younger with tan bases..... ***Xyris serotina***
28 Seeds translucent, not farinose; surfaces of leaves smooth (or sparsely tuberculate-scabrid in *X. curtissii*, which also has leaves linear-curvate and generally < 10 cm long); leaves generally a bright yellowish-green above the base.
30 Leaves spreading-recurved to erect, 3-13 cm long, 1-4.5 mm wide; scapes at mid-length 0.4-0.6 (-0.7) mm wide; mature spikes 3-7 (-12) mm long; fertile bracts 3-5 mm long; leaf bases various; old flowers fugacious, not persisting on spikes; seeds 0.3-0.5 mm long. .....
..... ***Xyris curtissii***
30 Leaves ascending to erect, 5-60 cm long, 2-5 (-15) mm wide; scapes at mid-length (0.5-) 1.0-1.5 (-2.0) mm wide; mature spikes 7-15 (-25) mm long; fertile bracts 5-7 mm long; leaf bases tan to brown; old flowers often persisting on spikes, drying blackish; seeds 0.4-0.5 mm long .
..... ***Xyris jupicai***

Xyris ambigua Beyrich ex Kunth. COASTAL PLAIN YELLOW-EYED-GRASS. **Hab:** Wet pine savannas and flatwoods, pinelands, edges of depression ponds. **Dist:** Se. VA south to s. FL, west to AL and ec. TX, primarily on the Coastal Plain; also West Indies (Cuba), and Mexico south into Central America. **Phen:** May-Aug. **ID Notes:** The leaf bases of this species are typically mucilaginous (slimy). **Syn:** = Ar, C, ETx1, F, FNA22, G, K1, K3, Meso6, NcTx, RAB, Tn, Tx, Va, W, WH3, Bridges & Orzell (1987), Bridges & Orzell (2003); < *Xyris ambigua* Beyrich ex Kunth – GW1, S, Kral (1966a).

Xyris baldwiniana J.A. Schultes. GRASSLEAF YELLOW-EYED-GRASS, BALDWIN'S YELLOW-EYED-GRASS. **Hab:** Wet pine savannas, seepage bogs, sandhill seeps, wet savanna ecotones. **Dist:** Se. NC south to n. peninsular FL, west to s. AR and ec. TX, primarily on the Coastal Plain; also s. Mexico and Central America. **Phen:** Jun-Jul. **Syn:** = Ar, ETx1, FNA22, GW1, K1, K3, K4, NcTx, RAB, S, WH3, Bridges & Orzell (2003), Kral (1966a); > *Xyris baldwiniana* var. *baldwiniana* – Tx, Malme (1937); > *Xyris baldwiniana* var. *tenuifolia* (Chapman) Baldwin – Tx, Malme (1937). NatureServe G5 (Secure).

Xyris brevifolia Michaux. SHORTLEAF YELLOW-EYED-GRASS. **Hab:** Wet sands of pinelands, especially seasonally wet, open, white sands of spodosol longleaf pine flatwoods (Leon series soils), margins of Carolina bay sandrims. **Dist:** Se. NC south to s. FL, west to s. AL and w. FL; West Indies and South America. **Phen:** Jun-Aug. **Syn:** = FNA22, GW1, K1, K3, K4, RAB, S, WH3, Bridges & Orzell (2003), Kral (1966a). NatureServe G4G5 (Apparently Secure).

Key to Map Symbology:  (see introduction for more)

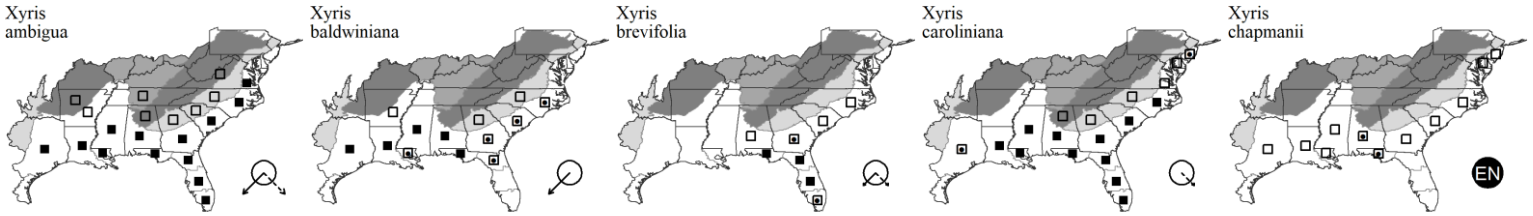
* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable

X : extirpated

Xyris caroliniana Walter. PINELAND YELLOW-EYED-GRASS. **Hab:** Dry to moist pine pine flatwoods, moist pine savannas, longleaf pine sandhills. **Dist:** Se. VA south to s. FL, west to se. TX; disjunct in s. NJ; West Indies (Cuba). **Phen:** Jun-Jul. **Tax:** White-petaled plants that have generally been included as a phase or color form of *X. caroliniana* occur in the East Gulf Coastal Plain. They are the basis of *X. pallescens* (C. Mohr) Small and may well warrant taxonomic recognition. **ID Notes:** The strongly twisted, narrow leaves, and usually dry(ish) habitat (compared to most other Xyris species) is distinguishing. **Syn:** = C, ETx1, FNA22, GW1, K1, K3, K4, RAB, Tx, Va, WH3, Bridges & Orzell (2003), Kral (1966a); > *Xyris flexuosa* Muhlenberg ex Elliott – F, G, S; > *Xyris pallescens* (C. Mohr) Small – S.

Xyris chapmanii E.L. Bridges & Orzell. CHAPMAN'S YELLOW-EYED-GRASS. **Hab:** Sandhill seepage bogs in areas of copious lateral seepage in deep muck soils. **Dist:** With a disjunct distribution in the Southeastern Coastal Plain: s. NJ (Moyer & Bridges 2015); sc. NC south to c. SC (in the fall-line Sandhills) (Sorrie, Van Eerden, & Russo 1997); wc. GA; Panhandle FL west through s. AL to s. MS; e. TX. **Phen:** Aug-Sep; Sep-Oct. **Tax:** See Bridges & Orzell (1990) for detailed information. **ID Notes:** This taxon is abundantly distinct from *X. scabrifolia* by its essentially glabrous leaves and lack of outer scale leaves and bulbous bases. **Syn:** = K3, K4, Bridges & Orzell (1990), Bridges & Orzell (2003); = n/a – RAB; < *Xyris scabrifolia* R.M. Harper – FNA22, K1, WH3, Kral (1966a).



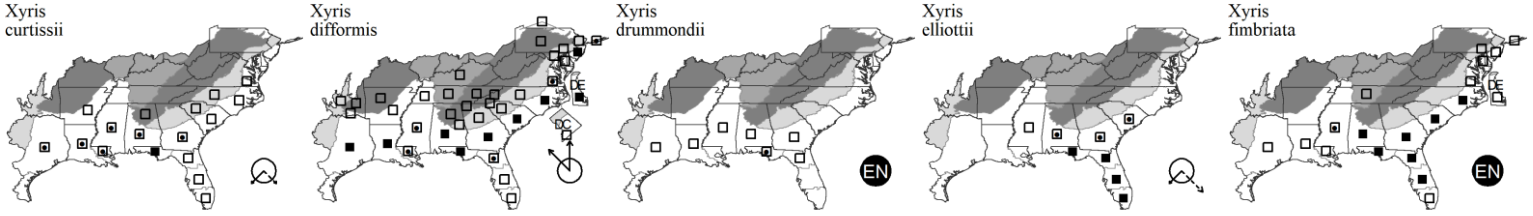
Xyris curtissii Malme. CURTISS'S YELLOW-EYED-GRASS. **Hab:** Longleaf pine savannas, inland in acid bogs and seeps. **Dist:** Se. VA south to ne. FL, FL Panhandle, and west to s. AR and ec. TX, primarily on the Coastal Plain; disjunct in w. SC in the uppermost Piedmont (Blue Ridge Escarpment region); disjunct in s. NJ; Central America (Belize). **Phen:** Jul-Aug. **Syn:** = G, K3, K4, RAB, Va, WH3; = *Xyris difformis* Chapman var. *curtissii* (Malme) Kral – Ar, C, ETx1, FNA22, GW1, K1, Meso6, Tx, Kral & Moffett (2009), Kral (1966a); = *Xyris neglecta* Small – S; > *Xyris bayardii* Fernald – F; > *Xyris curtissii* Malme – F, Bridges & Orzell (2003). NatureServe G5T5 (Secure).

Xyris difformis Chapman. BOG YELLOW-EYED-GRASS. **Hab:** Pine savannas, roadside ditches, pond margins, acid seeps, bogs, other wet habitats. **Dist:** New England and s. Canada south to n. peninsular FL and ec. TX. **Phen:** Aug-Oct. **Syn:** = K3, K4, Mi, Tn, Va, WH3, Bridges & Orzell (2003); = *Xyris difformis* Chapman var. *difformis* – C, ETx1, FNA22, GW1, K1, NE, NY, Tx, Kral & Moffett (2009), Kral (1966a); < *Xyris difformis* Chapman – F, G, Pa, RAB, S, W. NatureServe G5T5 (Secure).

Xyris drummondii Malme. DRUMMOND'S YELLOW-EYED-GRASS. **Hab:** Wet pine flatwoods, ditches. **Dist:** Se. GA south to ne. FL, west to Panhandle FL and s. MS. **Phen:** Jun-Jul. **Syn:** = ETx1, FNA22, GW1, K1, K3, K4, WH3, Bridges & Orzell (2003), Kral (1966a). NatureServe G3G4 (Vulnerable).

Xyris elliottii Chapman. ELLIOTT'S YELLOW-EYED-GRASS. **Hab:** Margins of drawdown zones of clay-based Carolina bays, limesinks and flatwoods swales, wet savannas. **Dist:** E. SC south to s. FL, west to s. AL; Nicaragua, Belize, Mexico (Tabasco); West Indies; South America. **Phen:** May-Jun. **Syn:** = *Xyris elliottii* var. *elliottii* – Malme (1937); < *Xyris elliottii* Chapman – FNA22, GW1, K1, K3, K4, RAB, S, WH3, Bridges & Orzell (2003), Kral (1966a).

Xyris fimbriata Elliott. FRINGED YELLOW-EYED-GRASS. **Hab:** In mucky or sandy soils of upland depression ponds, also along sandhill streams, impoundments and in deep muck of sandhills seepage slopes often just below the zone occupied by *Xyris chapmanii*. **Dist:** Se. VA south to c. peninsular FL, west (interruptedly) to se. TX; disjunct in s. NJ, DE, and c. TN. **Phen:** Sep-Oct. **ID Notes:** Where this species narrowly co-occurs with *X. panacea* in Wakulla County, FL, it can be distinguished by its shorter, wider spikes and more exserted fimbriate sepals. **Syn:** = C, ETx1, F, FNA22, G, GW1, K1, K3, K4, RAB, S, Tn, Va, WH3, Bridges & Orzell (2003), Kral (1966a). NatureServe G5 (Secure).



Xyris flabelliformis Chapman. FANLEAF YELLOW-EYED-GRASS. **Hab:** Wet sands of pinelands, especially seasonally wet, open, white sands of spodosol longleaf pine flatwoods (Leon series soils), margins of Carolina bay sandrims. **Dist:** Se. NC south to s. FL, west to se. LA, on the Coastal Plain; Cuba. **Phen:** May-Jun. **Syn:** = FNA22, GW1, K1, K3, K4, RAB, S, WH3, Bridges & Orzell (2003), Kral (1966a), Ward (2007b). NatureServe G4 (Apparently Secure).

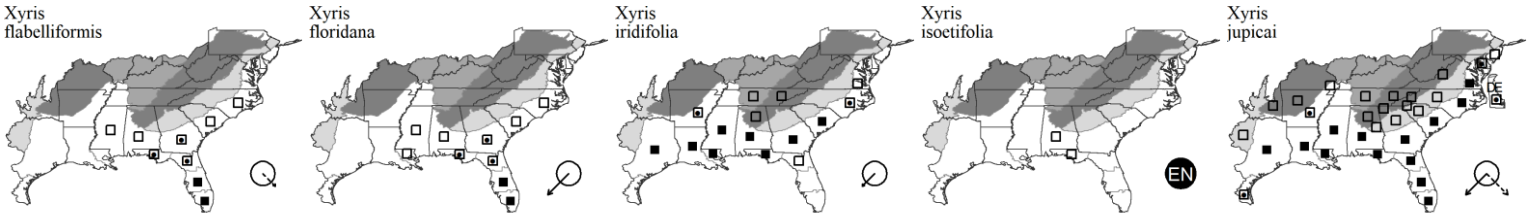
Xyris floridana (Kral) E.L. Bridges & Orzell. FLORIDA YELLOW-EYED-GRASS. **Hab:** Pine savannas, wet pine flatwoods, ditches. **Dist:** Se. NC south to s. FL, west to se. LA; Central America. **Phen:** Aug. **ID Notes:** *Xyris floridana* can be distinguished from *X. jupicai* by its more sharply pointed, more ovate spikes with older, shriveled flowers mostly or entirely absent. The leaf bases are also strongly purple-colored. **Syn:** = K3, K4, WH3, Bridges & Orzell (2003); = *Xyris difformis* Chapman var. *floridana* Kral – FNA22, GW1, K1, Meso6, Kral & Moffett (2009), Kral (1966a). NatureServe G5T4T5 (Apparently Secure).

Xyris iridifolia Chapman. IRISLEAF YELLOW-EYED-GRASS. **Hab:** Marshes, upland pond margins, blackwater river channels, floodplain pools, other wet habitats. **Dist:** Se. VA south to ne. FL and FL Panhandle, west to e. TX; disjunct in c. TN and Mexico. **Phen:** Jul-Sep. **Syn:** = C, GW1, RAB, S, Tx, Va, Kral (1966a); = *Xyris laxifolia* Mart. var. *iridifolia* (Chapman) Kral – Ar, ETx1, FNA22, K1, K3, K4, Tn, WH3, Bridges & Orzell (2003). NatureServe G4G5T4T5 (Apparently Secure).

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Xyris isoetifolia Kral. QUILLWORT-LEAVED YELLOW-EYED-GRASS. **Hab:** Seepage bogs, pine savannas, depression pond margins (with seepage), and (less typically) coastal scrubby flatwoods; often in the intermittently exposed, outer drawdown zones of depression pond margins in open saturated sands. **Dist:** Endemic to FL Panhandle and s. AL. **Syn:** = FNA22, GW1, K1, K3, K4, WH3, Bridges & Orzell (2003), Kral (1966a). NatureServe G2 (Imperiled).

Xyris jupicai L.C. Richard. RICHARD'S YELLOW-EYED-GRASS. **Hab:** Acid wetlands, ditches, various wet habitats. **Dist:** NJ south to s. FL, west to TN, AR, se. OK (Singhurst, Bridges, & Holmes 2007), and TX; Mexico, Central America, South America, West Indies. **Phen:** Jul-Sep. **Tax:** Sometimes weedy and considered by some to be adventive from farther south. At least some populations in our area are native and may additionally be worthy of taxonomic recognition as distinct from "true" *X. jupicai* (P. McMillan, pers. comm., 2003). **Syn:** = Ar, C, ETx1, FNA22, GW1, Il, K1, K3, K4, Meso6, Mo1, NcTx, RAB, Tn, Tx, Va, W, WH3, Bridges & Orzell (2003), Kral & Moffett (2009), Kral (1966a); = *Xyris caroliniana* Walter – F, misapplied; > *Xyris caroliniana* Walter – G, S, misapplied; > *Xyris communis* Kunth – S; > *Xyris elata* Chapman – G, S.



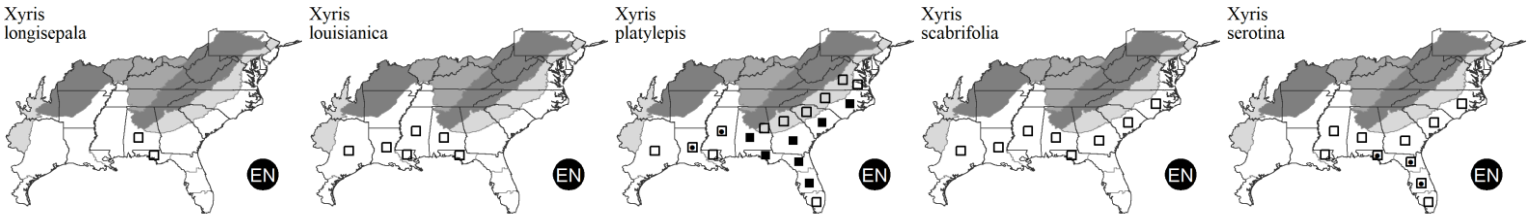
Xyris longisepala Kral. PANHANDLE YELLOW-EYED-GRASS, LONG-SEPALED YELLOW-EYED-GRASS. **Hab:** Depression pond margins. **Dist:** Endemic to FL Panhandle and s. AL. **Syn:** = FNA22, GW1, K1, K3, K4, WH3, Bridges & Orzell (2003), Kral (1966a). NatureServe G2G3 (Imperiled).

Xyris louisianica E.L. Bridges & Orzell. LOUISIANA YELLOW-EYED-GRASS. **Hab:** Pine savannas, bogs, ditches and disturbed areas. **Dist:** FL Panhandle west to se. TX. **Phen:** Jun-Aug. **Tax:** See Bridges & Orzell (1987) for detailed information. **Syn:** = K1, K3, K4, WH3, Bridges & Orzell (1987), Bridges & Orzell (2003); = *Xyris stricta* Chapman var. *obscura* Kral – ETx1, FNA22; < *Xyris ambigua* Beyrich ex Kunth – GW1, S, Kral (1966a).

Xyris platylepis Chapman. BULBOUS YELLOW-EYED-GRASS. **Hab:** Sandhill seeps, pine savannas, ditches, rarely inland in acid seepage over rock. **Dist:** Se. VA south to s. FL, west to se. LA; disjunct in sw. LA and se. TX; disjunct in w. SC in the uppermost Piedmont in the Blue Ridge Escarpment region. **Phen:** Jul-Sep. **Syn:** = C, ETx1, F, FNA22, G, GW1, K1, K3, K4, RAB, S, Tx, Va, WH3, Bridges & Orzell (1990), Bridges & Orzell (2003), Kral (1966a). NatureServe G5 (Secure).

Xyris scabrifolia R.M. Harper. ROUGHLEAF YELLOW-EYED-GRASS. **Hab:** Sandhill seepage bogs and wet pine savannas. **Dist:** Sc. and se. NC south to Panhandle FL, west to s. AL and s. MS; disjunct in sw. LA-se. TX. **Phen:** Jun-Jul. **Tax:** See Bridges & Orzell (1990) for detailed information. **ID Notes:** This taxon is abundantly distinct from *X. chapmanii*, through its presence of outer scale leaves and bulbous bases and by having strongly papillose-scabrid leaves. **Syn:** = ETx1, GW1, K3, K4, S, WH3, Bridges & Orzell (1990), Bridges & Orzell (2003); = n/a – RAB; < *Xyris scabrifolia* R.M. Harper – FNA22, K1, Kral (1966a). NatureServe G3 (Vulnerable).

Xyris serotina Chapman. GRAY-LEAVED YELLOW-EYED-GRASS. **Hab:** Depression meadows, ultisol savannas (Lynchburg/Rains complex or Eulonia/Oketee), ditches. **Dist:** Se. NC south to c. peninsular FL, west to s. MS, in the Coastal Plain. **Phen:** Sep. **Syn:** = FNA22, GW1, K1, K3, K4, RAB, S, WH3, Bridges & Orzell (2003), Kral (1966a). NatureServe G3G4 (Vulnerable).



Xyris smalliana Nash. SMALL'S YELLOW-EYED-GRASS. **Hab:** Pond margins, ditches; often growing in standing water in the intermediate zones of basin marshes adjacent to *Hypericum fasciculatum* and *Pontedaria cordata* [in peninsular FL]. **Dist:** S. ME south to s. FL, west to s. MS; disjunct to se. TX; s. Mexico south into Central America; West Indies (Cuba). **Phen:** Jul-Aug. **ID Notes:** This species typically has conspicuous pinkish-red leaf bases. **Syn:** = C, ETx1, FNA22, GW1, K1, K3, K4, Meso6, NE, NY, RAB, S, W, WH3, Bridges & Orzell (2003), Kral (1966a); > *Xyris congdonii* Small – F; > *Xyris smalliana* Nash – F; > *Xyris smalliana* var. *olneyi* (Wood) Gleason – G; > *Xyris smalliana* var. *smalliana* – G. NatureServe G5 (Secure).

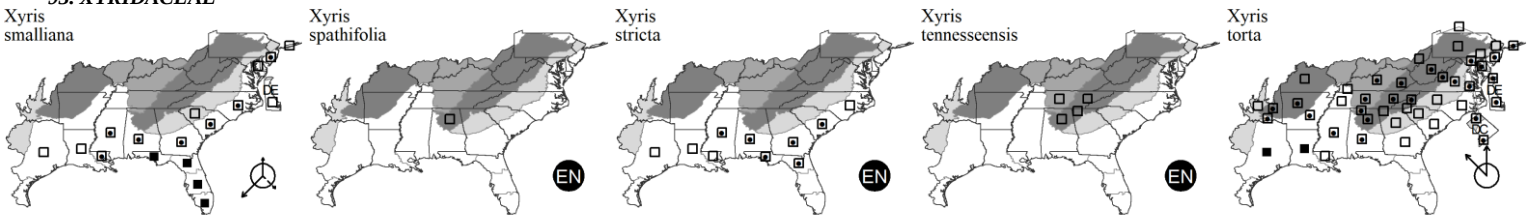
Xyris spathifolia Kral & Moffett. KETONA YELLOW-EYED-GRASS. **Hab:** Seeps over dolomite. **Dist:** Apparently endemic to Bibb County, c. AL. **Tax:** See Kral & Moffett (2009) for additional information. **Syn:** = K3, K4, Kral & Moffett (2009). NatureServe G1 (Critically Imperiled).

Xyris stricta Chapman. STRICT YELLOW-EYED-GRASS. **Hab:** Depression ponds, depression meadows, borrow pits, ultisol pine savannas, and ditches. **Dist:** SC south to ne. FL and Panhandle FL, west to s. MS and se. LA. Reported for our area by Kral (1966b). P. McMillan (pers. comm.) reports this species from a number of locations in the outer Coastal Plain of NC and SC. **Phen:** Jul-Sep. **Syn:** = GW1, K1, K3, K4, S, WH3, Bridges & Orzell (1987), Bridges & Orzell (2003), Kral (1966a); = *Xyris stricta* var. *stricta* – ETx1, FNA22. NatureServe G4 (Apparently Secure).

Xyris tennesseensis Kral. TENNESSEE YELLOW-EYED-GRASS. **Hab:** Seepy, fenlike areas over limestone. **Dist:** TN, AL, and nw. GA (Jones & Coile 1988). **Tax:** See Kral (1978b) for additional information. **Syn:** = FNA22, K1, K3, K4, Tn, Kral & Moffett (2009), Kral (1978b). NatureServe G2 (Imperiled); USESA E.

Xyris torta Smith. TWISTED YELLOW-EYED-GRASS, MOUNTAIN YELLOW-EYED-GRASS. **Hab:** Mountain bogs, seeps, marshes, streambanks, ditches. **Dist:** NH west to WI, south to e. VA, e. NC, w. SC, c. GA, LA, OK, and TX. **Phen:** Jun-Aug. **Comm:** This is one of the few species of *Xyris* in our area that is not strongly associated with the Coastal Plain. **Syn:** = Ar, C, FNA22, GW1, Il, K1, K3, Mi, Mo1, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WV, Kral & Moffett (2009), Kral (1966a); > *Xyris torta* var. *macropoda* Fernald – F, G; > *Xyris torta* var. *occidentalis* Malme – Malme (1937); > *Xyris torta* var. *torta* – F, G, Malme (1937). NatureServe G5 (Secure).

Key to Map Symbology: □ native; ◇ maybe exotic; △ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



94. ERIOCAULACEAE Martinov 1820 (PIPEWORT FAMILY) [in POALES]

A family of about 10 genera and 1100 species, of tropical and warm temperate regions (few in cold temperate regions), especially America, and most diverse in n. South America. References: Andrino et al (2021); Kral (1966c); Kral (2000b) in FNA22 (2000); Stützel in Kubitzki (1998b).

1 Scape glabrous, 10-110 cm tall at maturity; roots thickened, septate (not requiring magnification), unbranched; leaves with obvious air spaces; petals 2, fused below; stamens (3-) usually 4 (-6), the anthers black at maturity ..... ***Eriocaulon***
1 Scape pubescent (or glabrous), 6-40 cm tall at maturity; leaves lacking obvious air spaces; roots fibrous or spongy, not septate; petals 3 or absent; stamens 2-3, the anthers yellow at maturity.
  2 Scape glabrous or pubescent with eglandular hairs; roots fibrous, branched, dark; heads white, gray, or brown; leaves bright green, tapering gradually through most of their lengths, herbaceous in texture ..... ***Lachnocaulon***
  2 Scape pubescent with glandular hairs (or a mixture of glandular and eglandular hairs); roots spongy, unbranched, pale; heads yellowish-tan or gray; leaves bluish green, narrowly linear to the abruptly flared base, stiff in texture ..... ***Syngonanthus***

Eriocaulon Linnaeus 1753 (PIPEWORT)

A genus of about 400 species, of tropical and warm temperate regions (few in cold temperate areas). References: Gomes de Andrade et al (2010); Hare (1950); Kral (1966c); Kral (2000b) in FNA22 (2000); Stützel in Kubitzki (1998b).

Identification Notes: The roots "are pure white and translucent, soft in texture, very flexible and have a curious and characteristic vermiform appearance, owing to the presence of regularly spaced internal diaphragms" (Hare 1950).

1 Receptacle and/or base of flowers copiously hairy; some or most of perianth parts with chalk white hairs; heads overall appearing white, 5-20 mm in diameter when in full flower or fruit.
  2 Heads hard (little compressed by a plant press and feeling hard and knotty when squeezed between finger and thumb); leaves dark green, the tip acute to obtuse; scape sheaths shorter than most leaves; involucral bracts straw-colored, the apex acute; receptacular bracteoles pale, the apex narrowly acuminate; pistillate flower petals adaxially glabrescent; terminal cells of club-shaped hairs of the perianth whitened, the basal cells often uncongested and transparent.
    3 Leaves to 1 cm wide, with acute to rounded tip; heads 7-15 mm in diameter; [widespread in our area] ..... ***Eriocaulon decangulare var. decangulare***
    3 Leaves to 2 cm wide, with rounded tip; heads 13-20 mm in diameter; [of the East Gulf Coastal Plain, known from Panhandle FL and s. AL] ..... ***Eriocaulon decangulare var. latifolium***
  2 Heads soft (much flattened by a plant press, and easily compressed when fresh between finger and thumb); leaves pale green, the tip attenuate-subulate; scape sheaths longer than most leaves; involucral bracts gray or dark, the apex rounded or obtuse; receptacular bracteoles gray to dark gray, the apex acute; pistillate flower petals adaxially villous; all cells of club-shaped hairs on perianth white.
    4 Mature heads 10-20 mm in diameter; leaves 5-30 cm long; petals of staminate flowers conspicuously unequal; [plants primarily of seasonally flooded ponds] ..... ***Eriocaulon compressum***
    4 Mature heads 5-10 mm in diameter; leaves (1-) 2-5 (-7) cm long; petals of staminate flower nearly equal ..... ***Eriocaulon texense***
1 Receptacle and/or base of flowers glabrous or sparingly hairy; receptacular bracteoles and/or perianth parts glabrous or hairy, the hairs club-shaped, clear or white; heads dark gray or white, 3-4 mm (*E. koernickianum*, *E. parkeri*, and *E. ravenelii*), or 4-10 mm (*E. aquaticum* and *E. lineare*) in diameter when in full flower or fruit.
  ..... ***Eriocaulon lineare***

Eriocaulon compressum Lamarck. SOFT-HEADED PIPEWORT. **Hab:** Ponds, lakes, other depressions, wetter places in pine flatwoods and pine savannas, acidic seeps, Atlantic white cedar (*Chamaecyparis thyoides*) swamps. **Dist:** NJ south to s. FL, west to e. TX. **Phen:** Apr-Oct. **Syn:** = C, ETx1, F, FNA22, G, GW1, K1, K3, K4, RAB, S, Tx, W, WH3, Kral (1966c). NatureServe G5 (Secure).

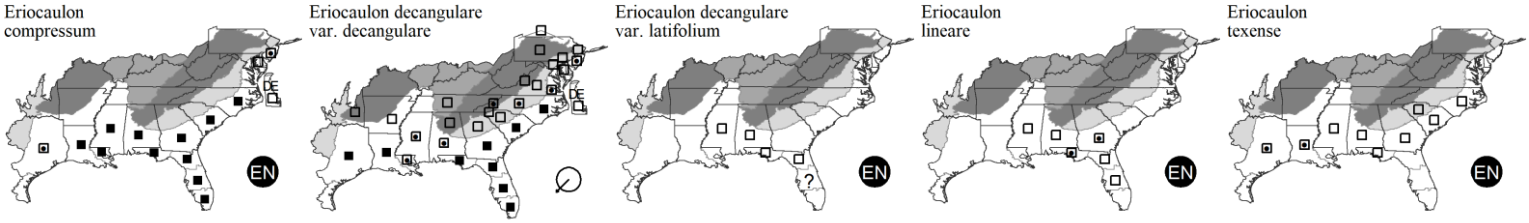
Eriocaulon decangulare Linnaeus *var. **decangulare***. COMMON TEN-ANGLED PIPEWORT. **Hab:** Wet pine savannas and pine flatwoods, bogs, mafic fens and seeps, seasonally flooded ponds, seepage bogs and swamps, wind-tidal marshes, sea-level fens. **Dist:** NJ south to s. FL, west to sw. AR and e. TX; Mexico (CAM, MIC, TAB, VER), Central America. **Phen:** Jun-Oct. **Syn:** = FNA22, K1, K3, K4, Va; < *Eriocaulon decangulare* – Ar, C, ETx1, F, G, GW1, Meso6, NcTx, Pa, RAB, S, Tn, Tx, W, WH3, Kral (1966c). NatureServe G5T5? (Secure).

Eriocaulon decangulare Linnaeus *var. **latifolium*** Chapman ex Moldenke. PANHANDLE PIPEWORT. **Hab:** Seepage bogs. **Dist:** Restricted to Panhandle FL, s. AL, and s. MS; disjunct in ne. FL. **Comm:** It appears to warrant taxonomic status, but needs additional study. **Syn:** = FNA22, K1, K3, K4; < *Eriocaulon decangulare* – GW1, S, WH3, Kral (1966c). NatureServe G5TNR (Not Yet Ranked).

Eriocaulon lineare Small. **Hab:** Seepage bogs. **Dist:** Sw. GA south to c. peninsular FL, west to s. AL. **Comm:** *Eriocaulon lineare* was reported for NC (Kral in FNA 2000), but this is apparently in error. Kral & Sorrie (1998) proposed the conservation of the name *E. lineare* with a conserved type, as the designated type actually represents *E. texense*; this course was accepted by Brummitt (2005). **Syn:** = FNA22, GW1, K1, K3, K4, S, WH3. NatureServe G4 (Apparently Secure).

Eriocaulon texense Körnicke. TEXAS HATPINS. **Hab:** Sandhill seepage bogs, Altamaha Grit outcrops, seepage over the Catahoula in the West Gulf Coastal Plain, seepage over granite in the Blue Ridge Escarpment. **Dist:** Sc. NC south to w. Panhandle FL, west to e. TX; disjunct in w. SC in

the uppermost Piedmont in the Blue Ridge Escarpment region. **Phen:** Apr-Jun. **Syn:** = ETx1, FNA22, GW1, K1, K3, K4, NcTx, Tx, WH3, Kral (1966c). NatureServe G4 (Apparently Secure).



Lachnocaulon Kunth 1841 (BOGBUTTONS)

A genus of 7 species, herbs, of se. North America and Cuba. Based on work of Gomes de Andrade et al. (2010) and Adrino et al. (2010), *Lachnocaulon* is embedded within a broadly conceived *Paepalanthus* Martius. *Lachnocaulon* can be included in *Paepalanthus*, a course favored by Christenhusz, Faye, & Byng (2018) and Chistenhusz et al. (2020), or, alternatively, *Paepalanthus* can be restructured into a number of smaller genera, including *Lachnocaulon*, a course being followed by specialists in the group (Andrino et al. 2021; Andrino, Sano, & Nepomuceno da Costa (2021). We follow the second course. References: Andrino et al (2021); Andrino, Sano, & Nepomuceno da Costa (2021); Christenhusz et al (2020); Christenhusz, Fay, & Byng (2018); Gomes de Andrade et al (2010); Kral (1966c); Kral (2000b) in FNA22 (2000); Stützel in Kubitzki (1998b).

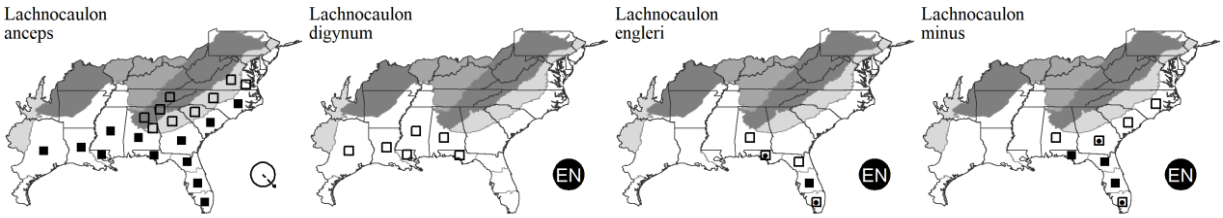
1 Trichomes at the tips of the receptacular bracts milky white, opaque, the head therefore appearing gray to white, obscuring the brown color of the bractlets. ..... ***Lachnocaulon anceps***
1 Trichomes at the tips of the receptacular bracts translucent, the head therefore showing the brown color of the bractlets.
  3 Scape with ascending hairs..... ***Lachnocaulon minus***
  3 Scape glabrous (or with a few trichomes).
    4 Leaves 0.5-1 (-2) cm long; head light brown, usually globose; carpels 2..... ***Lachnocaulon digynum***
    4 Leaves 2-3 cm long; head reddish- or dark brown, usually elongate-cylindric; carpels 3..... ***Lachnocaulon engleri***

Lachnocaulon anceps (Walter) Morong. COMMON BOGBUTTONS. **Hab:** Moist to dry sands, moist peats, in pinelands, sometimes locally abundant in open disturbed areas where competition has been removed. **Dist:** S. NJ south to s. FL, west to se. TX; rarely disjunct inland off the Coastal Plain, as in ec. TN; West Indies (Cuba). **Phen:** May-Oct. **Syn:** = C, ETx1, F, FNA22, G, GW1, K1, K3, K4, RAB, Tn, Tx, Va, WH3, Kral (1966c); = *Paepalanthus anceps* (Walter) Christenhusz & Byng – Christenhusz, Fay, & Byng (2018); > *Lachnocaulon anceps* (Walter) Morong – S; > *Lachnocaulon floridanum* – S; > *Lachnocaulon glabrum* Körnicke – S. NatureServe G5 (Secure).

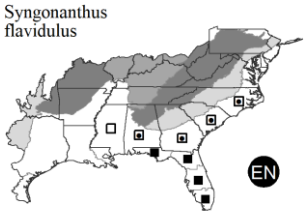
Lachnocaulon digynum Körnicke. PINELAND BOGBUTTON. **Hab:** Hillside seepage bogs, wet pine savannas. **Dist:** Panhandle FL (east to Liberty and Franklin counties) and s. AL west to s. MS; disjunct west of the Mississippi River in w. LA and extreme e. TX. **Phen:** Jun-Sep. **Syn:** = ETx1, FNA22, GW1, K1, K3, K4, S, WH3, Kral (1966c); = *Paepalanthus digynus* (Körnicke) Christenhusz & Byng – Christenhusz, Fay, & Byng (2018). NatureServe G3G4 (Vulnerable).

Lachnocaulon engleri Ruhland. ENGLER'S BOGBUTTON. **Hab:** Pondshores, pine savannas. **Dist:** N. FL peninsula south to s. FL; Panhandle FL and s. AL. **Phen:** Jun-Oct. **Syn:** = FNA22, GW1, K1, K3, K4, S, WH3, Kral (1966c); = *Paepalanthus engleri* (Ruhland) Christenhusz & Byng – Christenhusz, Fay, & Byng (2018). NatureServe G3 (Vulnerable).

Lachnocaulon minus (Chapman) Small. BROWN BOGBUTTON. **Hab:** Upper margins of Coastal Plain doline ponds, other pineland situations. **Dist:** E. NC south to s. peninsular FL, west to Panhandle FL and se. AL. **Phen:** May-Oct. **Syn:** = FNA22, GW1, K1, K3, K4, RAB, WH3, Kral (1966c); = *Paepalanthus minus* (Chapman) Christenhusz & Byng – Christenhusz, Fay, & Byng (2018); > *Lachnocaulon eciliatum* Small – S; > *Lachnocaulon minus* (Chapman) Small – S. NatureServe G3G4 (Vulnerable).



Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated



Syngonanthus Ruhland 1900 (YELLOW HATPINS)

A genus of about 200 species, primarily of tropical America, but some in Africa and Madagascar; ours is the only temperate species. References: Andrino et al (2021); Gomes de Andrade et al (2010); Kral (1966c); Kral (2000b) in FNA22 (2000); Stützel in Kubitzki (1998b).

Identification Notes: *Syngonanthus flavidulus* is distinguished from all other SEUS Eriocaulaceae by its flattened to even somewhat recurved (the leaf tips curving down into the ground at their tips) rosettes of quite narrow leaves, often with a bluish-green color. All of our other Eriocaulaceae have basal rosettes of leaves that are mostly ascending to spreading, and more of a yellowish-green to deep green (or sometimes stramineous) color. In flower, Syngonanthus has a more "chaffy" looking inflorescence, the bracts appearing dry. In contrast, most other US Eriocaulaceae flower heads are at least somewhat fleshy, and most species have white-clavate hairs obscuring most of the floral parts.

Syngonanthus flavidulus (Michaux) Ruhland. YELLOW HATPINS, BANTAM-BUTTONS. **Hab:** Pine savannas, pine flatwoods, borders of pineland ponds, and adjacent ditches. **Dist:** Se. NC south to s. FL, west to s. MS. **Phen:** May-Oct. **Syn:** = FNA22, GW1, K1, K3, K4, RAB, S, WH3, Kral (1966c). NatureServe G5 (Secure).

95. MAYACACEAE Kunth 1840 (BOGMOSS FAMILY) [in POALES]

A family of a single genus and 4-10 species, of tropical to warm temperate America and Africa. References: Faden (2000a) in FNA22 (2000); Stevenson in Kubitzki (1998b); Thieret (1975).

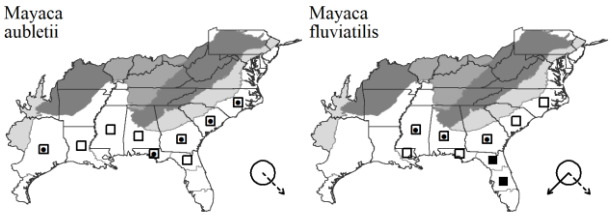
Mayaca Aublet 1775 (BOGMOSS)

A genus of 4-10 species, of tropical to warm temperate America and Africa. References: Faden (2000a) in FNA22 (2000); Stevenson in Kubitzki (1998b); Thieret (1975); Urquiola Cruz (2001).

1 Pedicels 5-30 mm long; plants decumbent, the leaves disposed either spirally to distichously on the stem; corolla pink (with a white 'eye'); capsule subglobose to ovoid ..... ***Mayaca aubletii***
1 Pedicels 1-5 (-10) mm long; plants erect to ascending, the leaves disposed spirally around the stem; corolla white or pink; capsules oblong-ellipsoid ..... ***Mayaca fluviatilis***

Mayaca aubletii Michaux. AUBLET'S BOGMOSS. **Hab:** Marshes, streams, swamp forests, shores of natural lakes (rarely in artificial impoundments), seepage areas, in saturated soil and usually associated with seepage. **Dist:** Se. NC south to c. peninsular FL, west to e. TX; West Indies (w. Cuba). **Phen:** (Dec-) May-Aug. **Comm:** The two species previously recognized have recently been usually interpreted as only different growth forms, induced by different hydrologic conditions; Urquiola (2001) disagrees and supports their recognition. The two taxa are provisionally adopted here; additional study is warranted. **Syn:** = RAB, S, Tx, Urquiola Cruz (2001); < *Mayaca fluviatilis* Aublet – ETx1, FNA22, GW1, K1, K3, K4, WH3, WI, Thieret (1975).

Mayaca fluviatilis Aublet. BOGMOSS. **Hab:** Mucky marshes, streams, swamp forests, shores of natural lakes (rarely in artificial impoundments), in saturated soil or variously submersed. **Dist:** Se. NC south to c. peninsular FL, west to e. LA; West Indies; Central America to South America. **Phen:** (Dec-) May-Nov. **Syn:** = RAB, S, Urquiola Cruz (2001); < *Mayaca fluviatilis* Aublet – FNA22, GW1, K1, K3, K4, Meso6, WH3, WI, Thieret (1975).



97. JUNCACEAE A.L. de Jussieu 1789 (RUSH FAMILY) [in POALES]

A family of about 8 genera and 350-440 species, herbs (and a few shrubs), largely of temperate regions of the Old and New World. References: Balslev in Kubitzki (1998b); Brooks & Clemants (2000a) in FNA22 (2000); Do & Záveská Drábková (2018); Záveská Drábková et al (2003).

2 Leaf blades terete or flat, glabrous; mature fruit many-seeded; [often in wetlands] ..... ***Juncus***
2 Leaf blades flat, ciliate; mature fruit with 3 seeds; [usually in uplands] ..... ***Luzula***

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Juncus Linnaeus 1753 (RUSH)

Contributed by B.A. Sorrie and W.M. Knapp

A genus of about 250-300 species, herbs, of cosmopolitan distribution. References: Balslev in Kubitzki (1998b); Bridges & Orzell (2008); Brooks & Clemants (2000b) in FNA22 (2000); Clemants (1990); Hämet-Ahti (1980); Kirschner (2002b); Kirschner (2002c); Knapp & Naczi (2008); Knapp (2014); Knapp (2016) in Naczi & collaborators (2019); Záveská Drábková et al (2003); Zika (2003); Zika (2013).

subgenus *Juncus*, section *Juncus*: *acutus ssp. leopoldii, roemerianus*
subgenus *Juncus*, section *Graminifolii*: *biflorus, filipendulus, longii, marginatus, repens*
subgenus *Juncus*, section *Iridifolii*: *polycephalos*
subgenus *Juncus*, section *Ozophyllum*: *acuminatus, brachycephalus, brevicaudatus, caesariensis, canadensis, megacephalus, militaris, nodosus, paludosus, pelocarpus, subcaudatus, torreyi, trigonocarpus, validus*
subgenus *Agathryon*, section *Tenageia*: *bufonius, ranarius*
subgenus *Agathryon*, section *Steirochloa*: *anthelatus, brachyphyllus, coriaceus, dichotomus, dudleyi, georgianus, gerardi, interior, secundus, tenuis,*
subgenus *Agathryon*, section *Juncotypus*: *balticus, filiformis, effusus* ssp. *effusus, effusus* ssp. *solutus, gymnocarpus, inflexus, pylaei*

Identification Notes: For identification of most rushes, it is important to collect plants with mature capsules and seeds. Stamen number is often a diagnostic character and can be determined after anthesis by counting the number of persistent filaments located behind the tepals. Care must be taken to collect specimens with uninjured heads, especially for the group of rushes in Key D; the long beaks of the capsules are often fragile and easily broken off.

1 Inflorescence appearing lateral; inflorescence bract erect, appearing to be a continuation of the culm..... ***KEY A***
1 Inflorescence appearing terminal; inflorescence bract not appearing to be a continuation of the culm.
  2 Leaf blades non-septate..... ***KEY B***
  2 Leaf blades septate (sometimes obscure in dried specimens; if so, rest leaf on hard surface and run fingernail over it lengthwise).
    3 Mature seeds distinctly tailed with elongate appendages at each end (may be obscure in *J. subcaudatus*), seeds 0.7-2.5 mm long; [subgenus *Juncus*, section *Ozophyllum*]..... ***KEY C***
    3 Mature seeds without appendages, < 0.7 mm long.
      4 Flowers solitary (rarely up to 3) along branches of inflorescence; flowers often aborted; inflorescence diffuse, with slender flexuous branches; [subgenus *Juncus*, section *Ozophyllum*]..... ***Juncus pelocarpus***
      4 Flowers in heads (glomerules) of 3 or more; flowers seldom aborted; inflorescence various.
        5 Heads spherical or nearly so, usually 15-60 flowered..... ***KEY D***
        5 Heads turbinate to hemispherical, 3-15 flowered; [subgenus *Juncus*, section *Ozophyllum*]..... ***KEY E***

KEY A

1 Flowers borne in heads (glomerules) of 2-6 flowers per head; leaves spine-tipped; single bracteole subtending glomerule present at base of pedicel; [plants of brackish habitats]; [subgenus *Juncus*, section *Juncus*]
..... ***Juncus roemerianus***
1 Flowers borne singly on branches of inflorescence; leaves not spine-tipped; each flower subtended by two bracteoles in addition to bracteole at base of pedicel; [plants of various habitats].
  3 At least a few sheaths at base of plant with well developed blades; inflorescence bract channeled on one side; [subgenus *Agathryon*, section *Steirochloa*].....
  ..... ***Juncus coriaceus***
  3 Sheaths at base of plant bladeless; bract not channeled; [subgenus *Agathryon*, section *Juncotypus*].
    4 Culms well spaced along creeping rhizomes.
    ..... ***Juncus gymnocarpus***
    4 Culms cespitose or tufted on short branching rhizomes.
      7 Perianth much shorter than capsule (about ½ as long); stamens 6; [from NC and TN south to Panhandle FL]..... ***Juncus gymnocarpus***
      7 Perianth > 3/4 length of capsule; stamens 6 or 3; [collectively widespread].
      ..... ***Juncus effusus ssp. solutus***

KEY B

1 Flowers borne in heads (glomerules) of 2 or more, individual flowers not subtended by two bracteoles (in addition to the bracteole at the base of the pedicel); [subgenus *Juncus*, section *Graminifolii*].
  2 Perianth 6-10 mm long; plant aquatic, submersed and sterile or emersed/stranded and fertile; stems weak, creeping, mat-forming..... ***Juncus repens***
  2 Perianth < 6 mm long; plant of uplands or wetland margins, never submersed; stems erect, never creeping or mat-forming.
    3 Heads 1-5 (-10) per culm; [calcareous glades inland, east to GA and TN]..... ***Juncus filipendulus***
    3 Heads >9 per culm; [collectively widespread].
      4 Infructescence usually congested, (1.8-) 2.4-4.7 (-6.4) cm long; greatest distance between adjacent rhizome cataphylls (5.3-) 6.3-10.5 (-13.0) mm; rhizome width (measured between adjacent cataphylls) (0.8-) 1.0-1.4 (-1.9) mm..... ***Juncus longii***
      4 Infructescence usually loose, (1.4-) 17.9-103.9 (-145) cm long; greatest distance between adjacent rhizome cataphylls (0.1-) 0.4-3.0 (-4.6) mm; rhizome width (measured between adjacent cataphylls) (0.4-) 1.0-3.5 (-4.5) mm.
        5 Widest leaf blade (2.6-) 3.1-4.5 (-7.0) mm wide; sheath of lowest leaf (3.2-) 4.3-7.8 (-9.7) cm long; tallest culm (27.2-) 50.8-81.2 (-100.7) cm; anthers (0.5-) 0.6-1.0 (-1.3) mm long, exserted; stem base (3.4-) 5.8-9.6 (-12.0) mm wide..... ***Juncus biflorus***

Key to Map Symbology: □ native; ◇ maybe exotic; △ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

5 Widest leaf blade (1.3-) 1.6-2.6 (-3.5) mm wide; sheath of lowest leaf (1.7-) 2.2-3.8 (-4.7) cm long; tallest culm (19.2-) 26.0-44.0 (-56.8) cm; anthers (0.2-) 0.3-0.5 (-0.7) mm long, concealed by tepals; stem base (0.4-) 2.0-4.4 (-6.0) mm wide ..... ***Juncus marginatus***

1 Flowers borne singly on branches of inflorescence, individual flowers subtended by two bracteoles (in addition to the bracteole at the base of the pedicel).
6 Plants annual, without coarse roots or persistent leaf bases; [subgenus *Agathryon*, section *Tenageia*]
..... ***Juncus bufonius***
6 Plants perennial, with coarse roots or persistent leaf bases.
8 Auricles 3-6 mm long at summit of leaf sheath.
9 Capsules < 3/4 length of perianth; unbranched terminal sections of the inflorescence with 2-5 flowers, the longest distance between the adjacent flowers (excluding the peduncle) 6-11 mm ..... ***Juncus anthelatus***
9 Capsules > 3/4 length of perianth; unbranched terminal sections of the inflorescence with 1-3 (-4) flowers, the longest distance between the adjacent flowers (excluding the peduncle) 0.5-5.5 mm ..... ***Juncus tenuis***
8 Auricles < 2 mm long or absent.
11 Leaf blades terete or channeled.
..... ***Juncus dichotomus***
11 Leaf blades flat.
14 Inflorescence bract shorter than inflorescence; capsules 3-locular.
15 Perianth usually 2.5-3.5 mm long; flowers secund; capsules globose to ellipsoid ..... ***Juncus secundus***
15 Perianth usually (3.3-) 4-5 (-5.7)mm long; flowers not secund; capsules ellipsoid or narrowly so
..... ***Juncus georgianus***
14 Inflorescence bract longer than inflorescence; capsules 1-locular to falsely 3-locular.
18 Mature capsules pale brown or darker; [of the Coastal Plain] ..... ***Juncus dichotomus***
18 Mature capsules pale tan or darker; [of prairies and plains, east to KY, se TN] ..... ***Juncus interior***

KEY C

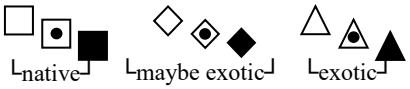
3 Mature capsules 3.0-4.0 mm long, < 1.5 mm longer than perianth, light reddish brown to light brown; heads 5-50 flowered ..... ***Juncus canadensis***
3 Mature capsules 4.0-5.0 mm long, 2 mm longer than perianth, dark reddish purple; heads 3-7 flowered ..... ***Juncus trigonocarpus***

KEY D

1 Leaves flattened, narrowly elliptic in cross-section.
2 Leaves with incomplete septae; heads about 10 mm diameter; tips of dehisced capsules united; [subgenus *Juncus*, section *Iridifolii*] .....
..... ***Juncus polycephalos***
2 Leaves with complete septae; heads about 12 mm diameter; tips of dehisced capsules split; [subgenus *Juncus*, section *Ozophyllum*] ..... ***Juncus validus***
1 Leaves terete, not at all flattened; [subgenus *Juncus*, section *Ozophyllum*].
3 Plants strictly cespitose, without any short, hard, knotty rhizomes; tepals lanceolate ..... ***Juncus acuminatus***
3 Plants with at least some short, hard, knotty rhizomes; tepals lanceolate-subulate.
4 Capsules shorter than the tepals, clearly included within the tepals at maturity ..... ***Juncus brachycarpus***
4 Capsules equaling or exceeding the tepals, exserted from or only barely included within the tepals at maturity.
5 Capsule valves separating at the apex at maturity; stamens 6.
..... ***Juncus torreyi***
5 Capsule valves remaining united at the apex after dehiscence; stamens 3.
7 Culms 4-8 mm in diameter near the base, usually > 80 cm tall; inflorescences usually > 15 cm tall, with > 25 heads; largest leaf blades > 25 cm long and > 3 mm in diameter ..... ***Juncus paludosus***
7 Culms 1-3 mm in diameter near the base, usually < 80 cm tall; inflorescences usually < 10 cm tall, with < 25 heads; largest leaf blades < 25 cm long and 1-2 mm in diameter.
8 Uppermost cauline leaf blade much shorter than its sheath; tepals reddish to reddish brown; outer tepals significantly longer than the inner tepals; basal leaf sheaths and cataphylls deep reddish purple ..... ***Juncus megacephalus***
8 Uppermost cauline leaf blade equaling or longer than its sheath; tepals green to straw-colored; outer tepals and inner tepals of similar length; basal leaf sheaths and cataphylls straw-colored to brown.
9 Heads lobulate; mature capsule 2.0-3.0 mm long ..... ***Juncus scirpoides var. compositus***
9 Heads spherical, not lobulate; mature capsule 3.0-4.5 mm long ..... ***Juncus scirpoides var. scirpoides***

KEY E

1 Mature capsules 2 mm or more longer than the perianth, 4.0-5.2 mm long ..... ***Juncus diffusissimus***
1 Mature capsules < 1.5 mm longer than the perianth, or subequal to it.
2 Stamens 6.
..... ***Juncus acuminatus***
2 Stamens 3.
6 Mature capsules about 1/3 longer than perianth (roughly 1-1.5 mm longer) ..... ***Juncus debilis***
6 Mature capsules equaling or barely exceeding perianth.
7 Heads 1-50; capsules 2.4-3.6 mm long
..... ***Juncus acuminatus***
7 Heads 30-250; capsules 1.9-2.9 mm long.
9 Capsules deep chestnut brown; roots with terminal tubers; inner tepals usually > 2.4 mm long; [southeastern] ..... ***Juncus elliottii***
9 Capsules straw colored; roots without terminal tubers; inner tepals usually 1.7-2.3 mm long; [midwestern, east to w. Panhandle FL and se. TN] .....
..... ***Juncus nodatus***

Key to Map Symbology: 

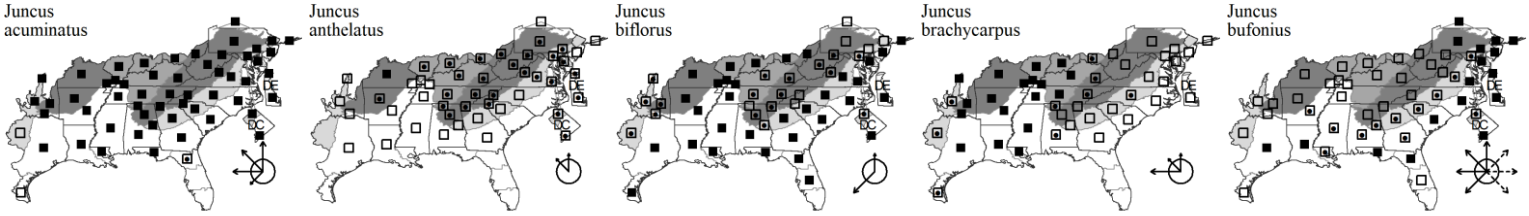
Juncus acuminatus Michaux. SHARP-FRUITED RUSH. **Hab:** In a range of natural and disturbed, saturated and seasonally flooded wetlands. **Dist:** ME and NS to ON and MN, south to n. peninsular FL, TX, and n. Mexico; S. Mexico and Honduras; BC to CA. **Phen:** May-Aug. **Syn:** = C, ETx1, F, FNA22, G, GrPl, GW1, Il, K1, K2, Meso6, Mi, Mo1, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV, Bridges & Orzell (2008), Kirschner (2002b), Kirschner (2002c). NatureServe G5 (Secure).

Juncus anthelatus (Wiegand) R.E. Brooks. LARGE PATH RUSH, GREATER POVERTY RUSH. **Hab:** Moist or wet sites, including disturbed areas such as roadsides, paths, and fields. **Dist:** NB and ME west to MN, south to GA, AR, and se. TX. **Phen:** Jul-Sep. **Comm:** The distribution as mapped here is somewhat speculative because of general historic lack of recognition. **Syn:** = Ar, ETx1, FNA22, Il, K3, K4, Mi, NE, NY, Tn, Va, Kirschner (2002b), Kirschner (2002c); = *Juncus tenuis* var. *anthelatus* Wiegand – F, Mo1, WV; < *Juncus tenuis* Willdenow – G, GrPl, GW1, K1, RAB, S, Tx, W; < *Juncus tenuis* Willdenow var. *tenuis* – C, Pa.

Juncus biflorus Elliott. LARGE GRASS-LEAVED RUSH. **Hab:** Pine savannas, pine flatwoods, mesic areas in sandhill-pocosin ecotones, roadsides, low fields in the Piedmont, wet meadows, interdune swales, freshwater and oligohaline tidal marshes, ditches. **Dist:** MA to MO, south to FL, TX, Mexico and Central America, and disjunct in South America. **Phen:** Jun-Oct. **Tax:** See Knapp & Naczi (2008) for clarification of the *Juncus marginatus* complex. **Syn:** = Ar, F, Il, K1, K2, Mi, Mo1, NE, NY, RAB, Tn, Va, W, WV, Knapp & Naczi (2008); = *Juncus aristulatus* Michaux var. *biflorus* (Elliott) Small – S; < *Juncus biflorus* Elliott – C, G, Pa; < *Juncus marginatus* Rostkovius – FNA22, GW1, K3, K4, Tx, WH3, Kirschner (2002b), Kirschner (2002c).

Juncus brachycarpus Engelmann. SHORT-FRUITED RUSH. **Hab:** Ditches, depressions, ponds, especially in seasonally flooded sites that draw down early in the growing season. **Dist:** MA to IL, south to SC, wc. GA, and TX. **Phen:** Jun-Sep. **Syn:** = Ar, C, ETx1, F, FNA22, G, GrPl, GW1, Il, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, WV, Bridges & Orzell (2008), Kirschner (2002b), Kirschner (2002c). NatureServe G4G5 (Apparently Secure).

Juncus bufonius Linnaeus. TOAD RUSH. **Hab:** Wet, open ground, roadsides, dried pools, drawdown shores. **Dist:** Cosmopolitan, and polymorphic; a number of varieties and segregate species have sometimes been recognized, but need additional study. **Phen:** (May-) Jun-Nov. **Syn:** = GrPl, Mi, NE, NY; = *Juncus bufonius* var. *bufonius* – C, F, G, K1, K4, Mo1; < *Juncus bufonius* Linnaeus – Ar, ETx1, FNA22, GW1, K2, K3, Meso6, NcTx, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV, Kirschner (2002b), Kirschner (2002c); > *Juncus bufonius* var. *bufonius* – Il; > *Juncus bufonius* var. *congestus* Wahlenberg – Il.



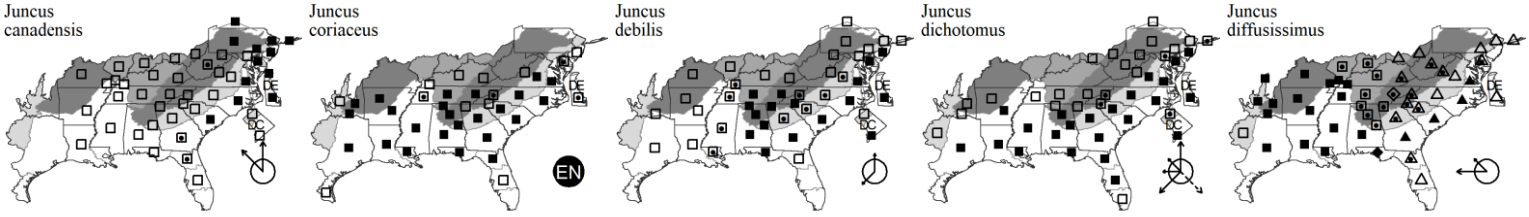
Juncus canadensis J. Gay ex Laharpe. CANADIAN RUSH. **Hab:** Lake, pond and stream margins, swamps, bogs, seepage slopes, wet meadows, ditches. **Dist:** NL (Newfoundland) to MN, south to c. peninsular FL, TN, and LA. **Phen:** Jul-Oct. **Tax:** *J. canadensis* is here treated as a single, polymorphic species. Fernald and others have described up to 5 forms and varieties of *J. canadensis*, based on variation in flower and capsule size (from 2.5 mm to nearly 4.0 mm), shape of the glomerules (densely flowered and subglobose to few-flowered and turbinate), and structure and size of the inflorescence (congested to open). Further study is necessary to determine whether any of these taxa should be recognized. **Syn:** = Ar, C, FNA22, G, GrPl, GW1, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Va, W, WH3, WV, Kirschner (2002b); > *Juncus canadensis* var. *canadensis* – F, Mo1; > *Juncus canadensis* var. *euroauster* Fernald – F.

Juncus coriaceus Mackenzie. LEATHERY RUSH. **Hab:** Stream and pond margins, swamps, flatwoods depressions, roadside ditches. **Dist:** S. NJ to c. peninsular FL, west to e. TX, north in the interior to KY, AR, and OK. **Phen:** Jun-Sep. **Syn:** = Ar, C, ETx1, F, FNA22, G, GW1, K1, K3, K4, NcTx, RAB, Tn, Va, W, WH3, Kirschner (2002b), Kirschner (2002c); = *Juncus setaceus* Rostkovius – S, misapplied. NatureServe G5 (Secure).

Juncus debilis A. Gray. WEAK RUSH. **Hab:** Marshy shores, stream and pond margins, along puddles in wet, disturbed clearings, ditches. **Dist:** RI to MO, south to n. FL and e. TX; Honduras. **Phen:** May-Aug. **Syn:** = Ar, C, ETx1, F, FNA22, G, GW1, Il, K1, K3, K4, Meso6, Mo1, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, Kirschner (2002b), Kirschner (2002c). NatureServe G5 (Secure).

Juncus dichotomus Elliott. FORKED RUSH. **Hab:** Often in disturbed, open, wet areas, ditches, wet meadows. **Dist:** MA to c. peninsular FL, west to OK and TX; Central America. **Phen:** May-Oct. **Tax:** The character used to separate *J. platyphyllus* (Wiegand) Fernald from *J. dichotomus* (flat leaf blade vs. terete leaf blade) does not appear to be reliable; leaf blades from culms in the same clump may vary from flat to slightly involute to completely terete. **Syn:** = Ar, ETx1, FNA22, GW1, K3, K4, NcTx, NE, NY, Pa, Tn, Tx, Va, W, WH3, WV, Kirschner (2002b), Kirschner (2002c); = *Juncus tenuis* var. *dichotomus* (Elliott) Alph. Wood – C, Meso6; > *Juncus dichotomus* Elliott – F, RAB; > *Juncus dichotomus* var. *dichotomus* – G, K1, S; > *Juncus dichotomus* var. *platyphyllus* Wiegand – G, K1, S; > *Juncus platyphyllus* (Wiegand) Fernald – F, RAB.

Juncus diffusissimus Buckley. DIFFUSE RUSH, SLIM-POD RUSH. **Hab:** Low, wet open areas, ditches, margins of ponds and streams. **Dist:** Originally distributed from KY, s. IN, s. IL, MO and KS south to s. AL, MS, LA, and TX, the more eastern part of the distribution apparently adventive (Lamont & Young 2005). **Phen:** May-Sep. **Syn:** = Ar, C, ETx1, F, FNA22, G, GrPl, GW1, Il, K1, K3, K4, Mo1, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV, Kirschner (2002b), Kirschner (2002c). NatureServe G5 (Secure).



Juncus effusus Linnaeus *ssp.* ***solutus*** (Fernald & Wiegand) Hämet-Ahti. COMMON RUSH, SOFT RUSH. **Hab:** Moist soil, marshes, margin of streams, ponds, lakes and swamps, low meadows. **Dist:** NL (Newfoundland) to MN, south to s. FL and Mexico. **Phen:** Jun-Sep. **Comm:** Ssp. *effusus*

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

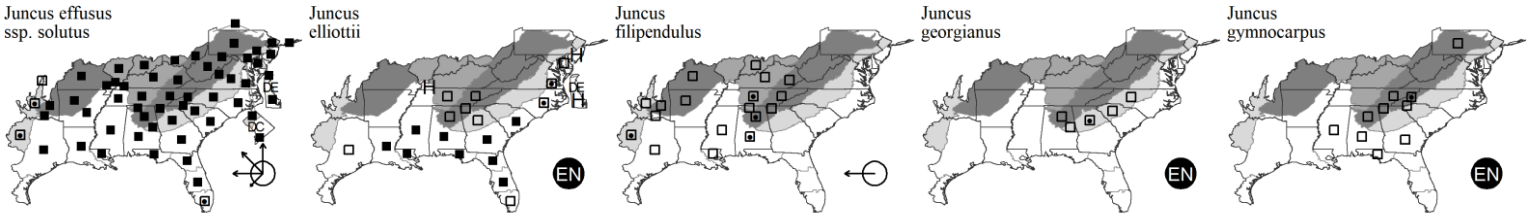
is European, and also occurs (apparently introduced) in the ne. United States. **Syn:** = K3, K4, Mo1, NE, NY, Tn, WH3, Hämet-Ahti (1980), Kirschner (2002b), Kirschner (2002c), Zika (2003), Zika (2013); = *Juncus effusus* Linnaeus var. *solutus* Fernald & Wiegand – C, Il, NcTx, Pa, Tx; < *Juncus effusus* – Ar, ETx1, FNA22, GrPl, GW1, Meso6, Mi, RAB, S, Va, W; > *Juncus effusus* var. *compactus* – G, misapplied; > *Juncus effusus* Linnaeus var. *conglomeratus* (Linnaeus) Engelmann – K1, misapplied; > *Juncus effusus* Linnaeus var. *solutus* Fernald & Wiegand – F, K1; >< *Juncus effusus* Linnaeus var. *solutus* Fernald & Wiegand – G; > *Juncus griscomii* Fernald – F, G.

Juncus elliottii Chapman. ELLIOTT'S RUSH. **Hab:** Margins of ponds and lakes, depressions in savannas and flatwoods, wet, disturbed clearings, roadside ditches. **Dist:** Coastal Plain, DE and e. MD (Knapp et al. 2011) to c. peninsular FL, west to se. TX. **Phen:** May-Sep. **Comm:** Capsules of *J. elliottii* are similar in shape to *J. acuminatus*, but the presence of tubiferous roots, shorter perianth (2.0-2.5 mm long vs. 2.5-3.5 mm) and fewer-flowered glomerules (3-8 flowered vs. 5-many flowered) clearly distinguishes *J. elliottii* from *J. acuminatus*. **Syn:** = C, ETx1, F, FNA22, G, GW1, K4, RAB, S, Tx, Va, WH3, Kirschner (2002b); > *Juncus elliottii* var. *elliottii* – K1, K2; > *Juncus elliottii* var. *polyanthemus* C. Mohr – K1, K2.

Juncus filipendulus Buckley. RINGSEED RUSH, TEXAS PLAINS RUSH. **Hab:** Seasonally wet soils of prairies and limestone barrens. **Dist:** KY, TN, and AL west to OK and TX. **Phen:** Apr-Aug. **Syn:** = ETx1, FNA22, GW1, K1, K3, K4, K4, NcTx, S, Tn, Tx, Kirschner (2002b). NatureServe G5 (Secure).

Juncus georgianus Coville. GEORGIA RUSH, FLATROCK RUSH. **Hab:** Shallow depressions in granitic outcrops. **Dist:** An endemic of the Southeastern Piedmont, restricted to granitic flatrocks of NC, SC, GA, and ec. AL. **Phen:** Jun-Aug. **Syn:** = FNA22, K1, K3, K4, RAB, S, W, Kirschner (2002b). NatureServe G4 (Apparently Secure).

Juncus gymnocarpus Coville. SEEP RUSH. **Hab:** Bogs, seeps, streambanks and riverbanks (especially just below waterfalls). **Dist:** Local, distributed in four disjunct area: mountains of e. PA; southern Blue Ridge of w. NC, e. TN, nw. SC and ne. GA; southern end of the Ridge and Valley in Bibb County, AL; and Coastal Plain of sw. GA, s. AL, s. MS (Sorrie & Leonard 1999), and w. Panhandle FL. **Phen:** Jul-Sep. **Comm:** In the Appalachians, *J. gymnocarpus* is scattered in mountain bogs and seeps throughout the mountain region of nw. NC, ne. TN south to nw. SC and n. GA; it reaches its most general occurrence in the escarpment gorge region of Transylvania, Macon, and Jackson counties, NC, where it also occurs along streambanks, especially just below waterfalls. **Syn:** = C, F, FNA22, G, GW1, K1, K3, K4, Pa, RAB, S, Tn, W, WH3, Kirschner (2002b), Zika (2013). NatureServe G4 (Apparently Secure).



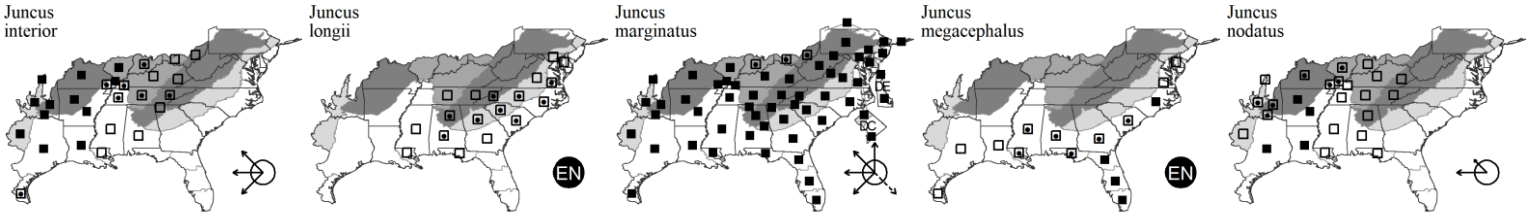
Juncus interior Wiegand. INLAND RUSH. **Hab:** Calcareous prairies, disturbed sites. **Dist:** OH west to SK, south to e. TN, AL (Sorrie & LeBlond 2008), MS (Sorrie & LeBlond 2008), LA, TX, and NM. **Phen:** Late Apr-Oct. **Syn:** = Ar, ETx1, FNA22, G, GrPl, Il, K4, NcTx, S, Tn, Tx, W, Kirschner (2002b), Kirschner (2002c); > *Juncus interior* var. *interior* – K1, K3; < *Juncus tenuis* Willdenow – GW1; < *Juncus tenuis* Willdenow var. *tenuis* – C.

Juncus longii Fernald. LONG'S RUSH. **Hab:** Usually in very wet, often inundated sites, bogs, ditches, rooting in clay or peat. **Dist:** MD south through VA, NC, SC to s. MS and se. LA (Urbatsch 2013), mainly in the Coastal Plain; disjunct inland in boggy sites, as in w. NC, nc. GA, TN, and n. AL (Knapp & Naczi 2008, more extensive distributions are based on misattribution). **Phen:** Jun-Aug. **Comm:** See Knapp & Naczi (2008) for clarification of the *Juncus marginatus* complex. **Syn:** = F, K1, K3, K4, RAB, Tn, Va, Knapp & Naczi (2008); = *Juncus aristulatus* Michaux var. *aristulatus* – S; < *Juncus biflorus* Elliott – C, G; < *Juncus marginatus* Rostkovius – FNA22, GW1, WH3, Kirschner (2002b).

Juncus marginatus Rostkovius. GRASS-LEAVED RUSH. **Hab:** Wet meadows, bogs, generally throughout in wet, sandy or peaty soil. **Dist:** NS to ON, MI, and NE, south to s. peninsular FL and TX; disjunct in CA and in South America. **Phen:** Jun-Sep. **Comm:** See Knapp & Naczi (2008) for clarification of the *Juncus marginatus* complex. **Syn:** = Ar, C, ETx1, G, GrPl, Il, K1, Mi, Mo1, NcTx, NE, NY, Pa, RAB, S, Tn, Va, W, WV; < *Juncus marginatus* Rostkovius – FNA22, GW1, K3, K4, Tx, WH3, Kirschner (2002b), Kirschner (2002c), Knapp & Naczi (2008); > *Juncus marginatus* Rostkovius – G; > *Juncus marginatus* var. *marginatus* – F; > *Juncus marginatus* var. *setosus* Coville – F; > *Juncus setosus* (Coville) Small – G.

Juncus megacephalus M.A. Curtis. LARGE-HEADED RUSH. **Hab:** Brackish and freshwater marshes, bogs, wet prairies, interdune swales, ditches, wet, open places. **Dist:** Coastal Plain, e. MD (Knapp et al. 2011) and VA to s. FL, west to se. TX. **Phen:** Jun-Aug. **Syn:** = C, F, FNA22, G, GW1, K1, K3, K4, RAB, S, Tx, Va, WH3, Bridges & Orzell (2008), Kirschner (2002b), Knapp (2014). NatureServe G4G5 (Apparently Secure).

Juncus nodatus Coville. STOUT RUSH. **Hab:** Shallow water, marshes, sloughs, savannas, bogs. **Dist:** KY west to KS, south to TN, AL, w. Panhandle FL, MS (Sorrie & LeBlond 2008), LA, and TX. **Phen:** (Jun-) Jul-Sep. **Syn:** = Ar, C, ETx1, FNA22, G, GrPl, GW1, Il, K1, K3, K4, Mo1, NcTx, Tn, Tx, WH3, Kirschner (2002b). NatureServe G5 (Secure).



Juncus paludosus E.L. Bridges & Orzell. SWAMP RUSH. **Hab:** Hardwood swamps, cypress swamps and stringers with seasonally flowing water, adjacent ditches. **Dist:** Ne. FL and e. FL Panhandle south to s. FL. **Phen:** Apr-May; May-Jul. **Comm:** See Bridges & Orzell (2008) for more detailed information. **Syn:** = K3, K4, WH3, Bridges & Orzell (2008), Knapp (2014). NatureServe G3G4 (Vulnerable).

Juncus pelocarpus E. Meyer. BROWN-FRUITED RUSH. **Hab:** Ditches, along pond and stream margins, seepage slopes, disturbed open areas, sea-level fens, interdunal swales, Atlantic white-cedar swamps. **Dist:** NL (Labrador) west to MN, south to DE, e. VA, n. IN; se. VA to SC; FL Panhandle and s. AL. **Phen:** Jul-Oct. **Comm:** The septae along the narrow leaf blades of *J. pelocarpus* are often difficult to detect. More southern populations

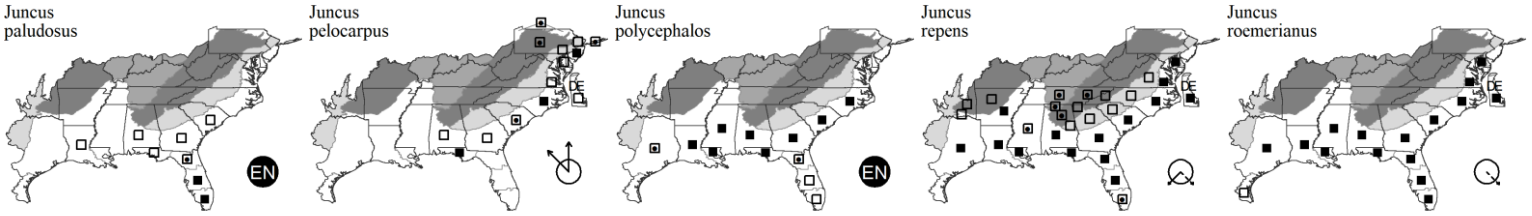
Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

(from VA southward) are more robust and have sometimes been separated as *J. abortivus*, but variation appears to be clinal. **Syn:** = FNA22, K4, Mi, NE, NY, Pa, Va, WH3, Kirschner (2002b); > *Juncus abortivus* – F, GW1, K1, RAB, S; > *Juncus pelocarpus* E. Meyer – K1; > *Juncus pelocarpus* E. Meyer var. *crassicaudex* Engelmann – C, F, G; > *Juncus pelocarpus* var. *pelocarpus* – C, F, G.

Juncus polycephalos Michaux. MANY-HEADED RUSH. **Hab:** Sandy pond margins, ditches, pine savannas. **Dist:** Coastal Plain, NC to s. FL, west to e. TX; KS. **Phen:** Jul-Sep. **Comm:** Often confused with *J. validus*; see Knapp (in press) for discussion. **Syn:** = K4, WH3; = *Juncus polycephalus* – ETx1, F, FNA22, GW1, K1, K2, NcTx, RAB, S, Tx, Kirschner (2002b), orthographic variant. NatureServe G5 (Secure).

Juncus repens Michaux. CREEPING RUSH. **Hab:** Streams, ponds, lakes, ditches, wet depressions in flatwoods, cypress savannas. **Dist:** DE to s. FL, west to TX, north into OK and TN; Mexico (Tabasco); Cuba. **Phen:** Jun-Oct. **ID Notes:** This species commonly forms dense mats – a useful field character. **Syn:** = Ar, C, ETx1, F, FNA22, G, GW1, K1, K3, K4, Meso6, RAB, S, Tn, Tx, Va, WH3, Kirschner (2002b), Kirschner (2002c). NatureServe G5 (Secure).

Juncus roemerianus Scheele. BLACK NEEDLE RUSH. **Hab:** Coastal tidal marshes, forming dense stands at and above mean high tide, above the *Spartina alterniflora* (*Sporobolus alterniflorus*) zone. **Dist:** MD to s. FL, west to se. TX; Bahamas; Hispaniola. **Phen:** Jan-Jun; May-Oct. **Comm:** See Eleuterius (1977) for additional information on this species. **Syn:** = Bah, C, ETx1, F, FNA22, G, GW1, K1, K3, K4, RAB, S, Tx, Va, WH3, Kirschner (2002b). NatureServe G5 (Secure).



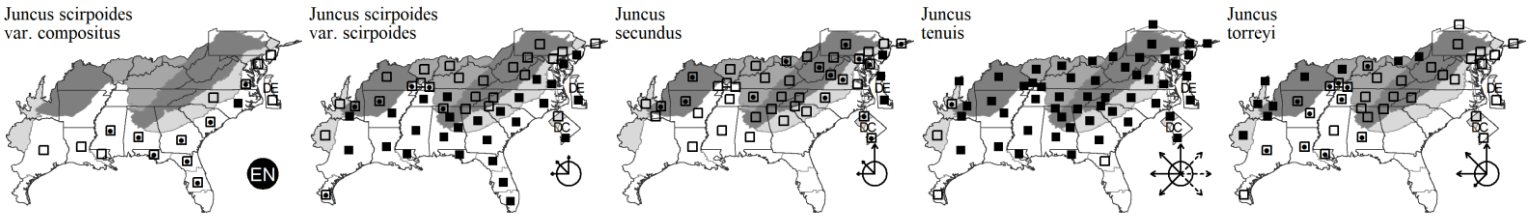
Juncus scirpoides Lamarck *var*. ***compositus*** R.M. Harper. LOBE-HEADED RUSH. **Hab:** Roadsides, wet, open, disturbed areas. **Dist:** Coastal Plain: NC, GA, FL, AL, MS, LA, SC, TX, VA. **Phen:** Jun-Oct. **Syn:** = S, Va; > *Juncus glomeratus* Batson – K1, nomen nudum; < *Juncus scirpoides* – FNA22, GW1, K1, K3, K4, NcTx, RAB, Tx, WH3, Bridges & Orzell (2008), Kirschner (2002b), Knapp (2014); <? *Juncus scirpoides* var. *meridionalis* Buchenau – F.

Juncus scirpoides Lamarck *var*. ***scirpoides***. **Hab:** Wet, open, disturbed areas, ditches, sandhill pocosin ecotones and seepage bogs, savannas and wet pine flatwoods, wet meadows. **Dist:** S. NY to s. FL, mostly Coastal Plain and Piedmont; west to TX; IN to MI, MO, OK. **Phen:** Jun-Oct. **Syn:** = F, Mo1, NY, S, Va; < *Juncus scirpoides* – Ar, C, ETx1, FNA22, G, GrPl, GW1, Il, K1, K3, K4, Mi, NcTx, Pa, RAB, Tn, Tx, W, WH3, WV, Bridges & Orzell (2008), Kirschner (2002b), Kirschner (2002c), Knapp (2014).

Juncus secundus Palisot de Beauvois ex Poiret. SECUND RUSH, LOP-SIDED RUSH. **Hab:** Dry woodlands and fields, rock outcrops. **Dist:** ME to IN, south to n. GA, c. AL, n. LA, and s. OK. **Phen:** Jun-Oct. **Syn:** = Ar, C, F, FNA22, G, GrPl, Il, K1, K3, K4, Mo1, NY, Pa, RAB, S, Tn, Va, W, WV, Kirschner (2002b), Kirschner (2002c). NatureServe G5? (Secure).

Juncus tenuis Willdenow. PATH RUSH, SLENDER RUSH, POVERTY RUSH. **Hab:** Dry or moist soil along roadsides and paths, fields. **Dist:** NL (Labrador) west to AK, south to FL, TX, CA, and n. Mexico; Central and South America; introduced widely around the world. **Phen:** Jun-Sep. **Comm:** *J. tenuis* as it is here treated includes *J. tenuis* var. *williamsii* Fernald, which has a more congested inflorescence with arched to recurved inflorescence branches. **Syn:** = Ar, ETx1, FNA22, Il, K3, K4, Mi, NcTx, NE, NY, Tn, Va, Kirschner (2002b), Kirschner (2002c); < *Juncus tenuis* Willdenow – G, GrPl, GW1, K1, RAB, S, Tx, W, WH3; < *Juncus tenuis* Willdenow var. *tenuis* – C, Meso6, Mo1, Pa, WV; > *Juncus tenuis* Willdenow var. *tenuis* – F; > *Juncus tenuis* var. *williamsii* Fernald – F.

Juncus torreyi Coville. TORREY'S RUSH. **Hab:** Bogs, fens, seeps, other sites with wet soil, especially over limestone. **Dist:** NB west to BC, south to GA, TX, CA, and n. Mexico. **Phen:** Jun-Sep. **Syn:** = Ar, C, ETx1, F, FNA22, G, GrPl, GW1, Il, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, S, Tn, Tx, Va, W, WV, Kirschner (2002b), Kirschner (2002c). NatureServe G5 (Secure).

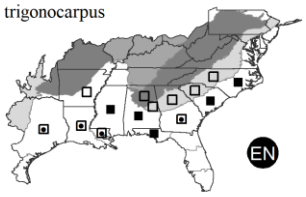


Juncus trigonocarpus Steudel. REDPOD RUSH. **Hab:** Seepage slopes, bogs, along stream margins, ditches in acid, sandy landscapes. **Dist:** Coastal Plain, NC to FL Panhandle, west to e. TX. **Phen:** Jul-Oct. **ID Notes:** Young *J. trigonocarpus* and *J. canadensis* are often confused; once mature, however, the two can usually be separated by capsule color alone. Although *J. canadensis* capsules redden, they never approach the dark reddish-purple tone of *J. trigonocarpus*. Seed and capsule size are also distinct for the two taxa. **Syn:** = ETx1, FNA22, GW1, K1, K3, K4, RAB, S, Tx, WH3, Kirschner (2002b). NatureServe G4G5 (Apparently Secure).

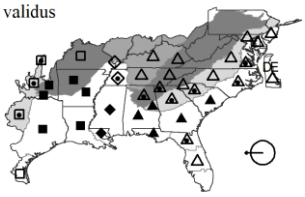
Juncus validus Coville. VIGOROUS RUSH, ROUND-HEADED RUSH, STOUT RUSH. **Hab:** Stream and pond margins, roadside ditches, wet, open, often disturbed ground. **Dist:** NC to n. FL, west to TX, OK and MO; apparently non-native east of the Mississippi River (Knapp et al. 2011; Knapp 2014). **Phen:** Jul-Sep. **Tax:** *J. fascinatus* (M.C. Johnston) W. Knapp, endemic to TX, is better accorded species status (Knapp 2014). **Syn:** = GrPl, K4, Tn, Knapp (2014); = *Juncus validus* var. *validus* – Ar, ETx1, FNA22, K1, K3, NcTx, Tx, Va, Bridges & Orzell (2008), Kirschner (2002b); < *Juncus validus* Coville – C, F, G, GW1, Il, Mo1, RAB, S, W, WH3. NatureServe G3G5 (Apparently Secure).

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Juncus trigonocarpus



Juncus validus



Luzula A.P. de Candolle 1805 (WOOD-RUSH)

A genus of about 75-115 species, cosmopolitan. References: Balslev in Kubitzki (1998b); Ebinger (1962); Kirschner et al (2002a); Swab (2000) in FNA22 (2000); Záveská Drábková & Vlček (2010).

1 Flowers borne singly (rarely paired) at the tips of elongated inflorescence branches; [subgenus *Pterodes*]. ..... ***Luzula acuminata var. carolinae***
1 Flowers borne in dense glomerate clusters (glomerules) of 3 or more sessile or subsessile flowers; [subgenus *Luzula*, section *Luzula*].
  4 Inflorescence branches divergent, at least some widely spreading (though less so before anthesis); glomerules capitate to broadly ovoid, not cylindric; leaves with a minute point at tip..... ***Luzula echinata***
  4 Inflorescence branches erect, none widely spreading; glomerules often cylindric (less commonly merely capitate); leaves with a blunt tip in the form of an obvious callous.
    5 Seeds 0.9-1.3 mm long; caruncles (seed appendages) 0.5-0.7 mm long; plants producing several basal bulblets (white swollen leaf bases); capsules equal to or longer than the tepals ..... ***Luzula bulbosa***
    5 Seeds 1.1-1.7 mm long; caruncles (seed appendages) 0.2-0.5 mm long; plants not producing basal bulblets; capsules shorter than the tepals ..... ***Luzula multiflora var. multiflora***

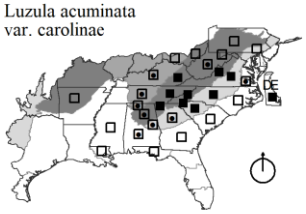
Luzula acuminata Rafinesque *var.* ***carolinae*** (S. Watson) Fernald. CAROLINA WOOD-RUSH. **Hab:** Moist forests. **Dist:** MA, NY, PA, and se. OH south to n. FL and AR. **Phen:** Apr-Aug. **Tax:** Perhaps better treated at species rank. **Syn:** = Ar, C, F, FNA22, G, GW1, K1, K3, NE, RAB, Tn, Ebinger (1962); = *Juncoides carolinae* (S. Watson) Kuntze – S; = *Luzula acuminata* ssp. *carolinae* (S. Watson) Z. Kaplan – K4, Kirschner et al (2002a); < *Luzula acuminata* – Pa, Va, W, WH3, WV. NatureServe G5T4T5 (Apparently Secure).

Luzula bulbosa (Wood) Smyth & Smyth. BULBOUS WOOD-RUSH. **Hab:** Dry forests and fields. **Dist:** MA, PA, IN, and NE south to GA, LA, and c. TX. **Phen:** Mar-Aug. **Syn:** = Ar, C, ETx1, F, FNA22, GrPl, GW1, Il, K1, K3, K4, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, WV, Kirschner et al (2002a); = *Juncoides bulbosum* – S; = *Luzula campestris* (Linnaeus) A.P. de Candolle var. *bulbosa* Wood – G, Mo1; < *Luzula multiflora* – W.

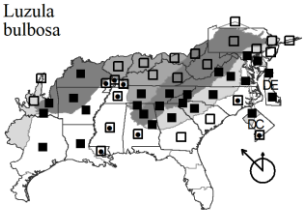
Luzula echinata (Small) F.J. Hermann. SPREADING WOOD-RUSH. **Hab:** Mesic to dry forests. **Dist:** Se. MA, se. NY, PA, WV, and IA south to n. FL, GA, AL, MS, and e. TX. **Phen:** Mar-Aug. **Syn:** = Ar, C, ETx1, FNA22, GrPl, GW1, Il, K1, K3, K4, NE, NY, Pa, RAB, Tn, Va, WH3, WV, Kirschner et al (2002a); = *Juncoides echinatum* Small – S; = *Luzula campestris* (Linnaeus) A.P. de Candolle var. *echinata* (Small) Fernald & Wiegand – G, Mo1; > *Luzula echinata* var. *echinata* – F; > *Luzula echinata* var. *mesochorea* F.J. Hermann – F, NcTx, Tx; < *Luzula multiflora* – W.

Luzula multiflora (Ehrhart) Lejeune *var.* ***multiflora***. **Hab:** Forests. **Dist:** Circumboreal, in North America from NL (Newfoundland), ON, SK, and BC, south to NC, GA, AL, MS, MO, MT, and OR; Eurasia; Costa Rica. **Phen:** Mar-Aug. **Syn:** = F, Va, WV; = *Luzula campestris* (Linnaeus) A.P. de Candolle var. *multiflora* (Ehrhart) Čelakovský – G, Meso6, Mo1; = *Luzula multiflora* ssp. *multiflora* – FNA22, K3, K4, NE, NY, Kirschner et al (2002a); = *Luzula multiflora* ssp. *multiflora* var. *multiflora* – K1; < *Luzula multiflora* – C, GrPl, Il, Mi, Pa, RAB, Tn, W.

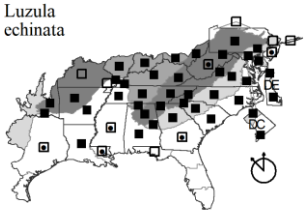
Luzula acuminata var. carolinae



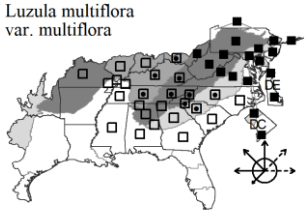
Luzula bulbosa



Luzula echinata



Luzula multiflora var. multiflora



98. CYPERACEAE A.L. de Jussieu 1789 (SEDGE FAMILY) [in POALES]

A family of about 100 genera and 5000 species, mostly herbs, cosmopolitan. References: Ball, Reznicek, & Murray (2002) in FNA23 (2002b); Goetghebeur in Kubitzki (1998b); Muasya et al (2009); Tucker (1987).

1 Achene enclosed in a perigynium (a sac-like structure); [subfamily *Caricoideae*, tribe *Cariceae*]..... ***Carex***
1 Achene not enclosed in a perigynium.
  2 Scales obviously and strongly distichously imbricate; spikelets either aggregated into spikes or heads (*Cyperus, Dulichium, Schoenus*), or solitary (*Abildgaardia*); [subfamily *Cyperoideae*].
    4 Inflorescence axillary; leaves predominantly cauline, conspicuously 3-ranked; perianth bristles subtending the achene 6-9; [tribe *Dulichieae*] ..... ***Dulichium***
    4 Inflorescence terminal, more-or-less scapose (though immediately subtended by leafy bracts); leaves predominantly basal, not 3-ranked; perianth bristles absent (*Cyperus*) or present (*Schoenus*); [tribe *Cypereae*]. ..... ***Cyperus***
  2 Scales spirally imbricate; spikelets not usually aggregated.

Key to Map Symbology:

* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable

X : extirpated

6 Achene (when ripe) bony and white; style base persistent on the summit of the achene, forming a differently-textured or differently-colored tubercle; spikelets all unisexual, the pistillate spikelets 1-flowered, the staminate spikelets several-flowered; [subfamily *Sclerioideae*, tribe *Sclerieae*] ..... ***Scleria***

6 Achene mostly brown, black, or tan; style base either persistent as a differentiated tubercle (*Bulbostylis, Eleocharis, Rhynchospora*) or not (*Cladium, Eriophorum, Fuirena, Isolepis, Cyperus, Schoenoplectus, Scirpus, Trichophorum*); spikelets mostly or all bisexual; [subfamily *Cyperoideae*].

7 Style base persistent as a differentiated tubercle (this small and inconspicuous in *Bulbostylis* and some spp. of *Rhynchospora*).

8 Leaves consisting of bladeless sheaths; spikelet 1 per stem, terminal (very rarely proliferating and with > 1 spikelet); [tribe *Eleocharideae*] ..... ***Eleocharis***

8 Leaves with well-developed blades; spikelets few to many per stem, usually subtended by foliaceous bracts.

9 Perianth bristles absent; spikelets several-many-flowered; leaves capillary; [tribe *Abildgaardieae*] ..... ***Bulbostylis***

9 Perianth bristles present (rarely absent in species without capillary leaves); spikelets 1-2-flowered (several-many-flowered in some species without capillary leaves); leaves capillary to broad; [tribe *Schoeneae*] ..... ***Rhynchospora***

7 Style base not persistent as a differentiated tubercle.

10 Achene not subtended by a modified perianth of bristles or scales (in addition to the scales of the spikelets).

11 Involucral bracts 1-3, the lowest erect, appearing like a continuation of the culm, the inflorescence therefore appearing lateral.

12 Achenes 0.5-0.7 mm long, 1.8-3× as long as wide, minutely papillose in longitudinal lines; [tribe *Cypereae*] ..... ***Cyperus***

12 Achenes 1.2-1.5 mm long, 1-1.4× as long as wide, minutely pitted or transversely rugose.

13 Achenes transversely rugose; [tribe *Fuireneae*] ..... ***Schoenoplectiella***

13 Achenes minutely pitted in longitudinal lines; [tribe *Cypereae*] ..... ***Isolepis***

11 Involucral bracts 2-several, spreading, the inflorescence therefore appearing terminal.

15 Plants diminutive, to 5 dm tall; leaves 3-15 cm long, to 1 mm wide; [tribe *Abildgaardieae*] ..... ***Bulbostylis***

15 Plants moderate to very robust, 7-30 dm tall; leaves 30-150 cm long, 1.5-15 mm wide.

16 Flowers 1-2 per spikelet; [tribe *Schoeneae*] ..... ***Cladium***

16 Flowers several-many per spikelet.

17 Style fimbriate; leaves 0.5-5 mm wide; [tribe *Abildgaardieae*] ..... ***Fimbristylis***

17 Style smooth; leaves (2-) 5-18 mm wide; [tribe *Scirpeae*] ..... ***Scirpus georgianus***

10 Achene subtended by a modified perianth of either bristles, 3 stalked paddle-like scales, or 1-2 broad-based scales (in addition to the scales of the spikelets).

18 Achene subtended by stalked paddle-like scales or broad-based scales.

19 Achene lacking a perianth, but subtended by 1-2 broad-based scales; plants 0.5-3 dm tall; [tribe *Cypereae*] ..... ***Cyperus***

19 Achene subtended by a perianth of 3 stalked paddle-like scales; plants 2-7 dm tall; [tribe *Fuireneae*] ..... ***Fuirena***

18 Achene subtended by bristles.

22 Main involucral bract 1 (rarely 2), erect, appearing as a continuation of the culm (the inflorescence thus appearing lateral, though in some species the longer inflorescence branches may overtop the bract); [tribe *Fuireneae*]

23 Achenes rugulose; plants annual ..... ***Schoenoplectiella***

23 Achenes smooth; plants perennial ..... ***Schoenoplectus***

22 Main involucral bracts 2-8, spreading and foliaceous (the inflorescence thus appearing terminal).

24 Spikelets 10-40 mm long, 6-12 mm in diameter, 3-50 per culm; [tribe *Fuireneae*] ..... ***Bolboschoenus***

24 Spikelets 2.5-19 mm long, 2-4 mm in diameter, usually > 50 per culm; [tribe *Scirpeae*] ..... ***Scirpus***

Bolboschoenus Palla 1905 (BULRUSH)

A genus of about 10-16 species, herbs, cosmopolitan. Muasya et al. (2009) indicate that *Bolboschoenus* is in a clade with *Fimbristylis, Abildgaardia, Bulbostylis, Fuirena, Eleocharis*, and other genera not in our flora, and therefore not closely related to (or congeneric with) *Schoenoplectus* or *Scirpus*. References: Goetghebeur in Kubitzki (1998b); Smith (2002a) in FNA23 (2002b); Strong (1994).

2 Bristles mostly equaling to surpassing the distinctly trigonous achene ..... ***Bolboschoenus fluviatilis***

2 Bristles shorter than to equaling the lenticular or plano-convex achene.

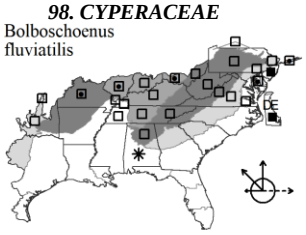
3 Inflorescence relatively open, with (10-) 15-50 spikelets; bristles persistent ..... ***Bolboschoenus novae-angliae***

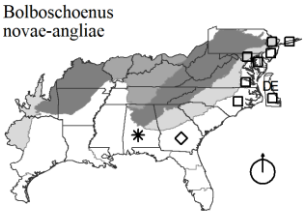
3 Inflorescence relatively congested, mostly with 5-20 spikelets; bristles more or less caducous ..... ***Bolboschoenus robustus***

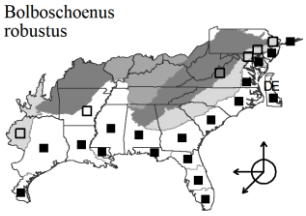
Bolboschoenus fluviatilis (Torrey) Soják. RIVER BULRUSH. **Hab:** Freshwater tidal marshes, river marshes, marl marshes. **Dist:** NB west to SK, BC (Vancouver Island) and WA, south to VA, WV (Vanderhorst et al. 2013), KY, TN, n. AL (Barger et al. 2012), s. AL (where probably not native), OH, IN, KS, AZ, and CA; Asia; Australia and New Zealand. **Phen:** Jun-Jul; Jul-Aug. **Syn:** = FNA23, Il, Mi, Mo1, NE, NY, Tn, Va; = *Schoenoplectus fluviatilis* (Torrey) M.T. Strong – K1, K3, K4, Pa, Strong (1994); = *Scirpus fluviatilis* (Torrey) A. Gray – C, F, G, GrPl. NatureServe G5 (Secure).

Bolboschoenus novae-angliae (Britton) S.G. Smith. NEW ENGLAND BULRUSH. **Hab:** Fresh to brackish (oligohaline) tidal marshes, ditches. **Dist:** ME to NC (or GA?). **Phen:** Late Jun-Jul; Jul-Sep. **Comm:** Probably a hybrid derivative of *Bolboschoenus fluviatilis* and *B. robustus*, but its distinctiveness and ecological behavior suggest that it should be treated as a species; see Schuyler (1975) and Cronquist (1991) for additional discussion. **Syn:** = FNA23, NE, NY, Va; = *Schoenoplectus novae-angliae* (Britton) M.T. Strong – K3, K4, Strong (1994); = *Scirpus cylindricus* (Torrey) Britton – C, K1, illegitimate name; = *Scirpus robustus* Pursh var. *novae-angliae* (Britton) Beetle – G; < *Scirpus maritimus* var. *fernaldii* (E.P. Bicknell) Beetle – F. NatureServe G3 (Vulnerable).

Bolboschoenus robustus (Pursh) Soják. SALTMARSH BULRUSH. **Hab:** Brackish marshes; inland in saline glades and marshes. **Dist:** Along the coasts, from NS to s. FL, west to TX, and into tropical America; also in CA. **Phen:** Late May-Jun (-Sep); late Jun-Sep. **Syn:** = Ar, ETx1, FNA23, NE, NY, Va; = *Schoenoplectus robustus* (Pursh) M.T. Strong – K1, K3, K4, Strong (1994); = *Scirpus maritimus* Linnaeus var. *macrostachyus* Michaux – Tx; = *Scirpus robustus* Pursh – Bah, C, F, GW1, RAB, S, W, WH3; = *Scirpus robustus* var. *robustus* – G. NatureServe G5 (Secure).







Bulbostylis Kunth 1837 (HAIRSEDGE)

A genus of about 100 species, herbs, of tropical and warm temperate areas, concentrated especially in tropical Africa and tropical South America.
References: Goetghebeur in Kubitzki (1998b); Kral (1971); Kral (2002c) in FNA23 (2002b).

1 Spikelets sessile, the inflorescence therefore a capitate cluster (sometimes a few spikelets pedicellate, but the pedicels not generally longer than the spikelets, the inflorescence still appearing glomerate).
  2 Inflorescence bracts widened abruptly at its base, the widened portion prominently fimbriate-pectinate; perennial, culms 10-50 cm tall; achene 1-1.3 mm long, white or yellowish, the apex retuse (the three lobes projecting beyond and surrounding the tubercle) ..... ***Bulbostylis warei***
  2 Inflorescence bracts not widened abruptly at its base, the membranous margins smooth or ciliate; annual, culms 5-35 cm tall; achene 0.5-1.2 mm long, pale brown or gray, the apex rounded or truncate (the three lobes not exceeding the tubercle).
  ..... ***Bulbostylis barbata***
1 Spikelets mostly on slender pedicels, the inflorescence therefore open and umbel-like.
  4 Achenes finely transversely rugose or rugulose, tan or brown (when ripe); spikelet scales 1.5-2.5 mm long, with truncate to apiculate apices.
  ..... ***Bulbostylis capillaris ssp. capillaris***
  4 Achenes very finely papillose and waxy, gray or dark greenish-brown (when ripe); spikelet scales 0.7-1.8 mm long, with obtuse to rounded apices.
    6 Annual, to 1-2 (-3) dm tall; inflorescence a simple (rarely compound) umbel of few (3-9) lance-ovoid spikelets; longest involucral bract seldom exceeding the inflorescence; leaf margins usually hispidulous ..... ***Bulbostylis ciliatifolia***
    6 Perennial, to 1.5-4 dm tall; inflorescence a compound (rarely simple) umbel of many (8-30) oblong or lance-linear spikelets; longest involucral bract commonly exceeding the inflorescence; leaf margins usually distinctly tuberculate-scabrid ..... ***Bulbostylis coarctata***

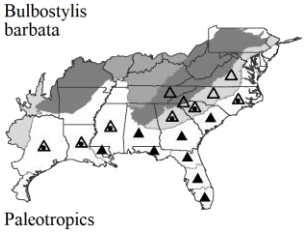
* ***Bulbostylis barbata*** (Rottbøll) C.B. Clarke. OLD WORLD HAIRSEDGE. **Hab:** Sandy fields, other disturbed areas. **Dist:** Native of the Old World tropics. **Phen:** Jul-Oct. **Syn:** = ETx1, FNA23, GW1, K1, K3, K4, RAB, W, WH3, Kral (1971); = *Stenophyllus barbatus* (Rottbøll) Britton – S. NatureServe GNR (Not Yet Ranked).

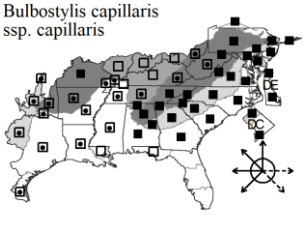
Bulbostylis capillaris (Linnaeus) Kunth ex C.B. Clarke *ssp*. ***capillaris***. COMMON HAIRSEDGE. **Hab:** Thin soils on rock outcrops, especially granite domes and granite flatrocks (but also on mafic rocks, such as diabase), sandy soils, fields, bogs (in FL). **Dist:** ME to MN, south to Panhandle FL and TX, and west to AZ and CA, also in Mexico, Central America, the West Indies, and s. Asia. **Phen:** Jul-Oct. **Tax:** Ssp. *insulana* M.T. Strong is endemic to the Greater Antilles. **Comm:** This species frequently has a mixture of long and very short culms, the short culms only a few cm long and thus nearly hidden amongst the leaves. **Syn:** = K1, K3, K4; < *Bulbostylis capillaris* – Ar, C, ETx1, FNA23, G, GrPl, GW1, Il, Mi, Mo1, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, W, WH3, Kral (1971); > *Bulbostylis capillaris* var. *capillaris* – F; > *Bulbostylis capillaris* var. *crebra* Fernald – F; > *Bulbostylis capillaris* var. *isopoda* Fernald – F; > *Stenophyllus capillaris* (Linnaeus) Britton – S. NatureServe G5T5 (Secure).

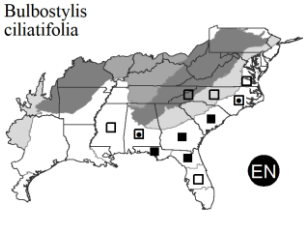
Bulbostylis ciliatifolia (Elliott) Fernald. SAVANNA HAIRSEDGE. **Hab:** Moist to wet sands of savannas, roadsides, disturbed areas. **Dist:** Se. VA south to s. FL and west to s. AL. **Phen:** Jul-Oct. **Tax:** Kral (1971) describes this plant as occurring in generally wetter habitats and being much weedier than *B. coarctata*. The sympatry of this taxon and *B. coarctata* suggests that they are best recognized as species. **Syn:** = F, G, Tx, Va; = *Bulbostylis ciliatifolia* (Elliott) Fernald var. *ciliatifolia* – C, ETx1, FNA23, GW1, K1, K3, K4, NcTx, Kral (1971); = *Stenophyllus ciliatifolius* (Elliott) C. Mohr – S; < *Bulbostylis ciliatifolia* (Elliott) Fernald – RAB, WH3. NatureServe G5T3T5 (Apparently Secure).

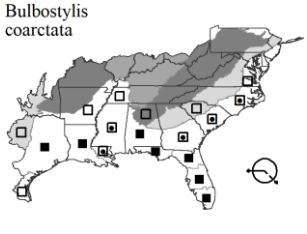
Bulbostylis coarctata (Elliott) Fernald. ELLIOTT'S HAIRSEDGE. **Hab:** Sandhills, usually associated with longleaf pine and wiregrass. **Dist:** Se. VA south to s. FL and west to e. TX, north in the interior to sw. TN; Cuba. **Phen:** Jul-Oct. **Tax:** The broad sympatry of this taxon and *B. ciliatifolia* suggests that they are best recognized as species. **Syn:** = F, G, Va; = *Bulbostylis ciliatifolia* (Elliott) Fernald var. *coarctata* (Elliott) Kral – Ar, C, ETx1, FNA23, GW1, K1, K3, NcTx, Tn, W, Kral (1971); = *Stenophyllus coarctatus* (Elliott) Britton – S; < *Bulbostylis ciliatifolia* (Elliott) Fernald – RAB, WH3. NatureServe G5T3T5 (Apparently Secure).

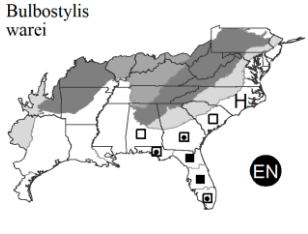
Bulbostylis warei (Torrey) C.B. Clarke. WARE'S HAIRSEDGE. **Hab:** Longleaf pine sandhills, dry pine flatwoods, dunes, Florida scrub. **Dist:** Se. NC south to s. FL and west to s. AL. **Phen:** Jul-Oct. **Syn:** = FNA23, GW1, K1, RAB, WH3, Kral (1971); = *Stenophyllus warei* (Torrey) Britton – S. NatureServe G3G4 (Vulnerable).











Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Carex Linnaeus 1753 (SEDGE)

Contributed by Derick B. Poindexter, Alan S. Weakley, and Bruce A. Sorrie

A genus of about 2000 (or more) species, herbs, cosmopolitan, especially temperate and boreal. References: Ball & Reznicek (2002) in FNA23 (2002b); Bryson, Kral, & Manhart (1987); Derieg et al (2013); Dorey (2019); Dragon & Barrington (2009); Fernald (1942b); Frye & Lea (2002); Goetghebeur in Kubitzki (1998b); Kirschbaum (2007); Kral, Manhart, & Bryson (1987); LeBlond et al (1994); Mackenzie (1931-1935); Maguilla et al (2015); Maguilla et al (2015); Medford, Poindexter, & Weakley (2021) in Weakley et al (2021); Naczi (1993); Naczi, Bryson, & Cochrane (2002); Poindexter & Naczi (2014); Poindexter & Weakley (2018b) in Weakley et al (2018a); Rettig (1989a); Sorrie et al (2011); Uttal (1971); Ward (2012a); Ward (2021).

1 Spike 1 per culm, all flowers attached to the main stem in a terminal spike ..... ***Key A***
1 Spikes 2 or more per culm (some flowers in lateral spikes)
  3 Stigmas 2; achenes flat or biconvex in cross-section (lenticular) ..... ***Key C***
  3 Stigmas (2-) 3 (-4); achenes trigonous or terete in cross-section.
    4 Body of perigynium pubescent, scabrous, hispid, or papillose (if papillose, the papillae longer than wide) ..... ***Key D***
    4 Body of perigynium glabrous or papillose (if papillose, the papillae shorter than wide).
      5 Bracts sheathless or with sheath < 4 mm long (rarely longer, and then the sheath shorter than the diameter of the stem) ..... ***Key E***
      5 Bracts (at least the lower) with sheath > 4 mm long (and longer than the diameter of the stem) ..... ***Key F***

Key A

2 Spike entirely staminate.
  3 Culms distinctly red or purple at the base ..... ***[26ddd] Section 41 Pictae***
  3 Culms yellow to brown or black, without red or purple coloration.
    4 Culms shorter than the leaves; widest leaf blades > 2 mm wide ..... ***[26kkk] Section 44 Phyllostachyae***
    4 Culms longer than the leaves; widest leaf blades < 2 mm wide ..... ***[26o] Section 11 Stellulatae***
2 Spike pistillate or with both pistillate and staminate flowers.
  5 Stigmas 2; achenes lenticular.
    ..... ***[26o] Section 11 Stellulatae***
  5 Stigmas 3; achenes trigonous.
    7 Perigynia pubescent near the tip ..... ***[26ddd] Section 41 Pictae***
    7 Perigynia glabrous.
      8 Spikes gynecandrous; beak of perigynium with apical teeth > 0.3 mm long ..... ***[26uu] Section 34 Squarrosae***
      8 Spikes androgynous or entirely pistillate; beak of perigynium with apex entire, emarginate, or with teeth < 0.2 mm long.
        9 Lower pistillate scales > 10 mm long ..... ***[26kkk] Section 44 Phyllostachyae***
        9 Lower pistillate scales < 10 mm long.
          10 Perigynium beak > 2 mm long, as long as or longer than the perigynium body ..... ***[26kkk] Section 44 Phyllostachyae***
          10 Perigynium beak < 2 mm long, or if more, then tapering to the perigynium body and shorter than the body.
            ..... ***Carex leptalea var. harperi***

Key C

1 Perigynia surfaces and beak often pubescent, finely papillate ..... ***[26bbb] Section 39 Acrocystis***
1 Perigynia glabrous, papillate or not.
  2 Lateral spikes usually pedunculate; lowermost inflorescence bracts sometimes with sheath; peduncles with prophyll at base.
    4 Pistillate scales (at least the lower) long-awned ..... ***[26r] Section 13 Phacocystis***
    4 Pistillate scales obtuse to acuminate or cuspidate.
      5 Perigynia smooth; style persistent on the achene ..... ***[26qq] Section 30 Vesicariae***
      5 Perigynia often papillose over most of the surface; style deciduous ..... ***[26r] Section 13 Phacocystis***
  2 Lateral spikes sessile; bracts sheathless; peduncles without (or rarely with) a prophyll
    6 Perigynia papillose (visible at 20× magnification).
      ..... ***[26r] Section 13 Phacocystis***
    6 Perigynia smooth.
      8 Terminal spike gynecandrous; lateral spikes gynecandrous or pistillate.
        12 Margins of perigynia flat, at least in the upper ½, flat portion (measured at the tip of the achene and base of beak) > (0.1-) 0.2 mm wider
          13 Achenes rounded at apex (style dehiscing at the surface of the achene); style conspicuously enlarged at the base .....
          ..... ***Carex bromoides ssp. bromoides***
          13 Achenes with short apiculus formed by the persistent base of the style; style not conspicuously enlarged at base ..... ***[26q] Section 12 Ovales***
        12 Margins of perigynia rounded, or with flat portion < 0.1 mm wide.
          15 Inflorescences in fruit 1-1.5× as long as wide ..... ***[26q] Section 12 Ovales***
          15 Inflorescences in fruit 1.5-2 (or more)× as long as wide.
            16 Lowermost perigynia in each spike spreading ..... ***[26o] Section 11 Stellulatae***
            16 Lowermost perigynia in each spike ascending or erect.
              17 Perigynium serrulate on the margins of the upper body and lower beak ..... ***Carex bromoides ssp. bromoides***
              17 Perigynium entire on the margins of the upper body and the lower beak ..... ***[26q] Section 12 Ovales***
      8 Terminal spike androgynous (rarely entirely staminate or entirely pistillate); lateral spikes androgynous, staminate, or pistillate.
        9 Sheath fronts of lower cauline leaves transversely rugose.
          10 Perigynia mostly > 2× as long as wide, widest near the base ..... ***[26a] Section 1a Vulpinae***
          10 Perigynia mostly < 2× as long as wide, widest near middle.

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

11 Inflorescence usually branched, at least at the base, usually with > 15 spikes; pistillate scales usually yellow or brown, sometimes with hyaline margins, 3-veined..... ***[26c] Section 3 Multiflorae***
11 Inflorescence unbranched or with 1 or 2 short branches at the base, with < 15 spikes; pistillate scales greenish hyaline, 1-veined..... ***[26d] Section 4.0 Phaestoglochin***
9 Sheath fronts of lower cauline leaves smooth (or very weakly and indistinctly transversely rugose).
18 Fronts of leaf sheaths dotted red, brown, or yellow.
19 Perigynia widest near the base; culms usually > 1 mm wide..... ***[26a] Section 1a Vulpinae***
19 Perigynia widest near the middle; culms usually < 1 mm wide.
20 Plants densely cespitose, with short rhizomes; pistillate scales acute to acuminate..... ***Carex decomposita***
20 Plants loosely cespitose, sometimes with long rhizomes; pistillate scales (at least the upper) obtuse..... ***[26c] Section 3 Multiflorae***
18 Fronts of leaf sheaths not dotted red, brown, or yellow.
26 Spikes not consistently androgynous, the terminal either entirely staminate or pistillate, the lateral spikes irregularly pistillate, or staminate, or mixed..... ***[26o] Section 11 Stellulatae***
26 Spikes consistently androgynous, occasionally some of the lateral spikes entirely pistillate.
27 Perigynium widest near the base, tapering from base to beak..... ***[26a] Section 1a Vulpinae***
27 Perigynium widest above the base, often abruptly beaked..... ***[26d] Section 4.0 Phaestoglochin***

Key D

1 Pistillate spikes all from the base of the plant..... ***[26bbb] Section 39 Acrocystis***
1 Pistillate spikes all or in part borne on the elongate, aboveground stem.
2 Bracts of the lowermost non-basal spike with well-developed sheath > 4 mm long.
4 Bracts of the lowermost non-basal spike bladeless, or with a blade < 2 mm long.
5 Perigynia 2.0-2.9 mm long; leaf blades 0.9-3.3 mm wide..... ***Carex pedunculata var. pedunculata***
5 Perigynia 4-5 mm long; leaf blades 4-8 mm wide..... ***[26ddd] Section 41 Pictae***
4 Bracts of the lowermost non-basal spike with blade > 3 mm long (and often much longer).
7 Leaves pubescent or pilose..... ***[26ff] Section 23 Hymenochlaenae***
7 Leaves usually glabrous, to scabrous on the veins.
8 Bases of plants brown..... ***[26ll] Section 26 Hallerianae***
8 Bases of plants distinctly red or purple.
9 Lowermost pistillate scales awned; leaves somewhat septate-nodulose; plants usually long-rhizomatous and forming large clonal colonies..... ***[26oo] Section 28 Paludosae***
9 Lowermost pistillate scales obtuse to acuminate; leaves not septate-nodulose; plants cespitose, short-rhizomatous..... ***[26ff] Section 23 Hymenochlaenae***
2 Bracts of the lowermost non-basal spike sheathless or with sheath < 4 mm long.
10 Perigynia > 10 mm long.
[26rr] Section 31 Lupulinae
10 Perigynia < 10 mm long.
13 Terminal spike gynecandrous or pistillate
[26ii] Section 24 Porocystis
13 Terminal spike staminate (or rarely androgynous).
16 Leaf sheaths (and usually the blades as well) pubescent.
17 Pistillate scales sometimes pubescent; pistillate spikes with 40-200 perigynia..... ***[26oo] Section 28 Paludosae***
17 Pistillate scales glabrous; pistillate spikes with < 40 (-50) perigynia.
18 Perigynia usually < 3.2 mm long, the apex rounded and beakless, or abruptly beaked..... ***[26ii] Section 24 Porocystis***
18 Perigynia > 3.5 mm long, the tip tapering or abruptly beaked.
19 Longer peduncles of pistillate spikes > 1 cm long; perigynia > 3× as long as wide, tapering gradually to the base..... ***[26ff] Section 23 Hymenochlaenae***
19 Longer peduncles of pistillate spikes 0-1 cm long; perigynia < 3× as long as wide, abruptly contracted to a short stipe at the base. ***[26ll] Section 26 Hallerianae***
16 Leaf sheaths and blades glabrous to scabrous.
23 Fronts of sheaths of lower leaves ladder-fibrillose; leaves and sheaths septate-nodulose (sometimes obscurely so)..... ***[26oo] Section 28 Paludosae***
23 Fronts of leaf sheaths not ladder-fibrillose, sometimes breaking into longitudinal fibers; leaves and sheaths not septate-nodulose.
24 Perigynia strongly 12-30-veined.
25 Pistillate scales with 3-7 (-10) veins..... ***[26ii] Section 24 Porocystis***
25 Pistillate scales with 1-3 veins.
26 Leaf blades, at least toward the tip, M-shaped in cross-section when young, the upper surface usually with 2 marginal veins more prominent than the midvein; staminate spikes 1-4..... ***[26oo] Section 28 Paludosae***
26 Leaf blades V-shaped in cross-section when young, the upper surface lacking 2 marginal veins more prominent than the midrib; staminate spike 1..... ***[26bbb] Section 39 Acrocystis***
24 Perigynia 0-12-veined.
28 Plants with at least some pistillate spikes basal; culms much shorter than the leaves..... ***[26bbb] Section 39 Acrocystis***
28 Plants with most pistillate spikes on obvious elongated stems; culms shorter than or longer than the leaves.
29 Upper leaves with blades > 2 cm long, longer than the sheaths..... ***[26bbb] Section 39 Acrocystis***
29 Upper leaves bladeless or with blades < 1 cm long and also shorter than the sheaths..... ***Carex pedunculata var. pedunculata***

Key E

1 Apex of perigynium beak with 2 teeth at least (0.4-) 0.5 mm long.
2 Perigynia with 2 distinct marginal veins, otherwise veinless or only very faintly veined; leaves not septate-nodulose..... ***Carex cherokeensis***

Key to Map Symbology:

←rare ←uncommon ←common (see introduction for more)

* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable

X : extirpated

2 Perigynia with 5+ distinct veins; at least proximal leaves septate-nodulose, rarely not.
4 Pistillate scales obtuse to acuminate, awnless or at most with a rough apiculus.
5 Staminate spike usually 1; perigynia 15-20-veined, each 10-20 mm long ..... ***[26rr] Section 31 Lupulinae***
5 Staminate spikes usually 1-3+; perigynia 6-15 (-22)-veined, each 4-10 (-12.5) mm.
6 Perigynia 6-14 (-15)-veined ..... ***[26qq] Section 30 Vesicariae***
6 Perigynia 14-25-veined
7 Perigynia narrowly ovate to subglobose, 2-2.5× as long as wide ..... ***[26oo] Section 28 Paludosae***
7 Perigynia elliptic to ovate, 3-4.5× as long as wide ..... ***[26qq] Section 30 Vesicariae***
4 Pistillate scales, at least some, with a scabrous awn.
8 Perigynia (9-) 10+ mm long.
..... ***[26rr] Section 31 Lupulinae***
8 Perigynia < 9 mm long.
10 Upper pistillate scales with awn > ½ as long as the body ..... ***[26qq] Section 30 Vesicariae***
10 Upper pistillate scales acute to short-awned, awn < ½ as long as the body.
12 Staminate spikes 1 (-4); perigynium beak > 1.7 mm long ..... ***[26oo] Section 28 Paludosae***
12 Staminate spikes 1-6; perigynium beak often < 1.7 mm long.
13 Perigynia veined only at base; widest leaves < 4 mm wide ..... ***[26oo] Section 28 Paludosae***
13 Perigynium veined to tip of body and often into beak; widest leaves mostly > 4 mm wide.
14 Pistillate scales with margins serrulate distally; awn, when present, rough.
15 Perigynia 3.1-4.8 × 0.9-1.5 (-1.8) mm; staminate spikes 1-2 ..... ***[26qq] Section 30 Vesicariae***
15 Perigynia 2.5-8 × 1.2-3.5 mm; staminate spikes usually 3-7 ..... ***[26oo] Section 28 Paludosae***
14 Pistillate scales with margins entire; awn, when present, usually smooth.
16 Perigynia 9-15-veined ..... ***[26qq] Section 30 Vesicariae***
16 Perigynia 14–25-veined.
17 Perigynia narrowly ovate to subglobose, 2-2.5× as long as wide ..... ***[26oo] Section 28 Paludosae***
17 Perigynia elliptic to ovate, 3-4.5× as long as wide ..... ***[26qq] Section 30 Vesicariae***

1 Apex of perigynium beak entire, emarginate, or with 2 teeth < 0.5 mm long.
18 Perigynia minutely papillose, at least distally (at 20× magnification).
19 Some roots with yellow-brown felty covering ..... ***Carex barrattii***
19 Roots brown or black, without yellow-brown felty covering, rarely with white felty covering.
20 Leaf blades and/or sheaths pubescent, at least at junction of blade and sheath ..... ***[26ii] Section 24 Porocystis***
20 Leaf blades and sheaths glabrous.
..... ***[26x] Section 17a Glaucescentes***
18 Perigynia not papillose, essentially smooth.
23 Terminal spike gynecandrous.
24 Perigynia with distinct beak 0.5-4 mm long.
..... ***[26uu] Section 34 Squarrosae***
24 Perigynia beakless or with beak < 0.5 mm long.
26 Adaxial side of leaves with 2 marginal veins more prominent than midvein; young leaves M-shaped in cross section.
..... ***[26ff] Section 23 Hymenochlaenae***
26 Adaxial side of leaves without 2 marginal veins more prominent than midvein; young leaves V-shaped or rounded in cross section.
..... ***[26ii] Section 24 Porocystis***
23 Terminal spike staminate or androgynous.
30 Leaves and/or sheaths pubescent, at least at junction of blade and sheath.
32 Perigynium beak 0.5-3 mm long, often > 1 mm long, about 1/2 the length of the body; proximal pistillate scales awned .....
..... ***[26ff] Section 23 Hymenochlaenae***
32 Perigynium beak absent or not more than 0.5 (-0.7) mm long, not > 1/4 the length of the body; proximal pistillate scales acute, acuminate or cuspidate. .
..... ***[26ii] Section 24 Porocystis***
30 Leaves and sheaths usually glabrous, rarely papillose.
33 Style persistent on achene in fruit; larger leaves and sheaths usually at least sparsely septate-nodulose, rarely not.
34 Perigynia (9-) 10+ mm long; staminate spike usually 1 ..... ***[26rr] Section 31 Lupulinae***
34 Perigynia < 10 mm long; staminate spikes 1-5 (-7).
35 Pistillate scales with margins serrulate distally, apex usually rough-awned.
36 Distal pistillate scales with apex acute to short-awned, awn < 1/2 as long as the body ..... ***[26oo] Section 28 Paludosae***
36 Distal pistillate scales with apex long-awned, awn > 1/2 as long as the body ..... ***[26qq] Section 30 Vesicariae***
35 Pistillate scales with margins entire, apex awnless or with short, smooth awn.
37 Perigynia not inflated, thick walled, brownish, dull ..... ***[26oo] Section 28 Paludosae***
37 Perigynia slightly to strongly inflated, thin walled, yellowish to purplish, shiny ..... ***[26qq] Section 30 Vesicariae***
33 Style deciduous; larger leaves and sheaths sometimes septate-nodulose, more often not.
38 Leaf blades, at least widest, M-shaped in cross section when young, adaxial surface with 2 marginal veins more prominent than midvein.
40 Pistillate scales awned, longest awn > 0.5 mm long ..... ***[26ee] Section 22 Griseae***
40 Pistillate scales obtuse to acuminate or short-awned, awn < 0.2 mm long ..... ***[26ff] Section 23 Hymenochlaenae***
38 Leaf blades V-shaped in cross section when young, adaxial surface without 2 marginal veins more prominent than midvein.
42 Plant base brown or blackish, without trace of red or purple ..... ***[26kkk] Section 44 Phyllostachyae***
42 Plant base red or purple tinged, sometimes only sparsely so.
..... ***[26bbb] Section 39 Acrocystis***

Key F

1 Apex of perigynium beak terminated by 2 teeth, mostly > 0.5 mm long.
2 Perigynia > 4× as long as wide (8-15 × 1-3 mm).

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3 Apical teeth of perigynium beak erect; achenes oblong-obovoid or obovoid; at least proximal pistillate scales with 3-5 (-7)-veined center..... ***[26ss] Section 32 Rostrales***
3 Apical teeth of perigynium beak reflexed; achenes elongate; pistillate scales with 1-veined center ***[26tt] Section 33 Collinsiae***
2 Perigynia < 4× as long as wide.
4 Perigynia > (9-) 10 mm long.
6 Perigynia 7-11-, 5-12-, or 12-25-veined.....***[26qq] Section 30 Vesicariae***
6 Perigynia 12-34-veined.
7 Basal and proximal leaf sheaths reddish or purplish.....***[26rr] Section 31 Lupulinae***
7 Basal and proximal leaf sheaths yellowish to brown, without trace of red or purple ***[26ss] Section 32 Rostrales***
4 Perigynia < 10 mm long.
8 At least proximal pistillate scales with long, rough awn.
9 Perigynia with 2 strong marginal veins, otherwise veinless or veined only proximally; leaves not septate-nodulose.....***[26ff] Section 23 Hymenochlaenae***
9 Perigynia with 5+ strong veins extending length of bodies; leaves septate-nodulose.
11 Perigynium body obovoid, widest distally; proximal bract > 3× as long as the inflorescence.....***[26uu] Section 34 Squarrosae***
11 Perigynium body ovoid or lanceoloid or ellipsoid, widest at middle or proximally; proximal bract usually < 2× as long as the inflorescence.
12 Perigynium beak 0.9-1.7 mm long; mature perigynia dull.....***[26oo] Section 28 Paludosae***
12 Perigynium beak 0.2-6 mm long; mature perigynia somewhat glossy.....***[26qq] Section 30 Vesicariae***
8 All pistillate scales obtuse to acuminate or cuspidate.
13 Culms with some red or purple at base.
14 All perigynia erect or ascending; leaves not septate-nodulose.....***[26ff] Section 23 Hymenochlaenae***
14 At least proximal perigynia in each spike spreading or reflexed; leaves sparsely septate-nodulose.....***[26qq] Section 30 Vesicariae***
13 Culms brown or black at base, without trace of red or purple.
15 Pistillate scales with 5-7-veined center..... ***[26ss] Section 32 Rostrales***
15 Pistillate scales with 1-3-veined center.
.....***[26ff] Section 23 Hymenochlaenae***

1 Apex of perigynium beak entire, emarginate, or with teeth mostly < 0.5 mm long.
17 Leaf blades variously hairy.
18 Plant brown or black at base.....***[26ee] Section 22 Griseae***
18 Plant with at least some red or purple at base.....***[26ff] Section 23 Hymenochlaenae***
17 Leaf blades glabrous.
19 Bracts without blades.
20 Leaves < 1 mm wide..... ***[26ggg] Section 43 Albae***
20 Leaves much wider, often over 10 mm wide ..... ***[26dd] Section 21 Careyanae***
19 Bracts, at least the proximal, with distinct blade.
21 Young leaves V-shaped or rounded in cross section, adaxial surface without 2 marginal veins more prominent than midvein or other veins.
22 Perigynium beak with 2 distinct terminal teeth, usually > 0.2 mm long.
23 At least proximal pistillate scales awned, awn at least 1/2 as long as body; leaves conspicuously septate-nodulose.
24 Base of culm strongly red or purple; leaves 2-4 mm wide.....***[26qq] Section 30 Vesicariae***
24 Base of culm brown, without or with only trace of red or purple; leaves 4–15 mm wide.
25 Distal pistillate scales acute, acuminate, or short-awned, awn less than 1/2 length of body.....***[26oo] Section 28 Paludosae***
25 Distal pistillate scales with awn at least about as long as body.....***[26qq] Section 30 Vesicariae***
23 Pistillate scales obtuse to acuminate, sometimes very shortly awned; leaves not or only weakly septate-nodulose.
.....***Carex meadii***
22 Perigynium beak entire, emarginate, or with 2 apical teeth < 0.2 mm long.
28 Perigynia rounded at base, sides proximally distinctly convex.
29 Perigynia with veins slightly prominent..... ***[26cc] Section 20 Granulares***
29 Perigynia with veins slightly impressed.....***[26ee] Section 22 Griseae***
28 Perigynia tapering at base, sides straight or only slightly convex proximally.
30 Perigynia rounded at apex, beakless or with beak < 0.3 mm long.
31 Widest leaf blades < 5 mm wide; plants usually not cespitose..... ***Carex meadii***
31 Widest leaf blades usually > 5 mm wide; plants usually cespitose .....***[26bb] Section 19 Laxiflorae***
30 Perigynia tapering to beak at least > (0.3-) 0.5 mm long.
.....***Carex meadii***
21 Leaf blades M-shaped in cross section when young, adaxial surface with 2 marginal veins more prominent than midvein and other marginal veins, sometimes apparent only on proximal leaves and on proximal part of blade.
34 Perigynium beakless or with beak < 0.5 mm long, entire or with 2 apical teeth < 0.1 mm long.
35 Widest leaf blades (usually basal) > 10 mm wide.
37 Perigynia trigonous with rounded angles in cross section.....***[26bb] Section 19 Laxiflorae***
37 Perigynia sharply trigonous in cross section ..... ***[26dd] Section 21 Careyanae***
35 Widest leaf blades < 10 mm wide. not more than 10 mm wide.
38 Perigynia not prominently veined, veins somewhat impressed .....***[26ee] Section 22 Griseae***
38 Perigynia at least slightly prominently veined or veinless except for 2 marginal veins.
39 Perigynia rounded at base, sides proximally convex..... ***[26cc] Section 20 Granulares***
39 Perigynia tapering at base, sides proximally straight, concave or slightly convex.
41 Perigynia sharply trigonous in cross section..... ***[26dd] Section 21 Careyanae***
41 Perigynia terete or with rounded angles in cross section.
42 Perigynia with 2 marginal veins and not more than 10 veins on faces .....***[26ff] Section 23 Hymenochlaenae***
42 Perigynia with more than 12 veins.
..... ***Carex meadii***
34 Perigynium with distinct beak > 0.5 mm, usually with apical teeth > 0.1 mm long.
44 Perigynia with 2 distinct marginal veins, otherwise veinless or with very weak veins proximally.

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

45 Perigynium beak entire, emarginate, or with apical teeth < 0.1 mm long.....***[26bb] Section 19 Laxiflorae***
45 Perigynium beak with apical teeth 0.2-1 mm.
46 Perigynium beak usually < 1 mm long. .....***Carex meadii***
46 Perigynium beak sometimes > 2 mm long.....***[26ff] Section 23 Hymenochlaenae***
44 Perigynia with more than 2 veins extending most of length of bodies.
47 Pistillate scales with narrow, indistinct bodies, scarcely enlarged at bases .....***[26uu] Section 34 Squarrosae***
47 Pistillate scales with wide, flat bodies, sometimes terminating in awns.
48 Perigynium beak entire or emarginate.
49 Perigynium with not more than 5 veins extending length of body on abaxial face, veinless or weakly veined on adaxial face.....
.....***[26ff] Section 23 Hymenochlaenae***
49 Perigynium with > 8 equally prominent veins on both faces.
50 Perigynia bluntly angled in cross section.....***[26bb] Section 19 Laxiflorae***
50 Perigynia sharply angled in cross section.....***[26dd] Section 21 Careyanae***
48 Perigynium beak with 2 distinct teeth at apex, usually > 0.2 mm long.
51 Pistillate spikes, at least the proximal, lax, proximal and middle perigynia separated by internodes at least 1/4 their length; leaves and sheaths not septate-nodulose .....***[26ff] Section 23 Hymenochlaenae***
51 Pistillate spikes dense, proximal and middle perigynia separated by internodes less than 1/10 their length; proximal leaves and sheaths sparingly septate-nodulose.
52 Pistillate scales, at least proximal, awned, awn at least 1/4 of scale body length.
53 Distal pistillate scales acuminate or with awn less than 1/2 body length; staminate spikes usually 2+ .....
.....***[26oo] Section 28 Paludosae***
53 Distal pistillate scales awned, awn usually more than 1/2 body length; staminate spikes 1, sometimes with 1 much smaller spike laterally.....***[26qq] Section 30 Vesicariae***
52 Pistillate scales obtuse to acute or apiculate, apiculus not more than 1/10 of body length.
.....***[26qq] Section 30 Vesicariae***

[26a] Section 1a Vulpinae - section *Vulpinae*

1 Leaf sheath fronts yellow, thickened, and not fragile at the top; leaf blades papillose adaxially (at 25× magnification) .....***Carex laevivaginata***
1 Leaf sheath fronts green or whitish, thin, and fragile at the top; leaf blades not papillose adaxially.
2 Leaf sheath fronts smooth.
3 Larger perigynia 6-8 mm long; leaves to 12 mm wide.....***Carex crus-corvi***
3 Larger perigynia 3-5 mm long; leaves to 7 mm wide.
.....***Carex oklahomensis***
2 Leaf sheath fronts rugose.
5 Perigynia broadly rounded at base, not distended; perigynium veins 3-5 abaxially, 0 adaxially .....***Carex conjuncta***
5 Perigynia cordate or truncate at base, distended; perigynium veins 15 abaxially, 7 adaxially.
6 Perigynia (5-) avg. 5.4 (-6) mm long, the beak > 3 mm long; larger leaves mostly 8-17 mm wide; perigynium scales cuspidate to short-awned; [mostly of the Coastal Plain and lower Piedmont] .....***Carex stipata var. maxima***
6 Perigynia (4-) avg. 4.7 (-5) mm long, the beak < 2.5 mm long; larger leaves mostly 4-10 mm wide; perigynium scales acuminate to cuspidate; [widespread in our area].....***Carex stipata var. stipata***

[26a] Section 1b Vulpinae - section *Vulpinae*

1 Beak of the perigynium shorter than the body.
2 Perigynia somewhat abruptly contracted into a beak ca. 0.5 × as long as the perigynium body; ventral surface of the perigynium with several incomplete veins basally; culms sharply triangular and narrowly winged, somewhat spongy and easily crushed; dorsal leaf sheaths green; ventral leaf sheaths with scattered red dots, and transversely rugose; [normally of shaded locations].....***Carex conjuncta***
2 Perigynia tapering into a beak, much shorter than the perigynium body; ventral surface of the perigynium with several inconspicuous complete veins; culms inconspicuously triangular to roundish, not winged, neither spongy nor easily crushed; dorsal leaf sheaths dark blue-green with conspicuous white dots; ventral leaf sheaths without scattered red dots, not transversely rugose; [normally of sunny locations].....***Carex oklahomensis***
1 Beak of the perigynium as long as, or longer than, the body.
3 Ventral leaf sheath margins with orange-red dots; achene ovate-lanceolate; perigynium wall adhering to achene.....***Carex crus-corvi***
3 Ventral leaf sheath margins without orange-red dots; achene broadly ovate to ovate-orbicular; perigynium wall not adhering to the achene (or only slightly so).
4 Ventral leaf sheaths not transversely rugose, more or less concave at the apex and not prolonged upward past the base of the blade, thickened, not friable .....
.....***Carex laevivaginata***
4 Ventral leaf sheaths transversely rugose, more or less convex at the apex and prolonged upward past the base of the blade, friable.
5 Perigynia (5-) avg. 5.4 (-6) mm long, the beak > 3 mm long; larger leaves mostly 8-17 mm wide; perigynium scales cuspidate to short-awned; [mostly of the Coastal Plain and lower Piedmont] .....***Carex stipata var. maxima***
5 Perigynia (4-) avg. 4.7 (-5) mm long, the beak < 2.5 mm long; larger leaves mostly 4-10 mm wide; perigynium scales acuminate to cuspidate; [widespread in our area].....***Carex stipata var. stipata***

[26c] Section 3 Multiflorae - section *Multiflorae*

1 Perigynia red-dotted .....***Carex triangularis***
1 Perigynia not red-dotted.
2 Perigynia golden yellow or yellowish-brown at maturity.....***Carex annectens***
2 Perigynia dull yellow-green or pale brown at maturity.
3 Leaves longer than the flowering stem; perigynia 2.0-3.2 mm long, 1.3-1.8 mm wide, the beak 1/3-1/2 the length of the body.....***Carex vulpinoidea***
3 Leaves shorter than the flowering stem; perigynia 3.2-4.0 mm long, 2.0-2.6 mm wide, the beak ca. 1/3 as long as the body.

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Carex fissa var. aristata

[26d] Section 4.0 Phaestoglochin - section *Phaestoglochin (Bracteosae)*

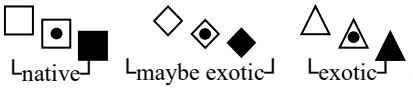
5 Perigynia not conspicuously corky-thickened at base.
6 Inflorescence ovoid in outline, the spikes densely aggregated, nearly indistinguishable except by the projecting setaceous bracts which subtend each spike.
7 Perigynia 1.3-1.7× as long as wide, widest near the broadly rounded, truncate, or even subcordate base ***Carex leavenworthii***
7 Perigynia 1.6-2.5× as long as wide, widest just below the middle, the base broadly cuneate to rounded.
8 Pistillate scales (excluding the awns) shorter than the perigynium body; culms not greatly exceeding the leaves ***Carex cephalophora***
8 Pistillate scales (excluding the awns) as long as or exceeding the perigynium body; culms much exceeding the leaves ***Carex mesochorea***
6 Inflorescence spicate-racemose, the individual spikes readily distinguishable (often separated by an exposed internode of the axis).
11 Perigynia ascending, nerveless on the ventral surface; scales awned, the awns 1.5-4 mm long; lowest inflorescence bract elongate, the free portion 1-5 cm long ***Carex austrina***
11 Perigynia spreading, either nerved or nerveless on the upper (ventral) surface; scales acuminate or with an awn to 1.5 (-2.0) mm long; lowest inflorescence bract short, delicate, the free portion 0.5-2 cm long.
12 Perigynia 3.0-3.5 mm long, nerveless on the upper (ventral) face ***Carex muehlenbergii var. enervis***
12 Perigynia 3.5-4.0 mm long, nerved on both faces ***Carex muehlenbergii var. muehlenbergii***
5 Perigynia corky-thickened in the lower 1/3 to 1/2 at maturity.
16 Beak of perigynium smooth; pistillate scales acuminate, early deciduous.
17 Average perigynium width ≥ 1.3 mm; average spongy portion of the perigynium ≥ 1.1 mm long; perigynium base distinctly nerved, bulging on the ventral surface, making the perigynium biconvex in cross-section; perigynium 2-2.5× as long as wide; perigynium gradually narrowed to a short beak; leaves 1-3 mm wide ***Carex retroflexa***
17 Average perigynium width < 1.3 mm; average spongy portion of the perigynium < 1.1 mm long; perigynium base nerveless, flattened on the ventral surface, making the perigynium planoconvex in cross-section; perigynium ca. 3× as long as wide; perigynium narrowed to a conspicuous beak; leaves 0.75-1.5 mm wide ***Carex texensis***
16 Beak of perigynium serrulate; pistillate scales obtuse, persistent.
18 Plants with creeping rhizomes, the culms arising scattered along the rhizome; perigynia 4-5× as long as wide ***Carex socialis***
18 Plants densely cespitose, the culms arising from the center of clump; perigynia 2-3× as long as wide.
19 Widest leaves 0.9-1.7 mm wide; base of fertile culm 0.7-1.4 mm wide.
20 Base of perigynium cuneate to rounded; distance from base of perigynium to base of achene 0.1-0.5 mm; [primarily of the Mountains in our area] ***Carex appalachica***
20 Base of perigynium rounded to truncate; distance from base of perigynium to base of achene 0.5-0.9 mm; [widespread in our area] ***Carex radiata***
19 Widest leaves 1.7-3.0 mm wide; base of fertile culm 1.4-2.2 mm wide.
21 Stigmas 0.03-0.06 mm thick, straight to slightly twisted; widest leaves < 2.0 mm wide; perigynia 3-7 (-8) per spike ***Carex radiata***
21 Stigmas 0.07-0.10 mm thick, mostly coiled; widest leaves > 1.7 mm wide; perigynia (6-) 7-14 (-20) per spike ***Carex rosea***

[26o] Section 11 Stellulatae - section *Stellulatae*

1 Spikes usually solitary; leaves involute; anthers 2.0-3.6 mm long; [mucky bogs, south to DE and e. MD; disjunct in sc. NC and s. AL and s. MS] ***Carex exilis***
1 Spikes 2-8; leaves flat or folded; anthers 0.6-2.2 (-2.4) mm long.
2 Perigynium beak smooth-margined (use at least 10× magnification) ***Carex seorsa***
2 Perigynium beak serrulate on margin (use at least 10× magnification).
3 Widest leaves 2.8-5.0 mm wide. ***Carex atlantica***
3 Widest leaves 0.8-2.7 mm wide.
8 Lower perigynia 2.0-3.0 mm wide ***Carex atlantica***
8 Lower perigynia 0.9-2.0 mm wide.
11 Widest leaves 1.6-2.7 mm wide; infructescence mostly 18-45 mm long; [widespread in our area] ***Carex atlantica***
11 Widest leaves 0.6-1.6 mm wide; infructescence mostly 8-20 mm long; [primarily of the Coastal Plain in our area, widely scattered elsewhere] ***Carex howei***

[26q] Section 12 Ovales - section *Ovales*

6 Pistillate scales in middle or lower portions of spikes with apex acuminate with subulate or awned tip.
7 Perigynia 2.6-4.0× as long as wide, the bodies lanceolate, 1.2-2.0 mm wide ***Carex scoparia***
7 Perigynia < 2.5× as long as wide, the bodies lance-ovate, ovate, broadly elliptic, orbiculate, or obovate, 1.8-3.9 mm wide.
11 Perigynium body obovate, often with conspicuous "shoulders"; leaves 2.5-6 mm at widest ***Carex alata***
11 Perigynium body elliptic, suborbiculate, or weakly obovate; leaves 1-3 (-4.2) mm at widest. ***Carex festucacea***
6 Pistillate scales with apex obtuse, acute, or acuminate (but not subulate or awned).
15 Perigynia < 2 mm wide.
16 Perigynia thin, often not winged to the base; leaf sheaths somewhat expanded toward the apex, bearing narrow wings continuous with the midvein and the edges of the leaf blade; leaves 3-7.5 mm wide; vegetative shoots tall, conspicuous, with numerous leaves spaced along the upper half of the culm.
17 Lower perigynia of each spike spreading or recurved (at an angle of > 80 degrees); spikes globose; pistillate scales hidden, 1.6-2.3 mm long ***Carex cristatella***
17 Lower perigynia of each spike appressed-ascending to somewhat spreading (at a 30-75 degree angle); spikes subglobose to ovate-oblong; pistillate scales evident, 2.0-3.0 mm long.

Key to Map Symbology: 

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19 Perigynia 3.0-4.0 mm long, 2.2-2.8 (-3) × as long as wide ..... ***Carex sangamonensis***
19 Perigynia (3.3-) 3.6-5.4 mm long, 3-5 × as long as wide ..... ***Carex tribuloides***
16 Perigynia thick, winged to the base; leaf sheaths with more-or-less rounded edges, not distinctly expanded toward the apex; leaves 1-4.5 mm wide (except in *C. normalis*); vegetative shoots usually inconspicuous, with relatively few leaves clustered at the tip.
20 Perigynia (2.5-) 2.6-4 × as long as wide, the body lanceolate, distance from beak tip to top of achene 2.2-5 mm ..... ***Carex scoparia***
20 Perigynia < 2.5 × as long as wide, the body obovate, orbiculate, or ovate; distance from beak tip to top of achene 0.8-2.2 mm.
23 Perigynium body obovate, widest toward the tip (excluding the beak).
24 Perigynium beak spreading, slender; pistillate scales acute; styles sinuous at base ..... ***Carex albolutescens***
24 Perigynium beak appressed-ascending, triangular; pistillate scales obtuse; styles straight ..... ***Carex longii***
23 Perigynium body ovate, elliptic, or orbiculate, widest toward the base or near the middle (excluding the beak).
25 Inflorescences on tallest culms compact, 1.5-3 × as long as wide, erect, the spikes overlapping, the lowest internode of the inflorescence 1-6 (-7.5) mm, ½ to 1/5 (-¼) the length of the inflorescence
27 Perigynia broadly elliptic or nearly orbiculate, the wing margin 0.4-0.8 mm wide, 0-6 veined on the inner face ..... ***Carex molesta***
27 Perigynia ovate to broadly ovate, the wing margin 0.25-0.45 mm wide, 4-7 veined on the inner face ..... ***Carex normalis***
25 Inflorescences on tallest culms elongate, more-or-less open toward the base, (2.5-) 3.0-5.1 × as long as wide, often arching or nodding at the tip; spikes more-or-less separate; lowermost internode (5-) 7-19 mm long, mostly 1/5-⅓ (-½) the length of the inflorescence.
28 Perigynium orbiculate, widest at mid-body ..... ***Carex festucacea***
28 Perigynium narrowly to broadly ovate, widest below mid-body.
29 Sheaths smooth, often whitish-mottled; perigynium beak spreading, exceeding the pistillate scales by 0.7-1.6 mm; beak and shoulders of perigynia greenish to yellowish or greenish brown at maturity ..... ***Carex normalis***
29 Sheaths, at least some, papillose near the collar (at magnification of 30 ×), not prominently whitish-mottled; perigynium beak appressed or ascending in spikes, exceeding the pistillate scales by 0.0-0.8 mm; beak and shoulders of perigynia straw-colored to reddish-brown at maturity ..... ***Carex tenera***
15 Perigynia > 2 mm wide.
31 Perigynium bodies obovate, widest toward the tip; leaf sheaths green-veined adaxially nearly to the summit, or with a narrow Y-shaped hyaline area.
36 Perigynium beak spreading, slender; pistillate scales acute; styles sinuous at base ..... ***Carex albolutescens***
36 Perigynium beak appressed-ascending, triangular; pistillate scales obtuse; styles straight. ..... ***Carex longii***
31 Perigynium bodies lanceolate, ovate, elliptic, orbicular, or reniform, widest at the middle or toward the base; leaf sheaths various, some with prominent hyaline band near the apex adaxially.
40 Perigynia finely granular-papillose (as seen with 30× magnification), the body reniform to orbiculate, 0.6-0.9 ×as long as wide, 3.5-4.5 (-4.9) mm wide; lowermost pistillate scale obtuse-rounded ..... ***Carex reniformis***
40 Perigynia smooth, the body broadly ovate, elliptic, orbicular, or slightly obovate, (0.7-) 0.9-1.7 × as long as wide, 1.5-6.1 mm wide; lowermost pistillate scales obtuse to acuminate-awned.
47 Perigynium body narrowly to broadly ovate, greenish; pistillate scales with green midstripe, hyaline or pale margins (rarely brown tinged); leaves 2.5-6.5 mm wide, the sheaths green mottled, with mouth truncate, and prolonged to 2 mm distal to base of the leaf blades ..... ***Carex normalis***
47 Perigynium body broadly ovate, broadly elliptic, or orbiculate, yellowish to tan brown; pistillate scales greenish or dark brown; leaves 1.5-4 (-5) mm wide, the sheaths usually evenly colored, with mouth concave.
48 Leaf sheaths finely papillose (at magnification of 30-40 ×), especially near the leaf base. ..... ***Carex festucacea***
48 Leaf sheaths smooth.
50 Spikes on larger culms (3-) 5-7 (-11), tapered at the base, the terminal spike with a conspicuous staminate base; inflorescences typically open, 2.5-4.5 (-6.5) cm long, the lowermost internode (3-) 4-13 (-23) mm long; perigynium body (0.7-) 0.9-1.3 × as long as wide.
51 Achenes 1.2-1.8 mm long, 1.0-1.3 mm wide; perigynia 2.5-4.2 mm long, 1.5-2.3 (-2.5) mm wide, mostly 2-4 (-6)-veined adaxially ..... ***Carex festucacea***
51 Achenes (1.6-) 1.7-2.2 mm long, (1.2-) 1.4-1.8 mm wide; perigynia 3.2-5.5 mm long, 2.5-3.6 mm wide, veinless or faintly 1-5 (-7)-veined adaxially. ..... ***Carex brevior***
50 Spikes on larger culms 2-4 (-5), rounded at the base, the terminal spike usually lacking a conspicuous staminate base; inflorescences compact, 1.2-3.0 (-3.6) cm long, the lowermost internode 1.5-7 (-13) mm long; perigynium body (0.7-) 0.9-1.6 × as long as wide.
53 Achenes of larger perigynia ellipsoid to narrowly oblong, 0.9-1.3 mm wide, 1.3-1.6 × as long as wide; perigynia (25-) 30-80 per spike, squarrose-spreading at maturity, 1.8-3.0 mm wide ..... ***Carex molesta***
53 Achenes of larger perigynia broadly oblong to nearly orbicular, 1.35-1.8 mm wide, 1-1.3 × as long as wide; perigynia (10-) 15-40 (-45) per spike, appressed-ascending at maturity, (2.1-) 2.5-3.4 (-3.5) mm wide. ..... ***Carex brevior***

[26r] Section 13 Phacocystis - section *Phacocystis* (*Cryptocarpae* and *Acutae*)

1 Lowest spike erect or ascending. ..... ***Carex stricta***
1 Lowest spike pendent.
6 Pistillate scales awnless, the sides black or deep purple-brown ..... ***Carex torta***
6 Pistillate scales awned, the sides dark reddish-brown, light golden-brown, tan, or clear.
7 Sheath backs glabrous [prickles 0-1 (-5) per mm2 of sheath surface 5 cm from base]; perigynia somewhat inflated, obovoid, rounded above to an abrupt beak; lowest bract of the infructescence 1.7-6.2 dm long.
8 Perigynia strongly obovoid, 3-4.5 mm long, 2-3 mm wide; achene symmetrical ..... ***Carex crinita var. brevicrinis***
8 Perigynia ellipsoid to slightly obovoid, 2-3 (-3.5) mm long, 1-2 mm wide; achene usually shortened on one side, slightly to strongly asymmetrical ..... ***Carex crinita var. crinita***
7 Sheath backs scabrous [prickles (1-) 5-54 per mm2 of sheath surface 5 cm from base]; perigynia flattened, elliptic to ovoid, tapering from near or below the middle to a minute beak; lowest bract of the infructescence 0.7-3.5 dm long. ..... ***Carex mitchelliana***

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[26x] Section 17a Glaucescentes - section *Glaucescentes (Pendulinae)*

1 Awn of the pistillate scale tapering gradually into the scale; perigynium 2-ribbed, and also distinctly and evenly nerved between the ribs; [of swamps and marshes] ... ***Carex joorii***
1 Awn of the pistillate scale emerging from a retuse notch in the apex of the scale; perigynium 2-ribbed, obscurely nerved between the ribs; [generally of acid seepages, pocosins, and blackwater situations, often associated with *Pinus serotina*].
2 Lowest pistillate spike drooping, on a peduncle 1-4 cm long; perigynia reddish-glaucous, lacking nerves; achenes slightly longer than wide ..... ***Carex glaucescens***
2 Lowest pistillate spike erect, sessile or with a peduncle up to 1 cm long; perigynia white-glaucous, rather distinctly 6-8 nerved; achenes as wide as long..... ***Carex verrucosa***

[26bb] Section 19 Laxiflorae - section *Laxiflorae*

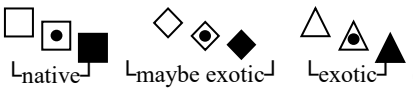
2 Perigynium with a short, bent beak, usually abruptly bent to one side.
3 Spikes loosely flowered, most perigynia not overlapping. ***Carex albursina***
3 Spikes densely flowered, the perigynia overlapping.
5 Basal sheaths purple when fresh, weathering to brown; uppermost bract rarely overtopping the staminate spike; staminate spike usually long-stalked ..... ***Carex gracilescens***
5 Basal sheaths brown; uppermost bract overtopping the staminate spike; staminate spike sessile or short-stalked
6 Widest bract of the uppermost lateral spike 0.5-3.4 mm wide ***Carex blanda***
6 Widest bract of the uppermost lateral spike (2.9-) 3.2-8.3 mm wide ***Carex kraliana***
2 Perigynium tapering to a straight or slightly curved beak (or a long, curved beak in *C. radfordii*) (note: some beaks may curve in pressing).
8 Basal sheaths purple or wine-red (may weather to brown in *C. gracilescens*).
9 Spikes densely flowered, the perigynia overlapping ***Carex gracilescens***
9 Spikes loosely flowered, the spikelets not overlapping. ***Carex purpurifera***
8 Basal sheaths brown, not purple or wine-red.
11 Mature perigynia obovoid.
12 Spikes overlapping, densely flowered; staminate spike more-or-less obscured; plant green ***Carex crebriflora***
12 Spikes scattered, loosely flowered; staminate spike prominently exserted; plant usually glaucescent ***Carex laxiflora***
11 Mature perigynia fusiform.
13 Spikes overlapping, the staminate more-or-less obscured and overtopped by the uppermost bract ***Carex crebriflora***
13 Spikes scattered, the staminate prominent and exceeding the uppermost bract.
14 Spikes densely flowered; perigynium beaks curved; lowest spike exserted on a long, arching, peduncle ***Carex styloflexa***
14 Spikes loosely flowered; perigynium beaks straight; lowest spike on a short, erect or ascending, peduncle
15 Widest leaf on vegetative shoots (including overwintered leaves) 2.0-6.0 (-6.9) mm wide; medial pistillate spikes more loosely flowered, the ratio of the number of perigynia to spike length (measured in mm) (0.20-) mean 0.41 (-0.52) ***Carex ignota***
15 Widest leaf on vegetative shoots (including overwintered leaves) 5.7-11.3 mm; medial pistillate spikes more densely flowered, the ratio of the number of perigynia to spike length (measured in mm) (0.47-) mean 0.57 (-0.90) ***Carex striatula***

[26cc] Section 20 Granulares - section *Granulares*

1 Plants with long-creeping rhizomes, the culms therefore mostly solitary; terminal spike and uppermost lateral spike usually separated.
2 Staminate scales with apex rounded to obtuse; widest leaves 1.8-3.0 (-4.4) mm wide; perigynium beak 0.1-0.3 mm long; [widespread] ***Carex crawei***
2 Staminate scales with apex acute to awned; widest leaves 2.8-8.3 mm wide; perigynium beak 0.3-0.9 mm long; [of Panhandle FL and AL westward] ..... ***Carex microdonta***
1 Plants with short rhizomes, the culms therefore clumped; terminal and uppermost lateral spike usually overlapping.
3 Leaves green; longest bract blade of uppermost lateral spike 1.6-4.6 (-7.1) cm long; perigynia (1.6-) 1.9-3× as long as thick; [of the Coastal Plain]..... ***Carex gholsonii***
3 Leaves glaucous (rarely green); longest bract blade of uppermost lateral spike 4.1-15.8 cm long; perigynia 1.4-2.2 (-2.4)× as long as thick; [widespread]..... ***Carex granularis***

[26dd] Section 21 Careyanae - section *Careyanae*

1 Basal sheaths purplish, sometimes mixed with brown.
2 Widest leaf blade 3-6 mm wide; peduncles of lateral spikes usually drooping ***Carex austrocaroliniana***
2 Widest leaf blade 10-25 mm wide; peduncles of lateral spikes usually erect or spreading.
3 Bracts of middle and basal portions of culms with blades 2.1-9.2 cm long; perigynia 5.0-6.6 mm long; longest (per plant) lateral spike with 4-9 perigynia ..... ***Carex careyana***
3 Bracts of middle and basal portions of culms bladeless, or with blades 0.1-1.9 cm long; perigynia 3.7-4.9 mm long; longest (per plant) lateral spike with 9-13 perigynia ***Carex plantaginea***
1 Basal sheaths brownish, lacking any purple coloration.
5 Basalmost scale of each lateral spike sterile (lacking a perigynium) or subtending a staminate flower.
6 Foliage usually bright green; longest (per plant) terminal spike 0.6-2.0 (-2.3) cm long; widest leaf blade 5.3-8.3 mm wide ***Carex copulata***
6 Foliage usually glaucous; longest (per plant) terminal spike (1.0-) 1.2-2.5 cm long; widest leaf blade 6.4-11.8 mm wide ***Carex laxiculmis***
5 Basalmost scale of each lateral spike subtending a perigynium.
7 Terminal spikes (1.0-) 1.2-2.7 mm wide; staminate scales acute, those from the middle region of the staminate spike 3.6-5.5 mm long; vegetative shoots shorter than or slightly taller than the culms, the tallest vegetative shoot 0.5-1.3 (-1.8)× as tall as the tallest culm.

Key to Map Symbology:  native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more)

* : waif; EN : endemic; H : historic

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8 Terminal spike usually surpassing the bract blade of the distalmost lateral spike; longest (per plant) peduncle of terminal spike (6.3-) 8.1-15.9 cm long; widest leaf blade 2.0-2.9 (-3.5) mm wide; each perigynium face 7-10-nerved ..... ***Carex digitalis var. macropoda***

8 Terminal spike usually surpassed by the bract blade of the distalmost lateral spike; longest (per plant) peduncle of terminal spike 0.9-7.2 (-11.4) cm long; widest leaf blade 2.7-4.5 (-5.3) mm wide; each perigynium face (8-) 11-15-nerved.

9 Perigynia 2.5-3.3 mm long, the apex barely excurved ..... ***Carex digitalis var. digitalis***

9 Perigynia 3.2-4.2 mm long, the apex noticeably excurved ..... ***Carex digitalis var. floridana***

7 Terminal spikes 0.6-1.4 (-1.6) mm wide; staminate scales obtuse, those from the middle region of the staminate spike 2.6-3.6 (-3.8) mm long; vegetative shoots much taller than the culms, the tallest vegetative shoot (1.4-) 1.7-3.7 (-4.9)× as tall as the tallest culm.

10 Perigynia spirally imbricate; longer lateral spikes with (6-) 8-13 perigynia; peduncles of proximal spikes usually erect, the longest (per plant) peduncle (7.0-) 15-42 (-49) mm long; bract blade of distalmost lateral spike 5.6-17 (-26) × as long as wide; loosely or densely cespitose; [primarily of the Coastal Plain in our area, though extending rarely into the Piedmont and Mountains] ..... ***Carex abscondita***

10 Perigynia distichously imbricate; longer lateral spikes with 4-8 (-9) perigynia; peduncles of proximal spikes usually drooping or nodding, the longest (per plant) peduncle (28-) 44-84 (-91) mm long; bract blade of distalmost lateral spike (12-) 17-51 × as long as wide; densely cespitose; [primarily of the Mountains and Piedmont] ..... ***Carex cumberlandensis***

[26ee] Section 22 Griseae - section *Griseae (Oligocarpae)*

1 Culm bases brown.

2 Leaf sheaths scabrous to hispidulous; perigynium beak (0.5-) 0.6-1.3 mm long

3 Leaf blades, especially of overwintered leaves, glaucescent, papillose abaxially; perigynia (3.7-) 4.0-4.7 (-5.1) × 1.5-1.7 (-1.8) mm; longest terminal spikes (25-) 30-46 mm long; [of the Cumberland Plateau of n. AL] ..... ***Carex brysonii***

3 Leaf blades green, glabrous abaxially or sparsely hispidulous; perigynia (4.5-) 4.6- 5.6 (-6.2) × 1.9-2.2 (-2.3) mm; longest terminal spikes 14-34 (-42) mm long; [of ne. United States, south in our area to w. NC and w. VA] ..... ***Carex hitchcockiana***

2 Leaf sheaths glabrous; perigynium beak 0-0.5 (-0.7) mm long

4 Leaf blades glaucous; pistillate scales awnless or awn < 1 (-1.9) mm long.

5 Perigynia (4.0-) 4.2-5.5 (-6.0) mm long; achene bodies 0.37-0.5× as long as the perigynia; pistillate spikes (5-) 5.7-8 (-9.6) mm wide; achene beak straight to bent less than 30° from the vertical ..... ***Carex flaccosperma***

5 Perigynia 3.2-4.5 (-4.7) mm; achene bodies 0.5-0.63 (-0.67)× as long as the perigynia; pistillate spikes (3.3-) 4.2-6.1 (-7.3) mm wide; achene beak usually bent 30–90° from vertical.

6 Perigynia 3.2-4.0 (-4.1) mm long, (1.5-) 1.8-2.3 (-2.5)× as long as wide; longest pistillate spike with (14-) 19-45 (-65) flowers, densely flowered, with the ratio [mm of spike length/number of flowers] = (0.56-) 0.67-1.1 (1.3); longest peduncle of staminate spike 0.5-15 (-31) mm long ..... ***Carex glaucodea***

6 Perigynia (3.7-) 3.9-4.5 (-4.7) mm long, (1.9-) 2.1-2.6 (-2.8)× as long as wide; longest pistillate spike with 11-25 (-28) flowers, rather loosely flowered, with the ratio [mm of spike length/number of flowers] = (0.97-) 1.0-1.3 (1.6); longest peduncle of staminate spike (1.5-) 7.5-37 (-62) mm long ..... ***Carex pigra***

4 Leaf blades deep or light green; pistillate scales usually with awns (0-) 1.2-3.7 (-6) mm long.

8 Widest leaf blades 2.6-4.0 mm wide; ligules of proximal bracts 0.4-1.8 (-3.6) mm long; perigynium apex bent; achene beaks bent ..... ***Carex impressinervia***

8 Widest leaf blades (3.7-) 4.2-8.2 (-9.1) mm wide; ligules of proximal bracts (1.8-) 4.0-10.7 (-12.9) mm long; perigynium apex straight; achene beaks straight. ..... ***Carex amphibola***

1 Culm bases purple-red

11 Perigynia spirally imbricate; proximal bracts with sheaths loose; ligules (0.9–) 2–12.9 mm

12 Culm bases with purple-red to (3.4-) 4.0-7.3 cm high; widest leaf blades 2.4-4.0 (-5.3) mm wide; achene stipes 0.6-0.8 (-0.9) mm long ..... ***Carex godfreyi***

12 Culm bases with purple-red to 0.3-2.4 (-7.3) cm high; widest leaf blades 3.3-8.0 (-9.1) mm wide; achene stipes (0.2-) 0.3-0.6 mm long.

14 Perigynia 4.2-5.0 (–5.2) × 1.5-1.9 (-2.2) mm, (2.2-) 2.5-3.1× as long as wide; achene bodies broadly obovoid to oblong-obovoid, widest at a point 0.55-0.67 (-0.70) from base to tip of body ..... ***Carex amphibola***

14 Perigynia (3.6-) 3.9-4.5 (-4.7) × (1.7-) 1.8-2.3 (-2.4) mm, 1.8-2.3 (-2.5)× as long as wide; achene bodies broadly obdeltoid-obovoid, widest at a point (0.6-) 0.65-0.80 from base to tip of body ..... ***Carex corrugata***

11 Perigynia distichously imbricate; proximal bracts with sheaths tight; ligules 4–4.9 (–9.6) mm (to 2.2 mm in *C. bulbostylis*).

17 Proximal bracts with bases of blades white between veins (most easily seen on abaxial surface) ..... ***Carex acidicola***

17 Proximal bracts with bases of blades uniformly green

18 Perigynia (1.7-) 2.1-2.6× as long as wide, apex usually abruptly contracted; beak (0.3-) 0.5-1.2 mm long; longest lateral spike with 2-8 (-10) perigynia (including undeveloped or aborted ones) ..... ***Carex oligocarpa***

18 Perigynia (2.4-) 2.5-3.3× as long as wide, apex gradually tapering; beakless or the beak 0.1-0.4 mm; longest lateral spike with (5-) 7-14 perigynia (including undeveloped or aborted ones)

21 Perigynia (1.9-) 2.0–2.3× as long as the achene bodies; achene beaks (0.3-) 0.4-0.7 mm long ..... ***Carex planispicata***

21 Perigynia 1.7-2.0× as long as the achene bodies; achene beaks 0.1-0.3 (-0.4) mm long. ..... ***Carex thornei***

[26ff] Section 23 Hymenochlaenae - section *Hymenochlaenae* -- Key to Groups

1 Terminal spike staminate; lateral spikes staminate, androgynous, or pistillate; base of culms tan, brown, or ivory.

2 Plants without rhizomes or with very short ones, densely cespitose ..... ***[26ff] Section 23c Hymenochlaenae***

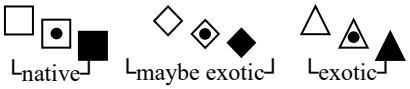
2 Plants with short-creeping rhizomes, loosely cespitose or colonial ..... ***Carex cherokeensis***

1 Terminal spike staminate or gynecandrous; lateral spikes pistillate, gynecandrous or rarely distal spike staminate; base of culms usually covered with dark maroon bladeless sheaths (often missing or very short in *C. prasina*).

3 Perigynia 2-ribbed but otherwise veinless or nearly so, green to yellow at maturity ..... ***[26ff] Section 23c Hymenochlaenae***

3 Perigynia 2-ribbed and veined between ribs, often conspicuously so, green to olive-green at maturity, usually red dotted.

Key to Map Symbology:



←rare ←uncommon ←common (see introduction for more)

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4 Perigynia fusiform to narrowly lance-ovoid, > 5 mm long, including the elongate beak; leaves generally < 5 mm wide; leaf sheaths usually glabrous, at least on back ..... ***[26ff] Section 23c Hymenochlaenae***

4 Perigynia ovoid-oblong to lance-ovoid, 2-6 mm (mostly < 5 mm long) tapering to a beak shorter than the body or beakless; leaves 2.5-12 mm wide; leaf sheaths glabrous or pubescent.

5 Terminal spike usually gynecandrous, rarely staminate ..... ***[26ff] Section 23b Hymenochlaenae***

5 Terminal spike usually staminate, rarely gynecandrous.

6 Lateral pistillate spikes erect at maturity, narrowly oblong to cylindric, to 25 × 2.5–9 mm, on stiff peduncles ..... ***[26ff] Section 23b Hymenochlaenae***

6 Lateral pistillate spikes drooping at maturity, short cylindric to linear, 8-80 × 3-5 mm, on slender arching peduncles ..... ***[26ff] Section 23c Hymenochlaenae***

[26ff] Section 23b Hymenochlaenae - section *Hymenochlaenae (the "Gracillimae" group)*

2 Perigynia strongly trigonous, the lateral ribs at the angles, broadest below the middle; basal sheaths brownish or greenish; leaf sheaths glabrous on the hyaline ventral portion ..... ***Carex prasina***

2 Perigynia terete to obscurely trigonous, the lateral ribs not at the angles, broadest near the middle; basal sheaths purplish or red; leaf sheaths pubescent on the hyaline ventral portion (glabrous in *C. gracillima*).

4 Leaf sheaths glabrous on the hyaline ventral portion; larger leaves 3-9 mm wide ..... ***Carex gracillima***

4 Leaf sheaths pubescent on the hyaline ventral portion; larger leaves 1.5-6 mm wide. ..... ***Carex oxylepis***

[26ff] Section 23c Hymenochlaenae - section *Hymenochlaenae (the "Sylvaticae" group)*

3 Internodes between the perigynia mostly 1.0-1.5 mm; sheaths of the pistillate bracts puberulent at the mouth. ..... ***Carex oblita***

3 Internodes between the perigynia mostly 2.0-4.0 (-6.0) mm; sheaths of the pistillate bracts glabrous at the mouth. ..... ***Carex debilis***

[26ii] Section 24 Porocystis - section *Porocystis (Virescentes)*

2 Perigynia densely pubescent; larger lateral spikes 2-4 mm wide; ligules longer than wide.

3 Terminal spikes 5-15 (-20) mm long; anthers 0.7-1.3 (-1.6) mm long ..... ***Carex swanii***

3 Terminal spikes (18-) 20-35 mm long; anthers (1.0-) 1.6-2.0 (-2.8) mm long ..... ***Carex virescens***

2 Perigynia glabrous, or minutely papillose, or with few scattered hairs; larger lateral spikes (3.5-) 4-8 mm wide; ligules as wide as long.

4 Perigynia papillose, with a short but definite beak, 2.5-4.0 mm long; anthers 2.5-3.5 mm long; pistillate scales about equal to perigynia or slightly longer; pistillate spikes 6-10 mm wide ..... ***Carex bushii***

4 Perigynia not papillose, beakless or with a short but definite beak [*C. caroliniana*], 2.0-3.5 mm long; anthers 1.3-2.5 mm long; pistillate scales usually much shorter than perigynia; pistillate spikes 4-7 mm wide.

5 Perigynia with a short but distinct beak, when mature more-or-less rounded in ×-section and with no faces flattish; blades glabrous or glabrate ..... ***Carex caroliniana***

5 Perigynia beakless, when mature more-or-less triangular in ×-section (or hemispheric) and with the inner face flattish, blades glabrous or glabrate [*C. complanata*] or densely hirtellous [*C. hirsutella*].

6 Blades glabrous or glabrate, especially on lower surface, sheaths glabrate to pubescent (if so, pubescence dense only in summit region); [mostly Coastal Plain and Piedmont] ..... ***Carex complanata***

6 Blades and sheaths densely hirtellous throughout; [mostly Coastal Plain, Piedmont, and Mountains] ..... ***Carex hirsutella***

[26ll] Section 26 Hallerianae - section *Hallerianae*

2 Perigynia densely white-villous apically, glabrous basally; achene body 2.0-2.7 mm long, long-stipitate ..... ***Carex dasycarpa***

2 Perigynia puberulent throughout; achene body 3.0-3.3 mm long, sessile ..... ***Carex tenax***

[26oo] Section 28 Paludosae - section *Paludosae*

1 Perigynium body pubescent.

2 Culms central, with the withered remains of the previous year's leaves at the base; basal sheaths of fertile culms not at all or only slightly reddened; [of the Coastal Plain] ..... ***Carex striata var. striata***

2 Culms lateral, with bladeless sheaths at the base; basal sheaths strongly reddened; [collectively widespread in our area]. ..... ***Carex vestita***

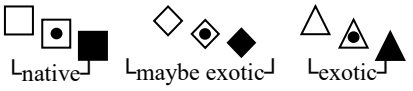
1 Perigynium body glabrous. ..... ***Carex hyalinolepis***

[26qq] Section 30 Vesicariae - section *Vesicariae* [including 52 - *Pseudocypereae*]

1 Pistillate scales with a prominent, scabrous awn (the body of the scale often ciliate as well).

3 Perigynia 6-12-nerved, the nerves separate nearly to the beak apex; perigynium bodies broadly ellipsoid to more or less globose, (1.8-) 2.0-4.2 mm wide; achenes rough-papillate.

4 Spikes 9-14 (-15) mm thick; widest leaves 2.4-4.0 (-5) mm wide; spikes usually 2.5-3.5× as long as wide; perigynia 4.8-6.6 (-7.6) mm long, the beaks usually 0.7-1.3× as long as the body ..... ***Carex baileyi***

Key to Map Symbology: 

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4 Spikes (12-) 15-22 mm thick; widest leaves (4.0-) 4.5-13 mm wide; spikes usually < 2.5× as long as wide if < 15 mm thick; perigynia (6-) 6.5 (-10.8) mm long, the beaks 0.6-0.9× as long as the body ..... ***Carex lurida***

3 Perigynia 12-25-nerved, the nerves (except for 2 prominent laterals) confluent at or below the middle of the beak; perigynium bodies ellipsoid to lance-ovoid, 1.1-2.2 mm wide; achenes smooth.
..... ***Carex comosa***

1 Pistillate scales smooth-margined, obtuse to acuminate, awnless (rarely the lowermost scales awned in *C. utriculata*).

9 Perigynium beaks finely scabrous (at least near the tip and on the teeth), 2.4-4.2 (-4.8) mm long; widest leaves 1.8-4.3 (-5) mm wide.
..... ***Carex bullata var. greenei***

9 Perigynium beaks smooth, 1-4.5 mm long; widest leaves 1.5-15 mm wide.
..... ***Carex elliottii***

[26rr] Section 31 Lupulinae - section *Lupulinae*

1 Sheath of uppermost leaf absent or <1.5 (-2.5) cm long; beak of perigynia 1.5-4.2 mm long; achenes with elliptic or obovate sides.

2 Perigynia rhombic-ovoid, cuneate to the base, 8-35 per spike, radiating in all directions and therefore forming a globular spike ..... ***Carex grayi***

2 Perigynia lanceoloid to ovoid, convex to the base, 1-12 (-20) per spike, ascending to spreading (the lowest sometimes slightly reflexed) and therefore forming an ovoid to obovoid spike.
..... ***Carex intumescens var. intumescens***

1 Sheath of uppermost leaf usually >1.7 cm long; beak of perigynia 4.5-10 mm long; achenes with rhombic or nearly triangular sides.

4 Achenes distinctly wider than long, widest above the middle; perigynia stiffly spreading at right angles to the rachis ..... ***Carex gigantea***

4 Achenes as wide as long or longer, widest near the middle; perigynia ascending.

5 Angles of the achenes pointed, often even knobbed, with nipple-like points; achenes (2.2-) 2.4-3.4 mm wide, often nearly as wide as long .....
..... ***Carex lupuliformis***

5 Angles of the achenes smoothly curved, not pointed or knobbed; achenes 1.7-2.6 (-2.8) mm wide, distinctly longer than wide.

6 Staminate peduncle (3-) 6-18 cm long, usually exceeding the uppermost spike by 2-12 cm; plants loosely colonial by long slender rhizomes .....
..... ***Carex louisianica***

6 Staminate peduncle 0.5-6 (-7) cm long, shorter than to exceeding the uppermost pistillate spike by < 2 cm; plants solitary or loosely cespitose in small clumps connected by stout, short rhizomes ..... ***Carex lupulina***

[26ss] Section 32 Rostrales - section *Rostrales (Folliculatae)*

1 Perigynia 6.4-10.7 mm long, 2.6-3.9× as long as wide ..... ***Carex turgescens***

1 Perigynia (8.3-) 10.5-15.6 mm long, 4-7× as long as wide.
..... ***Carex lonchocarpa***

[26tt] Section 33 Collinsiae - section *Collinsiae*

1 One species ..... ***Carex collinsii***

[26uu] Section 34 Squarrosae - section *Squarrosae*

1 Terminal spike usually entirely staminate; pistillate scales with an awn equaling or surpassing the perigynium; achenes 1.2-2.1 mm long.

2 Pistillate scales 0.4-0.9 (-1.1) mm wide, the body wide and translucent; staminate scales 0.9-1.6 mm wide, tightly imbricate in the spike; plants colonial, long-rhizomatous ..... ***Carex aureolensis***

2 Pistillate scales 0.1-0.4 mm wide, the body narrow and indistinct; staminate scales 0.3-0.8 mm wide, irregularly imbricate with spreading tips; plant cespitose, short-rhizomatous ..... ***Carex frankii***

1 Terminal spike gynecandrous, mainly pistillate; pistillate scales awnless, or with a short awn not surpassing the perigynium; achenes 2.0-3.0 mm long.

3 Achene 1.9-2.5× as long as wide; style persistent, strongly kinked at the base; spikes 1-2 (-3) per stem ..... ***Carex squarrosa***

3 Achene 1.2-1.9× as long as wide; style deciduous, straight or slightly curved; spikes (1-) 2-4 (-6) per stem ..... ***Carex typhina***

[26bbb] Section 39 Acrocystis - section *Acrocystis (Montanae)*

1 Primary culm accompanied by pistillate spikes borne on short or elongate peduncles from the same sheathed base (referred to as subradical or basal spikes).

2 Terminal staminate spikes alone or associated with a pistillate spike; lower pistillate scales acuminate, mostly exceeding the perigynium beak; perigynia lacking discernible papillae.
..... ***Carex umbellata***

2 Terminal staminate spikes usually with at least one approximate pistillate spike; lower pistillate scales acute, mostly shorter than the perigynium beak; perigynia distinctly papillate, at least at the base of the beak (except *C. deflexa*).
..... ***Carex austrodeflexa***

1 Primary culm solitary (i.e., lacking additional basal spikes originating from the same sheaths, excepting hybrids); however, some taxa may exhibit deceptively short individual culms (e.g., *C. emmonsii*, *C. nigromarginata*, *C. reznicekii*).

10 Body of the perigynium subglobose to obovoid, usually about as wide as long; achene angles broadly rounded.

11 Plants cespitose; leaves 0.9-4.7 mm wide; perigynium body pubescent, often with weak veins on the adaxial surface.
..... ***Carex communis***

11 Plants with long rhizomes, forming clonal patches; leaves 1.0-3.0 (-3.5) mm wide; perigynium body pubescent to nearly glabrous.

14 Beak of perigynium (0.8-) 1.3-2.0 (-2.4) mm long; perigynium body pubescent or nearly glabrous, with or without papillae.
..... ***Carex austrolucorum***

14 Beak of perigynium (0.2-) 0.5-0.9 (-1.3) mm long; perigynium body pubescent and papillate.
..... ***Carex species 7***

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

10 Body of the perigynium ellipsoid, distinctly longer than wide; achene angles narrow to slightly rounded.
18 Plants with conspicuously long rhizomes, forming clonal patches; perigynia typically papillate; [collectively of the Coastal Plain and, less commonly, Piedmont].
19 Achene body (1.1-) 1.2-1.3 (-1.4) mm long, trigonous; fertile culms 20-43 cm tall, equaling or exceeding the leaves; basal sheaths usually not fibrillose; pistillate scales (2.3-) 2.6-3.0 (-3.4) mm long ..... ***Carex albicans var. australis***
19 Achene body (1.4-) 1.5-1.7 (-2.0) mm long, biconvex, trigonous, or both; fertile culms 7-17 cm tall, usually much shorter than the leaves; basal sheaths usually very fibrillose; pistillate scales (2.7-) 3.0-3.7 (-4.2) mm long ..... ***Carex floridana***
18 Plants cespitose (sometimes loosely so from slender rhizomes in *C. novae-angliae* and *C. peckii*); perigynia papillae not evident to rather conspicuous; [collectively widespread in our area].
22 Achene body (1.3-) 1.4-1.6 (-1.7) mm long; fertile culms mostly 2-20 cm tall; pistillate scales 2.6-4.3 mm long.
23 Culms usually variable in length, (4.5-) 6.6-38 (-51) cm tall; widest leaf (1.9-) 2.3-4.5 mm wide; at least some pistillate scales often with reddish to purplish/black color below the distal tip extending laterally from near the margin to the green or brown longitudinal mid-stripe on either side of midvein ..... ***Carex nigromarginata***
23 Culms subequal in length, height 1.9–9.9 (–13.7) cm tall, widest leaf 1.2–2.2 (–2.5) mm wide; any reddish color on pistillate scales below the distal tip not extending laterally from near the margin to the green or brown longitudinal mid-stripe on either side of midvein ..... ***Carex reznicekii***
22 Achene body (0.9-) 1.2-1.3 (-1.5) mm long; fertile culms mostly 17-35 cm tall; pistillate scales 2.0-3.4 mm long. ..... ***Carex albicans var. albicans***

[26ddd] Section 41 Pictae - section *Pictae*

1 Plants monoecious, with 3-8 spikes per stem; leaf blades 4-8 mm wide, glaucous on the upper surface; [of the East Gulf Coastal Plain, east to sw. GA and Panhandle FL] ..... ***Carex baltzellii***
1 Plants dioecious, with a single unisexual spike per stem; leaf blades 2-4.5 mm wide, green on the upper surface; [of areas west of area, east to c. TN and nc. GA] ..... ***Carex picta***

[26ggg] Section 43 Albae - section *Albae*

1 One species ..... ***Carex eburnea***

[26kkk] Section 44 Phyllostachyae - section *Phyllostachyae*

3 Achenes subglobose, 1-1.5× as long as wide; staminate scales more or less truncate.
5 Longest (per plant) staminate portion of terminal spike (4.9-) 5.8-13.5 mm long; proximalmost staminate scale in terminal spike 1.1-1.8 (-2.1) mm long, 13-26 (-35)% of length of staminate portion of terminal spike; perigynium beaks (1.9-) 2.3-3.9 mm long, 39-53% of perigynium length; shoot bases lacking red-purple; [of rich mesic forests widespread in our area, especially VA] ..... ***Carex jamesii***
5 Longest (per plant) staminate portion of terminal spike 3.4-5.6 (-6.2) mm long; proximalmost staminate scale in terminal spike (1.9-) 2.1-3.3 mm long, (35-) 44-77% of length of staminate portion of terminal spike; perigynium beaks 1.4-2.3 (-2.5) mm long, 34-44% of perigynium length; shoot bases tinged with reddish-purple; [of c. TN and c. KY and westward] ..... ***Carex timida***
3 Achenes ellipsoid, 1.5-2.0× as long as wide; staminate scales obtuse to acute.
6 Tallest culm 0.18-0.38× as tall as plant; perigynia (7.0-) 7.5-10.8 mm long; perigynium beaks (3.6-) 4.1-6.4 mm long; culms erect; peduncles usually erect to spreading ..... ***Carex superata***
6 Tallest culm 0.41-0.87× as tall as plant; perigynia 4.5-8.0 mm long; perigynium beaks 1.7-4.3 mm long; culms erect to spreading; peduncles usually widely spreading to nodding.
7 Longest staminate portion of terminal spikes 12.7-25.6 mm long; perigynia 5.8-8.0 mm long; perigynium beaks 2.5-4.3 mm long; achenes (2.4-) 2.6-3.4 mm long ..... ***Carex basiantha***
7 Longest staminate portion of terminal spikes 4.9-5.7 (-6.5) mm long; perigynia 4.5-5.7 (-6.5) mm long; perigynium beaks 1.7-2.6 (-2.8) mm long; achenes 1.8-2.6 mm long ..... ***Carex willdenowii***

Carex abscondita Mackenzie. THICKET SEDGE. **Hab:** Bottomlands, other mesic forests, seepage swamps. **Dist:** MA south to Panhandle FL, west to TX and OK, and scattered inland. **Phen:** Apr-Jun. **Tax:** *C. abscondita* is highly variable and needs additional study. Notably, a second species, *C. magnifolia* Mackenzie, has sometimes been recognized. *C. magnifolia* differs morphologically from *C. abscondita* in its larger perigynia, longer leaves, and much more strongly glaucous leaves; it has a more southern distribution and occurs in wetter, boggier habitats in a more restricted range (NC to FL, and disjunct inland in Henderson Co. NC). Manhart (1984) found that *C. magnifolia* differed chemically from *C. abscondita*. Further study is needed to verify its taxonomic status. **Comm:** Naczi (1999b) reports a chromosome number of n = 24. **Syn:** = Ar, ETx1, FNA23, K1, K3, K4, Mo1, NcTx, NE, NY, Pa, Tn, Va, W, WH3; < *Carex abscondita* Mackenzie – C, G, RAB; > *Carex abscondita* Mackenzie – S, Mackenzie (1931-1935); > *Carex abscondita* var. *abscondita* – F; > *Carex abscondita* var. *rostellata* Fernald – F; > *Carex magnifolia* Mackenzie – S, Mackenzie (1931-1935).

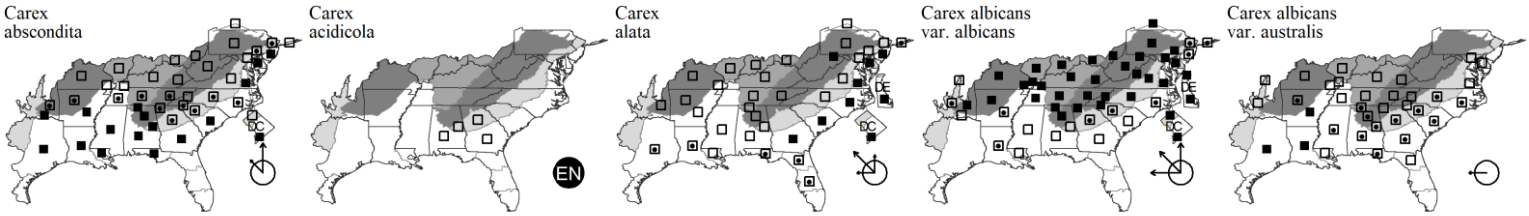
Carex acidicola Naczi. **Hab:** Mesic forests. **Dist:** Nc. GA and c. AL south to sw. GA (Naczi, Bryson, & Cochrane 2002). **Comm:** {*Griseae*}. **Syn:** = FNA23, K3, K4. NatureServe G2G3 (Imperiled).

Carex alata Torrey. BROAD-WINGED SEDGE. **Hab:** Bottomland forests, beaver ponds, oligohaline tidal marshes, other freshwater marshes, depression ponds. **Dist:** NH, MI, and MO south to c. peninsular FL and TX. **Phen:** May-Jun. **Syn:** = Ar, C, ETx1, F, FNA23, G, GW1, K1, K3, K4, Mi, Mo1, NE, NY, Pa, RAB, Tn, Tx, Va, W, WH3; < *Carex alata* Torrey – S.

Carex albicans Willdenow ex Sprengel *var.* ***albicans***. WHITE-TINGED SEDGE, ARCHITECTURAL SEDGE. **Hab:** Dry woodlands, forests, and clearings. **Dist:** ME west to IL, and OK, south to DE, NC, SC, n. GA (Jones & Coile 1988), TN, and MO. **Phen:** Apr-May. **Syn:** = Ar, C, FNA23, K1, K3, K4, Mi, Mo1, NE; = *Carex albicans* – NY, Pa, Tn, Va; = *Carex artitecta* Mackenzie – GrPl, RAB, W, Mackenzie (1931-1935); = *Carex nigro-marginata* Schweinitz var. *muhlenbergii* (A. Gray) Gleason – G; > *Carex artitecta* var. *subtilirostris* F.J. Hermann – F; < *Carex varia* Muhlenberg ex Willdenow – S.

Carex albicans Willdenow ex Sprengel *var.* ***australis*** (L.H. Bailey) J. Rettig. SOUTHERN WHITE-TINGED SEDGE, BELLOW'S-BEAK SEDGE. **Hab:** Dry woodlands. **Dist:** Se. VA south to ne. FL and FL Panhandle, west to AR, OK, TX, and Mexico. **Phen:** Apr-May. **Syn:** = Ar, ETx1, FNA23, K1, K3,

K4, Mo1, NcTx, WH3; = *Carex emmonsii* Dewey ex Torrey var. *muhlenbergii* (A. Gray) J. Rettig – Rettig (1989a); = *Carex physorhyncha* Liebmann ex Steudel – F, RAB, S, Tn, Tx, Va, W, Mackenzie (1931-1935), misapplied.



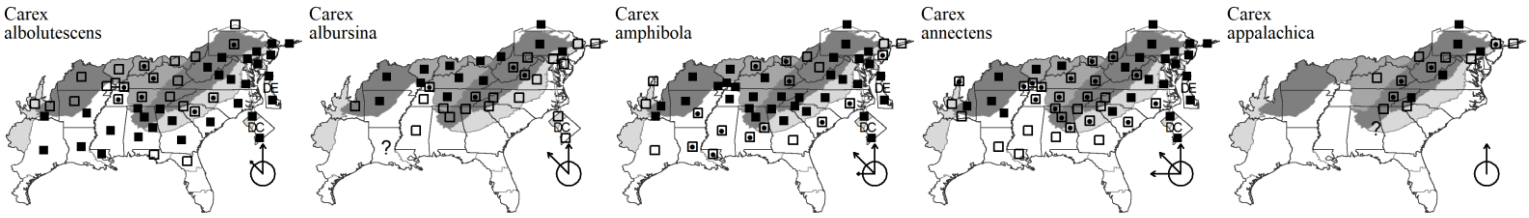
Carex albolutescens Schweinitz. GREENISH-WHITE SEDGE. **Hab:** Low fields, bottomlands. **Dist:** MA, NY, WI, and MO, south to Panhandle FL and TX. **Phen:** May-Jun. **Syn:** = Ar, C, ETx1, F, FNA23, GrPl, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, Tn, Tx, Va, WH3; < *Carex albolutescens* Schweinitz – G, GW1, RAB, W.

Carex albursina E. Sheldon. WHITE BEAR SEDGE. **Hab:** Nutrient-rich cove forests (and less commonly in drier forests), over mafic or calcareous rocks. **Dist:** VT and s. QC west to MN, south to SC (P. McMillan pers. comm. 2003, specimen at CLEMS), nw. GA, MS (Dorey & Bryson 2016), and AR. **Phen:** Apr-Jun. **Comm:** Naczi (1999b) reports a chromosome number of n = 22. **Syn:** = Ar, C, F, FNA23, GrPl, K1, K3, K4, Mi, Mo1, NE, NY, Pa, RAB, S, Tn, Va, W, Mackenzie (1931-1935); = *Carex laxiflora* var. *latifolia* F. Boott – G. NatureServe G5 (Secure).

Carex amphibola Steudel. EASTERN NARROWLEAF SEDGE. **Hab:** Moist loamy forests, bottomlands, slopes, uplands. **Dist:** MA, s. ON, MI, IL, MO, and OK, south to GA, AL, MS, LA, and TX. **Phen:** May-Jun. **Syn:** = Ar, ETx1, FNA23, G, K3, K4, Mi, Mo1, NE, NY, Pa, RAB, S, Tn, Va, Mackenzie (1931-1935); = *Carex amphibola* var. *amphibola* – F, K1, Ward (2012a); < *Carex amphibola* Steudel – GW1, Tx.

Carex annectens (E.P. Bicknell) E.P. Bicknell. YELLOW-FRUITED SEDGE. **Hab:** Marshes, bottomland forests, drier forests and woodlands. **Dist:** S. ME west to MN, south to FL and TX. **Phen:** Jul-Aug. **Comm:** See Cusick (1996). **Syn:** = Ar, ETx1, FNA23, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Va, W; = *Carex vulpinoidea* var. *ambigua* – C; > *Carex annectens* (E.P. Bicknell) E.P. Bicknell – Mackenzie (1931-1935); > *Carex annectens* var. *annectens* – F, G, GrPl, Mo1; > *Carex annectens* (E.P. Bicknell) E.P. Bicknell var. *xanthocarpa* (Kükenthal) Wiegand – F, G, GrPl, Mo1; > *Carex brachyglossa* Mackenzie – Mackenzie (1931-1935); < *Carex vulpinoidea* Michaux – GW1, Tx, WH3.

Carex appalachica J.M. Webber & P.W. Ball. APPALACHIAN SEDGE. **Hab:** Dry to mesic forests, rock outcrops. **Dist:** ME and ON south to w. SC, n. GA, and e. TN. **Phen:** May-Jun. **Comm:** First reported for South Carolina by Hill & Horn (1997) and Gaddy (2014). **Syn:** = C, FNA23, K1, K3, K4, NE, NY, Pa, Tn, Va; = *Carex radiata* (Wahlenberg) Small – F, S, Mackenzie (1931-1935), misapplied; < *Carex rosea* Schkuhr ex Willdenow – G, RAB, W.



Carex atlantica L.H. Bailey. PRICKLY BOG SEDGE. **Hab:** Bogs and seepages. **Dist:** NS west to MI and nw. IN, south to ne. FL, Panhandle FL, and e. TX. **Phen:** May-Jun. **Tax:** Reznicek & Ball (1980) found the distinction of *C. incomperta* from *C. atlantica* to be untenable. Intermediates between *C. atlantica* and *C. howei* (often treated as *C. atlantica* ssp. *capillacea*) occur in portions of their ranges, especially in the southern Coastal Plain. In most other areas they are sharply distinct, and sometimes grow together (as in the mountains of our area and farther north) with no evidence of intergradation or hybridization. I prefer to treat them at the species level. **Syn:** = GW1, Va; = *Carex atlantica* ssp. *atlantica* – Ar, FNA23, K1, K3, K4, Mi, Mo1, NE, NY, Pa, Tn, WH3; = *Carex atlantica* var. *atlantica* – C, ETx1; < *Carex atlantica* L.H. Bailey – Tx; > *Carex atlantica* L.H. Bailey – F, G, RAB, S, W, Mackenzie (1931-1935); > *Carex incomperta* E.P. Bicknell – F, G, RAB, S, W, Mackenzie (1931-1935).

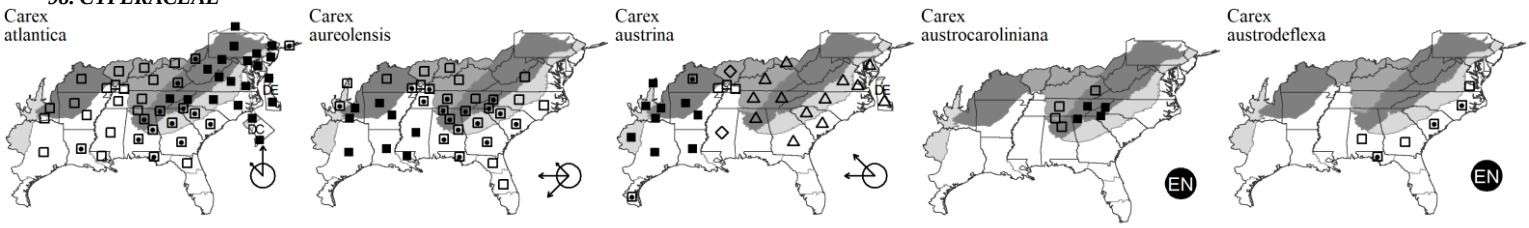
Carex aureolensis Steudel. SOUTHERN FRANK'S SEDGE, BROAD-SCALED SEDGE, GOLDEN CATTAIL SEDGE. **Hab:** Floodplain forests and marshes. **Dist:** VA, KY, IL, and NE south to n. peninsular FL, Panhandle FL, TX, NM, Coahuila, and Nuevo León; South America. **Phen:** May-Jul. **ID Notes:** Recognizably different in gestalt from *Carex frankii* by its more rhizomatous habit and obviously smaller and less "bristly" spikelets (the pistillate scales often shorter than the spikelets, so fewer things "sticking out"). **Syn:** = Ar, FNA23, K4, Tn; < *Carex frankii* Kunth – C, ETx1, F, G, GW1, K1, K3, RAB, S, Tx, W, WH3, Mackenzie (1931-1935).

Carex austrina Mackenzie. SOUTHERN SEDGE. **Hab:** Dry calcareous prairies, meadows, and forests, also roadsides, apparently introduced eastwards with hay and/or seed mixes used for erosion control. **Dist:** Native from IA and NE south to LA and TX; more eastern occurrences are at least in part introduced. **Phen:** May. **Comm:** First reported for areas east of the Mississippi by Bryson et al. (1996). Reported for DE (Longbottom, Naczi, & Knapp 2016). **Syn:** = Ar, ETx1, F, FNA23, K1, K3, K4, Mo1, NcTx, Tn, Mackenzie (1931-1935); = *Carex muhlenbergii* var. *australis* Olney – C, G, GrPl; < *Carex muhlenbergii* – S, Tx. NatureServe G4? (Apparently Secure).

Carex austrocaroliniana L.H. Bailey. SOUTH CAROLINA SEDGE. **Hab:** Nutrient-rich, moist coves in the sw. mountains of NC and adjacent SC, often with some seepage. **Dist:** Endemic to the southern end of the Southern Appalachians, in the Blue Ridge of sw. NC, ne. SC, n. GA, and e. TN, extending west to the Cumberland Plateau of TN. **Phen:** Apr-May. **Comm:** Naczi (1999b) reports a chromosome number of n = 28-30. **Syn:** = FNA23, K1, K3, K4, Tn, W; = *Carex austro-caroliniana* – RAB, S, Mackenzie (1931-1935), orthographic variant. NatureServe G4 (Apparently Secure).

Carex austrodeflexa P.D. McMillan, Sorrie, & van Eerden. CANEBRAKE SEDGE. **Hab:** Canebrakes and acid swamps. **Dist:** Coastal Plain, from se. VA to Panhandle FL, west to s. AL; apparently disjunct in w. LA. **Phen:** Feb-May. **Comm:** See Sorrie et al. (2011) for additional, more detailed information. **Syn:** = K3, K4, Va, Sorrie et al (2011); < *Carex novae-angliae* Schweinitz – FNA23, K1.

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



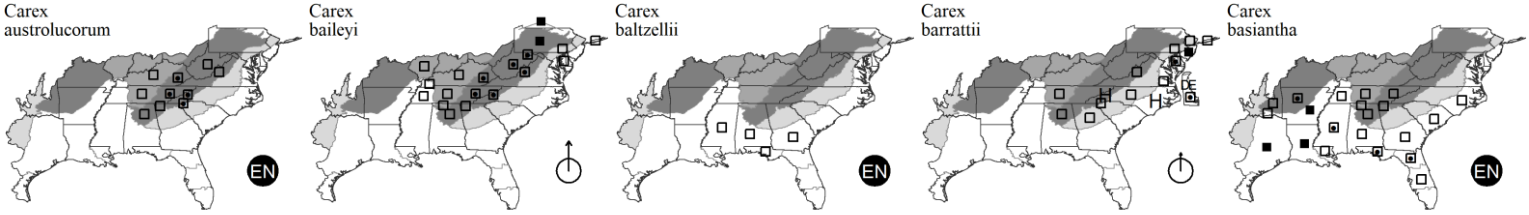
Carex austrolucorum (J. Rettig) D.B. Poindexter & Naczi. APPALACHIAN WOODLAND SEDGE. **Hab:** Xeric to mesic wooded slopes, usually in oak forests and northern hardwood forests. **Dist:** Sw. VA, s. WV, e. KY south to nw. SC, n. GA and ne. AL. **Phen:** Apr-May. **Tax:** See Poindexter and Naczi (2014) for additional, more detailed information. **Syn:** = Poindexter & Naczi (2014); = *Carex lucorum* Willdenow ex Link var. *austrolucorum* J. Rettig – FNA23, K1, K3, Tn, Va, Rettig (1989a); < *Carex lucorum* Willdenow ex Link – C, S, Mackenzie (1931-1935); < *Carex pensylvanica* Lamarck – W; < *Carex pensylvanica* Lamarck var. *distans* Peck – F, G, RAB, misapplied as to our plants.

Carex baileyi Britton. BAILEY'S SEDGE. **Hab:** Bogs, seeps. **Dist:** NH south to KY, NC, and TN, primarily Appalachian. **Phen:** Jun-Jul. **Syn:** = C, F, FNA23, G, K1, K3, K4, NE, NY, Pa, RAB, S, Tn, Va, Mackenzie (1931-1935). NatureServe G4 (Apparently Secure).

Carex baltzellii Chapman. BALTZELL'S SEDGE. **Hab:** Steepheads, beech-magnolia slopes, and mesic to dry-mesic hammocks. **Dist:** Sw. GA and Panhandle FL west to s. AL and s. MS. **Syn:** = FNA23, K1, K3, K4, S, WH3, Mackenzie (1931-1935). NatureServe G3 (Vulnerable).

Carex barrattii Schweinitz & Torrey. BARRATT'S SEDGE. **Hab:** Peaty bogs and marshes, especially in depression ponds, depression swamps, and sinkhole ponds. **Dist:** CT south to NC (at least formerly), on the Coastal Plain, and disjunct inland in places with many Coastal Plain affinities, as in w. VA (Augusta County), sw. NC (Henderson County, where now apparently extirpated), nw. SC, sc. TN (Coffee and Warren counties), n. GA, and n. AL. Reported for South Carolina by Hill & Horn (1997) and Horn (1999). **Phen:** Apr-May. **Comm:** This species flowers and fruits rarely. **Syn:** = C, F, FNA23, G, K1, K3, K4, NE, NY, Pa, RAB, S, Tn, Va, W, Mackenzie (1931-1935). NatureServe G4 (Apparently Secure).

Carex basiantha Steudel. SOUTHERN WILLDENOW'S SEDGE, WIDOW SEDGE. **Hab:** Mesic forests, bottomlands, and lower slopes, over calcareous rocks or sediments. **Dist:** Se. NC south to n. peninsular FL, Panhandle FL, west to e. TX, and north to nw. GA, c. TN, and c. AR. **Phen:** Apr-Jun. **Syn:** = Ar, ETx1, FNA23, K1, K3, K4, NcTx, Tn, WH3; < *Carex willdenovii* – S, Tx, orthographic variant; < *Carex willdenowii* Schkuhr ex Willdenow – RAB.



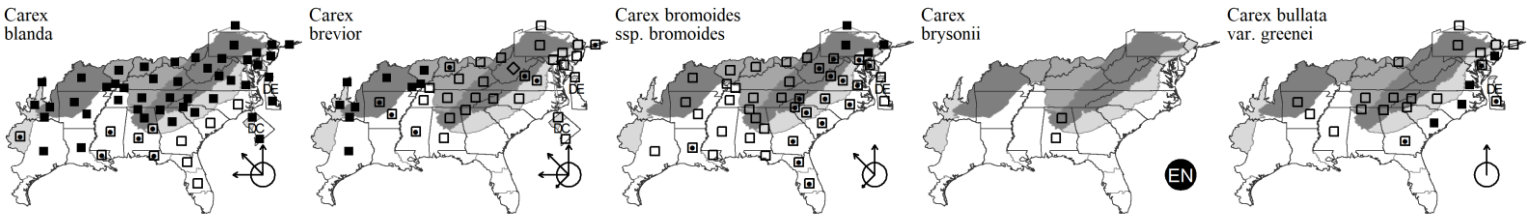
Carex blanda Dewey. EASTERN WOODLAND SEDGE, CHARMING SEDGE. **Hab:** Cove forests, bottomlands, and other mesic, nutrient-rich forests. **Dist:** ME and s. QC west to ND, south to c. GA (Jones & Coile 1988), n. peninsular FL, Panhandle FL, and TX. **Phen:** Apr-Jun. **Tax:** Naczi (1999b) reports chromosome numbers of n = 15-18. **Syn:** = Ar, C, ETx1, F, FNA23, GrPl, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, Mackenzie (1931-1935); = *Carex laxiflora* var. *blanda* (Dewey) F. Boott – G. NatureServe G5 (Secure).

Carex brevior (Dewey) Mackenzie ex Lunell. SHORTBEAK SEDGE. **Hab:** Prairies, dry forests, and woodland margins. **Dist:** ME west to BC, south to n. GA, c. TN, MS, TX, Tamaulipas, and AZ. **Phen:** May-Jun. **Syn:** = Ar, ETx1, F, FNA23, G, GrPl, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, Tn, W; < *Carex brevior* (Dewey) Mackenzie ex Lunell – C; < *Carex festucacea* Schkuhr ex Willdenow – GW1, RAB; < *Carex reniformis* (L.H. Bailey) Small – Tx.

Carex bromoides Willdenow *ssp*. ***bromoides***. COMMON BROME SEDGE. **Hab:** Swamp forests, bogs, seeps, hydric hammocks, other wetlands, often associated with base-rich soils. **Dist:** Ssp. *bromoides* ranges from NB west to e. MN, south to c. peninsular FL and e. TX; disjunct in s. Mexico. **Phen:** Feb-Jul. **Comm:** Naczi (1999b) reports a chromosome number of n = 32-34. **Syn:** = Ar, FNA23, K1, K3, K4, Mo1, NE, NY, Tn, Va; = *Carex bromoides* var. *bromoides* – Pa; < *Carex bromoides* – C, ETx1, F, G, GW1, Mi, RAB, S, W, WH3, Mackenzie (1931-1935). NatureServe G5T5 (Secure).

Carex brysonii Naczi. BRYSON'S SEDGE. **Hab:** Mesic forests. **Dist:** Endemic to the Cumberland Plateau and adjacent Coastal Plain of n. AL (falsely reported for MS). **Comm:** See Naczi (1993) for additional information. **Syn:** = FNA23, K1, K3, K4, Naczi (1993).

Carex bullata Schkuhr ex Willdenow *var*. ***greenei*** (Boeckeler) Fernald. GREENE'S SEDGE. **Hab:** Highly acidic wetlands, primarily in the Coastal Plain. **Dist:** NS south to e. GA, with scattered outliers inland, as in OH, w. NC, ne. TN, Eastern Highland Rim of TN, ne. MS, and AR. **Phen:** May-Jun. **Tax:** See Poindexter & Weakley (2018b) for detailed discussion. **Syn:** = Poindexter & Weakley (2018b) in Weakley et al (2018a); = *Carex bullata* var. *greenii* – G, K4, orthographic variant; < *Carex bullata* Schkuhr ex Willdenow – Ar, C, F, FNA21, GW1, K1, K3, NE, NY, Pa, S, Tn, Va.



Carex bushii Mackenzie. BUSH'S SEDGE. **Hab:** Moist to wet (rarely dry) prairies, meadows, fields, and alluvial areas, usually in moderately to strongly base-rich soils. **Dist:** MA and s. NY west to MO and KS, south to NC, sw. NC (Bradley et al. [in prep.]), GA (Jones & Coile 1988), MS, and TX; disjunct in MI. **Phen:** May-Jun. **Syn:** = Ar, C, ETx1, F, FNA23, G, GrPl, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, Mackenzie (1931-1935). NatureServe G4 (Apparently Secure).

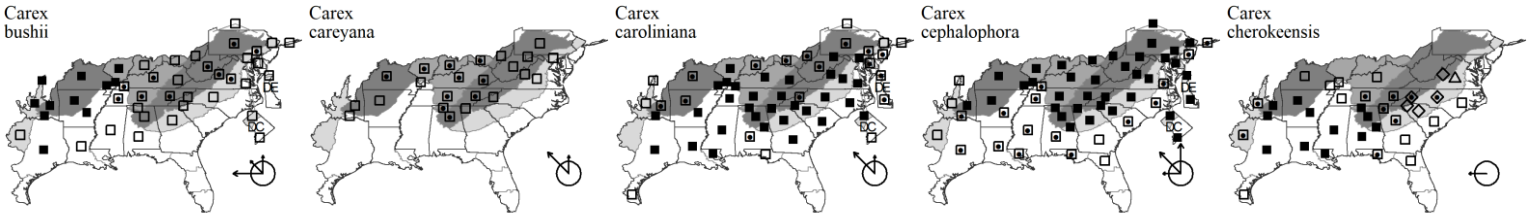
Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Carex careyana Torrey ex Dewey. CAREY'S SEDGE. **Hab:** Nutrient-rich moist forests, mostly over calcareous rocks. **Dist:** NY west to MI and IA, south to sw. NC, AL and MO. **Phen:** May-Jun. **Comm:** Naczi (1999b) reports a chromosome number of n = 34. **Syn:** = Ar, C, F, FNA23, G, K1, K3, K4, Mi, Mo1, NY, Pa, Tn, Va, W, Mackenzie (1931-1935). NatureServe G4G5 (Apparently Secure).

Carex caroliniana Schweinitz. CAROLINA SEDGE. **Hab:** Floodplain forests, depression swamps, less commonly in mesic to dry-mesic forests. **Dist:** NJ, PA, MO, and OK south to SC, e. GA, and TX; apparently disjunct in Panhandle FL and adjacent sw. GA. **Phen:** Apr-Jun. **Syn:** = Ar, C, ETx1, F, FNA23, G, GrPl, GW1, K1, K3, K4, Mo1, NcTx, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, Mackenzie (1931-1935). NatureServe G5 (Secure).

Carex cephalophora Muhlenberg ex Willdenow. OVAL-LEAVED SEDGE. **Hab:** Mesic to dry forests, especially oak-hickory forests. **Dist:** ME west to MN, south to Panhandle FL and TX. **Phen:** (Late Mar-) May-Jul. **Syn:** = Ar, ETx1, F, FNA23, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, S, Tn, Mackenzie (1931-1935); = *Carex cephalophora* var. *cephalophora* – C, G, GrPl; < *Carex cephalophora* Muhlenberg ex Willdenow – RAB, Tx, W, WH3.

Carex cherokeensis Schweinitz. CHEROKEE SEDGE, WOLFTAIL SEDGE. **Hab:** Predominantly in moist, rich, calcareous or subcalcareous forests, though introduced populations are not restricted to such settings. **Dist:** Se. NC, nw. SC, sw. NC, nc. TN, se. MO, and OK, south to n. peninsular FL, Panhandle FL, and west to e. TX and se. OK; disjunct in the Mountains of VA, where perhaps introduced (Belden et al. 2004). **Phen:** Apr-Jun. **Syn:** = Ar, ETx1, FNA23, G, GW1, K1, K3, K4, Mo1, NcTx, RAB, S, Tn, Tx, Va, W, WH3, Mackenzie (1931-1935). NatureServe G4G5 (Apparently Secure).



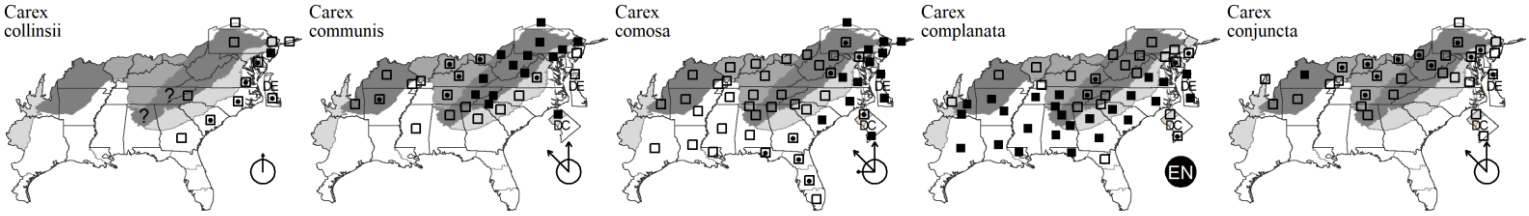
Carex collinsii Nuttall. COLLINS'S SEDGE. **Hab:** White cedar (*Chamaecyparis*) bogs, pocosins, and sphagnous, seepage-fed streamhead swamps in the Coastal Plain, bogs in the southwest mountains of NC (where associated with other Coastal Plain disjuncts), usually growing in *Sphagnum*. **Dist:** RI to wc. GA on the Coastal Plain, disjunct in the mountains of nw. NJ, PA, sw. NC, and possibly TN (Chester et al. 1993). **Phen:** Jun-Jul. **Comm:** *C. collinsii* is a very distinctive species; the slender perigynia teeth are reflexed 180 degrees (thus appressed back against the perigynium). **Syn:** = C, F, FNA23, G, K1, K3, K4, NE, NY, Pa, RAB, S, Tn, Va, W, Mackenzie (1931-1935); = *Carex collinsiae* – GW1, orthographic error. NatureServe G4 (Apparently Secure).

Carex communis L.H. Bailey. FIBROUS-ROOTED SEDGE. **Hab:** Dry woodlands and forests, bluffs, rich forests, streambanks. **Dist:** PE west to MN, south to n. SC, c. GA (Jones & Coile 1988), and AR. **Phen:** May-Jun. **Tax:** *Carex amplisquama* F.J. Hermann was originally described to include plants with longer beak teeth and pistillate scales than typical *C. communis*. Despite considerable cytogenetic and morphological variation with this species, current molecular sampling across its range does not reveal significant patterns that would justify taxonomic recognition of segregate taxa. Additional study is needed. **Syn:** = C, F, G, Mi, RAB, S, Tn, Va, Mackenzie (1931-1935); > *Carex amplisquama* F.J. Hermann – W; > *Carex communis* L.H. Bailey – W; > *Carex communis* L.H. Bailey var. *amplisquama* (F.J. Hermann) J. Rettig – FNA23, K1, K3, K4; > *Carex communis* var. *communis* – Ar, FNA23, K1, K3, K4, Mo1, NE, NY, Pa.

Carex comosa F. Boott. BOTTLEBRUSH SEDGE, BRISTLY SEDGE. **Hab:** Tidal freshwater and oligohaline marshes, tidal and alluvial swamps, calcareous spring marshes, beaver wetlands, and ditches and other wet disturbed areas. **Dist:** QC west to MN, south to s. FL, LA, se. OK (Hoagland & Buthod 2012), and ne. TX; also in w. North America. **Phen:** Apr-Jun. **Syn:** = Ar, C, ETx1, F, FNA23, G, GrPl, GW1, K1, K3, K4, Mi, Mo1, NE, NY, Pa, RAB, S, Tn, Va, W, WH3, Mackenzie (1931-1935). NatureServe G5 (Secure).

Carex complanata Torrey & Hooker. HIRSUTE SEDGE. **Hab:** Bottomland forests and swamps, depression swamps, drier barrens. **Dist:** NJ and s. PA south to n. peninsular FL and Panhandle FL, west to TX and MO; apparently disjunct in AZ. **Phen:** May-Jun. **Syn:** = ETx1, F, FNA23, GrPl, K1, K3, K4, Mo1, NcTx, S, Tn, Tx, Va, Mackenzie (1931-1935); = *Carex complanata* var. *complanata* – C, G; < *Carex complanata* Torrey & Hooker – GW1, RAB, W, WH3, (also see C. hirsutella).

Carex conjuncta F. Boott. SOFT FOX SEDGE. **Hab:** Well-drained floodplain forests, mesic to dry-mesic upland forests over mafic or calcareous rocks. **Dist:** NY, NJ, MN, and SD, south to VA, sc. TN, n. AL, and AR. **Phen:** May-Jul. **Syn:** = Ar, C, F, FNA23, G, GrPl, K1, K3, K4, Mi, Mo1, NY, Pa, Tn, Va, W, Mackenzie (1931-1935). NatureServe G4G5 (Apparently Secure).



Carex copulata (L.H. Bailey) Mackenzie. SPREADING SEDGE. **Hab:** Rich, mesic forests of floodplains and slopes. **Dist:** PA, ON, and WI south to NC, n. AL, and AR. **Phen:** Apr-Jun. **Tax:** *C. copulata*, has sometimes been considered the hybrid *C. digitalis* × *laxiculmis*; alternatively a variety of *C. laxiculmis*. Naczi (1999b) reports chromosome numbers for the two varieties, n= 22, 23, 25 for "*laxiculmis*", and n = 23-24 for "*copulata*"; normal pairing further suggests that var. *copulata* is not a hybrid. **Syn:** = *Carex* ×*copulata* (L.H. Bailey) Mackenzie – F, Mackenzie (1931-1935); = *Carex laxiculmis* var. *copulata* (L.H. Bailey) Fernald – Ar, FNA23, K1, Mi, NY, Pa, Tn, Va; < *Carex laxiculmis* Schweinitz – G, K3, K4, RAB, S, W. NatureServe G5T4 (Apparently Secure).

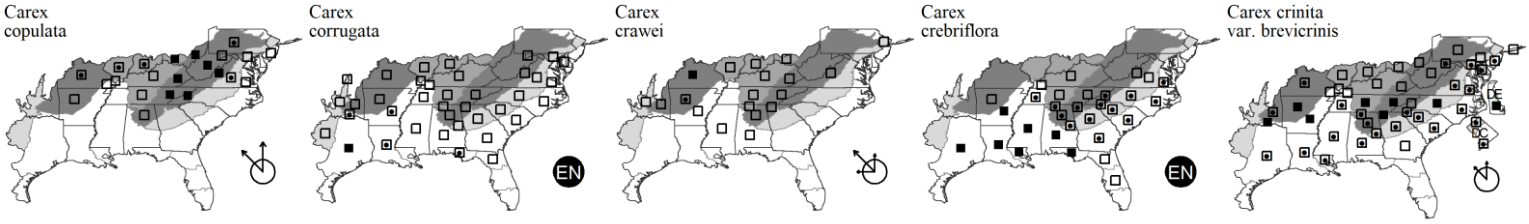
Carex corrugata Fernald. PRUNE-FRUITED SEDGE. **Hab:** Large-stream and river bottomlands, wet calcareous forests. **Dist:** Se. VA, KY, and s. OH south to Panhandle FL and AL, west to TX. **Phen:** May-Jun. **Comm:** See Hill (1992). **Syn:** = Ar, ETx1, F, FNA23, K1, K3, K4, Mo1, NcTx, Tn, Va, WH3; < *Carex amphibola* Steudel – GW1, Tx; < *Carex grisea* Wahlenberg – G, RAB, S, Mackenzie (1931-1935).

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Carex crawei Dewey. CRAWE'S SEDGE. **Hab:** Calcareous barrens, usually in gravelly areas with ephemeral or periodic seepage. **Dist:** QC west to BC, south to NJ, w. VA, c. TN, AL, AR, OK, CO, and AZ. First reported for VA by Ludwig (1999). **Tax:** Naczi (1999b) reports a chromosome number of n = 30. **Syn:** = Ar, C, F, FNA23, G, GrPl, K1, K3, K4, Mi, Mo1, NE, NY, S, Tn, Va, Mackenzie (1931-1935). NatureServe G5 (Secure).

Carex crebriflora Wiegand. COASTAL PLAIN SEDGE. **Hab:** Bottomland and other nutrient-rich forests. **Dist:** VA, KY, and AR south to n. peninsular FL and Panhandle FL and TX. **Phen:** Apr-Jun. **Syn:** = Ar, C, ETx1, F, FNA23, G, K1, K3, K4, RAB, S, Tn, Va, W, WH3, Mackenzie (1931-1935). NatureServe G4 (Apparently Secure).

Carex crinita Lamarck *var*. ***brevicrinis*** Fernald. SHORT-FRINGED SEDGE. **Hab:** Swamps, wet forests, and a wide range of other wetlands. **Dist:** MA south to FL, west to TX, north in the interior to KY and MO. **Phen:** May-Aug. **Syn:** = Ar, C, ETx1, F, FNA23, GrPl, K1, K3, K4, NcTx, NE, NY, Pa, Tn, Va; < *Carex crinita* – Mo1, S, Tx, W, Mackenzie (1931-1935); < *Carex crinita* Lamarck var. *crinita* – G, GW1, RAB.



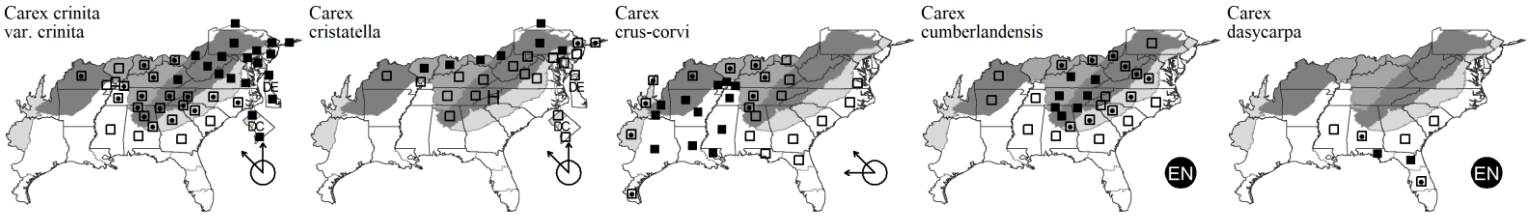
Carex crinita Lamarck *var*. ***crinita***. LONG-FRINGED SEDGE. **Hab:** Swamps, wet forests, bogs, and a wide range of other wetlands. **Dist:** NL (Newfoundland) west to MN and AB, south to GA, TN, and s. MO. **Phen:** Jun-Aug. **Syn:** = C, F, FNA23, GrPl, K1, K3, K4, NE, Pa, Tn, Va; < *Carex crinita* – Mi, Mo1, S, W, Mackenzie (1931-1935); < *Carex crinita* Lamarck var. *crinita* – G, GW1, NY, RAB. NatureServe G5T5 (Secure).

Carex cristatella Britton. CRESTED SEDGE. **Hab:** Grassy balds, fens, wet meadows, river shores, especially in calcareous or nutrient-rich alluvial soils. **Dist:** VT west to SK, south to w. NC, KY, MO, and KS. See Fox, Godfrey, & Blomquist (1952) for the first report from NC. **Phen:** May-Jun. **Syn:** = C, F, FNA23, G, GrPl, K1, K3, K4, Mi, Mo1, NE, NY, Pa, RAB, Va, W. NatureServe G5 (Secure).

Carex crus-corvi Shuttleworth ex Kunze. CROWFOOT SEDGE, RAVENFOOT SEDGE. **Hab:** Swamp forests, especially over calcareous substrates. **Dist:** Se. VA south to Panhandle FL, west to TX, north in the interior to IN, s. ON, MI, and MN. **Phen:** May-Jun. **Syn:** = Ar, C, ETx1, FNA23, G, GrPl, GW1, K1, K3, K4, Mi, Mo1, NcTx, RAB, S, Tn, Tx, Va, WH3, Mackenzie (1931-1935); > *Carex bayardii* Fernald – F; > *Carex crus-corvi* var. *crus-corvi* – F.

Carex cumberlandensis Naczi, Kral, & Bryson. CUMBERLAND SEDGE. **Hab:** Rich, mesic to dry, deciduous or mixed forests, especially over calcareous substrates. **Dist:** Sw. PA, s. OH, s. IL south to c. NC, c. SC, c. GA, sc. AL, e. MS, and w. TN; disjunct in nw. AR. **Phen:** May-Jul; Jun-Aug. **Syn:** = FNA23, K4, Tn, Va; < *Carex abscondita* Mackenzie – Ar, C, G, K1, K3, Pa, RAB, S, W, Mackenzie (1931-1935); < *Carex abscondita* var. *abscondita* – F.

Carex dasycarpa Muhlenberg. VELVET SEDGE. **Hab:** Maritime forests, hammocks, other sandy forests. **Dist:** E. SC south to n. peninsular FL, west to MS. Gaddy & Rayner (1980) report this species from a number of barrier islands in Beaufort and Charleston counties, SC; it has since been found in Georgetown County, SC, as well. **Phen:** May-Jun. **Syn:** = FNA23, K1, K3, K4, RAB, S, WH3, Mackenzie (1931-1935). NatureServe G4? (Apparently Secure).



Carex debilis Michaux. WHITE-EDGED SEDGE, WEAK SEDGE. **Hab:** Swamps, bogs, other moist to wet habitats. **Dist:** MA west to s. IN, south to n. peninsular FL, Panhandle FL, and TX. **Phen:** May-Aug. **Comm:** For other taxa often treated as varieties of *C. debilis*, see *C. allegheniensis* and *C. flexuosa*. **Syn:** = NcTx, S, Tn, Tx, Va, Mackenzie (1931-1935); = *Carex debilis* var. *debilis* – Ar, C, F, FNA23, G, K1, K3, K4, Mi, Mo1, NE, NY, Pa, RAB; < *Carex debilis* Michaux – ETx1, GW1, W, WH3.

Carex decomposita Muhlenberg. CYPRESS-KNEE SEDGE, EPIPHYTIC SEDGE. **Hab:** Blackwater swamp forests, often growing on cypress knees, cypress bases, or fallen logs (often at or near water level), river sloughs, beaver marshes, less typically inland in sloughs or in depressions in bedrock river scour. **Dist:** NY west to MI, south to sw. GA (Jones & Coile 1988), Panhandle FL, and TX; rarely disjunct inland from the Coastal Plain, especially in river sloughs or beaver marshes (Bradley et al. [in prep.]). **Phen:** Apr-Jul. **Comm:** See Gaddy & Rayner (1980). **Syn:** = Ar, C, ETx1, F, FNA23, G, GW1, K1, K3, K4, Mi, Mo1, NY, RAB, S, Tn, Tx, Va, WH3, Mackenzie (1931-1935). NatureServe G3G4 (Vulnerable).

Carex digitalis Willdenow *var*. ***digitalis***. SLENDER WOODLAND SEDGE. **Hab:** Mesic to dry forests. **Dist:** ME west to WI, south to FL and e. TX. **Phen:** Apr-Jun. **Comm:** Naczi (1999b) reports a chromosome number of n = 24. **Syn:** = Ar, FNA23, K1, K3, K4, NE, NY, Tn, Va; < *Carex digitalis* – C, F, G, Mi, Mo1, Pa, RAB, S, Tx, W, WH3, Mackenzie (1931-1935). NatureServe G5T5 (Secure).

Carex digitalis Willdenow *var*. ***floridana*** (L.H. Bailey) Naczi & Bryson. SOUTHERN SLENDER WOODLAND SEDGE. **Hab:** Rich forests. **Dist:** MD south to FL, west to TX. **Phen:** Apr-Jun. **Tax:** Perhaps warranting species rank (C. Bryson, pers. comm., 2019). **Comm:** Naczi (1999b) reports a chromosome number of n = 24. **Syn:** = Ar, ETx1, FNA23, K3, K4, Va; = *Carex digitalis* var. *asymmetrica* Fernald – F, K1; < *Carex digitalis* – C, G, RAB, S, Tx, W, WH3, Mackenzie (1931-1935). NatureServe G5T4T5 (Apparently Secure).

Carex digitalis Willdenow *var*. ***macropoda*** Fernald. LONG-SPIKED SLENDER WOODLAND SEDGE. **Hab:** Moist to dry forests. **Dist:** PA and IL south to FL and TX. **Phen:** Apr-Jun. **Tax:** Perhaps warranting species rank (C. Bryson, pers. comm., 2019). **Comm:** Naczi (1999b) reports a chromosome number of n = 24. **Syn:** = Ar, ETx1, F, FNA23, K1, K3, K4, Tn, Va; = *Carex macropoda* (Fernald) Mohlenbrock – Il; < *Carex digitalis* – C, F, G, Mo1, Pa, RAB, S, Tx, W, WH3, Mackenzie (1931-1935). NatureServe G5TNR (Not Yet Ranked).

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more)

* : waif
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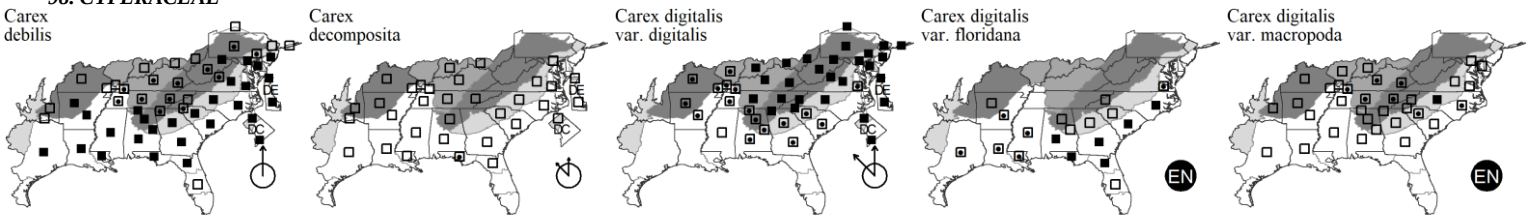


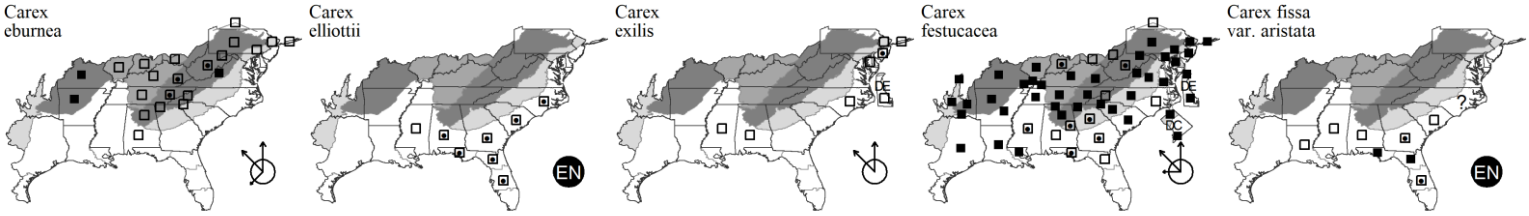
Carex eburnea F. Boott. EBONY SEDGE, BRISTLELEAF SEDGE. **Hab:** Calcareous cliffs, bluffs, and outcrops, westwards also in calcareous woodlands. **Dist:** NL (Newfoundland) west to AK, south to w. VA, w. NC, nw. SC, c. AL, n. AR, NE, s. AB, and s. BC; early reports of this species from TX are referable to *C. mckittrickensis* P.W. Ball. **Phen:** Apr-Aug. **Comm:** Locally abundant on limestone bluffs, easily recognized vegetatively by its wiry stems and leaves (ca. 0.5 mm wide). **Syn:** = Ar, C, F, FNA23, G, GrPl, K1, K3, K4, Mi, Mo1, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, Mackenzie (1931-1935). NatureServe G5 (Secure).

Carex elliottii Schweinitz & Torrey. ELLIOTT'S SEDGE. **Hab:** Bogs. **Dist:** E. NC south to c. pen. FL and west to s. AL. **Phen:** May-Jun. **Syn:** = FNA23, GW1, K1, K3, K4, RAB, S, WH3, Mackenzie (1931-1935). NatureServe G4? (Apparently Secure).

Carex exilis Dewey. MEAGER SEDGE, EXILED SEDGE. **Hab:** Peaty seepage bogs. **Dist:** NL (Newfoundland) and NL (Labrador) west to ON and n. MN, south to NJ, DE, MD, NY, n. MI, n. WI, and n. MN; disjunct southward in the Atlantic Coastal Plain of sc. NC and in the Gulf Coastal Plain of se. MS and sw. AL. The southern occurrences are remarkably disjunct from the Canadian, northern Coastal Plain, and Great Lakes distribution. **Phen:** May-Jun. **Syn:** = C, F, FNA23, G, K1, K3, K4, Mi, NE, NY, RAB, Mackenzie (1931-1935). NatureServe G5 (Secure).

Carex festucacea Schkuhr ex Willdenow. FESCUE SEDGE. **Hab:** Bottomland forests, depression ponds and swamps, wet meadows. **Dist:** VT west to MN, south to GA, Panhandle FL, AL, MS, LA, and TX. **Phen:** Apr-Jun. **Syn:** = Ar, C, ETx1, F, FNA23, GrPl, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, Tn, Va, WH3; < *Carex festucacea* Schkuhr ex Willdenow – G, GW1, RAB, W, (also see C. straminea).

Carex fissa Mackenzie *var*. ***aristata*** F.J. Hermann. HAMMOCK SEDGE. **Hab:** Wet pine savannas, roadside banks and ditches. **Dist:** Extreme se. SC (Jasper Co.), s. GA (Clinch County) (Carter, Baker, & Morris 2009; Sorrie 1998b) south to c. peninsular FL, west to FL Panhandle and s. MS (Bryson et al. 1996). **Comm:** Probably a species distinct from *C. fissa*. **Syn:** = FNA23, GW1, K1, K3, K4, WH3; < *Carex fissa* – Mackenzie (1931-1935). NatureServe G4?T4? (Apparently Secure).



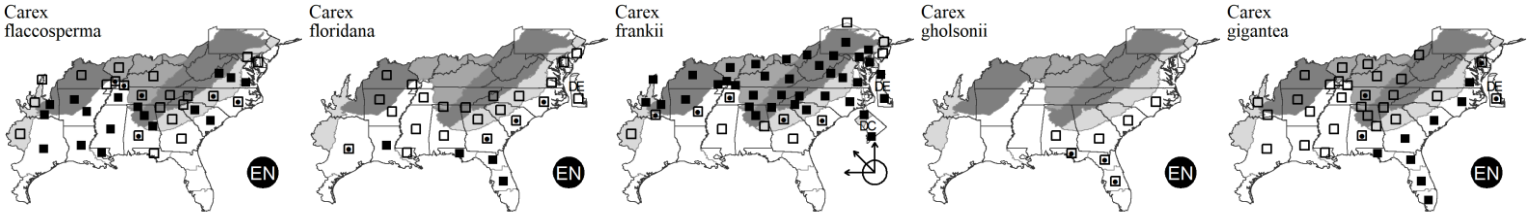
Carex flaccosperma Dewey. MEADOW SEDGE. **Hab:** Mesic forests, well-drained bottomlands. **Dist:** Se. VA south to Panhandle FL, west to TX, north in the interior to s. MO and IL. **Phen:** Mar-Jun. **Comm:** {distribution and abundance needing additional herbarium investigation}. **Syn:** = Ar, ETx1, FNA23, Il, K1, K3, K4, Mo1, NcTx, Tn, Va; = *Carex flaccosperma* var. *flaccosperma* – F, Ward (2012a); < *Carex flaccosperma* Dewey – C, G, GW1, RAB, S, Tx, WH3, Mackenzie (1931-1935). NatureServe G5TNR (Not Yet Ranked).

Carex floridana Schweinitz. FLORIDA SEDGE. **Hab:** Mesic hammocks, dry hammocks, maritime forests. **Dist:** S. NJ south to c. peninsular FL, west to TX. See McAvoy (2021) for discussion of the occurrence of this species in NJ, MD, DE, and VA. **Phen:** (Feb-) Mar-May. **Syn:** = FNA23, K1, K3, K4, S, Va, Mackenzie (1931-1935), Sorrie et al (2011); = *Carex nigromarginata* Schweinitz var. *floridana* (Schweinitz) Kükenthal – Ar, ETx1, F, Mo1, RAB, Tx, WH3. NatureServe G5? (Secure).

Carex frankii Kunth. FRANK'S SEDGE, CATTAIL SEDGE. **Hab:** Bottomland forests, other wet to moist forests and disturbed areas. **Dist:** W. NY and s. ON west to MI and se. NE, south to GA, AR, and OK. **Phen:** May-Jul. **Syn:** = Ar, FNA23, GrPl, K4, Mi, NY, Tn, Va; < *Carex frankii* Kunth – C, F, G, GW1, K1, K3, Mo1, NcTx, Pa, RAB, S, W, Mackenzie (1931-1935).

Carex gholsonii Naczi & Cochrane. GHOLSON'S SEDGE. **Hab:** Moist calcareous forests, especially marl flats and bottomlands over coquina. **Dist:** E. NC south to c. peninsular FL, west to s. AL. **Comm:** See Naczi, Bryson, & Cochrane (2002). **Syn:** = FNA23, K4, WH3; = *Carex granularis* var. *gholsonii* (Naczi & Cochrane) D.B. Ward – Ward (2012a); < *Carex granularis* Muhlenberg ex Willdenow – GW1, RAB, S.

Carex gigantea Rudge. GIANT SEDGE. **Hab:** Swamps, bottomland forests, cypress depressions. **Dist:** DE south to s. FL, west to e. TX, north in the interior to nw. GA (Jones & Coile 1988), IN and OK. **Phen:** Jun-Jul. **Syn:** = Ar, C, ETx1, F, FNA23, G, GW1, K1, K3, K4, Mo1, RAB, S, Tn, Tx, Va, WH3, Mackenzie (1931-1935). NatureServe G4 (Apparently Secure).



Carex glaucescens Elliott. BLUE SEDGE, SOUTHERN WAXY SEDGE. **Hab:** Blackwater swamps, pocosins, wet pine savannas, seepage bogs, depression ponds, pondcypress savannas, other acid and peaty situations. **Dist:** E. MD south to c. peninsular FL, west to e. TX and se. OK (Buthod & Hoagland 2013); disjunct in nw. GA (Jones & Coile 1988) and c. TN. **Phen:** May-Jun. **Syn:** = Ar, C, ETx1, F, FNA23, G, GW1, K1, K3, K4, RAB, S, Tn, Tx, Va, WH3, Mackenzie (1931-1935). NatureServe G4 (Apparently Secure).

Key to Map Symbology: □ native ◇ maybe exotic △ exotic ←rare ←uncommon ←common (see introduction for more)

* : waif EN : endemic H : historic

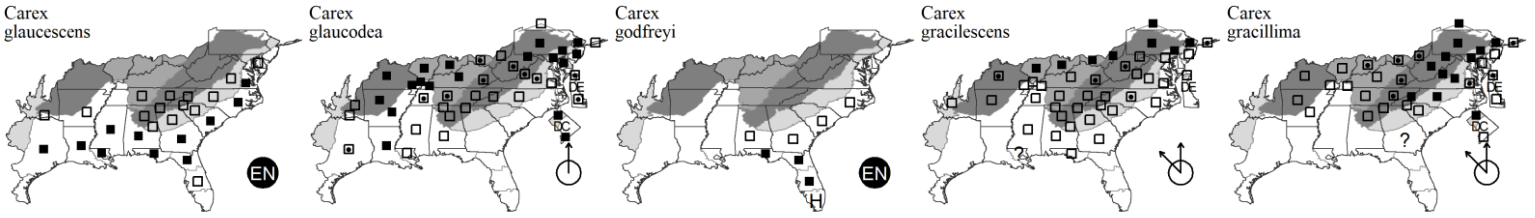
N : no P : planted ? : questionable X : extirpated

Carex glaucodea Tuckerman ex Olney. BLUE SEDGE. **Hab:** Prairies, upland woodlands, especially in hardpan situations with alternating wet and dry conditions. **Dist:** MA and ON west to s. IN and MO, south to NC, sc. TN, and AR. **Phen:** May-Jun. **Comm:** {distribution and abundance needing additional herbarium investigation}. **Syn:** = Ar, ETx1, FNA23, K1, K3, K4, Mo1, NcTx, NE, NY, Pa, Tn, Va; < *Carex flaccosperma* Dewey – C, GW1, RAB, Tx; < *Carex flaccosperma* Dewey var. *glaucodea* (Tuckerman ex Olney) Kükenthal – F; < *Carex glaucodea* Tuckerman ex Olney – G, S, Mackenzie (1931-1935). NatureServe G5T5 (Secure).

Carex godfreyi Naczi. GODFREY'S SEDGE. **Hab:** Calcareous swamps and bottomlands. **Dist:** Se. NC south to se. GA, c. peninsular FL south to Martin County (FL), and west to Panhandle FL, sw. GA, and s. AL. **Phen:** May-Jun. **Comm:** See Naczi (1993) for additional information. **Syn:** = FNA23, K1, K3, K4, WH3, Naczi (1993); = *Carex amphibola* var. *godfreyi* (Naczi) D.B. Ward – Ward (2012a); < *Carex amphibola* Steudel – GW1; < *Carex grisea* Wahlenberg – RAB, S, Mackenzie (1931-1935).

Carex gracilescens Steudel. SLENDER LOOSE-FLOWERED SEDGE. **Hab:** Moist, nutrient-rich forests, calcareous hammocks. **Dist:** VT and s. QC west to WI, south to SC, AL, LA, and e. TX; disjunct in sw. GA and Panhandle FL. **Phen:** May-Jun. **Comm:** Naczi (1999b) reports a chromosome number of n = 17, 19, 20. **Syn:** = Ar, F, FNA23, GrPl, K1, K3, K4, Mi, Mo1, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, Mackenzie (1931-1935); = *Carex laxiflora* var. *gracillima* F. Boott – G; < *Carex gracilescens* Steudel – C, (also see C. ormostachya).

Carex gracillima Schweinitz. GRACEFUL SEDGE. **Hab:** Moist ravine and slope forests, floodplains of rivers and large creeks. **Dist:** NL (Newfoundland) west to MB, south to SC (Gaddy et al. 1984), n. GA, AL, and n. AR. **Phen:** Apr-Jun. **Syn:** = Ar, C, FNA23, G, K1, K3, K4, Mi, Mo1, NE, NY, Pa, RAB, Tn, Va, W, Mackenzie (1931-1935); > *Carex gracillima* var. *gracillima* – F. NatureServe G5 (Secure).



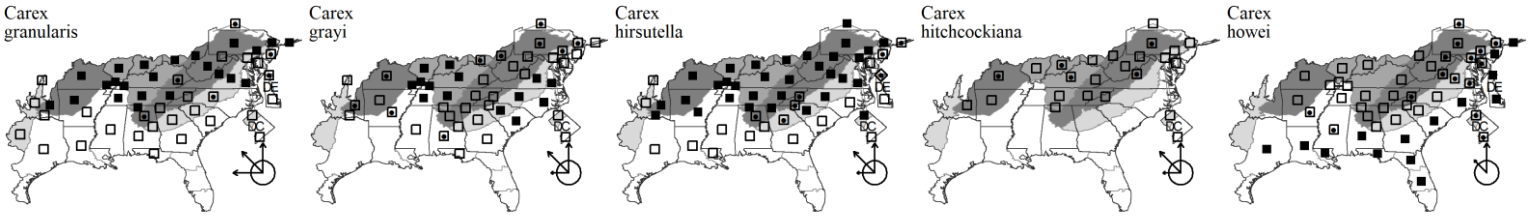
Carex granularis Muhlenberg ex Willdenow. LIMESTONE MEADOW SEDGE, CORNCOB SEDGE. **Hab:** Moist, nutrient-rich forests, especially bottomlands, mostly over calcareous rocks (limestone, dolostone, coquina limestone) or mafic rocks (diabase). **Dist:** ME and QC west to SK, south to GA, FL (Ward 2021), OK, and ne. TX. **Phen:** May-Jun. **Tax:** *C. haleana* Olney [= *C. granularis* var. *haleana* (Olney) Porter] is alleged to differ primarily in its more slender perigynia (1.0-1.5 mm wide vs. 1.5-2.5 mm) (see F and M for additional information). Here interpreted to include *C. haleana* Olney. Naczi (1999b) found little correlation between the morphological and cytological variability of *C. granularis*, and also little correlation of that variability with geography; he concluded that there was little support for recognition of infraspecific taxa. **Syn:** = Ar, C, ETx1, FNA23, G, K1, K3, K4, Mi, NcTx, NE, NY, Tn, Tx, Va, W; = *Carex granularis* var. *granularis* – Ward (2012a); < *Carex granularis* Muhlenberg ex Willdenow – GW1, RAB, S; > *Carex granularis* Muhlenberg ex Willdenow – Mackenzie (1931-1935); > *Carex granularis* var. *granularis* – F, GrPl, Mo1, Pa; > *Carex granularis* var. *haleana* (Olney) Porter – F, GrPl, Mo1, Pa; > *Carex haleana* Olney – Mackenzie (1931-1935).

Carex grayi Carey. GRAY'S SEDGE. **Hab:** Bottomland forests, tidal swamps. **Dist:** Sw. QC west to WI and IA, south to nw. GA and OK; disjunct in Panhandle FL. **Phen:** May-Jun. **Syn:** = Ar, C, FNA23, GrPl, K1, K3, K4, Mi, Mo1, NE, NY, Pa, RAB, Tn, Va, W, WH3; = *Carex asa-grayi* L.H. Bailey – S; = *Carex grayii* – G, GW1, Mackenzie (1931-1935), orthographic variant; > *Carex grayii* var. *grayii* – F; > *Carex grayii* var. *hispidula* A. Gray – F. NatureServe G4G5 (Apparently Secure).

Carex hirsutella Mackenzie. HAIRY-LEAVED SEDGE, FUZZY SEDGE. **Hab:** Dry-mesic oak-hickory forests, other mesic to dry forests, woodlands, and barrens. **Dist:** ME, s. ON, and IA, south to GA and ne. TX. **Phen:** May-Jun. **Syn:** = Ar, F, FNA23, GrPl, K1, K3, K4, Mi, Mo1, NE, NY, Pa, S, Tn, Va, Mackenzie (1931-1935); = *Carex complanata* Torrey & Hooker var. *hirsuta* (L.H. Bailey) Gleason – C, G; < *Carex complanata* Torrey & Hooker – GW1, RAB, W.

Carex hitchcockiana Dewey. HITCHCOCK'S SEDGE. **Hab:** Rich, moist to dry forests, especially over limestone, other calcareous, or mafic rocks. **Dist:** MA west to MN, south to NC, sc. TN, and AR. **Phen:** Jun-Jul. **Syn:** = Ar, C, F, FNA23, G, GrPl, K1, K3, K4, Mi, Mo1, NE, NY, Pa, Tn, Va, W, Mackenzie (1931-1935).

Carex howei Mackenzie. HOWE'S SEDGE, PRICKLY BOG SEDGE. **Hab:** Bogs and seepages, often growing in *Sphagnum*. **Dist:** NS west to MI and nw. IN, south to c. peninsular FL and e. TX, predominantly (but by no means strictly) on the Coastal Plain. **Phen:** May-Jun. **Tax:** See *C. atlantica* for discussion of the relationship between the two taxa. **Syn:** = F, G, GW1, RAB, Va, W, Mackenzie (1931-1935); = *Carex atlantica* L.H. Bailey ssp. *capillacea* (L.H. Bailey) Reznicek – Ar, FNA23, K1, K3, K4, Mi, NE, NY, Pa, Tn, WH3; = *Carex atlantica* var. *capillacea* (L.H. Bailey) Cronquist – C, ETx1; < *Carex atlantica* L.H. Bailey – Tx; > *Carex howei* Mackenzie – S; > *Carex mohriana* Mackenzie – S. NatureServe G5T5? (Secure).



Carex hyalinolepis Steudel. SHORELINE SEDGE. **Hab:** Tidal marshes, tidal and nontidal swamp forests. **Dist:** NJ south to Panhandle FL, west to TX, north in the interior to KS and NE; disjunct around the Great Lakes in MI, IN, and s. ON. **Phen:** May-Jun. **Syn:** = Ar, C, ETx1, F, FNA23, K1, K3, K4, Mi, Mo1, NcTx, Pa, RAB, S, Tn, Tx, Va, WH3, Mackenzie (1931-1935); = *Carex hyalinolepsis* – GW1, misspelling; = *Carex lacustris* Willdenow var. *laxiflora* Dewey – G. NatureServe G4G5 (Apparently Secure).

Carex ignota Dewey. INCOGNITO SEDGE, INCOGNITO LINED SEDGE. **Hab:** Mesic slope and ravine forests, upper terraces of floodplains in bottomland hardwood forests. **Dist:** E. SC south to n. FL, west to w. TN, e. TX, and AR. **Phen:** Apr. **Tax:** See Dorey (2019) for detailed information. **Syn:** = Dorey (2019); < *Carex laxiflora* Lamarck – S; < *Carex striatula* Michaux – Ar, ETx1, FNA23, K1, K3, K4, NcTx, RAB, Tn, Tx, WH3, Mackenzie (1931-1935).

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more)

* : waif
EN : endemic
H : historic

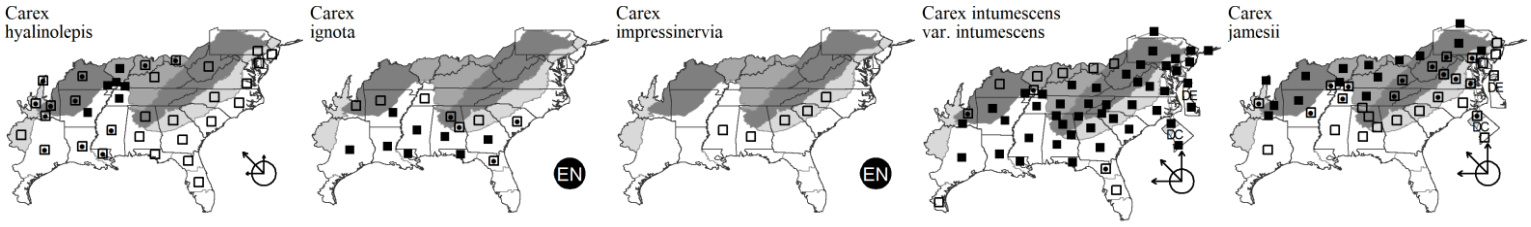
N : no
P : planted
? : questionable

X : extirpated

Carex impressinervia Bryson, Kral, & Manhart. **Hab:** Moist forests. **Dist:** Sc. NC south to AL and west to MS, apparently very rare and widely scattered. **Phen:** Apr-May. **Comm:** See Bryson, Kral, & Manhart (1987) for additional information on this species. **Syn:** = FNA23, K1, K3, K4. NatureServe G2 (Imperiled).

Carex intumescens Rudge *var*. ***intumescens***. BLADDER SEDGE, PREGNANT SEDGE. **Hab:** Bogs, fens, seeps, wet forests. **Dist:** NS west to WI, south to c. peninsular FL and e. TX. **Phen:** (Mar-) May-Jul. **Comm:** See discussion of var. *intumescens* and var. *fernaldii* under *Carex intumescens* var. *intumescens*. **Syn:** = F, Tn, Medford, Poindexter, & Weakley (2021) in Weakley et al (2021), Uttal (1971); < *Carex intumescens* – Ar, C, ETx1, FNA23, G, GrPl, GW1, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, RAB, S, Tx, Va, W, WH3, Mackenzie (1931-1935). NatureServe G5T5 (Secure).

Carex jamesii Schweinitz. JAMES'S SEDGE. **Hab:** Nutrient-rich bottomlands and mesic slopes over calcareous or mafic rocks. **Dist:** MD and NY west to MI, MN, and e. NE, south to c. SC, GA, and LA. **Phen:** May-Jun. **Comm:** Naczi (1999b) reports chromosome numbers of n = 33, 35. **Syn:** = FNA23, Mi, Mo1, NY, Pa, Tn, Va; < *Carex jamesii* Schweinitz – Ar, C, F, G, GrPl, K1, K3, K4, RAB, S, W, Mackenzie (1931-1935).



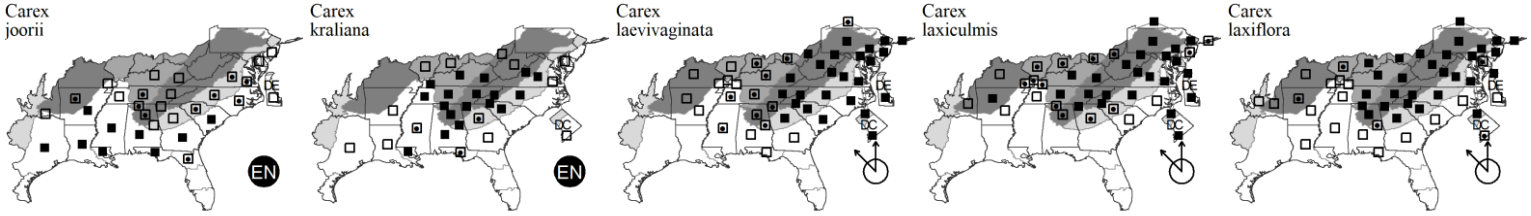
Carex joorii L.H. Bailey. JOOR'S SEDGE, HUMMOCK SEDGE, CYPRESS-SWAMP SEDGE. **Hab:** Swamps, upland depression swamps in the Piedmont, sphagnous wetlands. **Dist:** E. MD south to n. peninsular FL and Panhandle FL, west to e. TX, north in the interior to TN, MO, and OK. **Phen:** Jun-Oct. **Syn:** = Ar, C, ETx1, F, FNA23, G, GW1, K1, K3, K4, Mo1, RAB, S, Tn, Tx, Va, WH3, Mackenzie (1931-1935). NatureServe G4G5 (Apparently Secure).

Carex kraliana Naczi & Bryson. KRAL'S SEDGE. **Hab:** Mesic forests, slightly acidic to circumneutral. **Dist:** MD, WV (Vanderhorst et al. 2019), OH, and IN south to Panhandle FL and TX. **Phen:** Apr-May. **Tax:** See Naczi, Bryson, & Cochrane (2002). **Syn:** = Ar, ETx1, FNA23, K3, K4, Tn, Va, WH3. NatureServe G5 (Secure).

Carex laevivaginata (Kükenthal) Mackenzie. SMOOTH-SHEATHED SEDGE. **Hab:** Marshes, swamp forests, alluvial forests. **Dist:** MA, MI, and MN, south to Panhandle FL, AL, and MO. **Phen:** May-Jun. **Syn:** = Ar, C, F, FNA23, G, GrPl, GW1, K1, K3, K4, Mi, Mo1, NE, NY, Pa, RAB, Tn, Va, W, WH3, Mackenzie (1931-1935); = *Carex laevi-vaginata* – S, orthographic variant. NatureServe G5 (Secure).

Carex laxiculmis Schweinitz. SPREADING SEDGE. **Hab:** Slope or alluvial forests, both acidic and rich. **Dist:** S. ME west to s. WI and s. IA, south to NC, nw. GA (Jones & Coile 1988), n. AL, and MO. **Phen:** Apr-Jun. **Syn:** = F, Mackenzie (1931-1935); = *Carex laxiculmis* var. *laxiculmis* – Ar, FNA23, K1, Mi, NE, NY, Pa, Tn; < *Carex laxiculmis* Schweinitz – G, K3, K4, Mo1, RAB, S, W. NatureServe G5T5 (Secure).

Carex laxiflora Lamarck. BROAD LOOSE-FLOWERED SEDGE. **Hab:** In a wide range of moist to dry, acidic to nutrient-rich forests. **Phen:** May-Jun. **Tax:** Varieties have been recognized; their appropriate disposition is uncertain. Var. *laxiflora* ranges from ME and s. QC west to WI and IN, south to NC, TN, and AL; allegedly also in s. Mexico. Var. *serrulata* F.J. Hermann has been reported for our area by Hill & Horn (1997). Its range is stated by F to be NY and PA to MI, IN, and TN. It differs in being distinctly scabrous (vs. smooth to scaberulous), and in having the bract sheaths with serrulate angles (vs. entire or erose angles). **Syn:** = Ar, C, FNA23, K3, K4, Mi, NE, NY, Pa, RAB, Tn, Va, W, Mackenzie (1931-1935); ? *Carex heterosperma* Wahlenberg – S; < *Carex laxiflora* var. *laxiflora* – G; > *Carex laxiflora* var. *laxiflora* – F, K1, Mo1; > *Carex laxiflora* var. *serrulata* F.J. Hermann – F, K1.



Carex leavenworthii Dewey. LEAVENWORTH'S SEDGE. **Hab:** Dry forests, especially in sandy soils. **Dist:** NY, ON, and NE south to Panhandle FL and TX. **Phen:** May-Jun. **Comm:** Reported for DE (Longbottom, Naczi, & Knapp 2016), and considered "likely non-native" there. **Syn:** = Ar, C, ETx1, F, FNA23, G, GrPl, K1, K3, K4, Mi, Mo1, NcTx, NY, Pa, RAB, S, Tn, Va, W, Mackenzie (1931-1935); < *Carex cephalophora* Muhlenberg ex Willdenow – WH3.

Carex leptalea Wahlenberg *var*. ***harperi*** (Fernald) Weatherby & Griscom. HARPER'S SEDGE. **Hab:** Bogs, seeps, blackwater bottomlands, usually in saturated conditions with *Sphagnum spp*. **Dist:** NJ south to c. peninsular FL, west to TX, inland in the interior to IN and AR. **Phen:** May-Jun. **Comm:** Var. *harperi* is considered to differ from the typic variety in its larger perigynia, larger spikes, more aristate pistillate scales, and more southern range; it needs additional study. **Syn:** = F, G, Va; = *Carex leptalea* ssp. *harperi* (Fernald) W. Stone – ETx1, FNA23, K1, K3, K4; < *Carex leptalea* – Ar, C, GrPl, GW1, Pa, RAB, S, Tn, Tx, W, WH3, Mackenzie (1931-1935).

Carex lonchocarpa Willdenow. SOUTHERN LONG SEDGE. **Hab:** Pocosin margins, small blackwater stream swamps, bogs. **Dist:** S. MD south to ne. FL and Panhandle FL, west to e. TX; rarely inland, as in sc. TN. **Phen:** May-Jul. **Comm:** Recognition of *C. lonchocarpa* at the species level is supported by its distinctive achene micromorphology (Wujek & Menapace 1986). **Syn:** = ETx1, FNA23, K1, K3, K4, Tn, Va, WH3, Mackenzie (1931-1935); = *Carex folliculata* Linnaeus var. *australis* L.H. Bailey – C, F, G, RAB, Tx; = *Carex smalliana* Mackenzie – S; < *Carex folliculata* Linnaeus – GW1.

Carex longii Mackenzie. LONG'S SEDGE. **Hab:** Bogs, low fields, bottomlands. **Dist:** NS west to WI, south to s. FL and TX. **Phen:** May-Sep. **Syn:** = Ar, C, ETx1, F, FNA23, K1, K3, K4, Mi, NcTx, NE, NY, Pa, Tn, Tx, Va, WH3; < *Carex albolutescens* Schweinitz – G, GW1, RAB, W.

Carex louisianica L.H. Bailey. LOUISIANA SEDGE. **Hab:** Floodplain forests and other wet forests. **Dist:** S. NJ south to ne. FL, Panhandle FL, west to TX, north in the interior to KY, IN, and MO; disjunct in ne. OH. McAvoy (2021) documents the occurrence of the species in DE. **Phen:**

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* : waif
EN : endemic
H : historic

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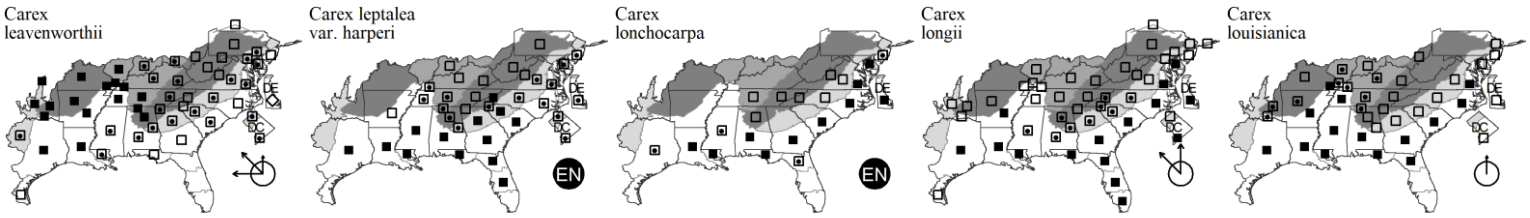
P : planted
? : questionable

X : extirpated

May-Jul. **Syn:** = Ar, C, ETx1, F, FNA23, G, GW1, K1, K3, K4, Mo1, NcTx, RAB, S, Tn, Va, W, WH3, Mackenzie (1931-1935); < *Carex lupulina* Muhlenberg ex Willdenow – Tx.



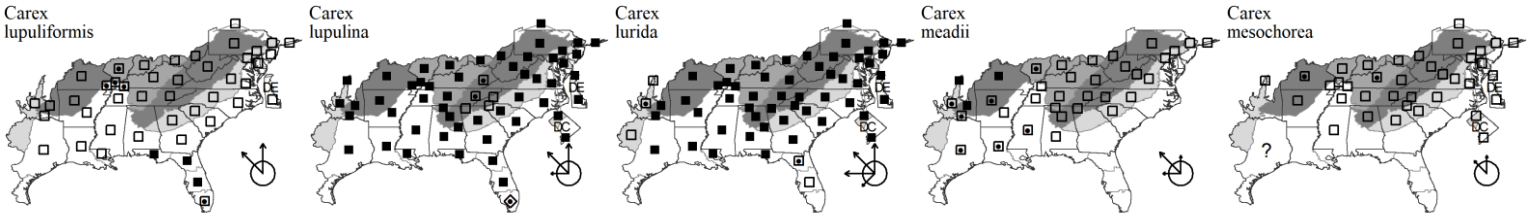
Carex lupuliformis Sartwell ex Dewey. UMBO SEDGE, FALSE HOP SEDGE. **Hab:** Wet forests, floodplain pools, swamps, riverbanks, especially in or around seasonal ponded areas. **Dist:** VT and QC west to se. WI, south to s. FL and e. TX. **Phen:** Jun-Jul. **Syn:** = Ar, C, ETx1, F, FNA23, G, K1, K3, K4, Mi, Mo1, NE, NY, Pa, RAB, Tn, Va, WH3, Mackenzie (1931-1935); < *Carex lupulina* Muhlenberg ex Willdenow – GW1, Tx.

Carex lupulina Muhlenberg ex Willdenow. HOP SEDGE. **Hab:** Bottomland forests, wet meadows, marshes, swamps. **Dist:** NS west to MN, south to ne. FL and e. TX. **Phen:** Jun-Sep. **Syn:** = Ar, C, ETx1, FNA23, G, GrPl, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, RAB, S, Tn, Va, W, WH3, Mackenzie (1931-1935); < *Carex lupulina* Muhlenberg ex Willdenow – GW1, Tx; > *Carex lupulina* var. *lupulina* – F; > *Carex lupulina* var. *pedunculata* A. Gray – F.

Carex lurida Wahlenberg. SALLOW SEDGE. **Hab:** Bogs, fens, swamps, marshes, ditches, and other wetlands. **Dist:** NS west to MN, south to c. peninsular FL, Panhandle FL, and Mexico. **Phen:** Apr-Sep. **Syn:** = Ar, C, ETx1, F, FNA23, G, GrPl, GW1, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, WH3, Mackenzie (1931-1935). NatureServe G5 (Secure).

Carex meadii Dewey. MEAD'S SEDGE. **Hab:** Mesic to wet prairies, limestone barrens and glades, on low, moist clayey soils over mafic or ultramafic rocks (such as diabase or serpentine) or calcareous rocks. **Dist:** S. NY, NJ, MI, and SK, south to nc. SC, nw. GA, sw. LA, and se. TX. **Phen:** May-Jun. **Tax:** Naczi (1999b) reports a chromosome number of n = 28. **ID Notes:** The species forms large clonal patches with a distinctive bluish cast at the time of flowering and fruiting. **Syn:** = Ar, C, ETx1, F, FNA23, G, GrPl, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, Mackenzie (1931-1935). NatureServe G4G5 (Apparently Secure).

Carex mesochorea Mackenzie. MIDLAND SEDGE. **Hab:** Mesic to dry forests and woodlands, dry grassy areas. **Dist:** MA, ON, and NE south to GA, AL, and TX. First reported for South Carolina by Hill & Horn (1997). **Syn:** = Ar, F, FNA23, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, S, Tn, Va, Mackenzie (1931-1935); = *Carex cephalophora* Muhlenberg ex Willdenow var. *mesochorea* (Mackenzie) Gleason – C, G, GrPl; < *Carex cephalophora* Muhlenberg ex Willdenow – RAB, Tx, W.



Carex microdonta Torrey & Hooker. LITTLE-TOOTH SEDGE. **Hab:** Limestone glades, calcareous prairies. **Dist:** AL and Panhandle FL west to MO, KS, OK, TX, NM, and AZ. **Phen:** Apr-Jul. **Syn:** = Ar, ETx1, FNA23, GrPl, K1, K3, K4, Mo1, NcTx, S, Tx, WH3, Mackenzie (1931-1935). NatureServe G4 (Apparently Secure).

Carex mitchelliana M.A. Curtis. MITCHELL'S SEDGE. **Hab:** Swampy woodlands and forests, seeps. **Dist:** Se. MA west to PA and KY, south to Panhandle FL, n. AL, and sc. TN. **Phen:** May-Jun. **Comm:** This species has a scattered distribution throughout its range, and is apparently rare. Bruederle, Fairbrothers, & Hanks (1989) and Bruederle (1999) provide additional information about this species. Allozyme studies suggest that *C. mitchelliana* is less closely related to *C. gynandra*, *C. crinita* var. *crinita*, and *C. crinita* var. *brevicrinis* than they are to one another. **Syn:** = C, F, FNA23, K1, K3, K4, NE, NY, Pa, S, Tn, Va, WH3, Mackenzie (1931-1935); = *Carex crinita* Lamarck var. *mitchelliana* (M.A. Curtis) Gleason – G, GW1, RAB; < *Carex crinita* – W.

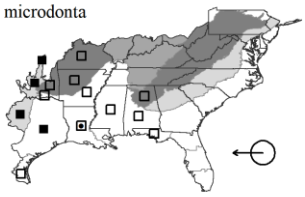
Carex molesta Mackenzie ex Bright. TROUBLESOME SEDGE. **Hab:** Dry to moist calcareous soils in calcareous glades and open woodlands. **Dist:** NH west to ND, south to VA, AL, MS, and OK. **Phen:** May-Jul. **Syn:** = Ar, F, FNA23, G, GrPl, K1, K3, K4, Mi, Mo1, NE, NY, Pa, Tn, Va; < *Carex brevior* (Dewey) Mackenzie ex Lunell – C.

Carex muehlenbergii Schkuhr ex Willdenow *var.* ***enervis*** W. Boott. MUHLENBERG'S SEDGE. **Hab:** Dry and often acidic woodlands and meadows. **Dist:** NH west to MN and NE, south to GA, AL, MS, and TX. **Phen:** Apr-May. **Syn:** = Ar, ETx1, FNA23, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Va; = *Carex muhlenbergii* var. *enervis* – F, G, GrPl, orthographic variant; = *Carex plana* Mackenzie – S, Mackenzie (1931-1935); < *Carex muhlenbergii* – Pa, RAB, Tx, W, orthographic variant; < *Carex muhlenbergii* var. *muhlenbergii* – C. NatureServe G5T5 (Secure).

Carex muehlenbergii Schkuhr ex Willdenow *var.* ***muehlenbergii***. MUEHLENBERG'S SEDGE. **Hab:** Dry to dry-mesic hammocks and woodlands. **Dist:** ME, ON, and MN south to Panhandle FL and TX. **Phen:** Apr-May. **Syn:** = Ar, ETx1, FNA23, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Va; = *Carex muhlenbergii* – Mackenzie (1931-1935); = *Carex muhlenbergii* var. *muhlenbergii* – F, G, orthographic variant; < *Carex muhlenbergii* – Pa, RAB, S, Tx, W, WH3, orthographic variant; < *Carex muhlenbergii* var. *muhlenbergii* – C. NatureServe G5T5 (Secure).

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated

Carex microdonta



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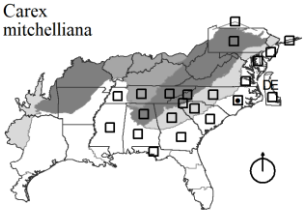
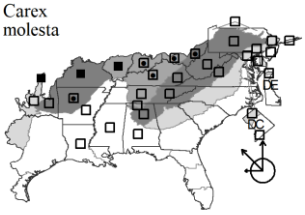
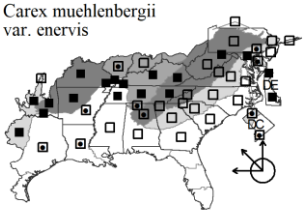


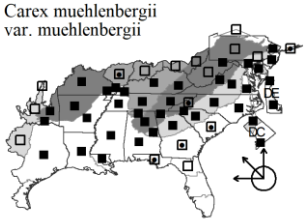
Carex molesta



Carex muehlenbergii var. enervis



Carex muehlenbergii var. muehlenbergii



Carex nigromarginata Schweinitz. BLACK-EDGED SEDGE. **Hab:** Dry woodlands and forests. **Dist:** DE and NJ west to WI, south to SC, GA, and TX. **Phen:** Mar-May. **Syn:** = C, FNA23, K1, K3, K4, NE, NY, Pa, Tn, Va, W, Mackenzie (1931-1935); = *Carex nigro-marginata* – S; = *Carex nigromarginata* var. *nigromarginata* – Ar, ETx1, F, Mo1, RAB; = *Carex nigro-marginata* var. *nigro-marginata* – G. NatureServe G5 (Secure).

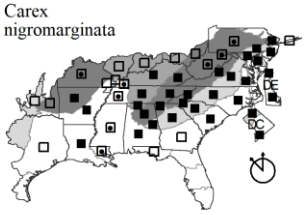
Carex normalis Mackenzie. GREATER STRAW SEDGE. **Hab:** Mesic to wet forests, moist prairies. **Dist:** ME, QC, and ON south to GA and AR. **Phen:** May-Jul. . **Syn:** = Ar, C, F, FNA23, G, GW1, K1, K3, K4, Mi, Mo1, NE, NY, Pa, RAB, Tn, Va, W. NatureServe G5 (Secure).

Carex oblita Steudel. SOUTHERN DARK GREEN SEDGE. **Hab:** Bogs, seeps, sphagnous swamps. and other wet habitats. **Dist:** NY (Long Island) and NJ south to sc. GA, west to w. LA, mostly on the Coastal Plain, but extending much less commonly inland to the Piedmont and Mountains. **Syn:** = S, Tn, Va, Mackenzie (1931-1935); = *Carex venusta* Dewey var. *minor* Böckeler – C, F, G, K1; < *Carex venusta* Dewey – FNA23, GW1, K3, K4, NY, W, WH3. NatureServe G4T4 (Apparently Secure).

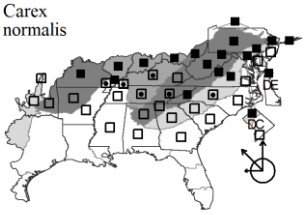
Carex oklahomensis Mackenzie. OKLAHOMA SEDGE. **Hab:** Seepages, disturbed wetlands, roadside ditches, eastwards probably adventive. **Dist:** Se. MO west to KS, south to AR, and ne. TX; disjunct (and apparently adventive) in various scattered sites east of the Mississippi River, as in AL, MS, GA, w. NC (Graham County) and w. VA (Giles County). **Phen:** Apr-Jun. **Comm:** First reported for VA by Wieboldt et al. (1998). See Bryson & Rothrock (2010) for further discussion; they consider that this species is "introduced during highway and reservoir construction or maintenance in contaminated hay, grass seeds or on construction, maintenance, and mowing equipment." **Syn:** = Ar, ETx1, F, FNA23, GrPl, K1, K3, K4, Mo1, NE, Tn, Va, Mackenzie (1931-1935); = *Carex stipata* Muhlenberg ex Willdenow var. *oklahomensis* (Mackenzie) Gleason – G; < *Carex stipata* – S.

Carex oligocarpa Schkuhr ex Willdenow. EASTERN FEW-FRUITED SEDGE. **Hab:** Rich forests, over calcareous or mafic rocks. **Dist:** MA west to MN, south to FL and TX. *C. oligocarpa* sensu stricto is in SC (P. McMillan, pers. comm., specimen at CLEMS). **Phen:** May-Jun. **Syn:** = Ar, C, F, FNA23, G, GrPl, K1, K3, K4, Mi, Mo1, NE, NY, Pa, Tn, Tx, Va, W; = *Carex oligocarpa* var. *oligocarpa* – Ward (2012a); < *Carex oligocarpa* Schkuhr ex Willdenow – RAB, S, Mackenzie (1931-1935).

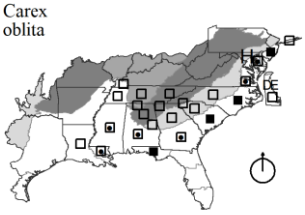
Carex nigromarginata



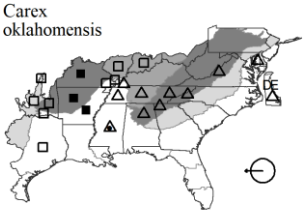
Carex normalis



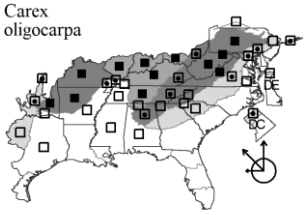
Carex oblita



Carex oklahomensis



Carex oligocarpa



Carex oxylepis Torrey & Hooker. SHARP-SCALED SEDGE. **Hab:** Bottomlands, calcareous forests. **Dist:** VA, KY, IL, MO, and OK south to c. peninsular FL and TX. **Phen:** Mar-Jun. **Tax:** A distinction is sometimes made between var. *oxylepis* (with glabrous perigynia) and var. *pubescens* (with pubescent perigynia). Var. *oxylepis* is widespread in the Southeast; var. *pubescens* is more restricted, from KY and s. IL south to AL and MS. **Syn:** = Ar, C, ETx1, F, FNA23, G, GW1, K4, Mo1, NcTx, RAB, S, Tx, Va, W, WH3, Mackenzie (1931-1935); > *Carex oxylepis* var. *oxylepis* – K1, K3, Tn; > *Carex oxylepis* var. *pubescens* J.K. Underwood – K1, K3, Tn.

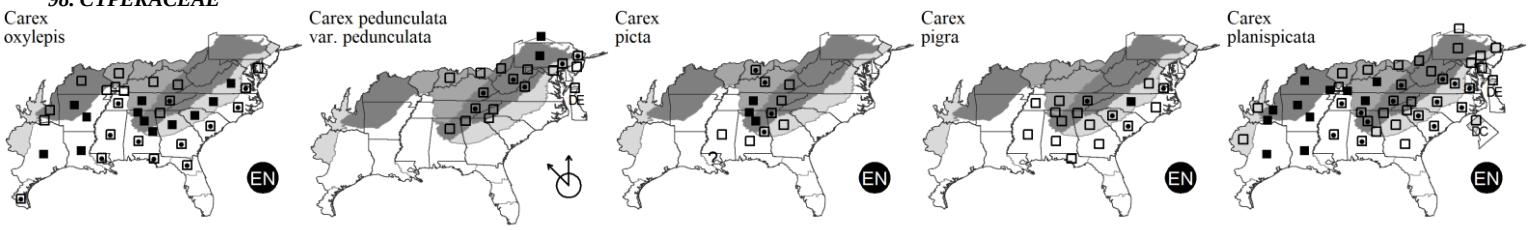
Carex pedunculata Muhlenberg ex Willdenow *var. **pedunculata***. LONGSTALK SEDGE. **Hab:** Nutrient-rich dry to mesic forests, usually over calcareous or mafic rocks. **Dist:** Var. *pedunculata* ranges from NL (Newfoundland), SK, and ND, south to NJ, w. VA, sw. NC (Gaddy et al. 1984), nw. SC (Gaddy et al. 1984), nw. GA (Dade County) (Jones & Coile 1988), n. AL, c. IN, c. IL, and n. IA. **Phen:** Apr. **Comm:** Var. *erythrobasis* (Léveillé & Vaniot) Koyama occurs in Korea. It may well prove that these two widely disjunct taxa should be recognized at the species level. **Syn:** = FNA23, Va; = *Carex pedunculata* ssp. *pedunculata* – NE, NY; < *Carex pedunculata* – C, F, G, K1, K3, K4, Mi, Pa, Tn, W, Mackenzie (1931-1935); < *Carex pendunculata* – GrPl, misspelling. NatureServe G5TNR (Not Yet Ranked).

Carex picta Steudel. PAINTED SEDGE. **Hab:** Dry to dry-mesic oak-hickory forests. **Dist:** S. IN south through KY and c. TN to nc. GA (Jones & Coile 1988), c. AL, and LA. **Comm:** Reported (erroneously?) for VA (Kartesz 1999). Locally abundant and forming "doughnut clumps", sometimes aggregated to form a coarse turf. **Syn:** = C, F, FNA23, G, K1, K3, K4, S, Tn, Mackenzie (1931-1935). NatureServe G4G5 (Apparently Secure).

Carex pigra Naczi. LAZY SEDGE. **Hab:** Moist forests, bottomlands. **Dist:** Se. VA west to se. and sc. TN, south to n. FL, s. AL, and ne. MS. **Phen:** May-Jun. **Comm:** See Naczi (1997) for additional information. **Syn:** = FNA23, K1, K3, K4, Tn, Va; = *Carex flaccosperma* var. *pigra* (Naczi) D.B. Ward – Ward (2012a); < *Carex flaccosperma* Dewey – G, GW1, RAB, WH3; < *Carex flaccosperma* Dewey var. *glaucodea* (Tuckerman ex Olney) Kükenthal – F; < *Carex glaucodea* Tuckerman ex Olney – S.

Carex planispicata Naczi. FLAT-SPIKED SEDGE. **Hab:** Rich to fairly acid mesic forests, on slopes and floodplains. **Dist:** C. NJ west to s. IN, se. MO, and se. OK, south to c. GA, s. MS, and se. TX. **Phen:** May-Jun. **Tax:** See Naczi (1999a) for additional information. **Syn:** = Ar, ETx1, FNA23, K3, K4, Mo1, Pa, Tn, Va; = *Carex amphibola* var. *rigida* (L.H. Bailey) Fernald – F, K1; < *Carex amphibola* Steudel – Tx.

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



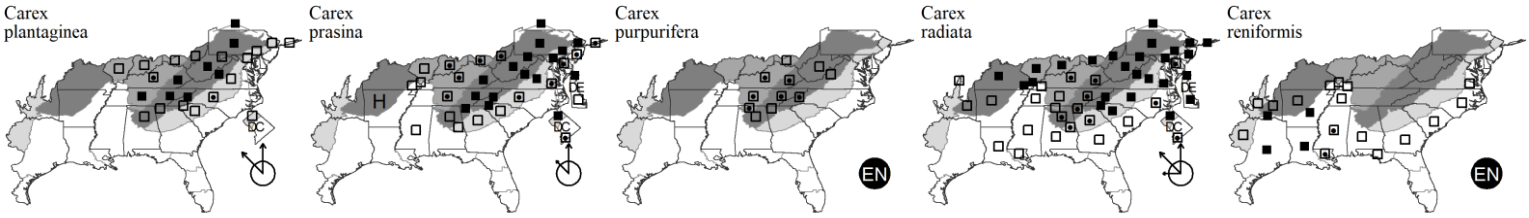
Carex plantaginea Lamarck. PLANTAINLEAF SEDGE, SEERSUCKER SEDGE. **Hab:** Rich cove forests, mostly over mafic or calcareous rocks, montane alluvial forests. **Dist:** NB west to MN, south to MD, NJ, VA, NC, ne. GA (Jones & Coile 1988), e. TN, c. TN, KY, and s. IN. **Phen:** Apr-May. **Syn:** = C, F, FNA23, G, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Va, W, Mackenzie (1931-1935). NatureServe G5 (Secure).

Carex prasina Wahlenberg. DROOPING SEDGE. **Hab:** Seepage swamps, brook banks, rocky stream margins. **Dist:** ME, ON, and WI south to GA, MS, and AR; in nearly all TN counties adjacent to NC and VA. **Phen:** May-Jun. **Syn:** = Ar, C, F, FNA23, G, GW1, K1, K3, K4, Mi, Mo1, NE, NY, Pa, RAB, S, Tn, Va, W, Mackenzie (1931-1935). NatureServe G4 (Apparently Secure).

Carex purpurifera Mackenzie. LIMESTONE PURPLE SEDGE. **Hab:** Moist, rich cove forests, at low elevations, over calcareous or mafic rocks. **Dist:** WV (Vanderhorst et al. 2019), w. VA and KY south to n. GA and n. AL, mostly west of the Blue Ridge Mountains, but with scattered disjunct populations on calcareous or mafic sites in the Blue Ridge. **Phen:** May-Jun. **Comm:** Naczi (1999b) reports a chromosome number of n = 17-19. **Syn:** = C, FNA23, K1, K3, K4, Tn, W; = *Carex laxiflora* var. *purpurifera* (Mackenzie) Gleason – G; < *Carex purpurifera* Mackenzie – RAB, S, Mackenzie (1931-1935).

Carex radiata (Wahlenberg) Small. EASTERN STAR SEDGE. **Hab:** Mesic to wet-mesic forests. **Dist:** NS west to MB, south to SC, AL, LA, and OK. **Phen:** May-Jun. **Syn:** = Ar, C, FNA23, K1, K3, K4, Mi, Mo1, NE, NY, Pa, Tn, Va; = *Carex rosea* Schkuhr ex Willdenow – F, S, Mackenzie (1931-1935), misapplied; < *Carex rosea* Schkuhr ex Willdenow – G, GrPl, RAB, W.

Carex reniformis (L.H. Bailey) Small. KIDNEY SEDGE. **Hab:** Floodplain forests (including blackwater), marshes, ditches, other wet areas. **Dist:** VA, IL, and OK south to FL Panhandle and TX. **Phen:** May-Jun. **Syn:** = Ar, C, ETx1, F, FNA23, G, GW1, K1, K3, K4, Mo1, NcTx, RAB, S, Tn, Va, WH3; < *Carex reniformis* (L.H. Bailey) Small – Tx.



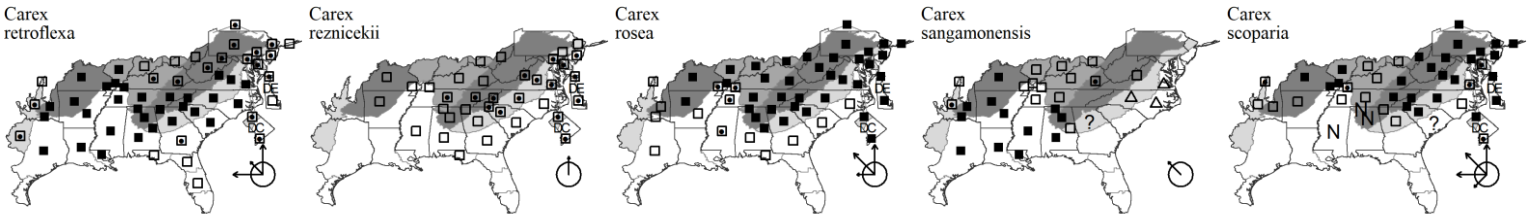
Carex retroflexa Muhlenberg ex Willdenow. REFLEXED SEDGE. **Hab:** Dry to mesic forests, especially over base-rich substrates. **Dist:** ME, MI and IA, south to n. peninsular FL and TX. **Phen:** May-Jun. **Tax:** See Downer & Hyatt (2003). **Syn:** = Ar, ETx1, F, FNA23, GrPl, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, S, Tn, Va, Mackenzie (1931-1935); = *Carex retroflexa* var. *retroflexa* – C, G; < *Carex retroflexa* Muhlenberg ex Willdenow – RAB, Tx, W, WH3, (also see C. texensis).

Carex reznicekii Werier. REZNICEK'S SEDGE. **Hab:** Dry to mesic forests and woodlands. **Dist:** RI, NY, PA, KY, and MO, south to SC, sw. GA, se. AL, Panhandle FL, n. MS and AR. To be expected in WV. **Tax:** See Werier (2006) for detailed information. **Comm:** {add to synonymy; section *Acrocystis*}. **Syn:** = Ar, K3, K4, NE, NY, Tn, Va; < *Carex nigromarginata* Schweinitz – Pa.

Carex rosea Schkuhr ex Willdenow. ROSY SEDGE. **Hab:** Dry to dry-mesic hardwood forests, especially over basic substrates. **Dist:** NS west to MB, south to FL Panhandle and TX. **Phen:** May-Jun. **Syn:** = Ar, C, ETx1, FNA23, K1, K3, K4, Mi, Mo1, NE, NY, Pa, Tn, Va; = *Carex convoluta* Mackenzie – F, GrPl, S, Mackenzie (1931-1935); < *Carex rosea* Schkuhr ex Willdenow – G, RAB, W, WH3, (also see C. appalachica and C. radiata).

Carex sangamonensis (Clokey) Mohlenbrock. MIDWESTERN BLUNT BROOM SEDGE. **Hab:** Bottomland forests, marshes. **Dist:** OH, IL, and KS, south to SC, AL, LA, and TX. **Phen:** May-Jun. **Tax:** Judged to perhaps warrant specific rank (Tennessee Flora Committee 2015), as treated here. **Syn:** = Il, K4; = *Carex tribuloides* Wahlenberg var. *sangamonensis* Clokey – Ar, ETx1, FNA23, G, K1, K3, Tn, Va; < *Carex tribuloides* Wahlenberg – C, F, GW1, Mo1, NcTx, RAB, W. NatureServe G5T4T5 (Apparently Secure).

Carex scoparia Schkuhr ex Willdenow. BROOM SEDGE. **Hab:** Bogs, swamp forests, marshes, seepy ledges, ditches. **Dist:** NL (Newfoundland) west to BC, south to GA, MS, and CA. **Phen:** May-Jun. **Tax:** *C. scoparia* var. *tesselata* Fernald & Wiegand, endemic to NB and ME, is now recognized as *C. waponahkikensis* M. Lovit & A.A. Haines (Lovit & Haines 2012). Tennessee Flora Committee (2015) mentions unresolved variation that may warrant taxonomic recognition. **Syn:** = K3, K4, Mi, Mo1, NY, Tn; = *Carex scoparia* var. *scoparia* – Ar, F, FNA23, K1, NE, Pa, Va; < *Carex scoparia* Schkuhr ex Willdenow – C, G, GrPl, GW1, RAB, W. NatureServe G5T5 (Secure).



Carex seorsa Howe. WEAK STELLATE SEDGE. **Hab:** Swamp forests in acid, organic soils. **Dist:** MA south to GA and Panhandle FL in the Coastal Plain, scattered inland westward to NY, OH, MI, IN, AR, and TN. **Phen:** May-Jun. **Syn:** = Ar, C, FNA23, G, GW1, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Va, W, WH3, Mackenzie (1931-1935). NatureServe G5 (Secure).

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more)

* : waif; EN : endemic; H : historic

N : no; P : planted; ? : questionable

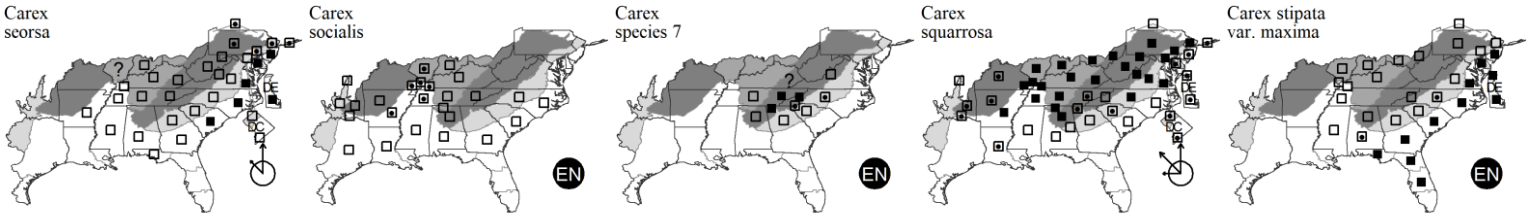
X : extirpated

Carex socialis Mohlenbrock & Schwegman. LOW WOODLAND SEDGE. **Hab:** Blackwater and brownwater swamp forests and bottomlands, forested seepage areas. **Dist:** Se. and sc. NC south to e. GA, west to e. TX, and north in the interior to s. IN, s. IL, and se. MO. **Phen:** Apr-May. **Syn:** = Ar, C, ETx1, FNA23, K1, K3, K4, Mo1, NcTx, Tn. NatureServe G4 (Apparently Secure).

Carex species 7. **Hab:** Moderate to high elevation oak, acid coves, and other hardwood forests. **Dist:** Southern Appalachians and nearby, lower elevation provinces, the distribution still poorly known, probably VA and KY south to SC, GA, and AL. **Syn:** < *Carex pensylvanica* Lamarck – FNA23, K1, K3, S, Tn, Va, Mackenzie (1931-1935); < *Carex pensylvanica* var. *pensylvanica* – C, F, G, RAB.

Carex squarrosa Linnaeus. SQUARROSE SEDGE. **Hab:** Bottomland forests, tidal swamps. **Dist:** CT west to se. ME and NE, south to NC, n. SC, and AR. **Phen:** Apr-Jul. **Syn:** = Ar, C, F, FNA23, G, GrPl, GW1, K1, K3, K4, Mi, Mo1, NE, NY, Pa, RAB, S, Tn, Va, W, Mackenzie (1931-1935). NatureServe G4G5 (Apparently Secure).

Carex stipata Muhlenberg ex Willdenow *var*. ***maxima*** Chapman. LARGE STALK-GRAIN SEDGE. **Hab:** Marshes, ditches, sloughs, alluvial forests, cypress-gum forests. **Dist:** NJ south to c. peninsular FL, west to TX, north in the interior to s. MO, s. IN, w. TN, and w. KY, primarily on the Coastal Plain. **Phen:** May-Jun. **Tax:** The validity of this variety needs additional study. **Syn:** = C, F, FNA23, G, K1, K3, K4, Pa, RAB, Tn, Va; = *Carex uberior* (C. Mohr) Mackenzie – S, Mackenzie (1931-1935); < *Carex stipata* – GW1, Tx, W, WH3.



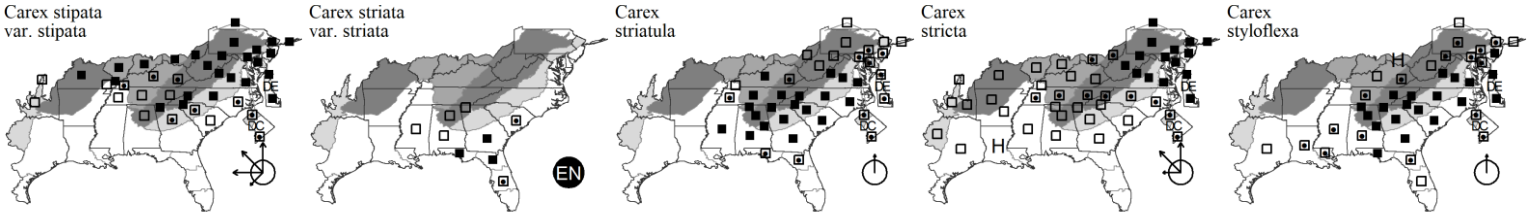
Carex stipata Muhlenberg ex Willdenow *var*. ***stipata***. STALK-GRAIN SEDGE, AWL-FRUIT SEDGE. **Hab:** Marshes, ditches, alluvial forests. **Dist:** NL (Newfoundland) west to AK, south to SC, TN, KS, NM, and Mexico. **Phen:** May-Jun. **Syn:** = C, F, FNA23, G, K1, K3, K4, NE, NY, Pa, RAB, Tn, Va; = *Carex stipata* – GrPl, Mackenzie (1931-1935); < *Carex stipata* – GW1, Mi, Mo1, S, W. NatureServe G5T5 (Secure).

Carex striata Michaux *var*. ***striata***. WALTER'S SEDGE, POCOSIN SEDGE. **Hab:** Pocosins, limesink ponds, small depression ponds, clay-based Carolina bays, acid peaty swamps, wet savannas (dominated by *Pinus serotina* and/or *Taxodium ascendens*). **Dist:** SC south to c. FL and Panhandle FL. **Phen:** May-Jun. **Syn:** = C, FNA23, K1, K3, K4; = *Carex walteriana* var. *walteriana* – F, G; < *Carex striata* – WH3; < *Carex walteriana* L.H. Bailey – GW1, RAB, S, Mackenzie (1931-1935). NatureServe G4G5T4T5 (Apparently Secure).

Carex striatula Michaux. LINED SEDGE. **Hab:** Bottomland and other nutrient-rich forests. **Dist:** CT, se. NY, PA, s. OH, and w. KY south to n. FL, Panhandle FL, and s. MS. Former attribution of a wider distribution to the west (west of the Mississippi River) represents *Carex ignota*. **Phen:** May-Jun. **Syn:** = Dorey (2019); < *Carex laxiflora* Lamarck – S, misapplied; < *Carex laxiflora* var. *angustifolia* Dewey – G; < *Carex striatula* Michaux – Ar, C, ETx1, F, FNA23, K1, K3, K4, NcTx, NE, NY, Pa, RAB, Tn, Va, W, WH3, Mackenzie (1931-1935).

Carex stricta Lamarck. TUSSOCK SEDGE, UPRIGHT SEDGE. **Hab:** Bogs, sedge meadows, seeps, swamps, depression ponds, old beaver ponds. **Dist:** QC and NS west to MB, south to GA, AL, MS, and TX. **Phen:** May-Jun. **Syn:** = Ar, C, ETx1, FNA23, GrPl, GW1, K1, K3, K4, Mi, Mo1, NE, NY, Pa, RAB, Tn, Tx, Va, W; = *Carex stricta* var. *stricta* – G; > *Carex stricta* Lamarck – S, Mackenzie (1931-1935); > *Carex stricta* var. *stricta* – F; > *Carex stricta* var. *strictior* (Dewey) Carey – F; > *Carex strictior* Dewey – S, Mackenzie (1931-1935).

Carex styloflexa Buckley. BENT SEDGE. **Hab:** Bogs, wet forests, acid stream swamps. **Dist:** CT west to s. OH, south to c. peninsular FL and se. TX. **Phen:** Apr-Jun. **Syn:** = C, ETx1, F, FNA23, G, K1, K3, K4, NE, NY, Pa, RAB, S, Tn, Va, W, WH3, Mackenzie (1931-1935). NatureServe G4G5 (Apparently Secure).



Carex superata Naczi, Reznicek, & B.A. Ford. LIMESTONE FOREST SEDGE. **Hab:** Calcareous forests and woodlands. **Dist:** Sc. NC, nc. SC, sw. VA, sc. KY, and ne. MS, south to Panhandle FL and s. AL. Reported for sw. VA (as *C. willdenowii* var. *megarrhyncha*) by Wieboldt et al. (1998). **Phen:** Apr-Jun. **Syn:** = FNA23, K1, K3, K4, Tn, Va, WH3; < *Carex willdenovii* – C, G, S, Mackenzie (1931-1935), orthographic variant; < *Carex willdenowii* Schkuhr ex Willdenow – F, RAB.

Carex swanii (Fernald) Mackenzie. SWAN'S SEDGE. **Hab:** Nutrient-rich forests, woodlands, and openings. **Dist:** NS, s. MI, s. WI, south to nw. SC and ne. AR. **Phen:** May-Jun. **Syn:** = Ar, C, F, FNA23, G, K1, K3, K4, Mi, Mo1, NE, NY, Pa, RAB, S, Tn, Va, W, Mackenzie (1931-1935). NatureServe G5 (Secure).

Carex tenax Chapman. WIRY SEDGE. **Hab:** Longleaf pine sandhills. **Dist:** Sc. NC south to Panhandle FL, west to MS; also in sw. LA and se. TX. **Phen:** Mar-Jun. **Syn:** = ETx1, FNA23, K1, K3, K4, RAB, Tx, WH3, Mackenzie (1931-1935); ? *Carex validior* Mackenzie – S. NatureServe G5? (Secure).

Carex tenera Dewey. SLENDER SEDGE, QUILL SEDGE. **Hab:** Low forests. **Dist:** NS west to BC, south to VA, NC, n. GA, ne. TN, MO, KS, WY, and OR. **Tax:** *Carex echinodes* (Fernald) P. Rothrock, Reznicek, & Hipp is sometimes treated as a variety of *C. tenera*, but warrants specific status. **Syn:** = K3, K4, Mi, NE, NY; = *Carex tenera* var. *tenera* – F, FNA23, Pa; < *Carex tenera* Dewey – C, G, GrPl, K1, RAB, Tn. NatureServe G5T5 (Secure).

Carex texensis (Torrey ex L.H. Bailey) L.H. Bailey. TEXAS SEDGE. **Hab:** Lawns, pastures, roadsides, usually weedy, especially in rocky or sandy soils. **Dist:** NY, OH, and KS south to FL and TX. **Phen:** Apr-May. **Tax:** See Downer & Hyatt (2003). **Syn:** = Ar, ETx1, F, FNA23, GrPl, K1, K3, K4, Mi, Mo1, NcTx, NY, Pa, S, Tn, Va, Mackenzie (1931-1935); = *Carex retroflexa* var. *texensis* (Torrey ex L.H. Bailey) Fernald – C, G; < *Carex retroflexa* Muhlenberg ex Willdenow – RAB, Tx.

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more)

* : waif
EN : endemic
H : historic

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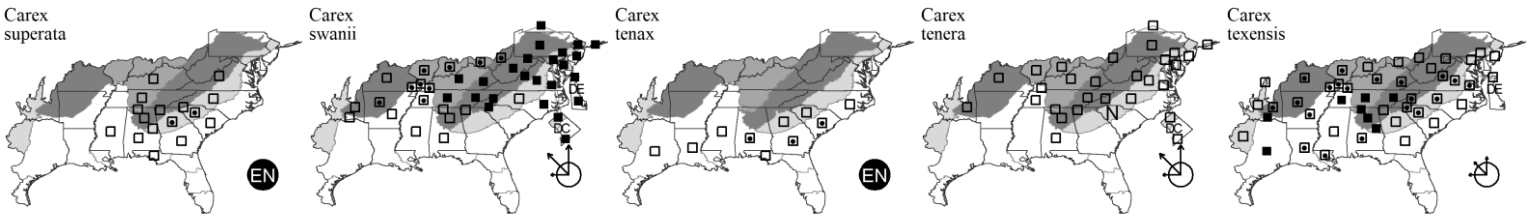
? : questionable

X : extirpated



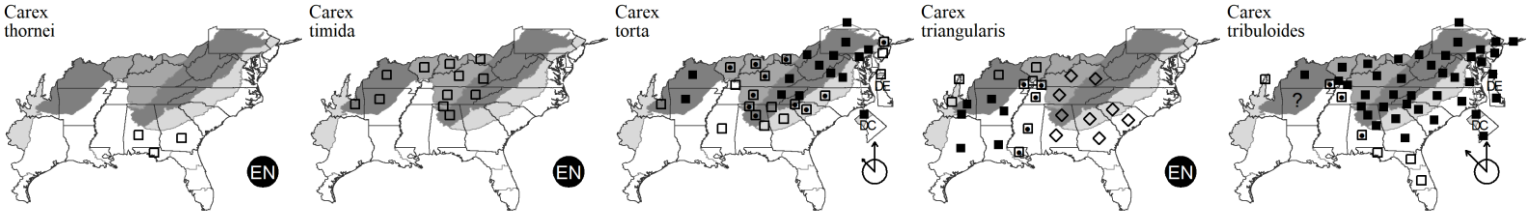
Carex thornei Naczi. **Hab:** Mesic deciduous forests, often in the upper floodplain. **Dist:** Endemic to the drainage of the Apalachicola/Chattahoochee and Flint in s. GA and s. AL south to Panhandle FL. **Comm:** See Naczi, Bryson, & Cochrane (2002). {not yet keyed}. **Syn:** = FNA23, K4, WH3; = *Carex oligocarpa* var. *thornei* (Naczi) D.B. Ward – Ward (2012a); < *Carex oligocarpa* Schkuhr ex Willdenow – S.

Carex timida Naczi & B.A. Ford. TIMID SEDGE. **Hab:** Calcareous, dry to mesic woodlands and forests. **Dist:** Scattered and disjunct, from OH, IN, s. IL, and s. MO to KY, TN, n. AL, and AR. **Phen:** Apr-May. **Tax:** Related to *C. jamesii* and *C. juniperorum*, from which it was separated by Naczi & Ford (2001). **Syn:** = Ar, FNA23, K3, K4, Tn; < *Carex jamesii* Schweinitz – C, F, G, K1, Mackenzie (1931-1935).

Carex torta F. Boott ex Tuckerman. STREAMBED SEDGE, TWISTED SEDGE. **Hab:** Rocky streambeds, often dominant in patches in the beds of mountain streams, along their banks, and on rocky or cobbly islands. **Dist:** NS west to ON, south to sc. NC, SC (Gaddy 1981), nc. GA (Jones & Coile 1988), AL, TN, and OH. **Phen:** Apr-May. **Syn:** = Ar, C, F, FNA23, G, K1, K3, K4, Mo1, NE, NY, Pa, RAB, S, Tn, Va, W, Mackenzie (1931-1935). NatureServe G5 (Secure).

Carex triangularis Boeckeler. EASTERN FOX SEDGE. **Hab:** Moist forests, ditches, other wet sites. **Dist:** SC and GA west to KS and TX. **Phen:** Apr-Jun. **Syn:** = Ar, ETx1, F, FNA23, G, GrPl, K1, K3, K4, Mo1, NcTx, RAB, S, Tn, Mackenzie (1931-1935); < *Carex vulpinoidea* Michaux – GW1, Tx; < *Carex vulpinoidea* var. *vulpinoidea* – C.

Carex tribuloides Wahlenberg. BLUNT BROOM SEDGE. **Hab:** Bottomland forests. **Dist:** NB west to MN and NE, south to c. peninsular FL, GA, TN, MO, and KS. **Phen:** May-Jun. **Syn:** = Il, K4, Mi; = *Carex tribuloides* Wahlenberg var. *tribuloides* – FNA23, G, K1, K3, NE, NY, Pa, Tn, Va; < *Carex tribuloides* Wahlenberg – C, F, GrPl, GW1, Mo1, RAB, Tx, W, WH3. NatureServe G5T5 (Secure).



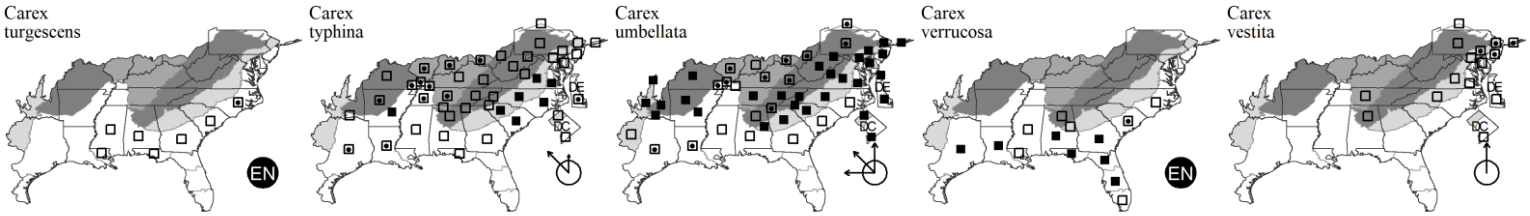
Carex turgescens Torrey. PINEBARREN SEDGE. **Hab:** Sandhill seepage bogs, streamhead pocosins, pocosin-sandhill ecotones, canebrakes, cypress domes and stringers, in highly acidic, sandy-peaty soils. **Dist:** Sc. NC south to Panhandle FL, west to se. LA, a Southeastern Coastal Plain endemic. **Phen:** May-Jun. **Syn:** = FNA23, GW1, K1, K3, K4, RAB, S, WH3, Mackenzie (1931-1935). NatureServe G4G5 (Apparently Secure).

Carex typhina Michaux. CATTAIL SEDGE. **Hab:** Bottomland forests, swamp forests. **Dist:** ME and QC west to WI and se. MN, south to GA, Panhandle FL, and e. TX. **Phen:** May-Aug. **Syn:** = Ar, C, ETx1, F, FNA23, G, GrPl, GW1, K1, K3, K4, Mi, Mo1, NE, NY, Pa, RAB, S, Tn, Tx, W, WH3, Mackenzie (1931-1935). NatureServe G5 (Secure).

Carex umbellata Schkuhr ex Willdenow. PARASOL SEDGE. **Hab:** Old fields, other habitats. **Dist:** Greenland west to AK, south through MN to TX and eastward. **Phen:** Dec-Mar. **Tax:** Molecular data (unpublished) indicate that *C. microrhyncha* is deeply embedded within *C. umbellata*. This group is receiving critical study by D.B. Poindexter. **Syn:** = Ar, FNA23, G, Mi, Mo1, NE, NY, Pa, Tn, Va, Sorrie et al (2011); = *Carex abdita* E.P. Bicknell – F; > *Carex microrhyncha* Mackenzie – ETx1, GrPl, K1, K3, K4, NcTx, Tx, Mackenzie (1931-1935); < *Carex umbellata* Schkuhr ex Willdenow – C, RAB, W; > *Carex umbellata* Schkuhr ex Willdenow – GrPl, K1, K3, K4, Mackenzie (1931-1935).

Carex verrucosa Muhlenberg. **Hab:** Pocosins, wet pinelands, pond cypress ponds, domes, and stringers. **Dist:** Se. NC south to south to s. FL, west to w. LA and e. TX. **Phen:** Jul-Sep. **Syn:** = ETx1, FNA23, GW1, K1, K3, K4, RAB, S, WH3, Mackenzie (1931-1935). NatureServe G4 (Apparently Secure).

Carex vestita Willdenow. VELVET SEDGE. **Hab:** Low forests, bogs, seepage swamps, wet clearings and depressions. **Dist:** S. ME south to se. VA, e. TN (where perhaps extirpated), and nc. NC. **Phen:** Apr-May. **Syn:** = C, F, FNA23, G, K1, K3, K4, NE, NY, Pa, RAB, Tn, Va, Mackenzie (1931-1935). NatureServe G5 (Secure).



Carex virescens Muhlenberg ex Willdenow. RIBBED SEDGE. **Hab:** Nutrient-rich forests, woodlands, and openings. **Dist:** S. ME, NY, and s. MI, south to e. VA, w. NC, nw. SC, and MO. **Phen:** May-Jun. **Syn:** = C, F, FNA23, G, K1, K3, K4, Mi, Mo1, NE, NY, Pa, RAB, S, Tn, Va, W, Mackenzie (1931-1935). NatureServe G5 (Secure).

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more)

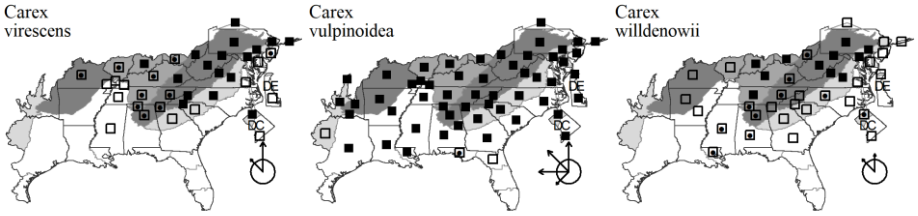
* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable

X : extirpated

Carex vulpinoidea Michaux. FOX SEDGE. **Hab:** Low fields, ditches, fens, seeps, tidal freshwater marshes, other wet (and especially disturbed) sites. **Dist:** NL (Labrador) west to BC, south to FL, TX, SON, and CA. **Phen:** Jul-Aug. **Syn:** = Ar, ETx1, F, FNA23, G, GrPl, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, RAB, S, Tn, Va, W, Mackenzie (1931-1935); < *Carex vulpinoidea* Michaux – GW1, Tx, WH3; < *Carex vulpinoidea* var. *vulpinoidea* – C, K1.

Carex willdenowii Schkuhr ex Willdenow. WILLDENOW'S SEDGE. **Hab:** Calcareous mesic forests, but also in more acidic dry-mesic upland oak forests. **Dist:** MA, VT, NY, s. ON, and c. IN, south to nc. SC, n. AL, and s. IL; disjunct in c. AR. **Phen:** May-Jun. **Comm:** Naczi (1999b) reports chromosome numbers of n = 31, 39. **Syn:** = Ar, FNA23, K1, K3, K4, NE, NY, Tn, Va; < *Carex willdenovii* – C, G, Mo1, Pa, S, Mackenzie (1931-1935), orthographic variant; < *Carex willdenowii* Schkuhr ex Willdenow – F, RAB, W.



Cladium P. Browne 1756 (SAWGRASS, TWIG-RUSH, TWIG-SEDGE)

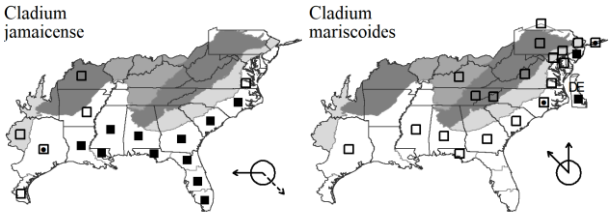
A genus of 3-4 species, herbs, subcosmopolitan. References: Bridges, Orzell, & Burkhalter (1993); Goetghebeur in Kubitzki (1998b); Tucker (2002a) in FNA23 (2002b).

1 Plants 1-3 m tall, coarse, from short rhizomes, forming dense tussocks; leaves 3-15 dm long, 5-12 mm wide, stiff and flat (or broadly V-shaped), the margins and midrib (beneath) harshly serrate (saw-toothed); inflorescence a narrow panicle 3-9 dm long, the branches bearing several fascicles of spikelets; achene base broadly rounded to truncate; [of tidal freshwater to brackish marshes or outer coastal plain calcareous savannas] ..... ***Cladium jamaicense***

1 Plants 0.4-1 m tall, relatively delicate, from creeping rhizomes, forming loosely tufted colonies; leaves 1-3 dm long, 1-3 mm wide, flat to channeled (terete apically), margins only slightly scabrous; inflorescence 0.5-3 dm long, of 2-4 umbelliform cymes, the branches rigidly ascending and bearing simple glomerules of spikelets; achene base squarely truncate to slightly flaring; [of Coastal Plain acidic seepages and tidal freshwater to slightly brackish marshes, Mountain fens or bogs] ..... ***Cladium mariscoides***

Cladium jamaicense Crantz. SAWGRASS. **Hab:** In circumneutral to alkaline situations, including brackish marshes, and rarely inland in pine savannas underlain by coquina limestone (NC) or in salt glades (s. AR). **Dist:** Se. VA south to s. FL, west to sc. AR and e. TX; West Indies. **Phen:** Jul-Oct. **Tax:** *C. jamaicense* is sometimes treated as one component (*C. mariscus* ssp. *jamaicense*) of a multi-continental *C. mariscus* complex. Unresolved taxonomic issues also relate to the circumscription of *C. jamaicense* and *C. californicum* (S. Watson) O'Neill, particularly as regards inland populations in the sw. United States and n. Mexico, extending east to the Edwards Plateau in TX. **Comm:** This is, of course, the famous sawgrass which dominates many square miles in the Everglades of s. FL (where underlain by oolite). The leaves can cut flesh or clothing. **Syn:** = Ar, Bah, C, ETx1, F, FNA23, G, GW1, RAB, Tx, Va, WH3; = *Mariscus jamaicensis* (Crantz) Britton – S; < *Cladium mariscus* (Linnaeus) Pohl ssp. *jamaicense* (Crantz) Kükenthal – K1, K3, K4, NcTx.

Cladium mariscoides (Muhlenberg) Torrey. TWIG-RUSH, FEN-SEDGE, SMOOTH SAWGRASS. **Hab:** In strongly acidic to circumneutral situations, including acidic seepage at the margins of brackish marshes, in wet flats under *Pinus serotina* and *Taxodium ascendens* (Gaddy & Rayner 1980), in mucky seepage bogs in the fall-line sandhills, in peaty fens and bogs in the Mountains (especially over mafic or ultramafic rocks, such as amphibolite), in oligohaline tidal marshes and interdune ponds. **Dist:** NL (Newfoundland) west to SK Widespread and rather common north of the glacial boundary, with scattered and disjunct occurrences southward in VA, NC, SC, GA, Panhandle FL, n. KY (Clark et al. 2005), s. AL, se. MS (Sorrie & Leonard 1999), and e. TX. **Phen:** Jul-Sep. **Comm:** Bridges, Orzell, & Burkhalter (1993) discuss in detail the phytogeography of this plant, particularly in reference to its southern occurrences, which are curiously fragmented and disjunct. **Syn:** = C, ETx1, F, FNA23, G, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, Va, W, WH3; = *Mariscus mariscoides* (Muhlenberg) Kuntze – S. NatureServe G5 (Secure).



Cyperus Linnaeus 1753 (UMBRELLA SEDGE)

Contributed by John C. Kees, Richard Carter, and Alan S. Weakley

A genus of about 600-700 species, herbs, of tropical and warm temperate areas. The circumscription of *Cyperus* has been expanded recently to include a number of genera found to be phylogenetically embedded within it, notably (for our area), *Kyllinga*, *Lipocarpha*, *Oxycaryum*, and *Remirea* (Larridon et al. 2011a, 2011b, 2011c, 2014; Bauters et al. 2014; Reynders 2011). References: Bauters et al (2014); Bruhl & Tucker (2002) in FNA23 (2002b); Bruhl (2002b) in FNA23 (2002b); Bryson & Carter (1992); Bryson & Carter (1994); Bryson et al (1996); Bryson et al (1997); Bryson, Maddox, & Carter (2008); Carter

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

& Bryson (1991); Carter & Bryson (2000); Carter & Jarvis (1986); Carter & Jones (1997); Carter & Kral (1990); Carter & Mears (2000); Carter (1988); Carter (1990); Carter (1993); Carter et al (1996); Carter et al (1999); Carter et al (2016); Carter, Allen, & Lewis (2009); Carter, Baker, & Morris (2009); Carter, Bryson, & Lipscomb (1987); De Castro et al (2015); Delahoussaye & Thieret (1967); Goetghebeur in Kubitzki (1998b); Goetghebeur & Van den Borre (1989); Goetghebeur & Van den Borre (1989); Jones, Wipff, & Carter (1996); Larridon et al (2014); McKenzie et al (1998); Reid (2016); Reid et al (2017); Reid, Carter, & Urbatsch (2014); Rosen et al (2012); Rosen, Carter, & Bryson (2006); Schippers, Ter Borg, & Bos (1995); Tucker & Gandhi (2019); Tucker (1983); Tucker (1984); Tucker (1987); Tucker (1994); Tucker (2002a) in FNA23 (2002b); Tucker (2002b) in FNA23 (2002b); Tucker, Marcks, & Carter (2002) in FNA23 (2002b); Wipff & Jones (1994).

Identification Notes: This treatment draws heavily on Tucker, Marcks, & Carter in FNA (2002b) and other sources for detailed measurements. Several of the major subgenera (*Pycnostachys*, *Cyperus*, *Pycreus*) used in the keys are not monophyletic as currently circumscribed (Reid 2016, Larridon et al. 2014). To facilitate field identification, characters which can be readily observed with a hand lens or in macro photos are emphasized in the key; however, a dissecting scope with magnification of 40-50× is useful for detailed examination of individual scales and achenes, and microscopic characters are often used as secondary characters and for closely related species. Mature fruiting material is required for reliable identification of *Cyperus* species. Because of the indeterminate growth of spikelets, florets can usually be found near the spikelet apex. The culm (main stem) in *Cyperus* species ranges from trigonous (triangular in cross-section, with flat or convex faces) or triquetrous (sharply triangular in cross-section, with concave faces), to nearly terete (circular in cross-section), and is terminated by a whorl of leaflike bracts, subtending an inflorescence of 1-many spikelets. Spikelets consist of 1-many floral scales (referred to as glumes in some treatments) arranged along a rachilla that may be winged; each floral scale subtends a single bisexual (usually) floret with perianth 0, stamens 1-3, and a pistil with a 2-3-branched style. Characters related to scale posture are based on fruiting material; in some species, particularly sect. Laxiglumi, scales are initially appressed and spread, the spikelet becoming compressed, as the achenes mature. Scales may be deciduous (falling from the rachilla at senescence with the achenes) or persistent (remaining attached to the rachilla); rachillas may be persistent (remaining attached to the plant) or deciduous (articulating at or near the base or below each scale). Scales have a thickened midrib that may be bicarinate (2-keeled) basally or project apically as a mucro, cusp, or awn, and 0-many lateral nerves (veins). Achene surfaces (at 40-50×) may be smooth, reticulate, papillose, or puncticulate (pitted); the achene may be sessile, short-stipitate, or have an enlarged spongy base; the style base may persist as a minute apiculus or longer beak. Cyperus often have highly branched inflorescences. Spikelets may be borne in spikes along an elongate rachis, or in digitate clusters or glomerulate or umbellate heads. These spikes, heads, or other clusters may be sessile or borne at the end of rays (pedunculate), in some species with 3 or 4 orders of branching. The plant base is often helpful for identification, as some species reproduce vegetatively from scaly, indurate rhizomes; slender, subterranean stolons, often terminated by tubers; proliferous spikelets; or enlarged, cormose culm bases.

Unkeyed taxa: *Cyperus squarrosus var. squarrosus*

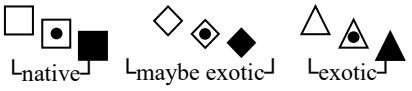
1 Floral scales spirally imbricate.
  3 Spikelets many, in densely globose to pyramidal heads, these borne on elongate rays or sessile; rhizomatous perennials, forming extensive floating mats; [section *Oxycaryum*]..... ***Cyperus blepharoleptos***
  3 Spikes [actually consisting of numerous highly reduced, spirally imbricate spikelets each with 1-2 (-3) scales] 1-5, terminal and capitate on the culm; terrestrial, often diminutive annuals; [subgenus *Lipocarpha*]..... ***Key A***
1 Floral scales 2-ranked and distichously imbricate.
  4 Spikelets reduced, 1(-2)-flowered with 2-3 scales, flattened, ovoid or lanceoloid, mostly < 5 mm long; rays absent, spikes 1-4, very dense, ovoid to oblong; stigmas 2; achenes biconvex; [subgenus *Kyllinga*]..... ***Key B***
  4 Spikelets 1-many-flowered (if all only 1-3-flowered then subterete to quadrangular in cross-section and ellipsoid to linear); rays present or absent, inflorescence mostly not as above.
    5 Stigmas 2; achenes laterally flattened, lenticular (to compressed-subterete), borne with an edge to the rachilla, spikelets thus laterally flattened. ..... ***Key C***
    5 Stigmas 3 (2 in subg. *Juncellus* species, sometimes 2 and 3 in *C. alopecuroides*); achenes either trigonous or dorsiventrally compressed and borne with a face to the rachilla; spikelets terete or quadrangular to strongly compressed-quadrangular or compressed-subterete.
      7 Rachilla corky-thickened, transversely articulated at the base of each scale, the spikelets at maturity separating into 1-fruited dispersal units, each with 1 scale, the rachilla segment and wings, conspicuously clasping the achene (spikelets visibly "jointed", at maturity breaking apart); spikelets linear, terete or scale tips slightly spreading. ..... ***Cyperus odoratus var. odoratus***
      7 Rachilla not transversely articulated; scales persistent or deciduous; rachilla wings present or absent, not corky, clasping the achene or not; spikelets ovoid to linear, compressed, quadrangular, or terete.
        10 Spikelets in dense glomerulate heads or digitate clusters, the rachis essentially absent; spikelets strongly laterally compressed; [subgenus *Pycnostachys*]..... ***Key D***
        10 Spikelets in spikes (sometimes sessile and capitate), arranged along a well-developed rachis, this sometimes obscured but evident upon dissection; spikelets quadrangular or terete to moderately compressed. ..... ***Key E***

Key A - Key to subgenus *Lipocarpha*

1 Inflorescence terminal, the bracts 2-3, deflexed to ascending; spikes (1-) 2-5, each 2-10 (-12) mm long; achenes narrowly obovoid, 3.3-5× as long as wide; anthers ca. 0.25 mm long, or longer; [section *Lipocarpha*] ..... ***Cyperus neotropicalis***
1 Inflorescence appearing lateral, the bracts 1-2 (-3), the longest held vertical and appearing as a continuation of the culm; spikes 1-2 (-3), each 1-5 (-8) mm long; achenes obovoid or ellipsoid, 1.5-2.5× as long as wide; anthers 0.1-0.2 mm long. ..... ***Cyperus subsquarrosus***

Key B - Key to subgenus *Kyllinga*

1 Scale keel conspicuously winged, laciniate; anthers 2 mm long; achenes ca. 1.2 mm wide, ovate to nearly orbicular; fibrous-rooted annual; [section *Kyllinga*]..... ***Cyperus metzii***
1 Scale keel toothed or entire; anthers <2 mm long; achenes 0.5-1 mm wide, elliptic to obovate or oblong; perennials (except *C. hortensis*); [section *Brevifoliae*].
  2 Plants with culms arising singly along a scaly, creeping rhizome; spikes green.
    3 Central spike 8-10 mm wide, globose, solitary; inflorescence bracts deflexed to spreading (divaricate); style 0.6-1.2 mm long; anthers 2-3; scale keel entire..... ***Cyperus brevifolioides***

Key to Map Symbology: 

3 Central spike 3-7 mm wide, ovoid to oblong, often branched; longest inflorescence bract held vertical on most culms; style 1.8-2.2 mm long; anther 1; scale keel denticulate ..... ***Cyperus brevifolius***

2 Plants cespitose or with very slender, easily broken stolons and cormose culm bases; spikes white (except *C. hortensis*).

4 Spikes green; plants cespitose, fibrous-rooted annuals; scale keels denticulate; achene light brown, oblong, 2× as long as wide ..... ***Cyperus hortensis***

4 Spikes whitish; plants cespitose or stoloniferous perennials; scale keels entire; achenes various. ..... ***Cyperus sesquiflorus***

Key C - Key to subgenus *Pycreus* – stigmas 2; achenes lenticular; achenes laterally flattened, borne with an edge toward the rachilla

1 Scales awned or cuspidate, cusp 0.3-0.5 mm long, excurved; achenes 0.6 mm long; [section *Pumili*] ..... ***Key ZA***

1 Scales obtuse to slightly mucronate, apex not notably excurved; achenes (0.7-)1-1.6 mm long.

2 Floral scales divaricate (thus the spikelet margin appearing coarsely dentate), with whitish or hyaline margins; coarse, erect plants 30-75cm tall, inflorescence diffuse; [section *Albomarginati*] ..... ***Cyperus flavicomus***

2 Floral scales with tips appressed (proximal sometimes spreading in *C. polystachyos*), lacking hyaline border; plants mostly smaller.

3 Achenes oblong, subterete, often only slightly compressed, apex truncate, apiculate; scales 3-5-nerved; spikelets mostly <2 mm wide (except *C. filicinus*); [section *Pycreus*].

4 Scales 2.5-3.6 mm long, 1.6-1.8 mm wide; achenes 1.2-1.6 mm long, 0.6-0.9 mm wide, narrowly obovoid; [beaches, maritime habitats] ..... ***Cyperus filicinus***

4 Scales 1.3-2.4 mm long, 1.0-1.4 mm wide; achenes 0.8-1.2 mm long, 0.4-0.6 mm wide; [habitats various] ..... ***Cyperus polystachyos***

3 Achenes ovoid, ellipsoid, or obovoid, biconvex, apex rounded to acute; scales bicarinate medially; spikelets mostly > 2mm wide.

6 Achenes black to dark reddish brown, with encrusted transverse whitish lines, epidermal cells longitudinally elongate, rectangular; scales pale brown or yellowish, the dark achenes strongly contrasting and visible through the spikelets in life (without backlighting); fibrous-rooted annuals; [section *Zonati*]..... ***Cyperus flavescens***

6 Achenes black to brownish, without transverse lines, epidermal cells square or isodiametric; plants either perennials or scales darker.

7 Scales uniformly pale yellowish to yellowish brown; cespitose perennials, rhizomes short; [section *Propinqui*]. ..... ***Cyperus lanceolatus***

7 Scales with anthocyanic (reddish-brown or purplish) pigmentation; fibrous-rooted annuals (except *C. sanguinolentus*); [section *Vestiti*].

9 Floral scales firmer, subcoriaceous, not bilaterally sulcate; reddish pigmentation ±uniformly distributed or concentrated basally and medially; floral scales 2.5-3 mm long; annuals, culms usually <25 (35) cm long ..... ***Cyperus bipartitus***

9 Floral scales membranous, each side with a narrowly elliptic, shallow, pale, translucent groove outlined at least marginally by reddish pigmentation; floral scales 1.8-2.7 mm long; annuals or perennials.

10 Cespitose annuals, culms usually < 25 (-35) cm tall; stamens 2; style divided nearly to base; style branches conspicuously exserted beyond floral scale, exposed portions about as long as floral scale ..... ***Cyperus diandrus***

10 Rhizomatous perennials, culms usually > 25 cm tall; stamens 3; style divided less than half its length; style branches not so conspicuously exserted, exposted portions less than half as long as floral scale ..... ***Cyperus sanguinolentus***

Key D - Key to subgenus *Pycnostachys* -- stigmas 3; achenes trigonous; rachis essentially absent, spikelets borne in digitate clusters or in umbellate or glomerulate heads

1 Scales cuspidate, with an excurved, awnlike tip (0.3-) 0.5-1 (-1.3) mm long ..... ***Key ZA***

1 Scales rounded to minutely mucronate (mucro <0.3mm), incurved to excurved.

2 Leaves mostly reduced to bladeless sheaths; inflorescence bracts 18-22 subequal, large and conspicuous; [the "umbrella sedge" common in the nursery trade]; [section *Alternifolii*] ..... ***Cyperus involucratus***

2 Leaf blades present (absent in *C. haspan* and *C. prolifer*); inflorescence bracts 2-10 (rarely more, then markedly unequal).

3 Scales with 1 central nerve on back, 2-keeled in lower 30-60%, nerves absent elsewhere or scales with 1 lateral rib on each side; spikelets with scales closely overlapping, aggregated into numerous dense glomerulate heads borne on elongate rays; [section *Luzuloidei*] ..... ***Key ZB***

3 Scales conduplicate their entire length, or broadly rounded on back, not 2-keeled as above, 5-11 nerved, medially 3-nerved, or occasionally with 2 indistinct lateral ribs and a single main keel nerve; spikelets in loose digitate clusters, or inflorescence congested into a single capitate cluster; [sections *Fusci*, *Haspani*, and *Diffusi*] ..... ***Key ZC***

Key E - Key to subgenus *Cyperus* – stigmas 3; achenes trigonous; spikelets borne in spikes on a well-developed rachis; rachilla continuous, or articulate only at the base

3 Spikelets quadrangular to subterete, 1-1.5× as wide as thick; floral scales 1-8, persistent and tightly appressed (rarely slightly ascending); rachilla articulate at the base, the whole spikelet falling as a unit at maturity ..... ***Key ZD***

3 Spikelets compressed-quadrangular or compressed-subterete, mostly 2× or more as wide as thick (less compressed in *C. erythrorhizos* and some forms of *C. esculentus* and *C. rotundus*); scales 1-many, deciduous or persistent; rachilla persistent or deciduous after the scales.

4 Spikes long-cylindric, with (25-) 35-80+ spikelets, and well-developed branches or 2nd order rays; scales deciduous, minute, (1.1-) 1.3-1.8 mm long, (6-) 12-20 (-30) per spikelet; spikelets quadrangular, slightly compressed (subterete in *C. alopecuroides*); achenes (0.4) 0.7-1 (-1.2) mm long, often moderately dorsiventrally compressed or plano-convex; plants coarse perennials, culms 5-25 dm tall, 5-50 mm in diameter (*C. erythrorhizos* keyed under both leads). ..... ***Cyperus erythrorhizos***

4 Spikes not as above; scales persistent or deciduous, mostly > 1.8 mm long (except sections *Iriodei* and *Aristati*); achenes > 1 mm long, trigonous (dorsiventrally compressed in *C. nipponicus* and *C. serotinus*); culms mostly < 10 dm tall, < 7.5 mm in diameter (except *C. prolixus*).

8 Scales strongly 5-nerved, obovate-orbiculate, 1-1.5 mm long, divaricate, scarcely overlapping, apex emarginate and mucronulate; style < 0.1 mm long; inflorescence diffuse, secondary rays present, spikelets widely spaced on elongate rachises; [weedy exotics]; [section *Iriodei*] ..... ***Cyperus iria***

8 Scales variously nerved, but at least 1.8 mm long (if shorter, with an excurved cusp > 0.5 mm long), not emarginate; style at least 0.5 mm long; inflorescence generally more congested.

Key to Map Symbology:

* : waif N : no X : extirpated
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H : historic ? : questionable

10 Scales cuspidate to awned, midrib excurrent at least 0.3 mm, conspicuously excurved (straight in *C. compressus* and *C. nipponicus*); plants either diminutive fibrous-rooted annuals, culms often decumbent, or cespitose perennials (section *Elegantes*) with involute leaves and vegetative parts viscid (sticky)..... ***Key ZA***

10 Scales acute, midrib not notably projecting, apices not excurved; plants erect, rhizomatous, stoloniferous, cormose-based, or cespitose perennials, vegetative parts not viscid, leaves plane or V-shaped (cuspidate perennial species also keyed above).
..... ***Key ZE***

Key ZA - Key to *Cyperus* of various affinities -- Scales cuspidate to awned

1 Leaves, bracts, and culms viscid (sticky); leaves involute; achenes (1.4-) 1.8-2.4 mm long, either with an elongate beak or a whitish overlay and spongy stipitate base; relatively robust plants, culms 1-7 dm tall; [subgenus *Cyperus*, section *Elegantes*]
2 Scales 6-22, with stout, slightly excurved mucros 0.2-0.3 mm long at apex; achenes black to reddish-brown (1.4-) 1.8-2 mm long × 0.91 mm wide, broadly obovoid, surfaces with a whitish-gray overlay (sometimes sloughing off in age)..... ***Cyperus elegans***
2 Scales 10-20 (-40), with cusps 0.2-0.8 mm ;png, usually narrow, awn-like and recurved at least in the upper scales; achenes brown, 2-2.4 mm long × 0.5-0.8 mm wide, narrowly obovoid..... ***Cyperus oxylepis***

1 Plants not viscid; leaves flat or V-shaped; achenes 0.6-1.5 mm long, without a spongy stipe or whitish overlay, obtuse to apiculate, not beaked; mostly diminutive annuals.
5 Longest inflorescence bract vertical, appearing as a continuation of the culm; scales with stout, excurved, mucronate apices at most 0.3 mm long; scales with 1 central keel, bicarinate in the basal 1/3, otherwise nerveless or with 2 obscure lateral ribs; [subgenus *Pycnostachys*, section *Luzuloidei*]..... ***Cyperus acuminatus***
5 Longest inflorescence bract ascending; scales with narrow, awnlike cusp (0.3-) 0.5-1 (-1.3) mm long; scales not bicarinate in the basal 1/3, conduplicate to broadly rounded, variously nerved.
7 Floral scales weakly 3-9-nerved, laterally greenish to whitish; scale tips with straight to slightly excurved cusp at most 0.7 mm long; achenes broadly obovoid (*C. compressus*) or oblong-obovoid, dorsiventrally compressed (*C. nipponicus*).
..... ***Cyperus compressus***
7 Floral scales strongly (5-) 7-13-nerved nearly to the margins, or medially 3-ribbed, often orange to reddish brown laterally at maturity; scale tips with conspicuously excurved cusp 0.5-1 (-1.3) mm long; achenes narrowly ellipsoid to oblong, trigonous.
9 Scales 3-ribbed medially; spikelets in loose digitate clusters, the rachis essentially absent; achenes 0.5-0.6 mm long, coarsely papillose; [subgenus *Pycnostachys*]..... ***Cyperus cuspidatus***
9 Scales strongly (5-) 7-13-nerved nearly to margins; spikelets in dense ovoid spikes, rachis obscured by spikelets but well-developed; achenes 0.7-1.2 mm long, puncticulate or minutely papillose; [subgenus *Cyperus*, section *Aristati*].
..... ***Cyperus granitophilus***

Key ZB - Key to *Cyperus*, subgenus *Pycnostachys*, section *Luzuloidei* -- Spikelets in glomerulate heads; scales with midrib bicarinate in basal 1/3, laterally nerveless or 2-ribbed.

1 Culms triquetrous (sharply trigonous with concave faces), harshly retrorsely scabrid on the angles (very rarely smooth); leaf blades, sheaths and bracts nodulose, with cross-ribs between veins.
2 Inflorescence congested, primary rays 3-5, secondary and tertiary rays absent; scales ovate, 1.4-1.6 mm long; spikelets 1.5-2.2 mm wide, in dense globose clusters; achenes 1.0-1.2 mm long, < 0.7× as long as the subtending floral scale..... ***Cyperus drummondii***
2 Inflorescence broad, diffuse, primary rays 6-12, secondary and often tertiary rays present; scales oblancolate, (1.3-) 1.5-2.0 (-2.4) mm long, spikelets 2-3.2 mm wide, in hemispheric to irregularly globose clusters; achenes 1.2-1.5 mm long, at least 0.7× as long as the subtending floral scale ..... ***Cyperus virens***

1 Culms not scabrid on the angles, smooth or slightly scabrous across the faces, obtusely trigonous to nearly terete, rarely with only slightly concave faces; leaf blades and bracts not nodulose.
3 Bracts 1-3, < 3 mm wide, the largest erect, appearing as a continuation of the culm; culms slender, 1-2 mm in diameter; plants cespitose, fibrous-rooted annuals (perennial in *C. reflexus*).
4 Scales yellowish green or straw-colored, sometimes with an orange tinge, apices incurved to straight; stems and rays scabridulous with retrorse prickles, rough to the touch (rarely with only a few prickles); spikelet clusters mostly loosely and irregularly fasciculate..... ***Cyperus surinamensis***
4 Scales either dark reddish-brown laterally, often with contrasting green keels or mucronate and conspicuously excurved apically; culms glabrous (rarely scabridulous in *C. acuminatus*); spikelet clusters densely globose to ovoid or pyramidal.
5 Scales slightly to strongly excurved apically, mucronate, greenish or stramineous, or sometimes light orange-brown laterally, but this grading evenly into the greenish or yellowish medial portion; achenes papillose, broadly ellipsoid; plants annual, rhizomes absent; heads hemispheric to globose..... ***Cyperus acuminatus***
5 Scales slightly excurved to incurved apically, acute, deep reddish-brown laterally at maturity, abruptly greenish or yellowish on the keels; achenes rugulose or reticulate, ellipsoid to oblong; plants perennial, rhizomes present (inconspicuous); heads very densely ovoid to pyramidal..... ***Cyperus reflexus***
3 Bracts (3-) 6-12, the larger > 3 mm wide, spreading to ascending; culms coarser, 2-5 mm in diameter; plants rhizomatous or cespitose perennials.
7 Spikelets elliptic to orbiculate-ovate, ≤ 5 mm long, very densely packed in subglobose, lobulate heads; achenes linear, 4-5× as long as wide, falcate; scales oblong-spatulate, (1.5-) 2-2.5 mm long, apices often excurved..... ***Cyperus pseudovegetus***
7 Spikelets lanceolate to linear, usually > 5 mm long, heads usually looser; achenes narrowly to broadly ovoid or ellipsoid, not falcate, < 4× as long as wide; scales ovate to lanceolate, to 2 (-2.3) mm long, apices straight to incurved (excurved in *C. eragrostis*).
8 Scales declined 60-90 degrees from the rachilla, blunt, incurved; achenes ellipsoid, < 3× as long as wide, narrowed to a distinct stipe; achene surfaces distinctly honeycomb-reticulate, often iridescent..... ***Cyperus ochraceus***
8 Scales declined 30-45 (-60) degrees from the rachilla; achenes very narrowly ellipsoid, 3-4× as long as wide, stipe absent to poorly developed (ellipsoid with distinct stipe in *C. eragrostis*); achene surfaces dull, smooth to puncticulate or obscurely reticulate.
9 Spikelets > 3 mm wide; scales 2-2.3 mm long, excurved apically; heads 20-40 mm in diameter, densely globose, lacking secondary rays; achenes broadly ellipsoid, < 2.5× as long as wide, with a distinct stipe..... ***Cyperus eragrostis***
9 Spikelets < 3 mm wide; scales < 2 mm long, incurved to straight; heads mostly ≤ 20 mm in diameter, usually with secondary rays; achenes narrowly ovoid or ellipsoid, 3-4× as long as wide, stipe absent.
10 Culms smooth (or rarely with sparse retrorse prickles); plants robust perennials, with thick deeply set rhizomes; culms mostly >5 dm tall, bases purplish black; floral scales diverging about 30 degrees from the rachilla, pale green; heads usually tightly globose ..... ***Cyperus entrerianus***

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10 Culms scabrid (at least apically) with abundant retrorse prickles; plants short-lived cespitose perennials, rhizomes absent; culms mostly < 5 dm tall, bases reddish or brownish; floral scales usually diverging at least 45 degrees from the rachilla, yellowish to yellowish-green; heads mostly loosely and irregularly fasciculate, with flattened spikelets fanned out like a deck of cards..... ***Cyperus surinamensis***

Key ZC - Key to *Cyperus*, subgenus *Pycnostachys*, sections *Fusci*, *Diffusi*, and *Haspani* -- Spikelets in digitate clusters or glomerulate heads; scales broadly rounded or conduplicate

1 Scales orbiculate or broadly obovate, to 1.1 mm long and wide, about as broad as long, minutely mucronate at the tip ("bead-like"); achenes 0.6-0.9 mm long × 0.3-0.4 mm wide, not much exceeded by the scales; plants fibrous-rooted annuals; [sect. *Fusci*]
..... ***Cyperus difformis***

1 Scales ovate to lanceolate, (1.1-) 1.6 mm long or longer, mucronate or not; achenes, if < 1.5 mm, much exceeded by (<1/2 the length of) the scales; plants perennial, often with cormose bases, stolons, or rhizomes.

3 Leave involute; live plants viscid; scales with a mucronate to cuspidate apex at least 0.2 mm long, usually excurved; achenes with beaks 0.5-1.2 mm long or a whitish overlay and spongy stipitate base; [subgenus *Cyperus*, section *Elegantes*; keyed here as failsafes] ..... ***Key ZA***

3 Leaves flat or V-shaped; live plants not viscid; scales obtuse to acute (minutely mucronate in *C. dentatus*); achenes at most 1 mm long (longer in the obscurely spicate subg. *Cyperus* species keyed here as failsafes), without a beak or spongy stipitate base.

5 Spikelets in dense spikes, inflorescence often capitate; scales divaricate at maturity, rounded on the keel, weakly 5-13-nerved; achenes (1-) 1.4-2.5 mm long; plants mostly with hardened cormose culm bases, sometimes also rhizomatous; [dry, sandy habitats]; [subgenus *Cyperus*, section *Laxiglumi*; keyed here as failsafes]..... ***Key ZE***

5 Spikelets in loose digitate clusters, rays elongate (except some forms of *C. haspan*); scales closely appressed, conduplicate and weakly 1-3 (-5)-ribbed; achenes 0.3-1 mm long; plants stoloniferous or rhizomatous; [mostly in wetlands]; [section *Haspani*]

6 Leaf blades usually absent; bracts 2 (-4), usually much reduced; achenes 0.3-0.6 mm long, globose to obovoid.
..... ***Cyperus haspan***

6 Leaf blades present; bracts 3-5, well-developed and often exceeding the inflorescence; achenes 0.7-1 mm long.

8 Scales 2-2.5 mm long × 1.2-2 mm wide, ovate or broadly elliptic, 3-26 (-50) per spikelet, minutely mucronate, sometimes excurved; spikelets ovate to linear, straight, light brown to reddish-brown laterally with greenish midribs; plants with stolons terminated by tubers, and often proliferous spikelets ...
..... ***Cyperus dentatus***

8 Scales 2.5-3 mm long × 1-1.8 mm wide, relatively narrowly ovate-elliptic, 20-60 per spikelet, blunt and incurved; spikelets lanceolate to linear, often contorted, pale yellowish at maturity; plants with stolons, lacking tubers or proliferous spikelets..... ***Cyperus lecontei***

Key ZD - Key to *Cyperus*, subgenus *Cyperus* -- Spikelets quadrangular to subterete; scales 1-8, persistent rachillas deciduous, articulate as the base

1 Culms, rays, and leaves bluish-glaucous, papillose; leaves harshly scabrid on margins and midrib; spikes with numerous well-developed branches or secondary rays; spikelets dark reddish brown at maturity ..... ***Cyperus ligularis***

1 Culms, rays, and leaves green, not papillose; leaves glabrous to scabridulous; spikes solitary or with a few reduced basal branches; spikelets various.

2 All but the uppermost spikelets strongly (-weakly in some forms of *C. hystricinus*) reflexed; scales (3.8-) 4-4.9 (-5.4) mm long, terminal involute and prolonged distally, midrib often bent downward; achenes linear to linear-oblong, (2.2-) 2.5-3 (-2.3) mm long; [section *Umbellati*, subsection *Longistylis*, *C. retrofractus* complex]

3 Spikes mostly at least 2× as long as wide, slightly (or not) narrowed to base, spikelets reflexed to spreading; culms, leaves, and bracts glabrous except for marginal prickles on leaves and bracts; rachilla wing clasping achene for its entire length (concealing it in abaxial view); floral scales golden-brown when mature..... ***Cyperus hystricinus***

3 Spikes mostly about as long as wide and strongly narrowed to the base, spikelets reflexed; culms scabrous, bracts scabridulous and also often hirtellous; rachilla wing clasping achene for <3/4 its length; floral scales greenish to brown or reddish-purple-striped.

4 Rays scabrid throughout their lengths; leaves and bracts puberulent; longest ray equal to or longer than the longest bract; culms roundly trigonous to subterete; terminal scale spinose distally; scales 1-2 (-3); spikes tight, burlike, turbinate..... ***Cyperus plukenetii***

4 Rays glabrous or rarely with a few hairs just below the spike; leaves and bracts with hairs confined to abaxial midrib; longest ray shorter than longest bract; culm sharply trigonous; terminal scale involute but not spinose; scales (2-)3-6; spikes often loose, sometimes more elongate .....
..... ***Cyperus retrofractus***

2 Spikelets ascending to spreading, or reflexed in the lower half of spike; scales 1.8-5.3 mm long, terminal scale not modified as above; achenes ellipsoid to narrowly oblong, 1.2-2.4 (-2.6) mm long (linear-oblong in *C. refractus*).

5 Spikes densely cylindric, all sessile or 1-3 (-5) lateral spikes on short horizontal rays; spikelets ellipsoid (rarely oblong-ellipsoid), with 1-2 (-4) scales; [section *Umbellati*, subsection *Brevistyli*].
..... ***Cyperus aggregatus***

5 Spikes oblong to ovoid (cylindric in *C. tetragonus*), primarily on well-developed rays; spikelets oblong-lanceoloid to linear, with (1-) 2-8 scales.

7 Spikelets very closely spaced, obscuring the rachis in life and when pressed; [section *Umbellati*, subsection *Brevistylis*]

8 Spikes broadly and appearing (because of longer spikelets) relatively loosely ellipsoid to ovoid-cylindric, 2.5-7 cm long × 1.5-6 cm wide; spikelets (11-) 12-25 (-28) mm long; achenes 2.2-3 mm long (if < 2.5 mm long, noticeably falcate).

9 Spikes dense, ellipsoid to obovoid, convex, with 50-90 spikelets; scales 3-6 (-7), each 4-4.6 mm long, not red-purple striate; achenes 3-4× as long as wide, falcate..... ***Cyperus lancastriensis***

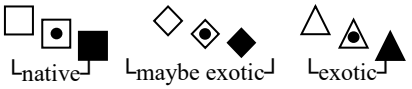
9 Spikes loose, broadly ovoid or ellipsoid to ovoid-cylindric, with 13-75 spikelets; scales 4-8(-11), each 4.5-5.3 mm long, red-purple striate; achenes 4-5× as long as wide, straight..... ***Cyperus refractus***

8 Spikes tightly globose or to oblong, not more than 2.5 cm long or 2 cm wide; spikelets 2-8 mm long; achenes < 2.3 mm long, straight.

10 Spikes uniformly convex throughout, globose or globose-ellipsoid, so dense as to appear nearly smooth in silhouette; scales 3.5-4.6 (-4.8) mm long, acute..... ***Cyperus echinatus***

10 Spikes cylindric, oblong, ellipsoid, or ovoid, mostly less dense; scales 1.8-3.6 mm long (or, if longer, mucronate).

11 Terminal scale of spikelet reduced, sterile, involute, with a minute but distinct mucro to 0.3 mm long, usually uncinate (hooked); fertile scales (if more than one) not overlapping on the same side of the rachilla, usually red-brown or orangeish laterally at maturity; leaf blades 1-3 mm wide; [*Cyperus retroflexus* complex]

Key to Map Symbology: 

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12 Fertile floral scales 1.9-3.0 (-3.3) mm long; rachilla wing usually membranaceous throughout; rachilla lacking lateral nerves; longest spikelets 2.8-5.8 (-8.0) mm long; terminal sterile floral scale of spikelet often much reduced, less than 2/3 the length of fertile floral scales; longest peduncle less than 2.7 (-3.9) cm long; plants diminutive, culms 3-35 (-45) cm tall..... ***Cyperus retroflexus var. pumilus***

12 Fertile floral scales (2.8-) 3.0-3.9 mm long; rachilla wing usually chartaceous beyond clasped achene angle, border membranaceous; rachilla with two lateral nerves, one along each side of the median; longest spikelets 4.9-9.0 (-11.3) mm long; terminal sterile floral scale usually not greatly reduced, 2/3 or more the length of fertile floral scales; longes peduncle (0.5-) 2.4-6.8 cm long; plants more robust, culms usually >25 cm tall..... ***Cyperus retroflexus var. retroflexus***

11 Terminal scale of spikelet not differentiated; scales acute, greenish-hyaline to brownish or straw-colored laterally; scales overlapping; leaf blades 1.5-5 mm wide.

13 Spikes relatively loosely ovoid, 8-20 mm wide, with (5-) 10-50 (-70) spikelets, lacking basal branches; spikelets (2.2-) 3.5-10 mm long, angular in ×-section, greenish-hyaline to pale yellow-green; bracts horizontal..... ***Cyperus croceus***

13 Spikes densely oblong-ellipsoid to ovoid, 6-8 (-10) mm wide, with (13-) 30-200 (-274) spikelets, occasionally with short basal branches; spikelets 2.2-4 (-4.5) mm, subterete, straw-colored to brown at maturity; bracts horizontal or ascending to erect; [*Cyperus retrorsus* complex]

14 Achenes oblong-fusiform, stipitate, narrowed to both ends; spikes densely oblong to oblong-cylindric, often 3× or more as long as wide; scales ascending (the tips free), usually straw-colored; bracts horizontal..... ***Cyperus ovatus***

14 Achenes oblong, usually abruptly constricted at the ends; spikes ovoid to oblong, to 2× as long as wide (rarely longer in *C. retrorsus*); scales appressed, usually reddish-brown at maturity; bracts ascending to erect (sometimes horizontal in *C. nashii*).

15 Spikes > 1.5× as long as wide, each with (42-) 50-200 (-274) spikelets; achenes 0.4-0.5 (-0.6) mm wide; stems moderately cespitose; [widespread and weedy]..... ***Cyperus retrorsus***

15 Spikes < 1.5 × as long as wide, each with (13-) 30-92 spikelets; achenes 0.5-0.7 mm wide; stems single to slightly cespitose; [Florida scrub, northward and westward in coastal dunes]
..... ***Cyperus species 1***

7 Spikelet attachments spaced apart at least proximally, rachis not obscured when pressed and usually also visible in life.

17 Fertile floral scales 1-3 (-5), not overlapping on the same side of the spikelet (if more than one); terminal scale reduced, sterile and involute, mucro usually uncinate; achenes (1.7-) 1.9-2.6 mm long; [section *Umbellati*, *Cyperus retroflexus* complex]
..... ***Cyperus retroflexus var. retroflexus***

17 Fertile floral scales 3-8, reaching the next scale or overlapping on the same side of the spikelet; terminal scale not involute and sterile, mucro straight; achenes various.

19 Scales 3.2-5.3 mm long, acute; spikes broadly ovoid-cylindric to ellipsoid, spikelets 5-30mm long; achenes narrowly oblong to linear, 3-6× as long as wide; culm bases cormose.

20 Spikelets ±terete; scales 4.5-5.3 mm long, persistent, laterally reddish brown or tinted with reddish brown if paler and stramineous; achenes usually at least half as long as floral scale; achenes linear-oblong, 2.6-3 mm long, 5-6× as long as wide, > 0.5 mm wide; anthers 1-1.5 mm long; spikes usually broadly and convexly ellipsoid or ovoid, usually unbranched (or rarely with 1-2 reduced proximal branches); [section *Umbellati*, subsection *Brevistylis*] ..... ***Cyperus refractus***

20 Spikelets flattened; scales 3.2-4.5 (-6) mm long, laterally golden yellow to stramineous; achenes less than half as long as floral scale; achenes oblong, (1.5-) 1.8-2.4 mm long, 3-4× as long as wide, < 0.4 mm wide; anthers 0.3-0.5 mm long; spikes usually parallel-sided, ovoid-cylindric, frequently branched; [section *Strigosi*] ..... ***Cyperus strigosus***

19 Scales (2-) 2.5-3.2 (-4) mm long, acute to cuspidate; spikes narrowly cylindric to ovoid, spikelets mostly 4-8mm long (if longer, scales mucronate); achenes ellipsoid, 2-3× as long as wide; culm bases not cormose.

22 Floral scales pale olivaceous to yellowish, not mucronate (rarely with a mucro to 0.1 mm long); spikes cylindric, loose, 6-10 spikelets per 5 mm span of the rachis; culms 0.5-1 mm in diameter; leaves 0.8-2.3 (-3) mm wide; [more widespread]; [section *Tetragoni*].....
..... ***Cyperus thyrsiflorus***

22 Floral scales straw-colored to reddish-brown, acute or mucronate, mucro up to 0.2 mm long; spikes loosely to densely ovoid to oblong, spikelets 8-21 per 5 mm span of the rachis; culms 1-2.6 mm in diameter; leaves (1-) 3-6 (-10) mm wide; [TX].
..... ***Cyperus hermaphroditus***

Key ZE - Key to *Cyperus*, subgenus *Cyperus* of various affinities -- Spikelets compressed; scales deciduous or persistent; rachilla persistent or deciduous after the scales

3 Rachilla wingless (except *C. prolixus* and *C. grayi*); spikelets at maturity 2-4 mm wide, scales divaricate (the spikelet appearing coarsely serrate in outline).

8 Anthers 0.8-1 mm long; achenes 0.5-0.8 mm wide, narrowly oblong; scales usually yellowish to yellowish brown; leaves very narrow, 0.5-2 mm wide .....
..... ***Cyperus filiculmis***

8 Anthers 0.3-0.6 mm long; achenes 0.8-1.2 mm wide, ±ellipsoid; scales usually off-white to pale tan to light reddish brown; leaves often broader, 1-4 mm wide.
..... ***Cyperus lupulinus var. lupulinus***

3 Rachilla winged, wings at least 0.4 mm wide; spikelets at most 2.2 mm wide, scales overlapping, tips closely imbricate, the margin appearing smooth or slightly serrate (some forms of *C. strigosus* have looser scales).

13 Scales 1-1.5 mm long, deciduous; spikes cylindric, with (20-) 40-80+ spikelets, often with secondary rays; fibrous-rooted annuals, but often robust, roots reddish; [sect. *Fastigiati*] ..... ***Cyperus erythrorhizos***

13 Scales 1.8-4.5 (-6) mm, deciduous or persistent; spikes ovoid, with (2-) 3-50 spikelets; stoloniferous, rhizomatous, cormose-based, or (*C. sphacelatus*) cespitose perennials.

14 Plants with cormose culm bases; scales 3.2-4.5 (-6) mm, 3-11 per spikelet, pale greenish-brown to straw-colored, dull; spikelets strongly compressed (at maturity), the scales loosely overlapping, tips spreading; achenes narrowly oblong, (1.5-) 1.8-2.4 mm long; [section *Strigosi*] ..... ***Cyperus strigosus***

14 Plants lacking cormose culm bases; scales 1.8-4 (-4.4) mm long, 6-36 (-42) per spikelet, various; spikelets often only slightly compressed, scales closely imbricate, tips appressed; achenes ellipsoid to oblong, 1.1-2 mm long.

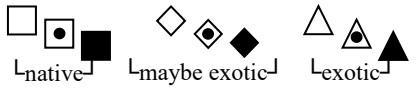
16 Culms terete at least towards the base, nodose-septate, with internal partitions every 5-50 mm, more frequent upwards; leaves usually all reduced to bladeless sheaths; bracts 2 (-4), erect, reduced, mostly < 2 cm long ..... ***Cyperus articulatus***

16 Culms trigonous to rounded-trigonous, not nodose-septate; leaf blades present; bracts (2-) 3-8, spreading to ascending, well-developed.

18 Spikelets (2-) 3-14 per spike, bracts often not exceeding the inflorescence; scales glossy dark purplish, with green keels and hyaline border; culm bases indurate, stolons wiry, horizontal, 1-2 mm in diameter, producing irregular, often elongate tubers ..... ***Cyperus rotundus***

18 Spikelets (3-) 10-28 per spike, bracts exceeding the inflorescence; scales yellowish to dull reddish-brown; culm bases not indurate, stolons spongy, weak, 1 mm in diameter, producing globose tubers; [*Cyperus esculentus* complex].

Key to Map Symbology:



←rare ←uncommon ←common (see introduction for more)

* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable

X : extirpated

20 Style and stigma combined < 4.2mm long; floral scales 1.8-2.7 mm long; anthers (1-) ca. 1.3 (-1.6) mm long..... ***Cyperus esculentus var. leptostachyus***

20 Style and stigma combined > 4.2mm long; floral scales (2.7-) 2.9-3.4 mm long; anthers (1.2-) 1.3–2.1 mm long..... ***Cyperus esculentus var. macrostachyus***

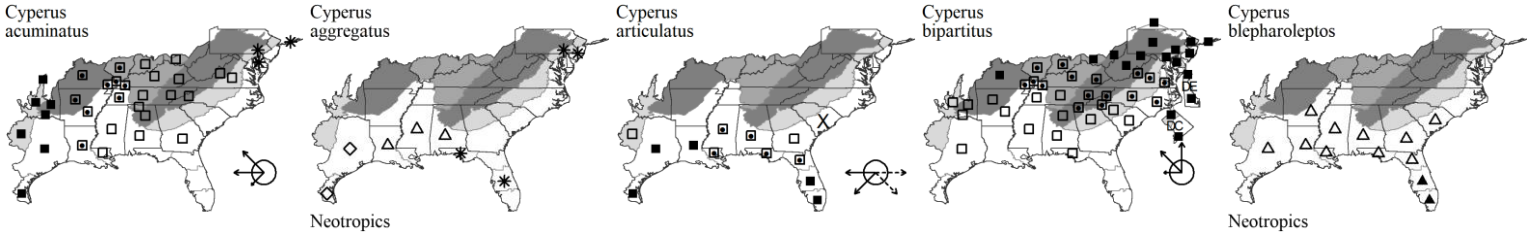
Cyperus acuminatus Torrey & Hooker ex Torrey. POINTED FLATSEDGE. **Hab:** Wet meadows or depressions, especially in glades, barrens, or woodlands over limestone. **Dist:** IL west to ND, south to w. LA, TX, and n. Mexico; disjunct from WA to s. CA; disjunct eastward at scattered localities in VA, NC, GA (Echols 2007), TN, KY, and OH (where probably native), and NY and NH (where probably introduced). **Phen:** May-Oct. **ID Notes:** The combination of pseudolateral inflorescences, spikelets in glomerulate heads, and excurved-mucronate scale apices is diagnostic. Forms of *C. surinamensis* with erect bracts may superficially resemble *C. acuminatus*, but lack excurved scale apices and usually have taller, densely antrorsely scabridulous culms. **Syn:** = Ar, C, ETx1, F, FNA23, G, GrPl, GW1, Il, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, Tn, Tx, W, Carter (1990). NatureServe G5 (Secure).

* ***Cyperus aggregatus*** (Willdenow) Endlicher. **Hab:** Disturbed areas, apparently introduced on ballast, perhaps only a waif and no longer present in some places in our region. **Dist:** Native of tropical America. **Syn:** = ETx1, FNA23, K1, K3, WH3; = *Cyperus cayennensis* (Lamarck) Britton – S; = *Cyperus huarmensis* (Kunth) M.C. Johnston – Tx, misapplied.

Cyperus articulatus Linnaeus. CHINTÚL. **Hab:** Marshes, tidal and non-tidal. **Dist:** Se. SC (formerly) south to s. FL west to e. TX, and south into tropical America. **Phen:** Jul-Sep. **Syn:** = ETx1, FNA23, GW1, K1, K3, K4, NcTx, RAB, S, Tx, WH3. NatureServe G4G5 (Apparently Secure).

Cyperus bipartitus Torrey. SLENDER FLATSEDGE, SHINING FLATSEDGE. **Hab:** Depression ponds, low fields, ditches, marshes, muddy river shores, along streams, especially in seasonally flooded situations. **Dist:** ME and QC west to MN and WA, south to FL (Wakulla County) (Kunzer et al. 2009), GA, LA, TX, NM, AZ, and CA. **Phen:** Jul-Oct. **Syn:** = Ar, C, ETx1, FNA23, GW1, Il, K1, K3, K4, Mi, Mo1, NE, NY, Pa, Tn, Va, W, WH3; ? *Cyperus rivularis* Kunth – F, G, GrPl, RAB, S, WV. NatureServe G5 (Secure).

* ***Cyperus blepharoleptos*** Steudel. CUBAN-BULRUSH. **Hab:** Ponds and marshes, especially in floating vegetation mats, ditches. **Dist:** Very likely accidentally introduced in the Southeastern US via shipping (first known occurrences in Mobile, AL in 1882 and New Orleans, LA in 1889). **Syn:** = K4; = *Oxycaryum cubense* (Poeppig & Kunth) Lye – Ar, FNA23, K3, WH3; = *Scirpus cubensis* Poeppig & Kunth – GW1, S, Tx. NatureServe G5? (Secure).



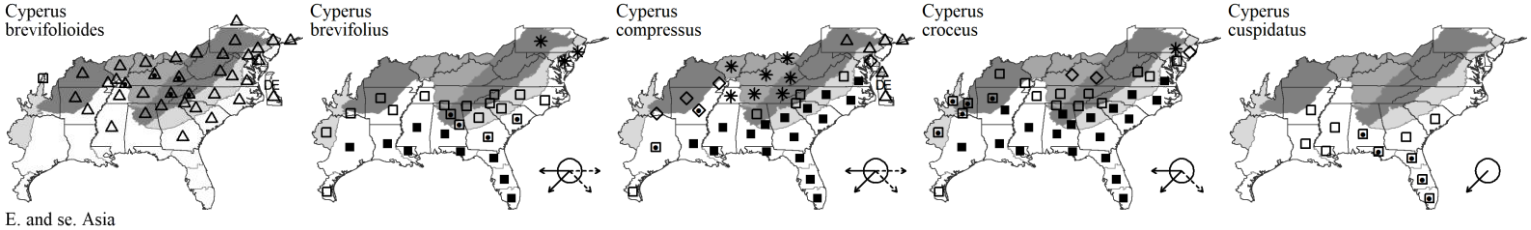
Cyperus brevifolioides Thieret & Delahoussaye. ASIATIC GREENHEAD SEDGE. **Hab:** River sand bars, tidal marshes, tidal shores, moist soils of pastures and ditches. **Dist:** Apparently introduced and native of e. Asia. Its distribution in North America is still somewhat obscure (because of confusion with *C. brevifolius*), but it is currently known from scattered locations in NC, SC, VA, CT, PA, MD, TN, AL, GA, NJ, DE, AR, MS, and KY. Reported for SC by Hill & Horn (1997), as *K. brevifolioides*. **Tax:** See Bryson et al. (1996). *Kyllinga gracillima* Miquel (1866) appears to be the oldest valid combination in the genus *Kyllinga*, predating *K. brevifolioides* (Thieret & Delahoussaye) Tucker. **Syn:** = C, GW1, K4, NY, Pa, RAB, W, Carter et al (2016), Goetghebeur & Van den Borre (1989); = *Kyllinga brevifolioides* (Thieret & Delahoussaye) Tucker – Tucker (1987); = *Kyllinga gracillima* Miquel – Ar, FNA23, K1, K3, Mo1, NE, Tn, Va; < *Cyperus brevifolius* (Rottbøll) Endlicher ex Hasskarl – F.

Cyperus brevifolius (Rottbøll) Endlicher ex Hasskarl. PERENNIAL GREENHEAD SEDGE. **Hab:** Moist soils of fields, ditches, lawns. **Dist:** Pantropical, north in North America to n. NC, se. OK, and CA. Likely to occur in s. VA. **Phen:** Jun-Sep. **Syn:** = Bah, GW1, K4, RAB, Tx, Carter et al (2016), Delahoussaye & Thieret (1967); = *Kyllinga brevifolia* Rottbøll – Ar, ETx1, FNA23, K1, K3, NcTx, S, WH3, Tucker (1984), Tucker (1987); < *Cyperus brevifolius* (Rottbøll) Endlicher ex Hasskarl – F, G.

Cyperus compressus Linnaeus. POORLAND FLATSEDGE. **Hab:** Sandy fields, disturbed areas. **Dist:** Pantropical and warm temperate, north in North America to s. NY, s. OH, s. IL, and e. TX, the northern extent of the native range uncertain. **Phen:** Jul-Sep. **ID Notes:** Occasionally mistaken for a member of subgenus *Pycreus*. The dark black, obviously trigonous achenes and mucronate scales distinguish it easily under a hand lens. **Syn:** = Ar, Bah, C, ETx1, F, FNA23, G, GW1, Il, K1, K3, K4, Mo1, NcTx, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3. NatureServe G5 (Secure).

Cyperus croceus Vahl. BALDWIN'S FLATSEDGE. **Hab:** Pine savannas, pine flatwoods, disturbed areas. **Dist:** NJ and MO south through the New World tropics. **Phen:** Jul-Oct. **Tax:** See Carter and Kral (1990) for clarification of nomenclature. Circumscription and identification are complicated by introgression, especially with *C. retrorsus* (Carter in prep.). **Comm:** {problems in circumscription; check specimens}. **Syn:** = Ar, C, ETx1, FNA23, K4, Mo1, NcTx, Tn, Va, WH3; = *Cyperus globulosus* Aublet – Bah, F, G, GW1, Tx, W, misapplied; > *Cyperus croceus* Vahl – K3; > *Cyperus globosus* – RAB, S; > *Cyperus multiflorus* (Britton) Small – S; > *Cyperus plankii* Britton – S; > *Cyperus retrorsus* Chapman var. *robustus* (Böckeler) Kükenthal – K1, RAB.

Cyperus cuspidatus Kunth. **Hab:** Sandy fields, disturbed areas. **Dist:** S. SC south to FL, west to LA; New World tropics. **Phen:** Jul. **Tax:** A supposed record of Cyperus breviculmis from MS (Lauderdale County) (Kartesz 2021) is apparently a misidentification of *Cyperus cuspidatus*. **Syn:** = Ar, FNA23, GW1, K1, K3, K4, RAB, S, WH3. NatureServe G4G5 (Apparently Secure).



Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

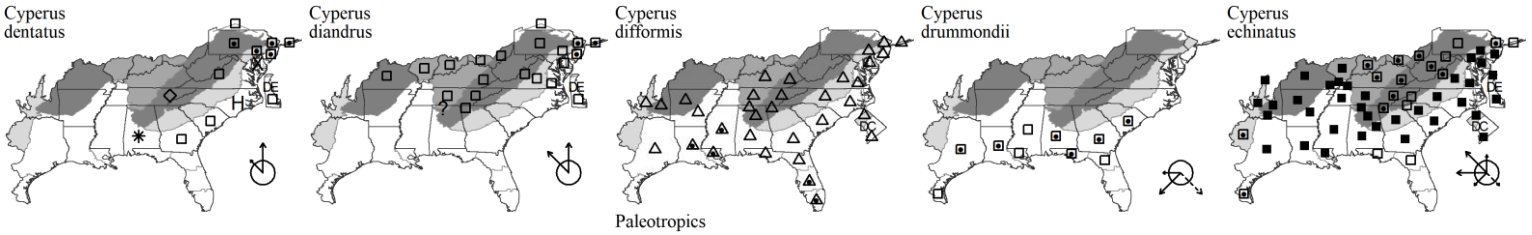
Cyperus dentatus Torrey. TOOTHED FLATSEDGE. **Hab:** Low sandy areas, sand and cobble bars, sandy shorelines, Shenandoah Valley sinkhole ponds. **Dist:** NS and QC south to e. SC; disjunct inland in w. VA, se. TN, and nw. IN. **Phen:** Jul-Oct. **ID Notes:** A distinctive feature of this species is the usual presence of proliferous bulblets in the spikelets. **Syn:** = C, F, FNA23, G, GW1, K1, K3, K4, NE, NY, Pa, RAB, S, Tn, Va, W. NatureServe G4 (Apparently Secure).

Cyperus diandrus Torrey. UMBRELLA FLATSEDGE. **Hab:** Interdune swales, ponds, exposed river and lake shores, usually where seasonally ponded. **Dist:** ME west to ND, south to VA, c. TN, n. AL, IL, MO, and IA. **Phen:** Jul-Oct. **Syn:** = C, F, FNA23, G, GrPl, GW1, Il, K1, K3, K4, Mi, Mo1, NY, Pa, S, Tn, Va, W. NatureServe G5 (Secure).

* ***Cyperus difformis*** Linnaeus. VARIABLE FLATSEDGE, SMALLFLOWER UMBRELLA SEDGE. **Hab:** Disturbed areas. **Dist:** Native of Old World tropics. **Phen:** Jul-Oct. **Comm:** See Bryson et al. (1996), Carter, Baker, & Morris (2009). **Syn:** = Ar, C, ETx1, F, FNA23, G, GW1, K1, K3, K4, NcTx, NY, Pa, Tn, Va, WH3. NatureServe GNR (Not Yet Ranked).

Cyperus drummondii Torrey & Hooker. DRUMMOND'S FLATSEDGE. **Hab:** Flatwoods ponds, savannas, coastal prairies, ditches, disturbed depressions. **Dist:** SC south to Panhandle FL, west to e. TX; West Indies; Central America; South America. **Phen:** Jun-Sep. **Comm:** Reported for several counties in the GA Coastal Plain (Carter, Baker, & Morris 2009). Reported for SC, GA, FL, AL, MS, LA, and TX (USDA Plants 2009). **Syn:** = ETx1, FNA23, K3, K4, WH3, Carter (1990); < *Cyperus virens* Michaux – GW1, K1, RAB, S. NatureServe G5TNR (Not Yet Ranked).

Cyperus echinatus (Linnaeus) Alph. Wood. ROUND-HEADED FLATSEDGE, GLOBE FLATSEDGE. **Hab:** Sandy woodlands, forests, fields, thin soils on outcrops, sand and gravel bars. **Dist:** CT and NY west to s. OH, IL, and se. KS, south to n. FL, TX, and ne. Mexico. **Phen:** Jul-Sep. **Tax:** See Carter and Jarvis (1986) for clarification of nomenclature. **Syn:** = Ar, C, ETx1, FNA23, Il, K1, K3, K4, Mo1, NcTx, NE, Pa, Tn, Va, WH3; = *Cyperus ovularis* (Michaux) Torrey – G, GrPl, GW1, RAB, S, Tx, W, WV; > *Cyperus ovularis* var. *ovularis* – F; > *Cyperus ovularis* var. *sphaericus* Böckler – F. NatureServe G5 (Secure).



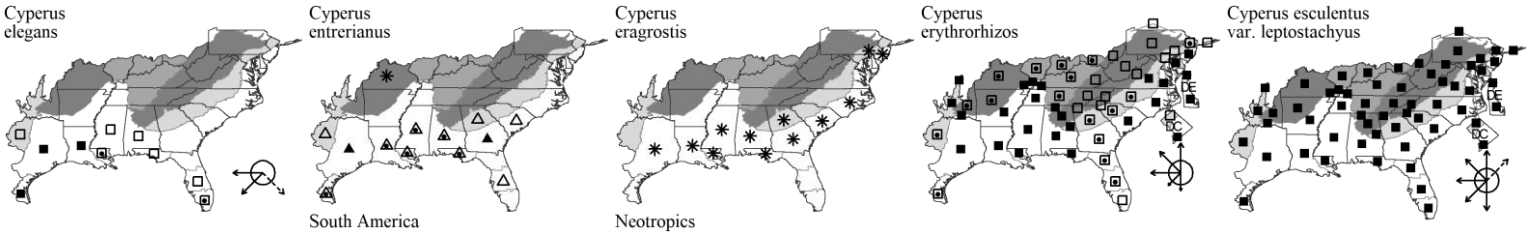
Cyperus elegans Linnaeus. ROYAL FLATSEDGE, STICKY FLATSEDGE. **Hab:** Ditches, wet open areas, coastal rock barrens. **Dist:** FL, AL, MS, TX, and NM, south to South America. **Phen:** Jul-Nov. **ID Notes:** The combination of involute leaves, viscid surfaces, and excurrent-mucronate scale apices is sufficient to distinguish *C. elegans* from all other *Cyperus* except *C. oxylepis*. In the field, the dark, broadly obovoid achenes of *C. elegans* are conspicuous, visible through the pale olivaceous scales as circular blackish spots. **Syn:** = Bah, ETx1, FNA23, K3, K4, NcTx, WH3; > *Cyperus elegans* var. *elegans* – Tx. NatureServe G5 (Secure).

* ***Cyperus entrerianus*** Boeckeler. WOODRUSH FLATSEDGE. **Hab:** Bottomland hardwood forests, coastal grasslands, marshes, vacant lots, disturbed areas. **Dist:** Native of temperate South America. Established from E. GA south to s. FL and west to e. and s. TX. Carter (1990), Rosen, Carter, & Bryson (2006), and Carter, Baker, & Morris (2009) discuss the spread of this noxious weed in the Southeastern United States. Bradley et al. [in prep.] report for Coastal Plain of SC (Jasper County). **Phen:** Jul-Sep. **Tax:** Culm usually smooth, but rarely with scattered retrorse teeth, a possible result of introgression with *C. surinamensis* (Carter 1990). **Syn:** = ETx1, FNA23, K1, K3, K4, WH3, Carter (1990). NatureServe G5 (Secure).

* ***Cyperus eragrostis*** Lamarck. LOVEGRASS FLATSEDGE. **Hab:** Disturbed wetlands. **Dist:** Native of tropical America. **Comm:** See Bryson et al. (1996), Brown & Marcus (1998), Kunzer et al. (2009). **Syn:** = FNA23, K1, K3, K4, WH3. NatureServe G5 (Secure).

Cyperus erythrorhizos Muhlenberg. REDROOTED FLATSEDGE. **Hab:** Marshes, ditches, shores, mud flats. **Dist:** MA west to ND and WA, south to n. FL, LA, TX, AZ, and CA. **Phen:** Jul-Dec. **ID Notes:** This species is frequently confused with *C. odoratus*, with which it is often closely associated. The neatly quadrangular spikelets with tiny (≤ 1.5 mm), closely imbricate scales (vs. terete, jointed spikelets with > 2 mm, loosely spaced scales) easily distinguish even depauperate plants of *C. erythrorhizos* at a glance. **Syn:** = Ar, C, ETx1, F, FNA23, G, GrPl, GW1, Il, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, W, WH3, WV; > *Cyperus erythrorhizos* Muhlenberg – S; > *Cyperus halei* Torrey ex Britton – S. NatureServe G5 (Secure).

Cyperus esculentus Linnaeus *var.* ***leptostachyus*** Boeckeler. YELLOW NUTSEDGE, YELLOW NUTGRASS, WILD CHUFA, EARTH-ALMOND. **Hab:** Fields, roadsides, shores, other disturbed areas. **Dist:** The species is widespread in tropical and warm temperate North, Central, and South America. **Phen:** Jul-Oct. **Syn:** = Ar, ETx1, FNA23, Il, K3, NE, NY, Pa, Va, De Castro et al (2015), Schippers, Ter Borg, & Bos (1995); < *Cyperus esculentus* – Bah, C, F, G, GrPl, GW1, K4, Mi, Mo1, NcTx, RAB, Tn, Tx, W, WH3, WV; > *Cyperus esculentus* – S; > *Cyperus esculentus* Linnaeus var. *leptostachyus* Boeckeler – K1; > *Cyperus esculentus* var. *sativus* Böckler – K1; > *Cyperus lutescens* Torrey & Hooker – S.



Cyperus esculentus Linnaeus *var.* ***macrostachyus*** Boeckeler. YELLOW NUTSEDGE, YELLOW NUTGRASS, WILD CHUFA, EARTH-ALMOND. **Hab:** Disturbed areas. **Dist:** Var. *macrostachyus* is the main variety in Central America north into s. United States. **Phen:** Jul-Oct. **Syn:** = Ar, ETx1, FNA23, K3, NY, De Castro et al (2015), Schippers, Ter Borg, & Bos (1995); < *Cyperus esculentus* – C, F, G, GrPl, GW1, K4, Mo1, RAB, S, Tx, W, WH3, WV; < *Cyperus esculentus* var. *esculentus* – Il, K1; < *Cyperus lutescens* Torrey & Hooker – S.

Cyperus filicinus Vahl. FERN FLATSEDGE. **Hab:** Brackish marshes, other maritime habitats. **Dist:** ME to s. FL, west to LA; West Indies. **Phen:** Jul-Sep. **ID Notes:** Often difficult to separate from *C. polystachyos* and occurring in similar habitats. Detailed examination of the individual scales

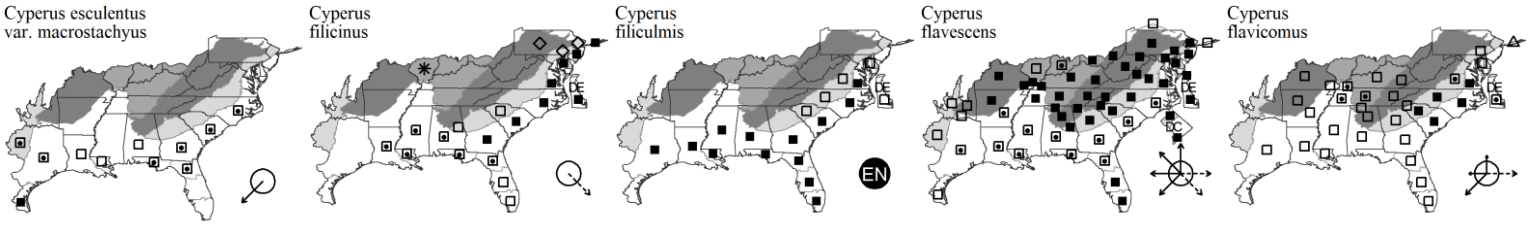
Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

and achenes (see key to subgenus *Pycreus*) is required. **Syn:** = C, F, FNA23, G, Il, K1, K3, K4, NE, NY, Pa, RAB, S, Va; < *Cyperus polystachyos* Rottbøll – GW1, WH3.

Cyperus filiculmis Vahl. SOUTHEASTERN FLATSEDGE. **Hab:** Longleaf pine sandhills, other sandy or rocky woodlands, forests, and fields. **Dist:** DE and MD south to s. peninsular FL, west to e. TX. Reported as new for DE (Longbottom, Naczi, & Knapp 2016). **Phen:** Jul-Oct. **Syn:** = ETx1, FNA23, RAB, Tx, Va, WH3; < *Cyperus lupulinus* Marcks ssp. *lupulinus* – K1, K3, K4.

Cyperus flavescens Linnaeus. YELLOW FLATSEDGE. **Hab:** Low fields, ditches, marshes, especially where seasonally flooded. **Dist:** Pantropical and warm temperate, north in North America to MA, MI, MO, and KS. **Phen:** Jul-Sep. **Syn:** = Ar, C, ETx1, FNA23, G, GW1, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV; > *Cyperus flavescens* var. *poiformis* (Pursh) Fernald – F, Mo1.

Cyperus flavicomus Michaux. WHITE-EDGED FLATSEDGE. **Hab:** Ditches, marshes, natural or artificial ponds, especially where seasonally flooded. **Dist:** Se. VA and KY south through the New World tropics. **Phen:** Jul-Oct. **ID Notes:** This species is unlikely to be confused with any other subgenus *Pycreus*, but may superficially resemble some species in subgenus *Cyperus*. The lenticular achenes and 2-branched styles are diagnostic. **Syn:** = Ar, C, ETx1, FNA23, K1, K3, K4, Mo1, NY, Tn, Va, W, WH3; = *Cyperus albomarginatus* (Martius & Schrader ex Nees) Steudel – F, G, GW1, RAB, Tx; ? *Cyperus sabulosus* (Martius & Schrader ex Nees) Steudel – S.



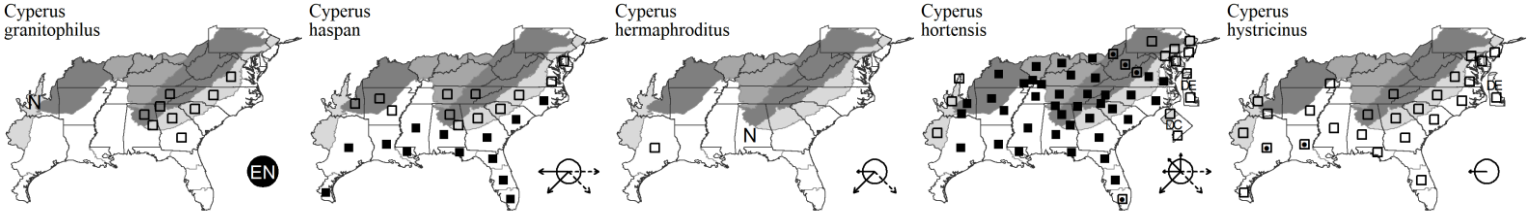
Cyperus granitophilus McVaugh. GRANITE FLATSEDGE. **Hab:** Granitic flatrocks, rarely on diabase flatrocks of the Piedmont, Altamaha Grit glades of the Coastal Plain, and sandstone outcrops of the Cumberland Plateau. **Dist:** Sc. VA south to ec. AL in the Piedmont; disjunct in se. and c. TN on sandstone and limestone and in sc. GA on Altamaha Grit; disjunct in c. TX and s. OK (O'Kennon & Taylor 2015). Plants reported as *C. granitophilus* by O'Kennon & Taylor (2015) are more closely related to *C. squarrosus* and are better treated as *C. squarrosus* var. *runyonii* (R. Carter, pers.comm., 2022). **Phen:** Jul-Oct. **Syn:** = FNA23, GW1, K1, K4, Va; < *Cyperus aristatus* Rottbøll – G, RAB, W; < *Cyperus inflexus* Muhlenberg – F, S.

Cyperus haspan Linnaeus. SHEATHED FLATSEDGE. **Hab:** Tidal marshes, other marshes, ponded depressions, low fields, ditches, waterfowl impoundments, weed in rice fields. **Dist:** Pantropical in distribution, north in North America to se. VA (MD?), sc. TN, c. AR, and c. TX. **Phen:** Jul-Oct. **Syn:** = Ar, C, ETx1, FNA23, G, GW1, K1, K3, K4, NcTx, RAB, S, Tn, Tx, Va, WH3; > *Cyperus haspan* var. *americanus* Böckler – F. NatureServe G5 (Secure).

Cyperus hermaphroditus (Jacquin) Standley. **Hab:** Floodplain forests. **Dist:** TX, south to tropical America. **ID Notes:** This is a widespread and weedy species in montane regions of Mexico and Central America, but very rare in the flora region, perhaps based mostly or entirely on misidentifications. It is most similar to *C. thyrsiflorus* and *C. lentiginosus*, both of which have much looser spikes. The former is a markedly less robust plant with very short rays, narrower leaves and culms, and pale olivaceous or whitish spikelets (vs. straw-colored); the latter has conspicuously cuspidate scale apices (vs. acute in *C. hermaphroditus*) and broader spikes. See Key ZD. **Syn:** = FNA23, K3, K4, Tx, Carter & Jones (1997).

Cyperus hortensis (Salzmann ex Steudel) Dorr. ANNUAL GREENHEAD SEDGE. **Hab:** Moist soils of fields, ditches, lawns, shores of ponds and rivers. **Dist:** Pantropical, north in North America to e. PA, MO, and e. KS. **Phen:** Jul-Oct. **Tax:** Dorr (2014) indicated that the correct name for this taxon in *Cyperus* appears to be *C. hortensis*; the basionym predates *C. tenuifolius* by a year. **ID Notes:** Frequently confused with *C. brevifolius*, which occurs in similar habitats. In addition to the rhizomes, which may be inconspicuous on immature or densely matted plants, *C. brevifolius* has scale keels that are entire and most culms with the longest bract held vertical. **Syn:** = K4, NY; = *Cyperus tenuifolius* (Steudel) Dandy – C, F, G, GrPl, GW1, Pa, RAB, Tx, W; = *Kyllinga pumila* Michaux – Ar, ETx1, Il, K1, K3, Mo1, NcTx, S, Tn, Va, WH3, WV, Tucker (1984), Tucker (1987); > *Cyperus densicaespitosus* Mattfeld & Kükenthal – Carter et al (2016).

Cyperus hystricinus Fernald. BRISTLY FLATSEDGE. **Hab:** Dry woodlands and forests. **Dist:** NJ south to n. FL, west to e. TX, mostly on the Coastal Plain. **Phen:** Jul-Sep. **Tax:** See Carter and Jarvis (1986) for clarification of nomenclature. **Comm:** {check specimens of this and relatives – discrepancy between mapped and stated ranges}. **Syn:** = Ar, C, ETx1, FNA23, K1, K3, K4, Mo1, NcTx, S, Va, WH3; = *Cyperus retrofractus* (Linnaeus) Torrey var. *hystricinus* (Fernald) Kükenthal – F, G; < *Cyperus retrofractus* (Linnaeus) Torrey – RAB, W, misapplied.



* ***Cyperus involucratus*** Rottbøll. UMBRELLA-PLANT. **Hab:** Cultivated and persistent, also naturalizing in disturbed areas. **Dist:** Native of Africa. Naturalized north at least to Panhandle FL (Kunzer et al. 2009). **Phen:** Jun-Nov. **Syn:** = ETx1, FNA23, K1, K3, K4, NcTx, NY, WH3; ? *Cyperus alternifolius* Linnaeus – Tx, misapplied. NatureServe GNR (Not Yet Ranked).

* ***Cyperus iria*** Linnaeus. RICE-FIELD FLATSEDGE. **Hab:** Marshes, ditches, disturbed wet areas, sandbars and gravelbars. **Dist:** Native of Old World. **Phen:** Jul-Oct. **Syn:** = Ar, C, ETx1, F, FNA23, G, GW1, Il, K1, K3, K4, Mo1, NE, NY, RAB, S, Tn, Tx, Va, WH3. NatureServe GNR (Not Yet Ranked).

Cyperus lancastriensis Porter ex A. Gray. MANY-FLOWERED FLATSEDGE, PORTER'S FLATSEDGE. **Hab:** Dry woodlands, forests, and fields. **Dist:** NJ west to WV, OH, and MO, south to GA, c. MS (Morris & MacDonald 2012), and AR. **Phen:** Jul-Sep. **Syn:** = Ar, C, F, FNA23, G, GrPl, Il, K1, K3, K4, Mo1, Pa, RAB, S, Tn, Va, W, WV. NatureServe G5 (Secure).

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more)

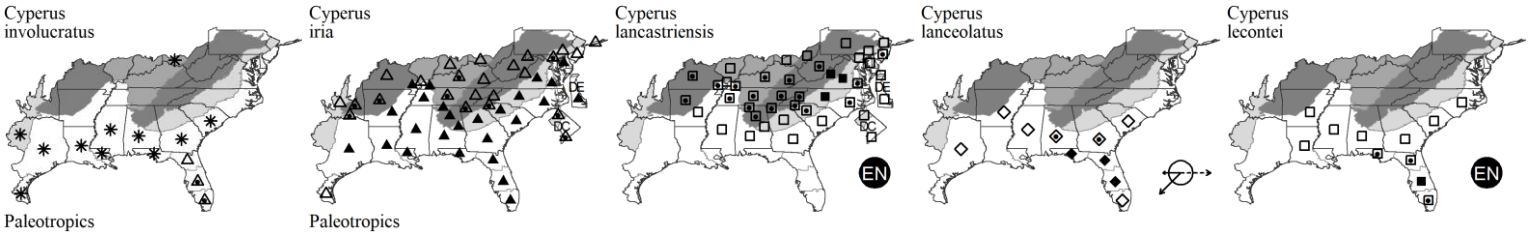
* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable

X : extirpated

* ***Cyperus lanceolatus*** Poiret. **Hab:** Wet places. **Dist:** Se. GA and ne. FL west to LA and c. TX (?), south into the Neotropics; also Africa. **Phen:** Jun-Sep. **Syn:** = Ar, ETx1, FNA23, GW1, K1, K3, K4, NcTx, WH3; ? *Cyperus densus* Link – S; > *Cyperus lanceolatus* Poiret var. *compositus* J. Presl & K. Presl – Tx.

Cyperus lecontei Torrey ex Steudel. **Hab:** Limesink ponds, low pinelands. **Dist:** Se. NC south to s. FL, west to w. LA. **Phen:** Jul-Sep. **Comm:** Sorrie (1998b) reports it for e. GA (Glynn County). **Syn:** = Ar, FNA23, GW1, K1, K3, K4, RAB, S, WH3. NatureServe G4? (Apparently Secure).



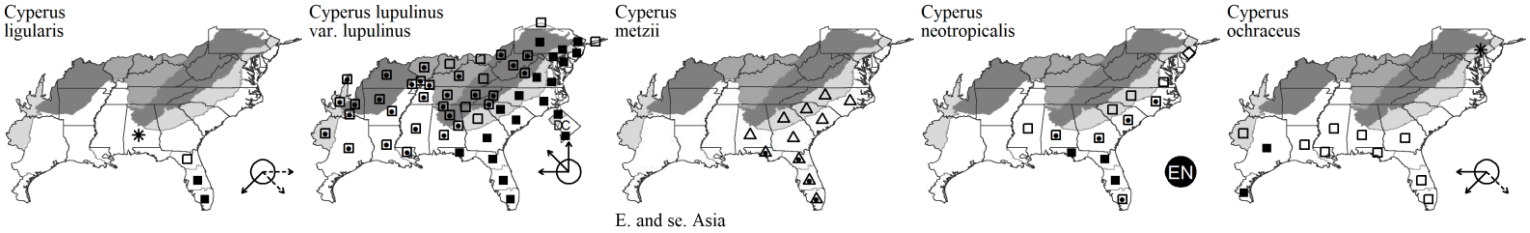
Cyperus ligularis Linnaeus. SWAMP FLATSEDGE. **Hab:** Brackish marshes, beaches, disturbed wetlands. **Dist:** FL and AL south into Mexico, Central America. South America; Africa. **Syn:** = Bah, FNA23, K4, WH3. NatureServe G5 (Secure).

Cyperus lupulinus (Sprengel) Marcks *var*. ***lupulinus***. GREAT PLAINS FLATSEDGE. **Hab:** Dry sterile soils in fields and meadows. **Dist:** MA and VT west to MN, south to NC, n. SC, TX; disjunct in ID, WA, and OR. **Phen:** Jul-Sep. **Syn:** = K4, NE; = *Cyperus filiculmis* Vahl var. *filiculmis* – F, G, Mo1, WV; = *Cyperus lupulinus* Marcks ssp. *lupulinus* – FNA23, GrPl, K1, K3, NY, Va; < *Cyperus filiculmis* Vahl – RAB, W; >< *Cyperus filiculmis* Vahl – S; < *Cyperus lupulinus* (Sprengel) Marcks – Ar, C, ETx1, Il, Mi, NcTx, Pa, Tn; > *Cyperus martindalei* Britton – S.

* ***Cyperus metzii*** (Hochstetter ex Steudel) Mattfeld & Kükenthal. CRESTED GREENHEAD SEDGE. **Hab:** Lawns, turf farms, athletic fields, golf courses, other disturbed areas. **Dist:** Native of Asia. Reported for AL by Barger et al. (2012). **Syn:** = K4, Carter et al (2016); = *Kyllinga squamulata* Thonning ex Vahl – FNA23, WH3. NatureServe GNR (Not Yet Ranked).

Cyperus neotropicalis Alain. AMERICAN LIPOCARPHA, AMERICAN HALFCHAFF. **Hab:** Riverine sandbars, depression ponds, interdune swales and ponds, borrow pits, impoundment shores, ditches, other moist exposed soil. **Dist:** Se. VA south to s. FL, west to AL. **Phen:** Jul-Sep. **Syn:** = K4, Bauters et al (2014); = *Lipocarpha maculata* (Michaux) Torrey – C, F, FNA23, G, GW1, Il, K1, RAB, S, Va, WH3, Goetghebeur & Van den Borre (1989), Tucker (1987). NatureServe G5 (Secure).

Cyperus ochraceus Vahl. **Hab:** Marshes, ditches, wet disturbed areas. **Dist:** Se. GA (Jones & Coile 1988), s. FL, s. AL, s. MS, LA, TX, south into Mexico, Central America, and South America. **Phen:** (May-) Jun-Nov. **Syn:** = Bah, ETx1, FNA23, GW1, K1, K3, K4, S, Tx, WH3, Carter (1990). NatureServe G5 (Secure).



Cyperus odoratus Linnaeus *var*. ***odoratus***. FRAGRANT FLATSEDGE. **Hab:** Low fields, marshes, ditches, sandbars. **Dist:** Pantropical, north in North America to MA, se. ME, ON, MN, KS, NM, AZ, and CA. **Phen:** Jul-Sep. **Tax:** *C. macrocephalus* Liebm. and *C. eggersii* Boeckeler are striking in the field and sometimes recognized, occurring in our area in s. TX. *C. macrocephalus* is distinguished by inflorescences congested into a single globose capitate cluster 2-3 cm in diam., ellipsoid (vs. oblong) achenes, and sharply trigonous culms; *C. eggersii* by penicillate spikes with very densely fascicled, erect-appressed spikelets (vs. looser spikes, the spikelets spaced out along the rachis and divaricate). **ID Notes:** This is a widespread, weedy and highly polymorphic species, frequently confused with the equally common, widespread, and variable *C. erythrorhizos* and *C. strigosus*. In addition to the rachilla characters given in the main key, *C. strigosus* has cormose culm bases (vs. annual with fibrous roots) and spikelets with longer [3.2-4.5 mm vs. (2.0-) 2.2-2.8 (-3.2) mm] scales that are initially quadrangular, becoming strongly compressed at maturity; differences from *C. erythrorhizos* are discussed under that species. **Syn:** = Va; = *Cyperus odoratus* – G, GW1, Mi, Pa; > *Cyperus ferax* L.C. Richard – S; > *Cyperus ferruginescens* Böckeler – F, RAB; > *Cyperus longispicatus* J.B.S. Norton – S; > *Cyperus macrocephalus* Liebmann – Tx; < *Cyperus odoratus* – Ar, C, ETx1, FNA23, GrPl, Il, K1, K3, K4, Mo1, NcTx, NE, NY, Tn, W, WH3; > *Cyperus odoratus* – F, RAB, Tx; > *Cyperus odoratus* Linnaeus var. *odoratus* – Tucker & Gandhi (2019); > *Cyperus odoratus* Linnaeus var. *squarrosus* (Britton) S.D. Jones, Wipff, & R. Carter – Tucker & Gandhi (2019); > *Cyperus speciosus* Vahl – S; < *Torulinum confertum* Desvaux ex Hamilton – Bah.

Cyperus ovatus Baldwin. **Hab:** Sandy beaches, maritime forests, and pinelands. **Dist:** Se. NC south to s. FL, west to s. AL. **Phen:** Jul-Oct. **ID Notes:** Because of similarities in habit and inflorescence form, *Cyperus ovatus* var. *ovatus* has been confused with *C. retrorsus*, from which it can be readily distinguished by its 3-5 fruited spikelets; apically conduplicate, ascending, whitish yellow to golden brown or stramineous floral scales; narrowly elliptic to fusiform achenes; yellow-green to light green foliage; and typically spreading to divaricate (rarely ascending) primary inflorescence bracts. *Cyperus ovatus* var. *ovatus* varies along a south-north cline. An extreme form with longer spikelets, broader nearly globose spikes, and generally fewer inflorescence rays is restricted to southern peninsular Florida and has been called *C. winkleri*. The incidence of this form decreases northward as the more common and more widespread form becomes predominant. Hybrids between *C. retrorsus* and *C. ovatus* do occasionally occur, and it seems likely that some of the variation observed in *C. ovatus* is the result of introgression between southern Florida populations of *C. ovatus*, where the *winkleri*-form is more common, northward into populations of *C. retrorsus*. Hybrids between *C. ovatus* var. *ovatus* and *C. croceus*, *C. retrorsus*, and *C. strigosus* have been observed. **Syn:** = FNA23, K1, K4, WH3; > *Cyperus deeringianus* Britton ex Small – S; < *Cyperus retrorsus* Chapman – C, G, GW1, W; > *Cyperus retrorsus* var. *deeringianus* (Britton ex Small) Fernald ex Griscom – RAB.

Key to Map Symbology: □⊡■ └native┘ ◇◈◆ └maybe exotic┘ △◬▲ └exotic┘ ←rare ←uncommon ←common (see introduction for more)

* : waif
EN : endemic
H : historic

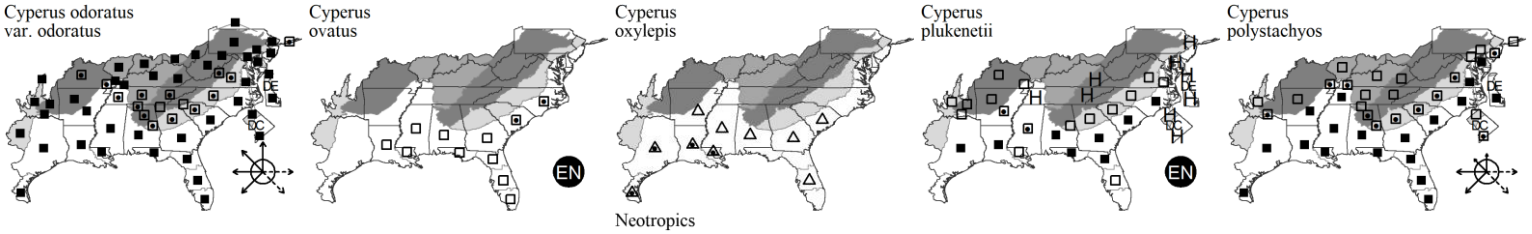
N : no
P : planted
? : questionable

X : extirpated

* ***Cyperus oxylepis*** Nees ex Steudel. SHARP-SCALE FLATSEDGE. **Hab:** Disturbed wet areas, marshes, saline areas. **Dist:** Native of South America. **Phen:** Jun-Nov. **Tax:** See Bryson et al. (1996). **ID Notes:** Forms with relatively short spikelets may be mistaken for *C. elegans*; see comments under that species. **Syn:** = Ar, ETx1, FNA23, GW1, K1, K3, K4, Tx, WH3. NatureServe G5? (Secure).

Cyperus plukenetii Fernald. STARBURST FLATSEDGE, PLUKENET'S FLATSEDGE. **Hab:** Longleaf pine sandhills, sandy woodlands, thin soils of rock outcrops, and dry, disturbed areas. **Dist:** NJ, KY, se. MO, and se. OK, south to c. peninsular FL and e. TX. **Phen:** Jul-Oct. **Tax:** See Carter and Jarvis (1986) for clarification of nomenclature and Carter (1993) for notes on animal dispersal. **Syn:** = Ar, C, ETx1, F, FNA23, K1, K3, K4, Mo1, NcTx, Pa, RAB, Tn, Va, W, WH3; = *Cyperus retrofractus* (Linnaeus) Torrey – S, misapplied; = *Cyperus retrofractus* var. *retrofractus* – G, misapplied.

Cyperus polystachyos Rottbøll. COAST FLATSEDGE. **Hab:** Low fields, ditches, and marshes. **Dist:** Pantropical and warm temperate, north in North America to ME, MA, KY, MO, and OK. **Phen:** Jul-Oct. **Tax:** A highly polymorphic species for which the infraspecific nomenclature should be examined critically: There are at least three infraspecific entities that R. Carter (pers.comm., 2022) refers to under the working names of *C. polystachyos polystachyos*, *C. polystachyos hahnianus*, and *C. polystachyos texensis*. Var. *texensis* is well known. It is a shorter plant than the others and is more widely distributed, occurring well beyond the coastal plain. *C. polystachyos polystachyos* is a much taller plant that appears to be restricted to the outer coastal plain – common throughout peninsular FL, northward into the FL panhandle, s GA, s AL, s MS, s LA, se TX (and probably in SC). *C. polystachyos hahnianus* is similar to *C. polystachyos polystachyos* in habit and most other respects except for the orientation of its spikelets: They are conspicuously fastigiate-pencilliform. In Florida, *C. p. polystachyos* and *C. p. hahnianus* do sometimes occur in mixed populations, which suggests that – as strikingly different as these plants are – *C. p. hahnianus* might better be treated as a form. Kükenthal's description seems to match these plants going under the working name of *C. p. hahnianus*, and the type locality is Martinique ("insula Martinica"). However, I have not been able to access photographs of the type of Cyperus hahnianus Boeckeler, Flora 61: 138. 1878 [=Cyperus polystachyos var. hahnianus (Boeckeler) Kük.]. --Type: "Hahn. Herb. No. 700 – (Vidi in hb. reg. Berolin.) Insula Martinica." -- Presumably at B. **ID Notes:** Often difficult to separate from *C. filicinus* and occurring in similar habitats, although *C. filicinus* is generally more coastal. A highly polymorphic species; depauperate plants may resemble species in subgenus *Cyperus*, check carefully for 2-branched styles and biconvex achenes. **Syn:** = Ar, ETx1, FNA23, Il, NcTx, NE, Pa, Tn, Va; > *Cyperus microdontus* Torrey – S; > *Cyperus odoratus* – S, misapplied; > *Cyperus paniculatus* Rottbøll – S; < *Cyperus polystachyos* Rottbøll – GW1, WH3; > *Cyperus polystachyos* Rottbøll var. *holosericeus* (Link) C.B. Clarke – K4; > *Cyperus polystachyos* Rottbøll var. *texensis* (Torrey) Fernald – Bah, C, F, G, K1, K3, Mo1, RAB, Tx, W.



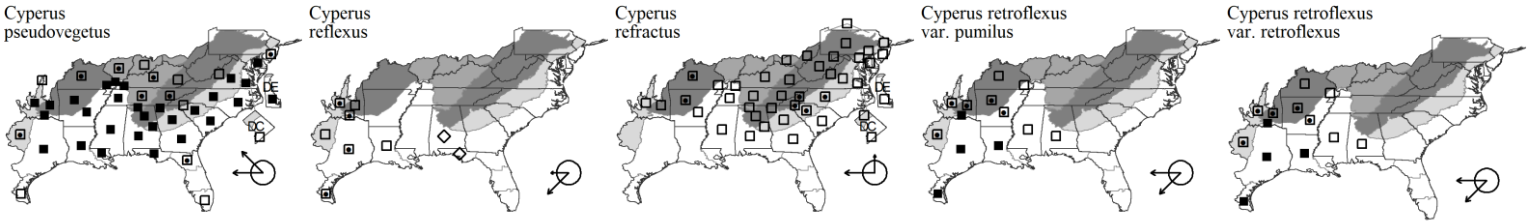
Cyperus pseudovegetus Steudel. GREEN FLATSEDGE, MARSH FLATSEDGE. **Hab:** Marshes, ditches, depressions. **Dist:** NJ and MA, west to s. IL, s. MO, and OK, south to FL and TX. **Phen:** Jun-Oct. -Oct. **Syn:** = Ar, C, ETx1, FNA23, G, GrPl, GW1, Il, K1, K3, K4, NcTx, NE, NY, RAB, S, Tn, Tx, Va, W, WH3, Carter (1990); = *Cyperus virens* Michaux – F, misapplied; > *Cyperus pseudovegetus* var. *pseudovegetus* – Mo1.

Cyperus reflexus Vahl. **Hab:** Disturbed wet areas. **Dist:** Native of sw. United States south to tropical America. OK south to LA, TX, and Mexico. Reported for AL (Crenshaw County) by Diamond (2013b). **Phen:** Jul-Aug. **Syn:** = ETx1, FNA23, K4, NcTx, Tx, WH3, Carter (1990).

Cyperus refractus Engelmann ex Boeckeler. REFLEXED FLATSEDGE. **Hab:** Dry sandy or rocky woodlands and forests, also in somewhat moister sites. **Dist:** NJ west to OH and MO, south to SC, GA, AL, and AR. **Phen:** Jul-Sep. **ID Notes:** Flowering material of the much more common *C. strigosus* is sometimes misidentified as this species; see Key ZD. **Syn:** = Ar, C, F, FNA23, G, K1, K3, K4, Mo1, Pa, RAB, S, Tn, Va, W. NatureServe G5 (Secure).

Cyperus retroflexus Buckley *var.* ***pumilus*** (Britton) R. Carter & S.D. Jones. **Hab:** Cropped fields, seasonally damp, disturbed areas. **Dist:** AL west to NM, south to Mexico. **Phen:** Jul-Sep. **ID Notes:** Spikes are quite similar to *C. retrorsus* at a glance. The sterile, reduced terminal scales, usually with a minute, uncinate mucro are diagnostic. *C. retrorsus* is a more robust plant with erect or strongly ascending bracts, and broader leaves and bracts. **Syn:** = Carter & Jones (1997); < *Cyperus retroflexus* Buckley – Ar, ETx1, FNA23, GrPl, K1, K3, K4, Mo1, NcTx.

Cyperus retroflexus Buckley *var.* ***retroflexus***. **Hab:** Cropped fields, seasonally damp, disturbed areas. **Dist:** AL west to NM, south to Mexico. **Phen:** Jul-Sep. **Syn:** = Carter & Jones (1997); < *Cyperus retroflexus* Buckley – Ar, ETx1, FNA23, GrPl, K1, K3, K4, Mo1, NcTx.



Cyperus retrofractus (Linnaeus) Torrey. ROUGH FLATSEDGE. **Hab:** Dry sandy or rocky woodlands and fields. **Dist:** NJ west to s. OH, and se. MO, south to GA. AL, and AR. **Phen:** Jul-Sep. **Tax:** See Carter and Jarvis (1986) for clarification of nomenclature. **ID Notes:** *C. lancastriensis* is occasionally confused with this species, which, unlike other members of the *C. retrofractus* complex, often has multiple fertile scales; *C. lancastriensis* has spikelets reflexed only in the proximal half of the spike, lacking prolonged, involute terminal scales, and oblong-falcate (vs. narrowly oblong and straight) achenes. **Syn:** = Ar, C, FNA23, K1, K3, K4, Mo1, Pa, Tn, Tx, Va, WH3; = *Cyperus dipsaciformis* Fernald – F, RAB, S, W; = *Cyperus retrofractus* (Linnaeus) Torrey var. *dipsaciformis* (Fernald) Kükenthal – G.

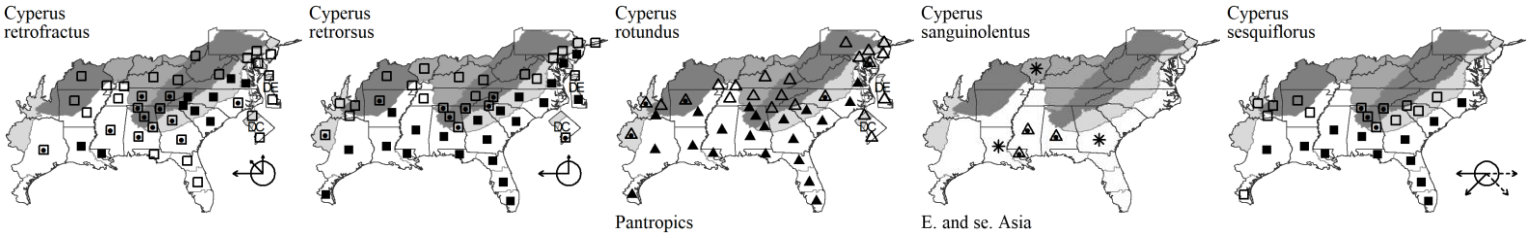
Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Cyperus retrorsus Chapman. PINELAND FLATSEDGE. **Hab:** Dry woodlands, forests, and rock outcrops. **Dist:** S. NY south to FL, west to TX, mostly on the Coastal Plain, but north in the interior to KY and se. OK. **Phen:** Jul-Oct. **Syn:** = Ar, C, ETx1, FNA23, G, GW1, Il, K3, K4, NcTx, NE, NY, Pa, Tn, Va, W, WH3; = *Cyperus retrorsus* Chapman var. *retrorsus* – F, K1, RAB; > *Cyperus retrorsus* Chapman – S; > *Cyperus torreyi* Britton – S. NatureServe G5T5 (Secure).

* ***Cyperus rotundus*** Linnaeus. PURPLE NUTSEDGE, NUTGRASS, COCOGRASS, TULILLO. **Hab:** Gardens, fields, disturbed areas. **Dist:** Pantropical and warm temperate in distribution (though extending less far north than *C. esculentus*). **Phen:** Jul-Apr. **Syn:** = Ar, Bah, C, ETx1, F, FNA23, G, GrPl, GW1, K1, K3, K4, Mo1, NcTx, NY, RAB, S, Tn, Tx, Tx, Va, WH3. NatureServe G5 (Secure).

* ***Cyperus sanguinolentus*** Vahl. **Hab:** Ditches, disturbed wet areas. **Dist:** Native of Asia, known in North America from e. GA west to LA. **Comm:** See Carter & Bryson (2000) for detailed information. **Syn:** = FNA23, K4; > *Cyperus louisianensis* Thieret – K1.

Cyperus sesquiflorus (Torrey) Mattfeld & Kükenthal. WHITEHEAD SEDGE. **Hab:** Moist soils of fields, ditches, lawns, shores of ponds and rivers, sand and gravel bars. **Dist:** Pantropical, north in North America to ne. NC and se. AR. **Phen:** Jul-Sep. **Comm:** Likely to occur in se. VA. **ID Notes:** In flower this species may superficially resemble *C. hortensis*. **Syn:** = C, GW1, K4, RAB, Tx, Carter et al (2016); = *Kyllinga odorata* Vahl – Ar, ETx1, K1, K3, S, WH3, Tucker (1984), Tucker (1987).



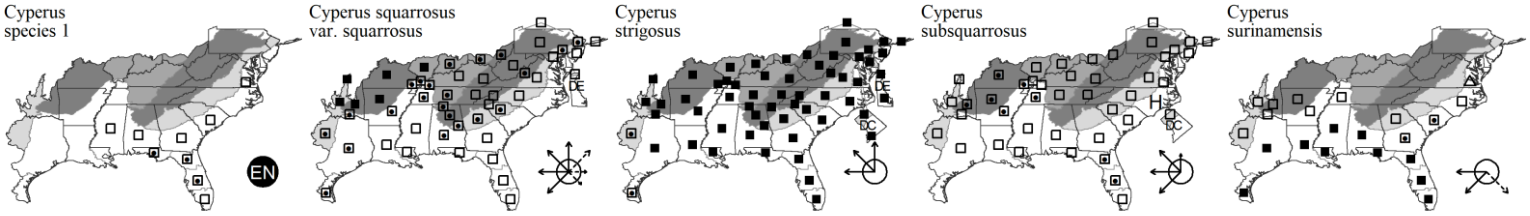
Cyperus species 1. DIMINUTIVE FLATSEDGE. **Hab:** Infrequent to locally abundant (following soil disturbance) on Florida scrub, stabilized dunes, and sandridges, generally on open white sands, near the coast but also inland on riverine (and aeolian?) dunes. **Dist:** Se. VA south to s. FL, west to s. MS. **Phen:** Jul-Oct. **Tax:** Under study by Richard Carter. **ID Notes:** Previously, this plant has been variously included within the concepts of *C. retrorsus*, *C. retrorsus* var. *nashii*, or *C. nashii*. **Syn:** < *Cyperus nashii* Small – S; < *Cyperus retrorsus* Chapman – C, FNA23, G, Va, WH3; < *Cyperus retrorsus* var. *nashii* (Britton) Fernald – F.

Cyperus squarrosus Linnaeus *var*. ***squarrosus***. AWNED FLATSEDGE. **Hab:** Moist depressions and seepages on granitic and other rocks, drawdown riverbanks, swales, shores, coastal rock barrens, other moist disturbed sites. **Dist:** Nearly cosmopolitan in distribution, in Old World and New World. **Phen:** May-Oct. **Tax:** Similar to the closely related *C. granitophilus*. **Syn:** = Wipff & Jones (1994); = *Cyperus aristatus* Rottbøll var. *aristatus* – Tx; < *Cyperus aristatus* Rottbøll – GW1; < *Cyperus inflexus* Muhlenberg – F, S, WV; < *Cyperus squarrosus* Linnaeus – Ar, C, ETx1, FNA23, GrPl, Il, K1, K3, K4, Mi, Mo1, NcTx, Pa, Tn, Va, WH3.

Cyperus strigosus Linnaeus. STRAW FLATSEDGE, FALSE NUTSEDGE. **Hab:** Marshes, ditches, wet flatwoods, wet disturbed areas. **Dist:** QC west to SD, south to FL and TX; also in w. North America. **Phen:** Jul-Oct. **Tax:** *Cyperus strigosus* is a widespread and polymorphic taxon. Robust plants with larger spikelets and longer floral scales have been called *C. strigosus* var. *stenolepis*. Most have not chosen to give such plants formal taxonomic status, because this variation appears to be continuous. However, our (R. Carter, R. Mears) field observations and an examination of vouchers of markedly robust plants with larger spikelets and longer floral scales, growing on black mucky soils in southern peninsular Florida, would indicate that these plants have taxonomic status. Similar plants have been found in Louisiana (Chris Reid, pers. comm.). **ID Notes:** This species is often confused with *C. esculentus*; the two are not closely related (see Key ZE). Small, looser-spiked plants of *C. strigosus* are easily distinguished at a glance by their longer, more spreading and loosely imbricate scales, greenish in flower and maturing dull stramineous or light brown laterally (vs. yellowish, occasionally light reddish-brown); in flower *C. strigosus* has shorter anthers (0.3-0.5 mm vs. 1 mm or more). **Syn:** = Ar, C, ETx1, FNA23, GW1, Il, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, W, WH3, WV; > *Cyperus praelongatus* Steudel – S; > *Cyperus stenolepis* – S; > *Cyperus strigosus* Linnaeus – S; > *Cyperus strigosus* var. *robustior* Britton – F; > *Cyperus strigosus* var. *stenolepis* (Torrey) Kükenthal – G; > *Cyperus strigosus* var. *strigosus* – F, G.

Cyperus subsquarrosus (Muhlenberg) Bauters. SMALLFLOWER HALFCHAFF. **Hab:** Riverbank draw-down zones, other moist sandy areas. **Dist:** ME west to ON and MN, south to s. FL and TX; south into tropical America. **Phen:** Jul-Aug. **Syn:** = K4, NY, Bauters et al (2014); = *Hemicarpha micrantha* (Vahl) Pax – F, GrPl, GW1, Il, RAB, S; = *Hemicarpha micrantha* var. *micrantha* – C, Tx; = *Hemicarpha micrantha* var. *minor* (Schrader) Friedland – G; = *Lipocarpha micrantha* (Vahl) G. Tucker – ETx1, FNA23, K3, Mi, Mo1, NcTx, NE, Pa, Tn, Va, WH3, Goetghebeur & Van den Borre (1989), Tucker (1987); < *Hemicarpha micrantha* (Vahl) Pax – K1.

Cyperus surinamensis Rottbøll. **Hab:** Marshes, pond edges, disturbed wet areas. **Dist:** Se. NC south to s. FL, west to KS, OK, TX, and south into Mexico and tropical America. **Phen:** Sep-Nov. **ID Notes:** Occasionally *C. entrerianus* may have somewhat scabridulous culms (Carter (1990). It is generally a much more robust plant, with denser, globose heads and indurate rhizomes; see characters given in Key ZB. **Syn:** = Ar, Bah, ETx1, FNA23, GrPl, GW1, K1, K3, K4, NcTx, RAB, S, WH3, Carter (1990). NatureServe G5 (Secure).

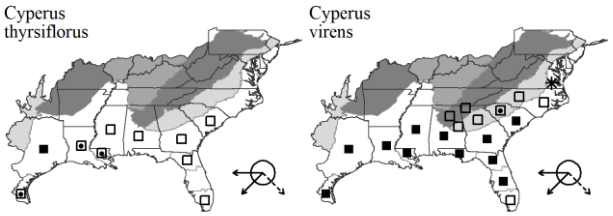


Cyperus thyrsiflorus Junghuhn. SOUTHERN FLATSEDGE. **Hab:** Calcareous woodlands/hammocks, swamp edges, and shell middens. **Dist:** E. SC south to s. FL, west to se. TX; West Indies; South America. **Phen:** May-Sep. **ID Notes:** *C. pseudothyrsiflorus* is sometimes confused with this species. *C. pseudothyrsiflorus* is a more robust plant, with mucronate scales, maturing reddish-brown (vs. pale olivaceous); see Key ZD. *C. tenuis*, a

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Central American species, has been reported from southern Texas, probably based on material of this species; it has much denser ovoid (vs. oblong-cylindric, parallel-sided) spikes, slightly flattened spikelets, and greenish scales overlapping at least 1/4-1/3 of the next distal scale. **Syn:** = ETx1, FNA23, K1, K3, K4, WH3, Carter & Jones (1997); = *Cyperus hermaphroditus* (Jacquin) Standley – S, misapplied. NatureServe G5 (Secure).

Cyperus virens Michaux. **Hab:** Marshes and ditches. **Dist:** E. NC south to c. peninsular FL, west to TX; Mexico to Argentina. Also as a chrome ore waif in VA. **Phen:** May-Nov. **ID Notes:** Easily identified in the field by its triquetrous culms with abundant retrorse prickles on the angles (sharp enough to slice open a finger moved up the stem, a hazard when collecting voucher specimens); other species in sect. *Luzuloidei* are mostly bluntly and obscurely trigonous. **Syn:** = Ar, ETx1, FNA23, K3, K4, Tx, WH3, Carter (1990); < *Cyperus virens* Michaux – GW1, K1, RAB, S.



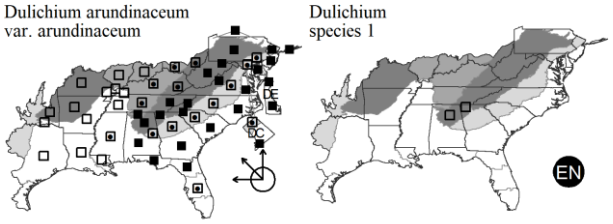
Dulichium Persoon 1805 (THREEWAY SEDGE)

A genus of 1-2 species, perennial herbs, North American. References: Goetghebeur in Kubitzki (1998b); Mastrogiuseppe (2002) in FNA23 (2002b).

Identification Notes: The combination of the distichous *Cyperus*-like spikelets and numerous, distinctly 3-ranked, short, cauline leaves makes *Dulichium* distinctive.

Dulichium arundinaceum (Linnaeus) Britton *var*. ***arundinaceum***. THREEWAY SEDGE. **Hab:** Streambanks, marshes, bogs, ditches. **Dist:** Var. *arundinaceum* ranges from NL (Newfoundland) west to MN, south to FL and TX; also from MT and BC south to CA. **Phen:** Jul-Oct. **Tax:** A second variety, var. *boreale* Lepage, is endemic in QC. **ID Notes:** Recognizable (even when sterile) by the strongly 3-ranked leaves and culms round in cross-section and hollow. **Syn:** = Ar, FNA23, K3, K4, NE, NY, Pa, Va; < *Dulichium arundinaceum* – C, ETx1, F, G, GrPl, GW1, Il, K1, Mi, Mo1, RAB, S, Tn, Tx, Tx, W, WH3, WV. NatureServe G5T5 (Secure).

Dulichium species 1. COOSA THREEWAY SEDGE. **Hab:** Glades and prairies. **Dist:** Endemic to Coosa prairies, nw. GA and ne. AL. **Tax:** Under study by Jim Allison.



Eleocharis R. Brown 1810 (SPIKERUSH, SPIKESEDGE)

Contributed by Bruce A. Sorrie and Alan S. Weakley

A genus of about 120-200 species, herbs, cosmopolitan. A molecular study supported the monophyly of subgenus *Limnochloa* (Roalson & Friar 2000).References: Angelo, Rosen, & Lange (2020); Bruhl (2002a) in FNA23 (2002b); Brunton, Campbell, & Reznicek (2018); Gibbons & McMullen (2019); Goetghebeur in Kubitzki (1998b); Hinchliff & Roalson (2009); Roalson & Friar (2000); Rosen (2006); Rosen, Hatch, & Carter (2007); Smith et al (2002) in FNA23 (2002b); Socorro González-Elizondo & Peterson (1997); Yashiro & Endo (2021).

subgenus *Eleocharis*
section *Eleocharis*
series *Eleocharis*
subseries *Eleocharis*: *erythropoda, fallax, halophila, palustris, smallii*
subseries *Truncatae*: *bifida, compressa, elliptica, intermedia, montevidensis, tenuis, tricostata, verrucosa*
series *Albidae*: *albida*
series *Melanocarpae*: *melanocarpa*
series *Rostellatae*: *rostellata*
series *Tenuissimae*
subseries *Chaetariae*: *baldwinii, brittonii, microcarpa var. filiculmis, microcarpa var. microcarpa, nigrescens, setifolia, tortilis, tuberculosa, vivipara*
section *Eleogenus*
series *Ovatae*: *engelmannii, obtusa, ovata*
series *Maculosae*

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

98. CYPERACEAE
subseries *Ocreatae*: *flavescens, olivacea*
subseries *Rigidae*: *atropurpurea, geniculata*
section *Parvulae*: *parvula*
subgenus *Limnochloa*
section *Limnochloa*: *cellulosa, elongata, equisetoides, interstincta, quadrangulata, robbinsii*
subgenus *Scirpidium*
section *Scirpidium*: *acicularis, radicans*

Identification Notes: "Scale" refers to the flower scales. "Sheath" refers to leaf sheaths. "Bristle" refers to perianth bristles.

Unkeyed taxa: *Eleocharis bifida, Eleocharis macrostachya, Eleocharis minima, Eleocharis wolfii*
Unkeyed waifs: *Eleocharis retroflexa*

1 Culms proliferating from vegetative shoots produced from sterile spikelets at the apex of the culms, often forming large many-branched masses; normally formed fertile spikelets with achenes very rarely produced; typically submersed aquatics, but occasionally spreading on moist exposed soil ..... ***Key A***
1 Culms erect or reclining, not proliferating from vegetative shoots at the apex of the culms, mat-forming or not; forming normal spikelets at the culm apices; terrestrial or emergent wetland plants.
  2 Spike 1-2 (-2.5)× as thick as the culm immediately below the spike, gradually expanded from the culm, the base of the spike narrowly cuneate; spike (3-) 4-8× as long as wide; [subgenus *Limnochloa*] ..... ***Key B***
  2 Spike > 2× as thick as the culm immediately below the spike, abruptly expanded from the culm, the base of the spike broadly cuneate, rounded, or truncate; spike 1-3 (-4)× as long as wide.
    3 Achenes with several distinct longitudinal ribs or low ridges, the intervening spaces with abundant, very narrow, horizontally elongate cells; [subgenus *Scirpidium*] ..... ***Eleocharis acicularis***
    3 Achenes without longitudinal ribs, the surface smooth, granular, or honeycomb-like (*E. tortilis* and *E. tuberculosa* have indistinct ribs, but intervening cells are honeycomb-like, not thin horizontally; *E. tricostata* has 3 keel-like ribs, but achene surface appears granular).
      4 Achenes lenticular or biconvex; styles 2-branched ..... ***Key D***
      4 Achenes trigonous or nearly terete; styles 3-branched ..... ***Key E***

Key A - spikerushes proliferating vegetatively, with no fertile spikelets present {key provisional and needing additional testing}

1 Each culm producing secondary or tertiary whorls.
  2 Base of whorl abruptly widened from culm, forming a distinct shoulder; whorl divisions many per whorl (commonly 20 or more); whorl divisions usually 0.2 mm or less wide, finely capillary (often < 0.1 mm, but some may approach 0.3 mm); surface texture of divisions obviously beaded (under dissecting microscope) ..... ***Eleocharis confervoides***
  2 Base of whorl gradually widened from culm, vase-shaped, not forming a distinct shoulder; whorl divisions fewer per whorl (commonly 15 or less); whorl divisions usually 0.3 mm or more wide (0.5 mm or more, but the finest secondary or tertiary divisions as slender as 0.15 mm); surface texture of divisions not beaded (under dissecting microscope) ..... ***Eleocharis vivipara***
1 Each culm producing a single whorl of proliferations.
  3 Upper portion of sheath firm, the edge closely red-dotted; sheath tip < 1 mm long ..... ***Eleocharis vivipara***
  3 Upper portion of sheath thin and scarious, the edge not differently colored; sheath tip 1-2 mm long; plants usually more filiform and capillary than *E. vivipara*.
    4 Spikelet proliferations distichous; lowest scale much shorter than the others ..... ***Eleocharis baldwinii***
    4 Spikelet proliferations polystichous or spirally disposed; lowest scale longer than others.
      5 Perianth bristles 0.6-1.0 mm long (shorter than to equaling the achene); proximal scale of the spikelets 0.8-1.0 mm wide ..... ***Eleocharis microcarpa var. filiculmis***
      5 Perianth bristles 0.2-0.4 mm long (shorter than the achene); proximal scale of the spikelets 0.4-0.5 mm wide ..... ***Eleocharis microcarpa var. microcarpa***

Key B - spikerushes with the spike about as thick as the culm (subgenus *Limnochloa*)

1 Culm transversely nodose-septate (appearing jointed); culms 2-9.5 mm in diameter.
  2 Spike distinctly thicker than the culm; culms < 3 mm in diameter ..... ***Eleocharis montana***
  2 Spike not distinctly thicker than the culm; culms > 5 mm in diameter.
    4 Achene faces with longitudinal rows of enlarged linear cells separated by obscure longitudinal lines; perianth bristles slender and flexuous, finely spinulose, shorter than to equaling the achene (to 2.5 mm long); culm septae widely (>10 mm) and ± evenly spaced; [widespread in our area] ..... ***Eleocharis equisetoides***
    4 Achene faces with 20-40 bold transverse-rugulose lines; perianth bristles stiff and stout, coarsely spinulose, exceeding the achene (to 2.9 mm long); culm septae concentrated proximally (below spikelet); [of Panhandle FL and s. AL] ..... ***Eleocharis interstincta***
1 Culm not transversely nodose-septate (septae incomplete, if present); culms 1-5.5 mm in diameter.
  5 Spike 3-5 mm in diameter, to 5 cm long, rounded to obtuse at the tip, densely flowered, the flowers (scales) 50-100 per spike, arranged in obvious spiral rows; culm 2-5 mm in diameter; [of estuarine and riverine marshes, or brackish interdune swale ponds on barrier islands].
    6 Culms 3-5 mm in diameter, live culms terete when fresh; tubercle base confluent with the summit of the achene ..... ***Eleocharis cellulosa***
    6 Culms 2-4 mm in diameter, sharply 3-4-angled when fresh; tubercle base distinctly constricted, forming a "waist" ..... ***Eleocharis quadrangulata***
  5 Spike 1-2 mm in diameter, to 2.5 cm long, sharply pointed at the tip, loosely flowered, the flowers (scales) 10-25, few enough that the spiral arrangement is not readily apparent; culm 0.5-1.5 (-2) mm in diameter; [of limesink (doline) ponds and Carolina bay lakes of the mainland].
    7 Achene body 0.8-1.5 mm long; scales mostly ca. 3.5 mm long; culms terete when fresh ..... ***Eleocharis elongata***
    7 Achene body 1.5-2.5 mm long; scales mostly ca. 5 mm long; culms 3-angled when fresh ..... ***Eleocharis robbinsii***

Key to Map Symbology:
* : waif
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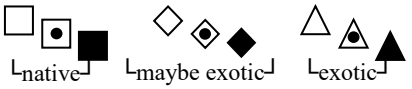
H : historic
N : no
P : planted
? : questionable
X : extirpated

Key D - spikerushes with achenes lenticular or biconvex and styles 2-branched

1 Apex of sheath thin, membranous, hyaline, often with a torn edge.
  2 Culms 0.1-0.3 mm in diameter; achenes whitish to pale brown; leaf sheaths of the upper culm closely sheathing the stem, not wrinkled, the apex acute ..... ***Eleocharis bicolor***
  2 Culms 0.3-0.6 mm in diameter; achenes rufous- or olivaceous-brown to black; leaf sheaths of the upper culm usually prominently wrinkled, inflated, membranous, and disintegrating.
    3 Achenes rufous-brown to reddish-purple to black, (0.3-) 0.4-0.6 mm wide; longer bristles retrorsely barbed, shorter than to equaling achene body ..... ***Eleocharis flavescens var. flavescens***
    3 Achenes olivaceous-brown to black, 0.5-0.7 (-0.8) mm wide; longer bristles either retrorsely barbed and equaling to exceeding the tubercle, or smooth and shorter than the tubercle. ..... ***Eleocharis olivacea var. olivacea***
1 Apex of sheath firm, somewhat thickened, opaque, with a definite edge.
  5 Rhizomatous perennials growing from thick horizontal rhizomes.
    6 Basal (sterile) scales 2-3, the lowest not encircling the base of the spike; [of the Mountains, rarely the Piedmont] ..... ***Eleocharis palustris***
    6 Basal (sterile) scale solitary and spathiform, encircling the base of the spike; [of either the Mountains, upper Piedmont, or outer Coastal Plain].
      7 Achenes prominently reticulate-pitted; [of the outer Coastal Plain] ..... ***Eleocharis ambigens***
      7 Achenes smooth to faintly reticulate; [of the Mountains, rarely Piedmont, or outer Coastal Plain]. ..... ***Eleocharis erythropoda***
  5 Tufted or cespitose annuals without thick horizontal rhizomes.
    9 Tubercle nearly or actually as broad as the achene, and appearing confluent with it, broader than high.
      10 Tubercle flat-deltoid, 1/4 as high as the achene; bristles shorter than the achene body; [plants of clay soils only] ..... ***Eleocharis engelmannii***
      10 Tubercle short-conic, 1/3-1/2 as high as the achene; bristles much exceeding the tubercle; [plants of a variety of soils] ..... ***Eleocharis obtusa***
    9 Tubercle < 2/3 as broad as the achene, conic, taller than broad.
      12 Spikes lance-ovoid to subcylindric; achene body -.5-0.6 mm long ..... ***Eleocharis atropurpurea***
      12 Spikes ovoid to subglobose; achene body 0.7-1.0 mm long ..... ***Eleocharis geniculata***

Key E - spikerushes with achenes trigonous or nearly terete and styles 3-branched

1 Achenes roughly and coarsely honeycomb-reticulate; plants usually forming dense, broad tussocks.
  2 Tubercle much narrower than the achene; culms 'lazy', often reclining, distinctly 3-angled, twisted ..... ***Eleocharis tortilis***
  2 Tubercle as broad or broader than the achene; culms ascending to erect, subterete, not twisted ..... ***Eleocharis tuberculosa***
1 Achenes smooth to finely honeycomb-reticulate.
  3 Tubercle confluent with the achene summit, not constricted at the base.
    4 Achenes bicolored, body black, tubercle whitish, depressed; [plant of freshwater ponds and Carolina bays] ..... ***Eleocharis melanocarpa***
    4 Achenes unicolored, body and tubercle light brown or olive brown; [plants of brackish to saline marshes].
      5 Plants diminutive, culms slender, rounded, 1-7 cm long, not arching and rooting ..... ***Eleocharis parvula***
      5 Plants robust, culms broad, flattened, 20-80 (or more) long, at least some arching and rooting at tips ..... ***Eleocharis rostellata***
  3 Tubercle not confluent with the achene summit, constricted at the base.
    6 Achenes with prominent keel-like angles or ribs ..... ***Eleocharis tricostata***
    6 Achenes with rounded angles.
      7 Scales 2-ranked; spikes usually 2-4-flowered ..... ***Eleocharis baldwinii***
      7 Scales spirally imbricate; spikes many-flowered.
        8 Achenes white or very pale gray.
          9 Bristles none. ..... ***Eleocharis brittonii***
          9 Bristles present.
            11 Tubercle depressed-deltoid; scales rounded, appressed ..... ***Eleocharis brittonii***
            11 Tubercle conic or deltoid; scales acute to attenuate, the tips free
              12 Perianth bristles 0.6-1.0 mm long (shorter than to equaling the achene); proximal scale of the spikelets 0.8-1.0 mm wide ..... ***Eleocharis microcarpa var. filiculmis***
              12 Perianth bristles 0.2-0.4 mm long (shorter than the achene); proximal scale of the spikelets 0.4-0.5 mm wide ..... ***Eleocharis microcarpa var. microcarpa***
        8 Achenes yellowish, brown, or olive.
          13 Horizontal rhizomes absent. ..... ***Eleocharis vivipara***
          13 Horizontal rhizomes present.
            15 Achenes not honeycomb-reticulate.
              16 Bristles absent; culms strongly flattened; [of inland basic soils] ..... ***Eleocharis compressa var. compressa***
              16 Bristles present; culms rounded; [of coastal brackish soils] ..... ***Eleocharis albida***
            15 Achenes honeycomb-reticulate.
              19 Mature achenes with bristles; achenes yellow or brown; culms 0.6-1.0 mm thick; [rare, on outer Coastal Plain of NC and SC] ..... ***Eleocharis montevidensis***
              19 Mature achenes without bristles (present when immature, but drop off); achenes olive (yellow in *E. elliptica*); culms slender-wiry, 0.2-0.4 mm wide (0.4-0.8 in *E. tenuis* var. *pseudoptera*); [collectively widespread].
                21 Rhizomes (1.1–)1.4–1.9(–2.3) mm wide, appearing thick relative to short internode lengths of (0.9-) 1.3-2.6 (-4.4) mm, scales of rhizome (1.4-) 2.3-3.3 (-4.6) mm long; tubercles typically ¾ the width of achene, greatly depressed, rarely pyramidal; achenes 0.6-0.7 (-0.9) mm in length to base of tubercle by 0.5 (-0.7) mm wide, coarsely (to finely) rugose to cancellate (at 10× magnification); [e. PA and NJ south to GA, west to e. NE, OK, and TX] ..... ***Eleocharis verrucosa***

Key to Map Symbology:


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21 Rhizomes 0.6-1.4 (-1.9) mm wide, appearing delicate or slender relative to long internode lengths of (2.6-) 3.5-7.7 (-10.0) mm, scales of rhizome (3.7-) 4.4-8.5 (-10.2) long; tubercles typically less than ¾ the width of achene, pyramidal to depressed; achenes (0.6-) 0.7-1.1 mm in length to base of tubercle by (0.4-) 0.5-0.8 mm wide, finely rugulose to finely cancellate (at 10× magnification).
- 22 Culms bluntly angled to smooth, seldom deeply sulcate, to 0.5 mm wide; rhizomes delicate to slender, 0.6-1.0 (-1.2) mm wide, with longer internodes (2.6-) 3.5-5.9 (-8.0), scales of rhizome (3.7-) 4.4-6.7 (-7.9) mm in length; tubercles pyramidal, rarely depressed (0.2-) 0.3-0.4 mm wide; achene obovate occasionally nearing an orbicular shape (0.6-) 0.7-0.8 (-0.9) mm long by (0.4-) 0.5-0.7 mm wide, rugulose to finely cancellate at 10×; [e. KY and w. NC northeast to NS] ..... ***Eleocharis tenuis var. tenuis***
- 22 Culms sharply angled, usually deeply sulcate, to 0.8 mm wide; rhizomes slender, (0.8-) 0.9-1.4 (-1.9) mm wide, with longer internodes (3.2-) 4.6-7.7 (-10) mm, scales of rhizome (3.7-) 5.1-8.5 (-10.2) mm in length; tubercles depressed, rarely pyramidal (0.3-) 0.4-0.6 mm wide; achene elongate obovate to faintly spatulate, (0.7-) 0.9-1.1 mm long by 0.6-0.8 mm wide, obscurely to finely rugulose (at 10× magnification); [w. NC northeast to se. ME, disjunct to s. IL) ..... ***Eleocharis tenuis var. pseudoptera***

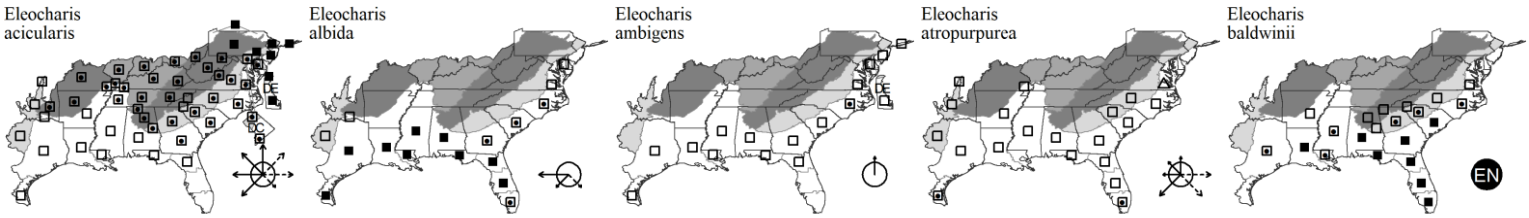
Eleocharis acicularis (Linnaeus) Roemer & J.A. Schultes. NEEDLE SPIKERUSH. **Hab:** Drawdown shores of lakes, ponds, and rivers, marshes, ditches. **Dist:** Greenland, NL (Newfoundland), NU, and AK south to GA, TX, CA; Mexico, Central America, n. South America, Eurasia. **Phen:** Jul-Sep. **Syn:** = Ar, C, ETx1, FNA23, G, GrPl, GW1, K1, K3, Mi, Mo1, NcTx, NE, NY, Pa, RAB, S, Tn, Va, WH3; < *Eleocharis acicularis* (Linnaeus) Roemer & J.A. Schultes – Tx; > *Eleocharis acicularis* var. *acicularis* – F, Il; > *Eleocharis acicularis* var. *gracilescens* Svenson – Il; > *Eleocharis acicularis* var. *porcata* S.G. Smith – Il; > *Eleocharis bella* (Piper) Svenson – Il.

Eleocharis albida Torrey. WHITE SPIKERUSH. **Hab:** Brackish tidal marshes, interdune swales and ponds. **Dist:** MD south to s. FL, west to TX and Mexico; Bermuda. **Phen:** Jul-Sep. **Syn:** = C, ETx1, F, FNA23, G, GW1, K1, K3, K4, RAB, S, Tx, Va, WH3. NatureServe G4G5 (Apparently Secure).

Eleocharis ambigens Weatherby. **Hab:** Brackish tidal marshes. **Dist:** MA south to n. FL, west to TX. **Phen:** Jul-Sep. **Syn:** = F, FNA23, G, NE, NY; < *Eleocharis fallax* Weatherby – C, GW1, K1, K3, K4, RAB, Va, WH3.

Eleocharis atropurpurea (Retzius) J. Presl & C. Presl. PURPLE SPIKERUSH. **Hab:** Clay-based Carolina bays, other pineland ponds, disturbed wetlands. **Dist:** Widely scattered in North America; Mexico, West Indies, Central America, South America, Asia, Africa. **Phen:** Jun-Sep. **Comm:** Reported for South Carolina by Hill & Horn (1997). **Syn:** = C, ETx1, F, FNA23, G, GrPl, GW1, K1, K3, K4, Mi, Mo1, S, Tx, WH3. NatureServe G4G5 (Apparently Secure).

Eleocharis baldwinii (Torrey) Chapman. BALDWIN'S SPIKERUSH. **Hab:** Bogs, pools, acid shores. **Dist:** VA south to FL, west to AR and TX. **Phen:** May-Sep. **Comm:** Often proliferous. **Syn:** = Ar, C, ETx1, FNA23, GW1, K1, K3, K4, NcTx, RAB, Tx, Va, WH3; > *Eleocharis baldwinii* (Torrey) Chapman – S; > *Eleocharis capillacea* Kunth – S, misapplied; > *Eleocharis prolifera* Torrey – S. NatureServe G4G5 (Apparently Secure).



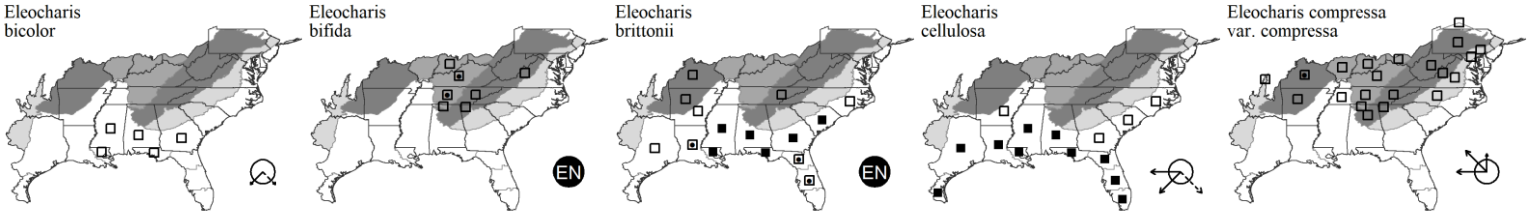
Eleocharis bicolor Chapman. **Hab:** Moist sites, wet pine savannas. **Dist:** AL and GA west to LA; West Indies; Nicaragua. **Syn:** = FNA23, K1, S; < *Eleocharis minima* Kunth – K3, K4, WH3.

Eleocharis bifida S.G. Smith. CEDAR GLADE SPIKERUSH. **Hab:** Seasonally wet seepage in limestone glades. **Dist:** KY and w. VA south through TN to nw. GA and n. AL. **Comm:** {not yet keyed; synonymy incomplete}. **Syn:** = FNA23, K3, K4.

Eleocharis brittonii Svenson ex Small. **Hab:** Bogs, pine savannas. **Dist:** NC south to FL, west to TX, north in the interior to TN and MO; disjunct in DE. **Comm:** Smith et al. in FNA discuss variation within *E. brittonii* and the possibility that two taxa are involved. **Syn:** = Ar, ETx1, F, FNA23, K1, S, Tn; < *Eleocharis microcarpa* Torrey – C, G, GW1, K3, K4, RAB, WH3.

Eleocharis cellulosa Torrey. GULF COAST SPIKERUSH. **Hab:** Fresh to brackish interdune swale ponds on barrier islands. **Dist:** E. NC south to s. FL, west to TX and Mexico; West Indies; Bermuda; Central America (Nicaragua). **Phen:** Jun-early Nov. **Comm:** See Gaddy & Rayner (1980) for the report of this species in SC and Carter, Baker, & Morris (2009) for discussion of its occurrence in GA. **Syn:** = Ar, Bah, ETx1, FNA23, GW1, K1, K3, K4, NcTx, RAB, S, Tx, WH3, Angelo, Rosen, & Lange (2020), Rosen, Hatch, & Carter (2007). NatureServe G4G5 (Apparently Secure).

Eleocharis compressa Sullivant *var*. ***compressa***. FLATTENED SPIKERUSH. **Hab:** Limestone or mafic glades and barrens, riverside scours. **Dist:** QC, MN, SD, and CO south to VA, nc. NC, nw. GA, AL, MS, AR, and KS. **Phen:** May-Jun. **Comm:** See Brown & Marcus (1998). **Syn:** = Ar, F, FNA23, Mi, NE, NY, Pa, Va; = *Eleocharis compressa* Sullivant – NcTx, Tx; < *Eleocharis compressa* Sullivant – C, G, GrPl, GW1, Il, K1, K3, Mo1, WV. NatureServe G4 (Apparently Secure).



Eleocharis confervoides (Poiret) Steudel. WEBSTERIA. **Hab:** Submersed in lakes and ponds. **Dist:** AL, GA, and FL; West Indies; Central and South America; Asia; Africa; n. Australia. **Comm:** This taxon, often segregated into the monotypic genus *Websteria*, is widely distributed in tropical and subtropical regions of both hemispheres. Its retention in *Eleocharis* is supported by a molecular phylogenetic study (Roalson & Friar 2000). **Syn:** = K3, K4; = *Websteria confervoides* (Poiret) S. Hooper – FNA23, GW1, K1, WH3; = *Websteria submersa* (C. Wright) Britton – S. NatureServe G3G5 (Apparently Secure).

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more)

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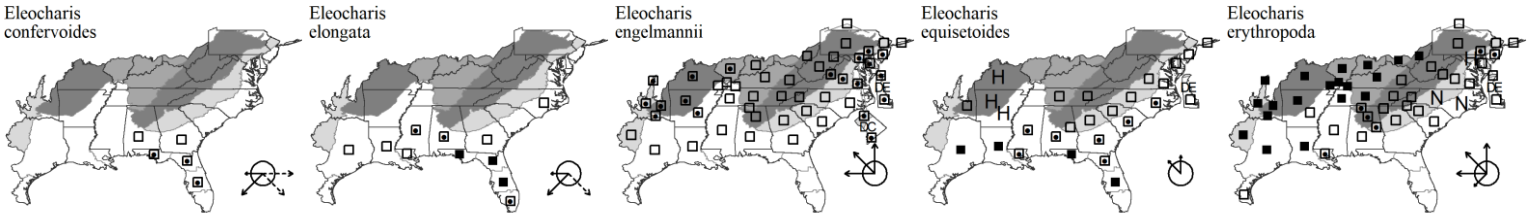
Eleocharis elongata Chapman. **Hab:** Quiet waters of limesink (doline) ponds, Everglades sawgrass sloughs. **Dist:** Se. NC south to FL, west to s. AL, s. MS, and TX (Sorrie & Leonard 1999); Jamaica; Mexico, Central America, South America. **Phen:** Jul-Aug. **Syn:** = ETx1, FNA23, GW1, K1, K3, K4, S, WH3, Angelo, Rosen, & Lange (2020). NatureServe G5? (Secure).

Eleocharis engelmannii Steudel. ENGELMANN'S SPIKERUSH. **Hab:** Freshwater shores, marshes, disturbed wet places. **Dist:** MA, ON, and BC south to GA, MS (Sorrie & LeBlond 2008), TX, and CA. **Phen:** Jul-Sep. **Syn:** = Ar, ETx1, F, FNA23, G, Il, K1, K3, K4, Mi, NcTx, NY, Pa, RAB, S, Tn, Va, WV; > *Eleocharis engelmannii* var. *detonsa* A. Gray – NE; > *Eleocharis engelmannii* var. *engelmannii* – NE.

Eleocharis equisetoides (Elliott) Torrey. HORSETAIL SPIKERUSH. **Hab:** Quiet waters of limesink (doline) ponds, natural lakes, borrow pits, ditches, artificial millponds. **Dist:** MA south to c. peninsular FL, west to se. TX, AR, s. MO, and se. OK; also near the Great Lakes from NY west to MI, MO. Reported for OK (Buthod & Hoagland 2017). **Phen:** Jun-Sep. **Syn:** = Ar, C, ETx1, F, FNA23, G, GW1, Il, K1, K3, K4, Mi, Mo1, NE, NY, RAB, Tn, Tx, Va, WH3, Angelo, Rosen, & Lange (2020), Brunton, Campbell, & Reznicek (2018); < *Eleocharis equisetoides* (Elliott) Torrey – S.

Eleocharis erythropoda Steudel. BALD SPIKERUSH. **Hab:** Streambanks, marshes, ponds, swamps. **Dist:** NS and AK south to NC, MS, TX, AZ, and OR. **Phen:** Jul-Sep. **Syn:** = Ar, ETx1, FNA23, GrPl, GW1, Il, K1, Mi, Mo1, NE, NY, Pa, RAB, Tn, Va; > *Eleocharis calva* Torrey – F, G, S, WV; < *Eleocharis palustris* (Linnaeus) Roemer & J.A. Schultes – C, K3, K4, NcTx.



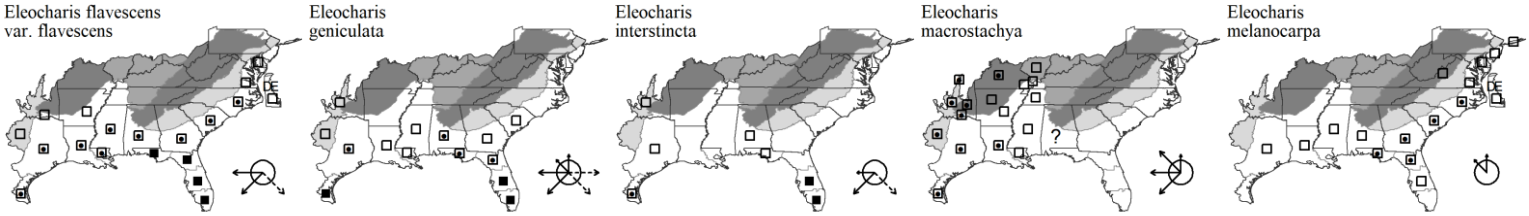
Eleocharis flavescens (Poiret) Urban *var.* ***flavescens***. PALE SPIKERUSH, YELLOW SPIKERUSH. **Hab:** Coastal Plain ponds, pools. **Dist:** DE south to s. FL, west to TX; West Indies; South America. **Phen:** Jun-Sep. **Tax:** Var. *thermalis* (Rydberg) Cronquist occurs inland in w. United States. **Syn:** < *Eleocharis flavescens* – F, GW1, K1, NcTx, RAB, Tx, Va, WH3; < *Eleocharis flavescens* (Poiret) Urban var. *flavescens* – Ar, C, ETx1, FNA23, G, K3, K4.

Eleocharis geniculata (Linnaeus) Roemer & J.A. Schultes. **Hab:** Marshes, moist disturbed areas. **Dist:** Widespread but scattered across much of the United States; West Indies, Central America, South America, Asia, Africa. **Phen:** Jun-Sep. . **Syn:** = ETx1, F, FNA23, G, GW1, Il, K1, K3, K4, Mi, NcTx, Pa, WH3; > *Eleocharis caribaea* (Rottbøll) S.F.Blake – Bah, C, GrPl, RAB, S, Tx.

Eleocharis interstincta (Vahl) Roemer & J.A. Schultes. KNOTTED SPIKERUSH. **Hab:** Ponds, lakes, borrow pits, canals. **Dist:** S. AL and Panhandle FL south to s. FL and west (interruptedly) to OK and TX; Bahamas and West Indies; Mexico, Central America, e. South America. **Phen:** Apr-Oct. **Syn:** = Bah, ETx1, FNA23, GW1, K1, K3, K4, Tx, WH3, Angelo, Rosen, & Lange (2020), Brunton, Campbell, & Reznicek (2018); < *Eleocharis equisetoides* (Elliott) Torrey – S.

Eleocharis macrostachya Britton. LARGE SPIKERUSH. **Hab:** Wet ditches, marshes, shorelines. **Dist:** QC to AK south to WV, AL, MS, TX, CA, and Mexico; South America. **Phen:** Jul-Oct. **Comm:** Mapping is especially conjectural. {not yet keyed; add to synonymy}. **Syn:** = Ar, ETx1, FNA23, GrPl, Il, K1, Tx; < *Eleocharis palustris* (Linnaeus) Roemer & J.A. Schultes – C, K3, K4, Mo1.

Eleocharis melanocarpa Torrey. BLACK-FRUITED SPIKERUSH. **Hab:** Coastal Plain ponds, cypress meadows, sinkhole ponds in the Shenandoah Valley. **Dist:** MA south to n. peninsular FL, west to s. MS; disjunct in e. TX, s. MI, and n. IN (Sorrie & Leonard 1999). **Phen:** Jul-Sep. **Syn:** = C, ETx1, F, FNA23, G, GW1, K1, K3, K4, Mi, NE, NY, RAB, S, Tx, Va, WH3. NatureServe G4 (Apparently Secure).



Eleocharis microcarpa Torrey *var.* ***filiculmis*** Torrey. TORREY'S SPIKERUSH. **Hab:** Bogs, wet pine savannas. **Dist:** MA and MI south to FL west to TX. **Phen:** Jun-Sep. **Syn:** = Ar, F, FNA23, Mi, NE, NY, Tn, Va; = *Eleocharis torreyana* Böckeler – S; < *Eleocharis microcarpa* Torrey – C, ETx1, G, GW1, K1, K3, K4, NcTx, Pa, RAB, Tx, WH3.

Eleocharis microcarpa Torrey *var.* ***microcarpa***. **Hab:** Wet pine savannas, Coastal Plain bogs. **Dist:** SC south to FL, west to LA; West Indies. **Phen:** Jun-Sep. **Syn:** = F, FNA23, Tn; = *Eleocharis microcarpa* Torrey – S; < *Eleocharis microcarpa* Torrey – C, G, GW1, K1, K3, K4, RAB, Tx, WH3.

Eleocharis minima Kunth. SMALL SPIKERUSH. **Hab:** Pond margins. **Dist:** GA and FL west to TX; West Indies, Central America, South America, Asia, Australia (FNA). **Phen:** Apr-Oct. **Syn:** = ETx1, FNA23; < *Eleocharis minima* Kunth – K1, K3, K4, Tx; ? *Eleocharis uncialis* Chapman – S.

Eleocharis montana (Kunth) Roemer & J.A. Schultes. **Hab:** Ponds, swales. **Dist:** FL and se. and sw. GA west to TX, south to Mexico, Central America, and South America; West Indies. **Syn:** = ETx1, FNA23, K1, K3, K4, Tx, WH3, Brunton, Campbell, & Reznicek (2018); > *Eleocharis nodulosa* (Roth) J.A. Schultes – S.

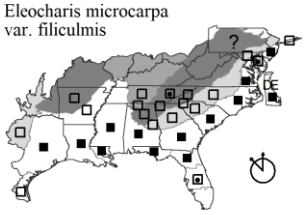
Eleocharis montevidensis Kunth. SAND SPIKERUSH. **Hab:** Maritime wet grasslands, ponds, swales, ditches. **Dist:** E. NC south to FL, west to TX and CA; Mexico, South America. **Phen:** Jul-Sep. **Comm:** Reported for SC by Nelson & Kelly (1997) and discussed for GA by Carter, Baker, & Morris (2009). **Syn:** = Ar, ETx1, FNA23, GrPl, GW1, K1, K3, K4, NcTx, RAB, Tx, WH3. NatureServe G5 (Secure).

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more)

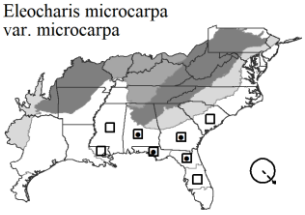
* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable
X : extirpated

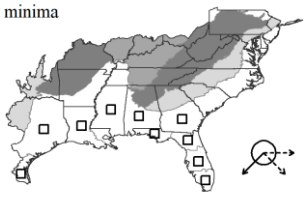
Eleocharis microcarpa var. filiculmis



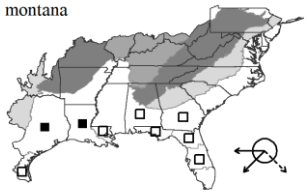
Eleocharis microcarpa var. microcarpa



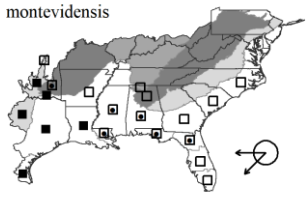
Eleocharis minima



Eleocharis montana



Eleocharis montevidensis



Eleocharis obtusa (Willdenow) J.A. Schultes. BLUNT SPIKERUSH. **Hab:** Ditches, marshes, disturbed wet areas. **Dist:** NS west to BC, south to FL, TX, and CA. **Phen:** Late Apr-Oct. **Syn:** = Ar, ETx1, FNA23, G, GW1, Il, K1, K3, K4, Mi, NcTx, S, Tn, Tx, Va, WH3, WV; > *Eleocharis obtusa* var. *ellipsoidalis* Fernald – F; > *Eleocharis obtusa* var. *jejuna* Fernald – F; > *Eleocharis obtusa* var. *obtusa* – F, GrPl, NE, NY, Pa; > *Eleocharis obtusa* var. *ovata* – GrPl; > *Eleocharis obtusa* var. *peasei* Svenson – NE, Pa; < *Eleocharis ovata* (Roth) Roemer & J.A. Schultes – C, Mo1, RAB.

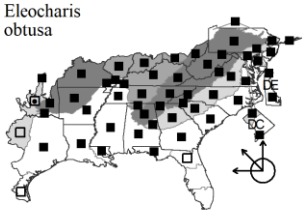
Eleocharis olivacea Torrey *var*. ***olivacea***. OLIVE SPIKERUSH. **Hab:** Coastal Plain ponds, pools. **Dist:** NS west to MN, south to FL and TX. **Phen:** Jun-Sep. **Syn:** = K1, K3; > *Eleocharis flaccida* (Reichenbach) Urban – S; < *Eleocharis flavescens* – RAB, Tx; < *Eleocharis flavescens* (Poiret) Urban var. *olivacea* (Torrey) Gleason – Ar, C, ETx1, FNA23, G, K4, Mi, NE, NY; < *Eleocharis olivacea* – F, GW1, Il, Pa, WH3; > *Eleocharis olivacea* – S.

Eleocharis palustris (Linnaeus) Roemer & J.A. Schultes. COMMON SPIKERUSH, SMALL'S SPIKERUSH. **Hab:** Marshes. **Dist:** NL (Labrador) west to AK, south to FL, TX, CA, and Mexico; Eurasia. **Phen:** Jun-Sep. **Tax:** As discussed by Smith et al. in FNA (2002b), variable in geographically correlated ways and probably warranting recognition of varieties or segregate species. *E. smallii* is sometimes separated as the eastern North American member of the north temperate *E. palustris* complex. **Syn:** = Ar, ETx1, FNA23, G, Il, K1, Mi, Mo1, NY, Pa, Tn, Va; < *Eleocharis palustris* (Linnaeus) Roemer & J.A. Schultes – C, K3, K4, NcTx, RAB; > *Eleocharis palustris* ssp. *palustris* – NE; > *Eleocharis palustris* ssp. *vigens* (L.H. Bailey) A. Haines – NE; > *Eleocharis palustris* var. *major* Sonder – F; > *Eleocharis palustris* var. *palustris* – F; > *Eleocharis smallii* Britton – F, GrPl, WV; > *Eleocharis xyridiformis* – GrPl.

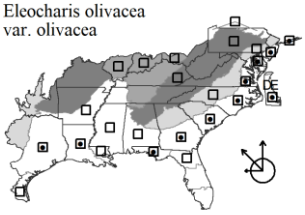
Eleocharis parvula (Roemer & J.A. Schultes) Link ex Bluff, Nees, & Schauer. DWARF SPIKERUSH, SMALL SPIKERUSH. **Hab:** Tidal brackish and freshwater marshes, inland salt marshes, shallow waters of managed impoundments. **Dist:** NS, NL (Newfoundland), and MI south to c. peninsular FL and LA; BC south to CA; Mexico, Central America, South America, Eurasia, Africa. **Phen:** Jul-Sep. **Syn:** = Ar, ETx1, FNA23, G, GW1, Il, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, WH3; = *Eleocharis parvula* var. *parvula* – C, F; > *Eleocharis parvula* var. *anachaeta* (Torrey) Svenson – GrPl; > *Eleocharis parvula* var. *parvula* – GrPl.

Eleocharis quadrangulata (Michaux) Roemer & J.A. Schultes. SQUARESTEM SPIKERUSH. **Hab:** Pools, marshes. **Dist:** MA west to ON and MI, south to n. FL and TX. **Phen:** Jun-Sep. **Syn:** = Ar, C, ETx1, FNA23, GrPl, GW1, Il, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, WH3, WV, Angelo, Rosen, & Lange (2020); > *Eleocharis quadrangulata* var. *crassior* Fernald – F, G; > *Eleocharis quadrangulata* var. *quadrangulata* – F, G.

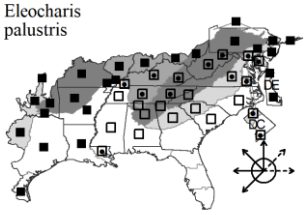
Eleocharis obtusa



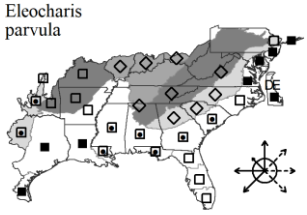
Eleocharis olivacea var. olivacea



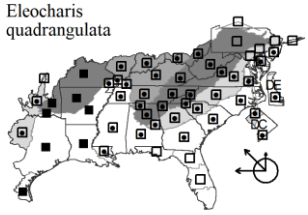
Eleocharis palustris



Eleocharis parvula



Eleocharis quadrangulata



* ***Eleocharis retroflexa*** (Poiret) Urban. **Hab:** Moist areas. **Dist:** S. AL (probably a ballast waif, collected in Mobile and Baldwin counties by Mohr in 1896); Mexico, West Indies, Central America, South America, tropical Asia, Australia. **Comm:** {not yet keyed}. **Syn:** = FNA23, K2, K4. NatureServe G5 (Secure).

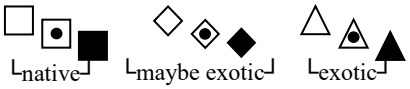
Eleocharis robbinsii Oakes. ROBBINS'S SPIKERUSH. **Hab:** Quiet waters of limesink (doline) ponds, natural lakes, millponds. **Dist:** NS and NB west to ON, south to s. MS (Sorrie & Leonard 1999); also near the Great Lakes, from NY west to IN, WI, and MN. **Phen:** Jul-Aug. **Syn:** = C, F, FNA23, G, GW1, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Va, WH3, Angelo, Rosen, & Lange (2020). NatureServe G4G5 (Apparently Secure).

Eleocharis rostellata (Torrey) Torrey. BEAKED SPIKERUSH. **Hab:** Brackish and freshwater tidal marshes, sea-level fens. **Dist:** ME, ON, and BC south to FL, TX, CA, and Mexico; West Indies. Reported for WV (Harmon, Ford-Werntz, & Grafton 2006). **Phen:** Jul-Sep. **Syn:** = C, ETx1, F, FNA23, G, GrPl, GW1, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, Tx, Va, WH3. NatureServe G5 (Secure).

Eleocharis tenuis (Willdenow) J.A. Schultes *var*. ***pseudoptera*** (Weatherby ex Svenson) Svenson. **Hab:** Bogs. **Dist:** NS, QC and IN south to NC; disjunct in s. IL. **Phen:** Jun-Sep. **Tax:** See Gibbons & McMullen (2019) for detailed discussion of the *E. tenuis* complex. This variety very likely warrants species rank status, distinct from *E. tenuis* (var. *tenuis*), as it sometimes co-occurs and remains morphologically distinct. **Syn:** = C, F, FNA23, G, K1, K3, K4, NE, NY, Pa, Tn, Gibbons & McMullen (2019); < *Eleocharis capitata* (Linnaeus) R. Brown – S; < *Eleocharis tenuis* (Willdenow) J.A. Shultes – RAB. NatureServe G5T5? (Secure).

Eleocharis tenuis (Willdenow) J.A. Schultes *var*. ***tenuis***. SLENDER SPIKERUSH, KILL-COW. **Hab:** Bogs, marshes. **Dist:** NS and QC south to NC and s. AL. **Phen:** Jun-Sep. **Tax:** See Gibbons & McMullen (2019) for detailed discussion of the *E. tenuis* complex. **Syn:** = C, F, FNA23, G, K1, K3, K4, NE, NY, Pa, Tn, Va, Gibbons & McMullen (2019); < *Eleocharis capitata* (Linnaeus) R. Brown – S; < *Eleocharis tenuis* (Willdenow) J.A. Shultes – RAB. NatureServe G5T5 (Secure).

Key to Map Symbology:



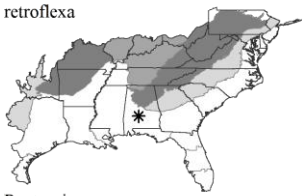
←rare ←uncommon ←common (see introduction for more)

* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable

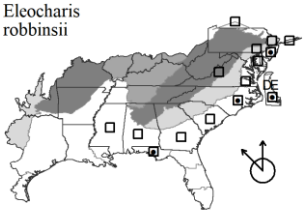
X : extirpated

Eleocharis retroflexa

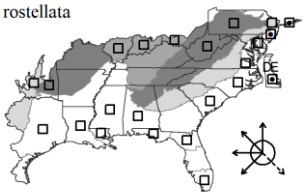


Pantropics

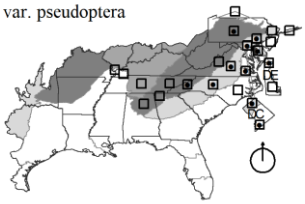
Eleocharis robbinsii



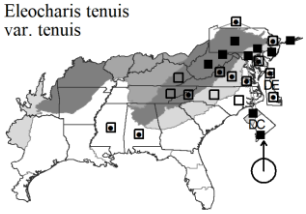
Eleocharis rostellata



Eleocharis tenuis var. pseudoptera



Eleocharis tenuis var. tenuis



Eleocharis tortilis (Link) J.A. Schultes. TWISTED SPIKERUSH. **Hab:** Wet pine savannas, Coastal Plain seepage bogs, seeps, pocosin ecotones. **Dist:** NJ south to FL, west to TX, inland to sw. NC, w. TN, and AR. **Phen:** Jul-Sep. **Syn:** = Ar, C, ETx1, F, FNA23, G, GW1, K1, K3, K4, NY, RAB, Tn, Tx, Va, WH3; < *Eleocharis simplex* (Elliott) A. Dietrich – S, misapplied. NatureServe G5 (Secure).

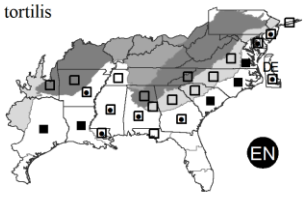
Eleocharis tricostata Torrey. THREE-ANGLE SPIKERUSH. **Hab:** Wet pine savannas, bogs. **Dist:** MA, NY, and MI south to FL, AL, and MS. **Phen:** Jul-Sep. **Syn:** = C, F, FNA23, G, GW1, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Va, WH3. NatureServe G4 (Apparently Secure).

Eleocharis tuberculosa (Michaux) Roemer & J.A. Schultes. LARGE-TUBERCLED SPIKERUSH. **Hab:** Bogs, savannas, acidic seeps, ditches. **Dist:** NS south to FL, west to TX. **Phen:** Jun-Sep. **Syn:** = Ar, C, ETx1, F, FNA23, G, GW1, K1, K3, K4, NE, NY, Pa, RAB, S, Tn, Tx, Va, WH3. NatureServe G5 (Secure).

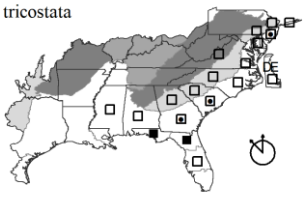
Eleocharis verrucosa (Svenson) L.J. Harms. **Hab:** Bogs and seeps. **Dist:** NJ, PA, WI, and s. SD south to GA, a. AL, s. MS, s. LA, and se. TX. **Phen:** Mar-Sep. **Tax:** See Gibbons & McMullen (2019) for detailed discussion of the *E. tenuis* complex. **Syn:** = GrPl, GW1, Il, Mo1, Gibbons & McMullen (2019); = *Eleocharis tenuis* (Willdenow) J.A. Schultes var. *verrucosa* (Svenson) Svenson – Ar, C, ETx1, F, FNA23, G, K1, K3, K4, Pa, Tn, Tx, Va; < *Eleocharis capitata* (Linnaeus) R. Brown – S. NatureServe G5T3T5 (Apparently Secure).

Eleocharis vivipara Link. VIVIPAROUS SPIKERUSH. **Hab:** Coastal Plain ponds. **Dist:** NC south to FL, west to TX. **Phen:** Jul-Sep. **Syn:** = C, ETx1, F, FNA23, GW1, K1, K3, K4, RAB, S, Va, WH3; > *Eleocharis vivipara* Link – S. NatureServe G5 (Secure).

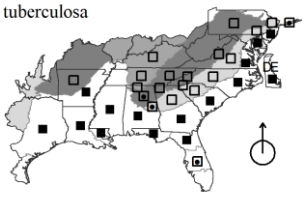
Eleocharis tortilis



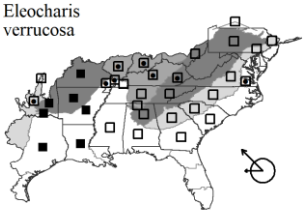
Eleocharis tricostata



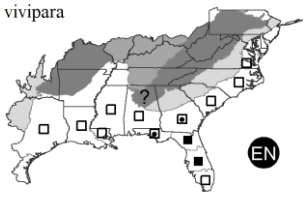
Eleocharis tuberculosa



Eleocharis verrucosa

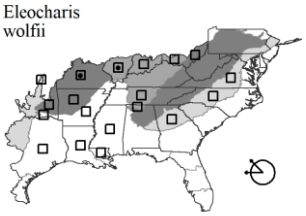


Eleocharis vivipara



Eleocharis wolfii (A. Gray) A. Gray ex Britton. WOLF'S SPIKERUSH. **Hab:** Oak flatwoods, shallow ephemeral pools on granitic flatrocks, prairies. **Dist:** OH, WI, MN, and ND south to GA, AL, TN, LA, and TX. **Phen:** May-Jul. **Comm:** {not yet keyed}. **Syn:** = Ar, C, ETx1, F, FNA23, G, GrPl, Il, K1, K3, K4, Mo1, NY, Tn, Tx, Va. NatureServe G3G5 (Apparently Secure).

Eleocharis wolfii



Fimbristylis Vahl 1806 (FIMBRY)

A genus of about 250-300 species, herbs, primarily warm temperate and tropical. References: Goetghebeur & Van den Borre (1989); Kral (1971); Kral (2002b) in FNA23 (2002b); Rosen et al (2012).

1 Style branches 3; achene trigonous or terete; plant an annual.
  2 Achene trigonous; spikelets linear-oblong to lanceolate, 3-7 mm long; ligule present, as a line of short, pale hairs ..... ***Fimbristylis autumnalis***
  2 Achene terete; spikelets subglobose to ovoid, 2-4 mm long; ligule absent ..... ***Fimbristylis littoralis***
1 Style branches 2; achene lenticular or terete; plant an annual or perennial.
  3 Plants diminutive annuals, the culms 1-6 (-30) cm tall; leaf blades < 1 mm wide.
    4 Achene cylindrical, 2-4× as long as wide, curved like a tiny banana; inflorescence bracts 1-2 cm long ..... ***Fimbristylis perpusilla***
    4 Achene obovate, 1-1.5× as long as wide, not curved; inflorescence bracts 4-10 cm long. ..... ***Fimbristylis vahlii***
  3 Plants small to large annuals or perennials, the culms (6-) 15-150 cm tall; leaf blades > 1 mm wide.
    7 Plant a medium-sized to robust perennial, the culms generally 5-15 dm tall, either cespitose, with a hardened base, and deeply set in the substrate, or rhizomatous, the rhizomes either slender or thick
      8 Plant cespitose, lacking rhizomes; bases of leaves hard, leathery, dark brown, deeply set in the substrate, the base of the plant generally 5-15 cm below the ground surface; achene (1.3-) 1.5-2 mm long ..... ***Fimbristylis castanea***
      8 Plant rhizomatous, the rhizomes either thick and knotty or slender and scaly (rarely with both); bases of leaves often somewhat thickened, hardened, and brownish, the base of the plant not especially deeply set; achene 0.8-1.2 (-1.3) mm long.
        9 Plant a robust perennial to 15 (-20) dm tall, with elongate, slender, scaly, pale-to-reddish rhizomes (excavate carefully); leaves usually flat or keeled, 2-5 mm wide; stem usually flattened and scabrous-edged above; ligule present, a line of short, pale hairs ..... ***Fimbristylis caroliniana***
        9 Plant a medium-sized perennial to 10 dm tall, rhizomatous, the rhizomes either short, thick, and knotty or also with slender rhizomes); leaves usually involute, ca. 1 mm wide; stem usually terete or oval in cross-section, smooth; ligule either absent or present. ..... ***Fimbristylis puberula***
    7 Plant a small to medium-sized annual or perennial, the culms to 8 dm tall, neither rhizomatous (except *F. brevivaginata*) nor with a hardened base deeply set in the substrate.
      11 Spikelets pale, usually solitary (-3) on the scape (and thus appearing somewhat like an *Eleocharis*) ..... ***Fimbristylis schoenoides***
      11 Spikelets dark, usually in a complex inflorescence.
        12 Face (one side) of the achene with 15 or more longitudinal rows of rounded pits, the achene margin noticeably paler ..... ***Fimbristylis tomentosa***
        12 Face (one side) of the achene with 13 or fewer longitudinal rows of rectangular pits, the achene margin not noticeably paler.

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

13 Plant a perennial; leaves spreading, 2-5 mm wide; achenes lacking warts.
14 Plant bulbous at base, and also with scale-covered short rhizomes; spikelet scales glabrous or puberulent; [plant a rare native of rock outcrops in GA and AL] ..... ***Fimbristylis brevivaginata***
14 Plant neither bulbous nor rhizomatous; spikelet scales glabrous; [plant weedy, probably introduced in North America] ..... ***Fimbristylis dichotoma***
13 Plant an annual; leaves spreading or ascending, 1-4 mm wide; achenes with or without warts.
15 Achenes lacking warts or with warts scattered over the entire surface; primary rays of umbel spreading or ascending, the inflorescence generally longer than broad; leaves relatively soft ..... ***Fimbristylis annua***
15 Achenes with a few low warts on the edges; primary rays of umbel stiffly spreading (even deflexed), the inflorescence therefore often as broad as long or broader; leaves relatively hard, broad (averaging 2 mm wide), and spreading subdistichously ..... ***Fimbristylis decipiens***

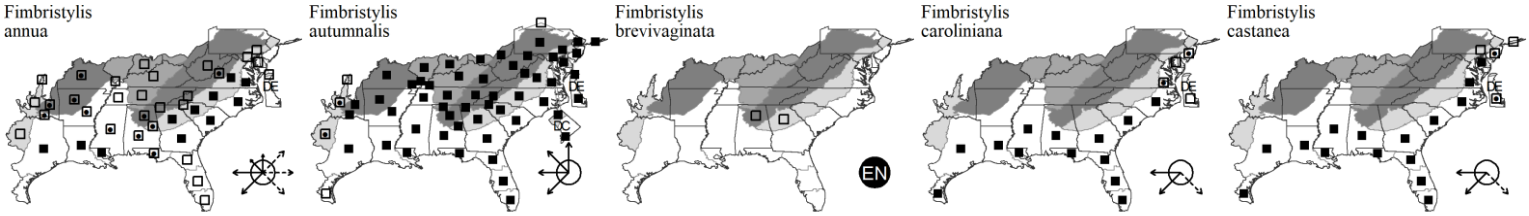
Fimbristylis annua (Allioni) Roemer & J.A. Schultes. ANNUAL FIMBRY. **Hab:** Wet, disturbed areas, thin soils of rock outcrops; variously interpreted as entirely alien or partly native. **Dist:** SE. PA, WV, s. IN, s. IL, MO, e. KS, south to n. peninsular FL, s. TX, s. AZ, and south through Mexico to Central and South America; West Indies; Eurasia, Africa, etc. **Phen:** Jul-Sep. **Syn:** = Ar, C, ETx1, FNA23, G, GrPl, GW1, Il, K1, K3, K4, Mo1, NcTx, Pa, Tn, Tx, Va, W, Kral (1971); ? *Fimbristylis baldwiniana* (J.A. Schultes) Torrey – F, S; < *Fimbristylis dichotoma* (Linnaeus) Vahl – RAB, WH3.

Fimbristylis autumnalis (Linnaeus) Roemer & J.A. Schultes. SLENDER FIMBRY. **Hab:** Moist to wet disturbed areas. **Dist:** ME west to MN and SD and south to s. FL and TX; New World tropics. **Phen:** Jun-Oct. **Syn:** = Ar, C, ETx1, FNA23, G, GrPl, GW1, Il, K1, K3, K4, Meso6, Mi, Mo1, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, W, WH3, Kral (1971); > *Fimbristylis autumnalis* (Linnaeus) Roemer & J.A. Schultes – S; > *Fimbristylis autumnalis* var. *autumnalis* – F; > *Fimbristylis autumnalis* var. *mucronulata* (Michaux) Fernald – F, WV; > *Fimbristylis geminata* (Nees) Kunth – S. NatureServe G5 (Secure).

Fimbristylis brevivaginata Kral. FLATROCK FIMBRY. **Hab:** Pools and seepage over granite or sandstone. **Dist:** Endemic to Piedmont of GA (on granite) and Cumberland Plateau of AL (on sandstone) (Kral 1992). **Comm:** See Kral (1992) for details. **Syn:** = FNA23, K1, K3, K4. NatureServe G2 (Imperiled).

Fimbristylis caroliniana (Lamarck) Fernald. CAROLINA FIMBRY. **Hab:** Brackish or alkaline sands of marsh edges and dune swales, less typically in pine savannas or pine flatwoods. **Dist:** NJ south to s. FL and west and south to TX; Yucatan Peninsula; West Indies. **Phen:** Jul-Sep. **Comm:** This species often grows in proximity to *F. castanea*, which, however, occupies the brackish marsh itself. **Syn:** = Bah, C, ETx1, F, FNA23, GW1, K1, K3, K4, Meso6, Tx, Va, WH3, Kral (1971); < *Fimbristylis caroliniana* (Lamarck) Fernald – G; > *Fimbristylis harperi* Britton ex Small – S; < *Fimbristylis spadicea* (Linnaeus) Vahl – RAB.

Fimbristylis castanea (Michaux) Vahl. MARSH FIMBRY. **Hab:** Brackish marshes and dune swales. **Dist:** NY (Long Island) south to s. TX and adjacent Mexico; Yucatan peninsula; West Indies. **Phen:** Jul-Sep. **Comm:** Replaced in most of the New World tropics by the related *F. spadicea*. **Syn:** = C, ETx1, F, FNA23, G, GW1, K1, K3, K4, NY, S, Tx, Va, Kral (1971); < *Fimbristylis spadicea* (Linnaeus) Vahl – Bah, RAB, WH3.



Fimbristylis decipiens Kral. TRICKY FIMBRY. **Hab:** Wet, disturbed areas. **Dist:** E. NC south to n. FL and west to e. TX. **Phen:** Jul-Sep. **Syn:** = ETx1, FNA23, GW1, K1, K3, K4, Kral (1971). NatureServe G4 (Apparently Secure).

* ***Fimbristylis dichotoma*** (Linnaeus) Vahl. **Hab:** Wet, disturbed areas. **Dist:** Presumably introduced, probably native of Asia. The species is now pantropical and subtropical. **Phen:** Jul-Sep. **Syn:** = Bah, ETx1, FNA23, GW1, K1, K3, K4, Meso6, Kral (1971); < *Fimbristylis dichotoma* (Linnaeus) Vahl – RAB, WH3; ? *Fimbristylis diphylla* (Retzius) Vahl – S.

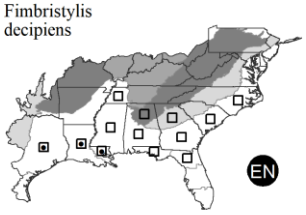
* ***Fimbristylis littoralis*** Gaudichaud-Beaupré. **Hab:** Disturbed wet ground. **Dist:** Native of Asia. Kral (1971) suggests that it may have been introduced into se. United States early, in association with rice. In North America, now ranging from Central America and the West Indies north to NC, KY, and AR. **Phen:** Jul-Sep. **Tax:** The name *F. miliacea* has been rejected as a nomen ambiguum (Brummitt 2005). **Syn:** = Ar, K3, K4, Meso6, WH3, WI; = *Fimbristylis miliacea* (Linnaeus) Vahl – C, ETx1, FNA23, GW1, NcTx, RAB, S, Tn, Tx, W, Kral (1971), nomen ambiguum; > *Fimbristylis littoralis* var. *littoralis* – Mo1.

Fimbristylis perpusilla R.M. Harper ex Small & Britton. HARPER'S FIMBRY. **Hab:** Drawdown zones of natural depression ponds or exposed banks of blackwater or brownwater rivers. **Dist:** The "range" consists of geographically scattered and "irregularly apparent" populations, usually on the drawdown zones of natural ponds or rivers, in the Coastal Plain from DE and e. MD south through e. VA, se. NC, and ne. SC, to sw. GA and AL, disjunct in the Cumberland Plateau of se. TN (Wofford & Jones 1988) and KY (Boone & Chester 2009). **Phen:** Jul-Sep. **Comm:** See Leonard (1981a, 1981b, 1987) for the first reports of the species in SC and NC and Diamond (2016b) for the first report in AL. The species characteristically occurs on dry to moist banks exposed in summer by falling water levels, often with other diminutive annuals, such as *Cyperus subsquarrosus*, *Edrastima uniflora*, *Juncus repens*, *Lindernia dubia*, *Eleocharis baldwinii*, and *Eragrostis hypnoides*. At known locations it does not appear every year; presumably it is present in a seedbank which germinates only under favorable hydrologic (and other?) conditions. **Syn:** = C, FNA23, GW1, K1, K3, K4, S, Tn, Va, Kral (1971). NatureServe G2 (Imperiled).

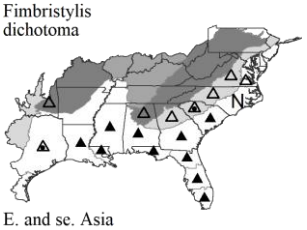
Fimbristylis puberula (Michaux) Vahl. HAIRY FIMBRY. **Hab:** Pine savannas, pine flatwoods, bogs, wet meadows or prairie-like areas, granite outcrops. **Dist:** Long Island, NY south to s. FL and west to TX, KS, and NE. **Phen:** Jul-Sep. **Syn:** = Mi; = *Fimbristylis puberula* (Michaux) Vahl var. *puberula* – Ar, C, ETx1, FNA23, GrPl, K1, K3, K4, Mo1, NcTx, NY, Pa, Tx, Va, Kral (1971); > *Fimbristylis anomala* Böckler – S; > *Fimbristylis drummondii* (Torrey & Hooker) Böckler – F; < *Fimbristylis puberula* (Michaux) Vahl – GW1, Tn, WH3; > *Fimbristylis puberula* (Michaux) Vahl – S; > *Fimbristylis puberula* var. *drummondii* (Torrey & Hooker) D.B. Ward – Il; < *Fimbristylis spadicea* (Linnaeus) Vahl – RAB, W.

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Fimbristylis decipiens

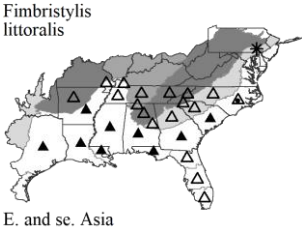


Fimbristylis dichotoma



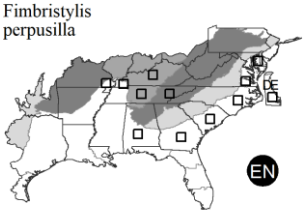
E. and se. Asia

Fimbristylis littoralis

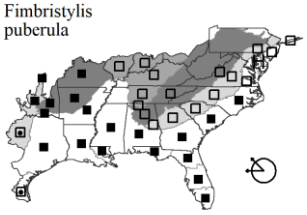


E. and se. Asia

Fimbristylis perpusilla



Fimbristylis puberula

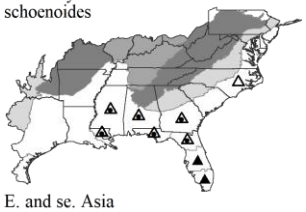


* ***Fimbristylis schoenoides*** (Retzius) Vahl. **Hab:** Disturbed wetlands. **Dist:** Native of Asia. Reported for sw. GA (Jones & Coile 1988) and also occurs in se. GA (B.A. Sorrie, pers. comm.). Also reported for Ocracoke Island, Hyde County, NC (Sorrie & LeBlond 2008). **Syn:** = Bah, FNA23, GW1, K1, K3, K4, WH3. NatureServe GNR (Not Yet Ranked).

* ***Fimbristylis tomentosa*** Vahl. **Hab:** Wet, disturbed areas. **Dist:** Presumably introduced, probably native of e. and se. Asia. Ranging north to NC and AR. **Phen:** Jul-Sep. **Syn:** = Ar, ETx1, FNA23, GW1, K1, K3, K4, Tx, Kral (1971); < *Fimbristylis dichotoma* (Linnaeus) Vahl – RAB, WH3.

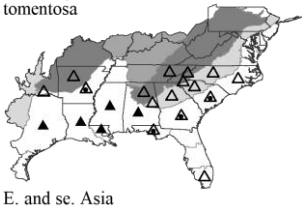
Fimbristylis vahlii (Lamarck) Link. **Hab:** Mudflats along rivers or reservoirs, also in sandy disturbed areas. **Dist:** Primarily from MO south to MS and e. TX, but with scattered outliers as far away as NJ, NC, SC, IL, and KS; also in western United States, Mexico, Central America. **Phen:** Jul. **Syn:** = Ar, C, ETx1, F, FNA23, G, GrPl, GW1, Il, K1, K3, K4, Meso6, Mo1, NcTx, RAB, S, Tn, Tx, WH3, Kral (1971). NatureServe G5 (Secure).

Fimbristylis schoenoides



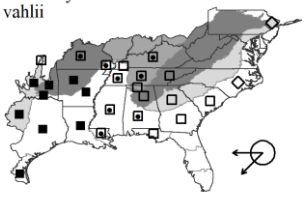
E. and se. Asia

Fimbristylis tomentosa



E. and se. Asia

Fimbristylis vahlii



Fuirena Rottbøll 1773 (UMBRELLA-SEDGE)

A genus of about 30 species, herbs, primarily in Africa and America, in tropical and warm temperate regions. References: Goetghebeur in Kubitzki (1998b); Kral (1978a); Kral (2002a) in FNA23 (2002b).

1 Sheaths of leaves glabrous, the largest leaf blades 0-2 (-5) cm long; plant strongly rhizomatous, the culms usually about 10 cm apart.
  2 Blades of culm leaves < 5 cm long; spikelets mostly lance-ovoid, sessile in terminal clusters and also often with additional sessile or peduncled clusters lower on the culm; involucral bract longer than the spikelets ..... ***Fuirena longa***
  2 Blades of culm leaves very short (< 0.5 cm long); spikelets mostly ovoid, sessile in terminal clusters; subtending involucral bract shorter than the spikelets ..... ***Fuirena scirpoidea***
1 Sheaths of leaves sparsely to densely hirsute, the largest leaf blades 5-20 cm long; plant more-or-less cespitose, annual or perennial, if perennial the rhizomes short and cormlike, the culms usually arising together.
  3 Perianth bristles no longer than the achene stipe (not nearly reaching halfway up the achene body), without barbs (sometimes very finely toothed, the teeth ascending); blades of the perianth scales with a blunt or short-apiculate apex ..... ***Fuirena breviseta***
  3 Perianth bristles longer than the achene stipe, reaching the middle of or exceeding the achene body, strongly and retrorsely barbed; blades of the perianth scales with an acuminate to awned apex.
    4 Perianth bristles reaching 1/2 to 3/4 the length of the achene body; anthers about 1.0 mm long; blades of the perianth scales mostly acuminate; perennial ..... ***Fuirena squarrosa***
    4 Perianth bristles as long as or exceeding the achene body; anthers about 0.5 mm long; blades of the perianth scales mostly awned or bearing a subapical bristle; annual ..... ***Fuirena pumila***

Fuirena breviseta (Coville) Coville. SHORT-BRISTLED UMBRELLA-SEDGE. **Hab:** Carolina bays, pine savannas, ditches, other wet habitats. **Dist:** A Southeastern Coastal Plain endemic: se. VA south to s. FL and west to e. TX, primarily in the outer Coastal Plain. **Phen:** Jul-Oct. **Syn:** = Ar, C, ETx1, F, FNA23, G, GW1, K1, K3, K4, S, Va, WH3, Kral (1978a); < *Fuirena squarrosa* Michaux – RAB, Tx.

Fuirena longa Chapman. CHAPMAN'S UMBRELLA-SEDGE. **Hab:** Pond margins. **Dist:** Panhandle FL and sw. GA west to e. TX. **Comm:** Possibly a hybrid derivative of *F. breviseta* and *F. scirpoidea*. **Syn:** = Ar, FNA23, GW1, K1, K3, K4, S, Kral (1978a); < *Fuirena scirpoidea* Michaux – Tx, WH3.

Fuirena pumila (Torrey) Sprengel. DWARF UMBRELLA-SEDGE. **Hab:** Depression ponds, savannas, ditches, other wet habitats. **Dist:** Primarily a species of the Southeastern Coastal Plain, ranging from se. MA south to s. FL and west to TX, and also disjunct in the lowlands around the Great Lakes (as in n. IN and s. MI). **Phen:** Jul-Oct. **Syn:** = Ar, C, ETx1, F, FNA23, G, GW1, K1, K3, K4, Mi, NE, NY, RAB, Va, WH3, Kral (1978a); = *Fuirena squarrosa* Michaux – S, misapplied.

Fuirena scirpoidea Michaux. SOUTHERN UMBRELLA-SEDGE. **Hab:** Natural lakes, pineland depression ponds, wet pine savannas, marshes. **Dist:** A Southeastern Coastal Plain endemic: se. GA (Jones & Coile 1988; Carter, Baker, & Morris 2009) and FL, west to se. TX, also in Cuba and reported as a disjunct (or introduced?) in ne. NC and s. IL. Kral's (1978a) report of this species from ne. NC, where disjunct from the main body of the range in the deep South, needs further investigation. **Phen:** Jul-Oct. **Syn:** = Ar, C, FNA23, G, GW1, Il, K1, K3, K4, S, Kral (1978a); < *Fuirena scirpoidea* Michaux – Tx, WH3.

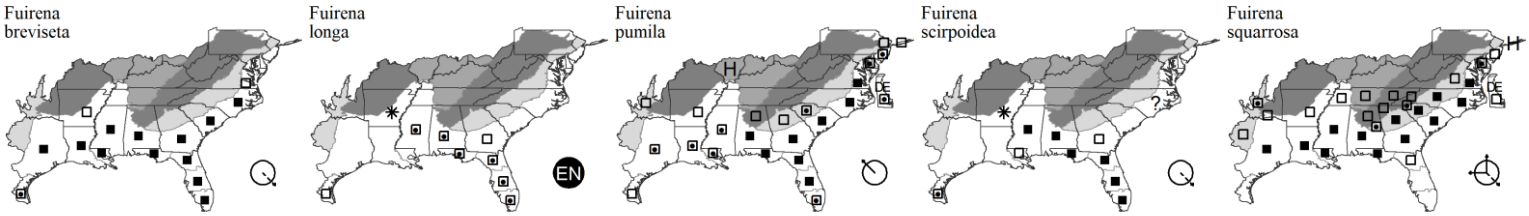
Fuirena squarrosa Michaux. HAIRY UMBRELLA-SEDGE. **Hab:** Pine savannas, seepages, streamhead pocosins, ditches, bogs, rocky river bars, calcareous fens, other wet habitats. **Dist:** MA (Cape Cod) and NY (Long Island) south to n. FL, west to c. TX, inland to w. NC, w. TN, KY, s. AR, and se. OK, mainly on the Coastal Plain, but less strictly limited to it than our other species. **Phen:** Jul-Oct. **Syn:** = Ar, C, ETx1, F, FNA23, G, GW1, K1, K3, K4, NE, NY, Tn, Va, W, WH3, Kral (1978a); = *Fuirena hispida* Elliott – S; < *Fuirena squarrosa* Michaux – RAB, Tx.

Key to Map Symbology:

←rare ←uncommon ←common (see introduction for more)

* : waif EN : endemic H : historic

N : no P : planted ? : questionable X : extirpated



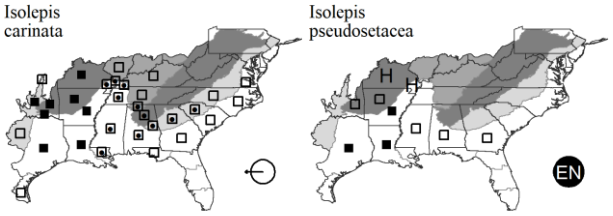
Isolepis R. Brown 1810 (CLUB-RUSH, CLUBSEDGE)

A genus of about 60 species, herbs, subcosmopolitan in distribution. Since *Isolepis* is more closely related to *Cyperus* than to *Scirpus*, in which it has often been included, its separation from *Scirpus* is clearly warranted. The generic delimitation of *Isolepis* in relation to *Ficinia* and *Scirpoides* is less certain. References: Goetghebeur in Kubitzki (1998b); Muasya & Simpson (2002); Smith (2002c) in FNA23 (2002b).

4 Achenes (1.0-) 1.2-1.6 mm long; scales in middle of spikelet 1.8-2.0 mm long, with a short awn to 0.2 (-0.5) mm long ..... ***Isolepis carinata***
4 Achenes 0.7-1.0 mm long; scales in middle of spikelet 1.0-1.2 mm long, mucronate < 0.1 mm ..... ***Isolepis pseudosetacea***

Isolepis carinata Hooker & Arnott ex Torrey. KEELED BULRUSH. **Hab:** Moist soils adjacent to granitic flatrocks, seepage areas, ephemeral pools, moist sandy sites, low fields, ditches. **Dist:** Se. VA, c. NC, KY, s. IL, MO, and se. KS south to Panhandle FL and c. TX; also in CA. **Phen:** May-Jun. **Syn:** = Ar, ETx1, FNA23, K1, K3, K4, Mo1, NcTx, Tn, Va, WH3, Muasya & Simpson (2002); = *Isolepis carinatus* – Il, orthographic variant; = *Scirpus carinatus* (Hooker & Arnott ex Torrey) A. Gray – S, (not S. carinatus Sm.); = *Scirpus koilolepis* (Steudel) Gleason – C, F, G, GrPl, GW1, RAB, Tx. NatureServe G5 (Secure).

Isolepis pseudosetacea (Daveau) Gandoger. **Hab:** Altamaha grit outcrops, moist soils. **Dist:** E. GA (Carter, Baker, & Morris 2009) west to sw. MO, AR, and c. TX. Reported for MS (J.R. Rigby, pers. comm., 2018). **Comm:** This species often grows intermixed with *I. carinata* and may be more widespread in our area. **Syn:** = Ar, ETx1, FNA23, K3, K4, Muasya & Simpson (2002); ? *Isolepis molesta* (M.C. Johnston) S.G. Smith – K1, Mo1, NcTx; ? *Scirpus molestus* M.C. Johnston – Tx.



Rhynchospora Vahl 1805 (BEAKSEDGE, BEAKRUSH)

Contributed by Richard J. LeBlond

A genus of about 250 species, subcosmopolitan, but concentrated in tropical and warm temperate America. See Thomas (1984) for the reasons for the inclusion of *Dichromena* in *Rhynchospora*. References: Bridges & Orzell (2000); Gale (1944); Goetghebeur in Kubitzki (1998b).; Kral (1996); Kral (1999); Kral (2002e) in FNA23 (2002b); McMillan (2007); Naczi & Moyer (2017); Naczi, Knapp, & Moore (2010); Naczi, Knapp, & Thomas (2012); Sorrie, LeBlond, & Weakley (2018a) in Weakley et al (2018b); Ward (2012a).

Identification Notes: Measurements and descriptions of the achene are of the achene body only, *not* including the tubercle, unless otherwise indicated.

Unkeyed waifs: *Rhynchospora corymbosa*

1 Tubercles 3-23 mm long; style simple or bifid only at the tip; [subgenus *Haplostylae*] ..... ***Key A***
1 Tubercles < 3 mm long; style divided into 2 slender stigmatic branches; [subgenus *Diplostylae*].
  2 Inflorescence bracts several, foliaceous, basally bright white, reflexed to horizontally spreading; [subgenus *Diplostylae*; section *Dichromena*] ..... ***Key B***
  2 Inflorescence bracts 0-several, capillary to foliaceous, green throughout (stramineous in age), variously oriented.
    3 Bristles present, plumose (at least towards their bases); [subgenus *Diplostylae*; section *Plumosae*] ..... ***Key C***
    3 Bristles absent, or present and smooth or minutely barbed.
      4 Bristles present, retrorsely barbed (at least towards their tips), or antrorsely barbed and straplike (flattened); [subgenus *Diplostylae*; section *Albae*] ..... ***Key D***
      4 Bristles absent, or present and smooth, or antrorsely barbed and filiform.
        5 Achene surface smooth, minutely pitted, or finely striate (not ridged, rugose, or reticulate); [subgenus *Diplostylae*; sections *Chapmaniae*, *Fasciculares*, and *Fuscae*] ..... ***Key E***
        5 Achene surface transversely ridged, rugose, or honeycombed-reticulate (sometimes faintly so); [subgenus *Diplostylae*; sections *Globulares*, *Harveyae*, *Mixtae*, *Psilocarya*, *Pusillae*, and *Rariflorae*] ..... ***Key F***

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Key A - beaksedges with tubercles 3-23 mm long [subgenus *Haplostylae*; sections *Longirostres* and *Polycephalae*]

1 Spikelets arranged in globose or subglobose clusters; tubercle 3-5 mm; leaf blades 2-8 mm wide. ..... ***Rhynchospora tracyi***
1 Spikelets in > 4 paniculate or corymbose clusters; tubercle 10-23 mm long; leaf blades 6-20 mm wide; [section *Longirostres*].
  3 Longest bristles shorter than the achene ..... ***Rhynchospora corniculata***
  3 Longest bristles longer than or equaling the achene.
    4 Plants cespitose; primary clusters with 10-50 (rarely 7 or fewer) densely clustered spikelets; achene (4.5-) 5-6 mm long ..... ***Rhynchospora macrostachya***
    4 Plants rhizomatous; primary clusters with 1-6 loosely clustered spikelets; achene (3.5-) 4.0-4.8 mm long.
      5 Bristles 2-8 mm long, the central bristle longest on one face, shortest or absent on the other ..... ***Rhynchospora careyana***
      5 Bristles 7-12 mm long, essentially of equal length ..... ***Rhynchospora inundata***

Key B - beaksedges with basally-white bracts (White-bracted Sedges) [subgenus *Diplostylae*; section *Dichromena*]

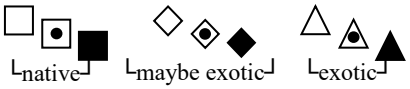
3 Inflorescence bracts 3-6 (-7); basal bract (1.4-) 2-5 mm wide, the white portion (2.5-) 9-25 mm long, tapering gradually into the green portion; rhizomes slender, straight, (0.6-) 0.7-1.7 (-2.1) mm in diameter; achene 1.0-1.2 mm wide; tubercle broadly truncate on achene ..... ***Rhynchospora colorata***
3 Inflorescence bracts (5-) 6-10; basal bract 5-12 mm wide, the white portion 22-55 mm long, tapering abruptly into the green portion; rhizomes often bent and swollen at the nodes, 1.4-3.8 mm in diameter; achene 1.2-1.5 mm wide; tubercle decurrent on achene ..... ***Rhynchospora latifolia***

Key C - beaksedges with plumose bristles [subgenus *Diplostylae*; section *Plumosae*]

1 Spikelets borne singly or a few together in loose clusters, some or all spikelets on slender stalks; achene 1.7-2.6 mm long, 1.2-2.0 mm wide.
  2 Achene obovoid, 1.7-2.0 mm long, 1.2-1.5 mm wide, the tubercle seated on its summit without a constriction or basal flange; longer bristles < ½ as long as the achene ..... ***Rhynchospora galeana***
  2 Achene broadly elliptic, 1.9-2.6 mm long, 1.5-2.0 mm wide, its summit constricted below a collar-like flange at the base of the tubercle; longer bristles three-fourths to exceeding the length of the achene ..... ***Rhynchospora oligantha***
1 Spikelets borne several to many in clusters, none of the spikelets on slender stalks; achene 1.3-2.2 mm long, 0.9-1.7 mm wide
  5 Basal sheaths shiny, dark brown; bristles longer than the tubercle; bristles plumose in a basal zone that extends 4-20% of the length of the bristle, then with a smooth zone, the terminal zone minutely denticulate; [Gulf Coastal Plain of FL, AL, and MS] ..... ***Rhynchospora marliniana***
  5 Basal sheaths dull, light to medium brown; bristles shorter than the tubercle; bristles plumose in a basal zone that extends 40-90% of the length of the bristle, the terminal zone minutely denticulate (lacking a smooth middle zone); [widespread in the Atlantic and Gulf Coastal Plain from NC south to FL, west to TX] ..... ***Rhynchospora plumosa***

Key D - beaksedges with bristles retrorsely barbed (at least distally) or antrorsely barbed and straplike (flattened) [subgenus *Diplostylae*; section *Albae*]

1 Bristles 8-25, retrorsely barbed distally, antrorsely barbed proximally; spikelets white, turning tan with age.
  2 Spikelets with 2-3 florets; bristles 8-12; achene 1.6-2.1 mm long, 0.9-1.3 mm wide ..... ***Rhynchospora alba***
  2 Spikelets with 1 floret; bristles 16-25; achene 2.0-2.4 mm long, 1.3-1.5 mm wide ..... ***Rhynchospora macra***
1 Bristles 6 or fewer, either retrorsely or (rarely) antrorsely barbed their entire length; spikelets variously brown, rufous, or tan (or very rarely white).
  3 Spikelets 1-fruited, the solitary achene terminating the axis; clusters 1-7, globose to turbinate.
    4 Clusters globose to turbinate; achene (measured from base of bristles) 1.3-1.8 mm long, 0.65-0.95 mm wide; tubercle 0.7-1.6 mm long.
      5 Clusters turbinate to hemispheric (rarely subglobose), the lowest spikelets usually spreading-ascending to spreading; larger leaves < 2 mm wide; achene 1.6-1.8 mm long; tubercle 1.0-1.6 mm long ..... ***Rhynchospora chalarocephala***
      5 Clusters globose to subhemispheric, the lowest spikelets usually reflexed; larger leaves > 2 mm wide; achene 1.3-1.6 mm long; tubercle 0.7-1.2 mm long... ..... ***Rhynchospora microcephala***
    4 Clusters globose to hemispherical; achene (measured from base of bristles) 1.8-2.6 mm long, 1.1-1.8 mm wide; tubercle 1.4-2.4 mm long.
      6 Achene 1.1-1.2 mm wide, 1.8 mm long ..... ***Rhynchospora cephalantha var. attenuata***
      6 Achene 1.2-1.8 mm wide, 2.1-2.6 mm long ..... ***Rhynchospora cephalantha var. cephalantha***
  3 Spikelets 1-5 fruited (if 1-fruited, then the axis terminated by a sterile floret); clusters 2-many, ovoid to turbinate (rarely globose).
    7 Clusters numerous, usually 20 or more; tubercle 1.3-1.8 mm long; achene 0.9-1.5 mm wide, 1.5-2.0 mm long, the summit narrowly truncate, the faces umbonate, the margin thickened and wire-like; leaves 2.5-7 mm wide ..... ***Rhynchospora glomerata***
    7 Clusters 2-8; tubercle 0.4-1.2 mm long; achene 0.6-1.2 mm wide, 1.1-2.0 mm long, the summit more rounded than truncate, the faces lenticular, a wire-like margin narrow or not evident; leaves 0.2-3.5 mm wide.
      10 Inflorescence typically with 1 terminal and 1 lateral cluster, the clusters ovoid, with 1-10 spikelets each; achene 1.8-2.0 mm long, 0.8-1.0 mm wide, 2-3 × as long as wide; leaves 0.2-0.4 mm wide ..... ***Rhynchospora capillacea***
      10 Inflorescence with 1-6 lateral clusters, the clusters turbinate with usually > 10 spikelets; achene 1.3-1.8 mm long, 0.9-1.2 mm wide, 1.5-2 × as long as wide; leaves 1.5-3.5 mm wide.
        11 Longer bristles 0.4 mm shorter than to 0.3 mm longer than the tubercle; tubercle 0.9-1.4 (-1.6) mm long, on average 0.69× as long as achene body; glomerules 3-5 (-6), 6-13 mm wide; [widespread in our area] ..... ***Rhynchospora capitellata***
        11 Longer bristles 0.3-1.0 mm longer than the tubercle; tubercle 0.8-1.1 mm long, on average 0.57× as long as achene body; glomerules 4-8, 4-8 mm wide; [of the Coastal Plain] ..... ***Rhynchospora leptocarpa***

Key to Map Symbology:  (see introduction for more)

* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable
X : extirpated

Key E - beaksedges with bristles smooth, or antrorsely barbed and filiform, or absent, the achene surface smooth, minutely pitted, or finely striate [subgenus *Diplostylae*; sections *Chapmaniae*, *Fasciculares*, and *Fuscae*]

1 Bristles 12; [section *Fasciculares*]..... ***Rhynchospora baldwinii***
1 Bristles 6 or fewer.
2 Leaves with a short taper at the tip, blunt to acute, but not long-acuminate; achene surface minutely pitted near the margin; [section *Chapmaniae*].
..... ***Rhynchospora ciliaris***
2 Leaves long-acuminate at the tip; achene surface smooth or finely striate.
4 Bristles absent or 1-3 rudimentary; scales white to pale tan (or pale reddish-brown in *R. brachychaeta*); [section *Chapmaniae*].
5 Inflorescence composed of (1-) 2-3 turbinate to ellipsoid clusters; spikelets pale reddish-brown, (2.7-) 3-3.5 mm long; achenes usually 2 per spikelet.....
.....***Rhynchospora brachychaeta***
5 Inflorescence composed of 1 (-2) hemispheric to broadly turbinate cluster(s); spikelets white to pale brown, either 2-2.5 (-3) mm or (3.5-) 4-5.5 mm long; achenes 1 per spikelet.
..... ***Rhynchospora chapmanii***
4 Bristles present (if rudimentary, then 4-6); scales tan, rufous, or brown.
7 Achene 0.6-1.1 mm wide, pyriform, obovoid, or narrowly elliptic, pale to dark brown but not blackish; tubercle margin setose.
9 Achene narrowly elliptic or narrowly obovoid, 1.2-1.5 mm long by 0.6-0.7 mm wide, twice as long as wide; tubercle 0.8-1.2 mm long.....
.....***Rhynchospora curtissii***
9 Achene broadly elliptic to obovoid or pyriform, < 2× as long as wide; tubercle 0.4-1.5 mm long.
10 Leaves 2-4 (-5) mm wide; stipe subtending achene 0.5-1.0 mm long.....***Rhynchospora crinipes***
10 Leaves 0.2-1.5 (-2) mm wide; stipe subtending achene < 0.4 mm long.
11 Leaves to 1.5 (-2) mm wide; achene 1.0-1.7 mm long, 0.9-1.1 mm wide; tubercle 0.5-1.5 mm long.
..... ***Rhynchospora harperi***
11 Leaves filiform, < 1 mm wide; achene 0.8-1.3 mm long, 0.6-0.9 mm wide; tubercle 0.4-0.8 mm long.
13 Culms without rhizomes; spikelets 2.5-5 mm long; achene translucent centrally; tubercle 0.4-0.7 mm long.
..... ***Rhynchospora filifolia***
13 Culms with delicate rhizomes; spikelets 5-7 mm long; achene uniformly opaque; tubercle 0.6-0.8 mm long..... ***Rhynchospora pleiantha***
7 Achene > 1 mm wide (except 0.8 mm wide in *R. fernaldii* with a blackish surface), suborbicular or broadly ellipsoid; tubercle margin smooth or roughened but not setose; [section *Fasciculares*].
15 Achene 0.9-1.0 mm long, 0.8 mm wide, blackish..... ***Rhynchospora fernaldii***
15 Achene 1.3-4.2 mm long, 1.1-3.6 mm wide, brown to dark brown.
16 Achene 2.0-4.2 mm long, 2.0-3.6 mm wide.
17 Leaves 2-4 mm wide; achene 2.0-2.7 mm long, 2.0-2.5 mm wide..... ***Rhynchospora grayi***
17 Leaves 4-8 mm wide; achene 3.0-4.2 mm long, 3.0-3.6 mm wide..... ***Rhynchospora megalocarpa***
16 Achene 1.3-2.0 mm long, 1.1-1.7 mm wide.
18 Tubercle 1.0-2.6 mm long, long-attenuate to subulate..... ***Rhynchospora gracilenta***
18 Tubercle 0.2-0.8 mm long, triangular to triangular-attenuate or with a strap-like beak.
19 Bristles rudimentary to ½ as long as the achene body.
20 Larger leaves to 1 mm wide; mature culms to 4.5 dm long; floral fascicles 1 (-2); tubercle 0.2-0.5 mm long .....
.....***Rhynchospora debilis***
20 Larger leaves 2-4 mm wide; mature culms to 13 dm long; floral fascicles (1-) 2-4; tubercle 0.4-0.7 mm long.....
.....***Rhynchospora fascicularis***
19 Bristles > ½ as long to exceeding the achene body.
21 Basal leaves filiform to (rarely)1.3 mm wide, the longer approaching length of culm; tubercle narrowed above the base into a strap-like beak.....***Rhynchospora wrightiana***
21 Basal leaves 1.3-4 mm wide, all much shorter than the culm; tubercle triangular to triangular-attenuate.
22 Longer bristles equaling to exceeding the achene body; achene body elliptic, 1.1-1.3 mm wide; tubercle triangular-attenuate; larger basal leaves 1.3-2.5 mm wide..... ***Rhynchospora distans***
22 Longer bristles < ½ as long to exceeding achene body; achene suborbicular, 1.2-1.5 mm wide; tubercle triangular; larger basal leaves 2-4 mm wide.....***Rhynchospora fascicularis***

Key F - beaksedges with bristles smooth, or antrorsely barbed and filiform, or absent, the achene surface transversely ridged, rugose, or honeycombed-reticulate [subgenus *Diplostylae*; sections *Globulares*, *Harveyae*, *Mixtae*, *Psilocarya*, *Pusillae*, *Rariflorae*]

1 Bristles absent (or apparently so at 10×); achene 0.5-0.7 mm wide; tubercle 0.1-0.2 mm long, skull-cap like; [section *Pusillae*].
2 Achene including tubercle 1.0-1.2 mm long, the achene surface evidently reticulate and obscurely transversely ridged, the body ellipsoid; bristles present, white, barely visible at 20×, the longest shorter than the achene body.....***Rhynchospora thornei***
2 Achene including tubercle 0.6-0.9 mm long, the body obovoid; bristles absent.
3 Achene surface smooth, faintly reticulate, not transversely ridged.....***Rhynchospora divergens***
3 Achene surface rough, distinctly transversely ridge..... ***Rhynchospora pusilla***
1 Bristles present or absent; if absent, then the achene > 1 mm long or > 0.7 mm wide, and tubercle triangular to subulate.
4 Culms and leaves filiform.
5 Achene including tubercle 1.0-1.2 mm long; tubercle minute, skullcap-like; [section *Pusillae*].....***Rhynchospora thornei***
5 Achene including tubercle 1.5-2.9 mm long; tubercle triangular to triangular-acuminate; [section *Rariflorae*].
6 Bristles subequaling to exceeding the tubercle; tubercle 0.75-1.4 mm long.....***Rhynchospora stenophylla***
6 Bristles shorter than the achene body; tubercle 0.3-1.0 mm long.
..... ***Rhynchospora rariflora***
4 Culms stouter; leaves wider, not filiform.

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

8 Achene faces flat or concave; when one face is concave, the opposite face is sometimes slightly convex (slightly biconvex *R. decurrens* and *R. microcarpa* are keyed here for convenience).
9 Achene at least twice as long as wide, elliptic-oblong; tubercle subulate, 0.8-1.2 mm long; [section *Mixtae*] ..... ***Rhynchospora inexpansa***
9 Achene < twice as long as wide, obovate; tubercle triangular, 0.2-0.9 mm long.
10 Longer bristles exceeding the achene body.
12 Larger leaves (3-) 4-6 mm wide; bristles exceeding tubercle; achene faces flattened ..... ***Rhynchospora elliottii***
12 Larger leaves 1-3 (-4) mm wide, bristles half as long as achene to equaling tubercle; achene faces slightly convex ..... ***Rhynchospora microcarpa***
10 Longer bristles shorter than to equaling achene body, or absent.
13 Larger leaves 3-5 mm wide; achene 1.4-1.6 mm wide; tubercle 0.6-0.8 mm long, abruptly rising from a flaring basal collar; [section *Globulares*] ..... ***Rhynchospora compressa***
13 Larger leaves 1-3 (-4) mm wide; achene 0.7-1.3 mm wide; tubercle 0.15-0.5 mm long, without a flaring basal collar; [section *Mixtae*].
14 Bristles rudimentary or absent ..... ***Rhynchospora perplexa***
14 Bristles one-half as long to equaling achene.
15 Achene 1.3-1.8 mm long, 0.9-1.2 mm wide, the faces flat with 10-12 transverse ridges ..... ***Rhynchospora torreyana***
15 Achene 0.8-1.4 mm long, 0.7-1.2 mm wide, the faces slightly biconvex with 6-12 transverse ridges.
16 Clusters elongate; achene 1.0-1.4 mm long, 0.8-1.0 mm wide, narrowly obovate to elliptic, averaging 8-12 transverse ridges; most tubercle bases convexly seated on the achene summit and somewhat decurrent along the achene margins, the tubercle surface often whitish-waxy ..... ***Rhynchospora decurrens***
16 Clusters usually compact; achene 0.8-1.2 mm long, 0.7-1.2 mm wide, suborbicular to elliptic, averaging 6-7 transverse ridges; most tubercle bases flat across the achene summit, not decurrent, the tubercle surface usually dark, not waxy ..... ***Rhynchospora microcarpa***
8 Achenes biconvex or tumid.
17 Achene 1.4-4.2 mm long, 1.2-3.6 mm wide, the summit with a thickened bony to crustaceous rim surrounding the base of the tubercle; [section *Harveyae*].
19 Leaves 4-8 mm wide; achene 3.0-4.2 mm long, 3.0-3.6 mm wide ..... ***Rhynchospora megalocarpa***
19 Leaves 2-4 mm wide; achene < 2.7 mm long and < 2.5 mm wide.
20 Achene 2.0-2.7 mm long, 2.0-2.5 mm wide ..... ***Rhynchospora grayi***
20 Achene 1.5-1.9 mm long, 1.4-1.7 mm wide ..... ***Rhynchospora harveyi***
17 Achene 0.7-1.8 mm long, 0.7-1.5 mm wide, the summit without a textured rim surrounding the base of the tubercle (if the base of the tubercle is rim-like, then it is distinguished from the summit of the achene by a constriction or articulation).
21 Bristles absent; achene 0.7-1.0 mm long; [section *Psilocarya*].
22 Tubercle triangular-lanceolate, as long as broad or longer; achene weakly transversely ridged ..... ***Rhynchospora scirpoides***
22 Tubercle depressed, broader than long; style not persistent; achene strongly transversely ridged ..... ***Rhynchospora nitens***
21 Bristles present (occasionally detached in *R. decurrens* and *R. miliacea* with achenes 1.0-1.4 mm long); achene 0.8-1.9 mm long.
24 Bristles not exceeding the achene body.
25 Cluster branches flexuous; bristles one-half as long to equaling the achene (or longer in *R. microcarpa*); achene slightly biconvex, 0.8-1.4 mm long, 0.7-1.0 (-1.2) mm wide; [section *Mixtae*].
26 Clusters elongate; achene narrowly obovate to elliptic, averaging 8-12 transverse ridges; most tubercle bases convexly seated on the achene summit and somewhat decurrent along the achene margins, the tubercle surface often whitish-waxy ..... ***Rhynchospora decurrens***
26 Clusters usually compact; achene suborbicular to elliptic, averaging 6-7 transverse ridges; most tubercle bases flat across the achene summit, not decurrent, the tubercle surface usually dark, not waxy ..... ***Rhynchospora microcarpa***
25 Cluster branches stiff; bristles < 1/3 to ¾ (-1) as long as the achene; achene tumid above, often somewhat compressed below, 1.0-1.9 mm long, 1.0-1.7 mm wide; [section *Globulares*].
27 Achenes 1.5-1.9 mm long, 1.4-1.7 mm wide, the transverse ridging faint to absent; tubercle grayish-tan to bony white, and buttressed at the base by a thick bony-white rim; leaves to 3 mm wide ..... ***Rhynchospora harveyi***
27 Achenes 1.0-1.9 mm long, 1.0-1.7 mm wide, the transverse ridging evident; tubercle grayish to dark brown, without a bony-white buttress; leaves to 3 or 5 mm wide.
28 Larger culm leaves to 5 mm wide; achenes (1.2-) 1.4-1.6 (-1.9) mm long, (1.1-) avg. 1.4 (-1.75) mm wide; achene surface alveoli longitudinally narrow; tubercle 0.3-0.7 mm long, base 0.6-1.0 mm wide ..... ***Rhynchospora cymosa***
28 Larger culm leaves to 3 mm wide; achenes (1.0-) avg. 1.3 (-1.5) mm long and wide; if achene surface alveoli longitudinally narrow, then tubercle 0.2-0.4 mm long and base 0.5-0.7 mm wide (*R. globularis*).
29 Longer bristles ⅓-½ (-¾)× the length of the achene; achene surface alveoli longitudinally narrow (typically 0.02-0.05 mm wide between the longitudinal walls), the latitudinal walls raised into horizontal ridges; tubercle 0.2-0.4 mm long, the base 0.5-0.7 mm wide ..... ***Rhynchospora globularis***
29 Longer bristles ⅔-1× the length of the achene; achene surface alveoli nearly as wide as long (typically 0.05-0.1 mm wide between the longitudinal walls), the latitudinal walls obscurely or not at all raised into horizontal ridges; tubercle 0.35-0.7 mm long, the base 0.7-0.9 mm wide ..... ***Rhynchospora pinetorum***
24 Bristles equaling or longer than the tubercle.
30 Primary branches of the inflorescence spreading at right angles from the culm, each spikelet or small cluster on slender spreading or reflexed stalks; [section *Mixtae*] ..... ***Rhynchospora miliacea***
30 Primary branches of the inflorescence ascending.
31 Spikelets 6-9 mm long; [section *Mixtae*] ..... ***Rhynchospora odorata***
31 Spikelets < 5 mm long.
32 Tubercle 0.4-0.8 mm long, the edges setose or uneven with waxy or crusty irregular protuberances; [section *Mixtae*].
33 Achene obovate to suborbicular, 1.2-1.6 mm wide, latitudinal alveoli walls strongly raised into transverse ridges ..... ***Rhynchospora caduca***
33 Achene slenderly obovoid, 0.8-1.0 mm wide, latitudinal alveoli walls weakly or not at all raised into transverse ridges ..... ***Rhynchospora mixta***
32 Tubercle 0.2-0.5 mm long, the edges smooth.
34 Spikelets 3.5-4 mm long; bristles exceeding the tubercle; achene 1.3-1.5 mm long, 1.2-1.3 mm wide; [section *Globulares*] ..... ***Rhynchospora saxicola***
34 Spikelets 2.5-3 mm long; longer bristles about equaling the tubercle; achene 0.8-1.2 mm long, 0.7-1.2 mm wide; [section *Mixtae*].

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

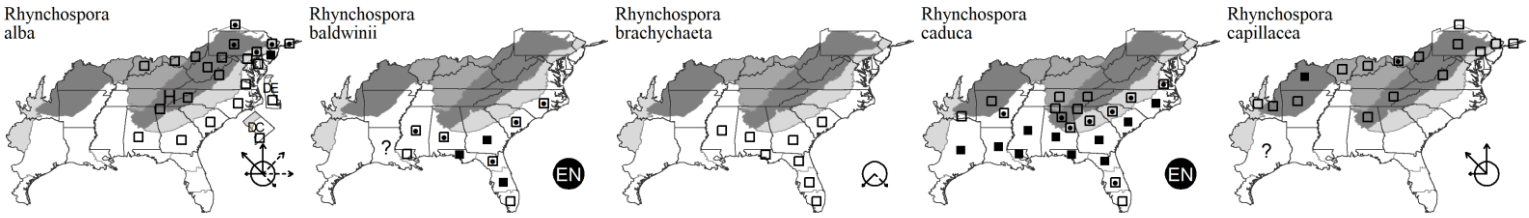
Rhynchospora alba (Linnaeus) Vahl. NORTHERN WHITE BEAKSEDGE. **Hab:** Mountain bogs and fens, peaty situations in the Coastal Plain, such as low pocosins in peat domes or large Carolina bays, and floating peat mats in limesink (doline) ponds and bay lakes, also in seepage bogs with abundant *Sphagnum*, generally occurring in the most open, harshest, and peatiest areas. **Dist:** Circumboreal, in North America from NL (Labrador) west to AK, south to SC, e. TN, ne. TN (where perhaps extirpated), IL, SK, ID, and CA; disjunct in se. GA (Charlton County, at the Okefenokee Swamp) (Williges & Loftin 1995), s. AL (Escambia County; specimen at CLEMS), and the mountains of Puerto Rico. **Phen:** Jul-Oct. **Syn:** = C, F, FNA23, G, GW1, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, Tn, Va, W, WV, Gale (1944), McMillan (2007); = *Rynchospora alba* – S. NatureServe G5 (Secure).

Rhynchospora baldwinii A. Gray. BALDWIN'S BEAKSEDGE. **Hab:** Wet pine savannas, seepages. **Dist:** Se. NC south to s. FL and west to LA. **Phen:** Jul-Aug. **Syn:** = C, FNA23, GW1, K1, K3, K4, RAB, WH3, Gale (1944), McMillan (2007); = *Rynchospora baldwinii* – S. NatureServe G4 (Apparently Secure).

Rhynchospora brachychaeta C. Wright. **Hab:** Cypress ponds, other depressions. **Dist:** E. SC south to Panhandle FL and s. AL and s. MS; West Indies (w. Cuba, Hispaniola, Puerto Rico; Central America (Belize, Nicaragua). **Comm:** The first report of this species for SC was by McMillan & Porcher (2005) and McMillan (2007). Kral in FNA considers this species possibly adventive, but McMillan & Porcher (2005) and McMillan (2007) provide good reasons for considering it native in our area. **Syn:** = FNA23, K1, K3, K4, Gale (1944), McMillan (2007); < *Rynchospora wrightiana* – S. NatureServe GNR (Not Yet Ranked).

Rhynchospora caduca Elliott. ANGLE-STEM BEAKSEDGE. **Hab:** Tidal swamps, pine savannas and flatwoods, hardwood swamps, interdune ponds, acidic meadows and seeps, other wet areas. **Dist:** E. and c. VA south to s. FL and west to TX, OK, and AR, north in the interior to sc. TN. This species is found at a few sites in the mountains of GA. **Phen:** Apr-Sep. **Comm:** See notes under *R. miliacea*. **Syn:** = Ar, C, ETx1, F, FNA23, G, GW1, K1, K3, K4, RAB, Tn, Tx, Va, W, WH3, Gale (1944), McMillan (2007); > *Rynchospora caduca* – S; > *Rynchospora patula* A. Gray – S. NatureServe G5 (Secure).

Rhynchospora capillacea Torrey. NEEDLE BEAKSEDGE. **Hab:** Calcareous fens and seeps. **Dist:** NL (Newfoundland) west to SK, south to sw. VA, ne. TN (Campbell County), and n. AR. **Phen:** Jul-Oct. **Syn:** = Ar, C, F, FNA23, G, GrPl, Il, K1, K3, K4, Mi, Mo1, NE, NY, Pa, Tn, Va, Gale (1944), McMillan (2007). NatureServe G4G5 (Apparently Secure).



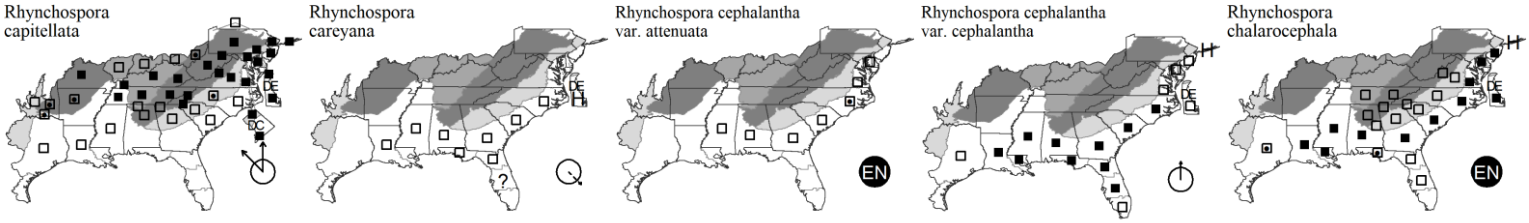
Rhynchospora capitellata (Michaux) Vahl. BROWNISH BEAKSEDGE. **Hab:** Bogs and fens, seepages, and wet rock outcrops in the Mountains and upper Piedmont, also in wet habitats in the Coastal Plain of ne. NC and e. VA, also found in a variety of wet habitats. **Dist:** NB west to WI and n. NE, south to GA, AL, MS; disjunct in sw. OR and CA. **Phen:** Jul-Sep. **Tax:** Sorrie (2000) clarified the relationships and distinctions of this taxon with *R. leptocarpa*. **Comm:** The only common beaksedge in the higher Mountains of our region. **Syn:** = Ar, C, F, G, GrPl, Il, K3, K4, Mi, Mo1, NE, NY, Pa, Tn, Va, W, WV, McMillan (2007), Naczi & Moyer (2017); = *Rynchospora capitellata* – S; < *Rhynchospora capitellata* (Michaux) Vahl – FNA23, GW1, K1, RAB, Tx, Gale (1944).

Rhynchospora careyana Fernald. CAREY'S HORNED BEAKSEDGE. **Hab:** Limesink (doline) depression ponds and in intermittently flooded depression meadows, mucky pondshores. **Dist:** Apparently ranging from se. NC south to FL, but the range poorly known because of confusion with *R. inundata*, from which it is perhaps not specifically distinct. **Phen:** Jul-Sep. **Syn:** = FNA23, K1, K3, K4, McMillan (2007); = *Rynchospora careyana* – S; < *Rhynchospora corniculata* (Lamarck) A. Gray – GW1; < *Rhynchospora inundata* (Oakes) Fernald – RAB, WH3.

Rhynchospora cephalantha A. Gray *var. **attenuata*** Gale. SMALL BUNCHED BEAKSEDGE. **Hab:** Pine savannas, sandhill seeps, openings in streamhead pocosins. **Dist:** The range of this variety is poorly known; it is reported by Gale (1944) from NC, SC, AL, and MS. Recent collections from MD and VA extend the range. See discussion in Sorrie et al. (1997). **Phen:** Jul-Oct. **Syn:** = Va, Gale (1944), McMillan (2007); < *Rhynchospora cephalantha* – C, FNA23, GW1, K1, K3, K4, RAB; < *Rynchospora axillaris* (Lamarck) Britton – S.

Rhynchospora cephalantha A. Gray *var. **cephalantha***. COMMON BUNCHED BEAKSEDGE. **Hab:** Pine savannas, wet roadsides, ditches, wet powerline rights-of-way. **Dist:** S. NJ south to s. FL and west to e. TX. **Phen:** Jul-Oct. **Comm:** This taxon is often weedy. **Syn:** = Va, McMillan (2007); < *Rhynchospora cephalantha* – C, ETx1, FNA23, GW1, K1, K3, K4, NY, RAB, WH3; > *Rhynchospora cephalantha* A. Gray var. *cephalantha* – F, G; > *Rhynchospora cephalantha* var. *pleiocephala* Fernald & Gale – F, G, Gale (1944); > *Rhynchospora cephalantha* A. Gray var. *typica* Fernald & Gale – Gale (1944); < *Rynchospora axillaris* (Lamarck) Britton – S.

Rhynchospora chalarocephala Fernald & Gale. LOOSE-HEADED BEAKSEDGE. **Hab:** Pine savannas, limesink ponds, and swamps, often weedy and occurring in abundance on wet roadsides and in powerline corridors. **Dist:** S. NJ south to c. FL and west to LA; disjunct in nw. GA (Jones & Coile 1988) and sc. TN (Coffee and Warren counties). **Phen:** Jul-Sep. **Syn:** = C, ETx1, F, FNA23, G, GW1, K1, K3, K4, NY, RAB, Tn, Va, W, WH3, Gale (1944), McMillan (2007). NatureServe G5 (Secure).



Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

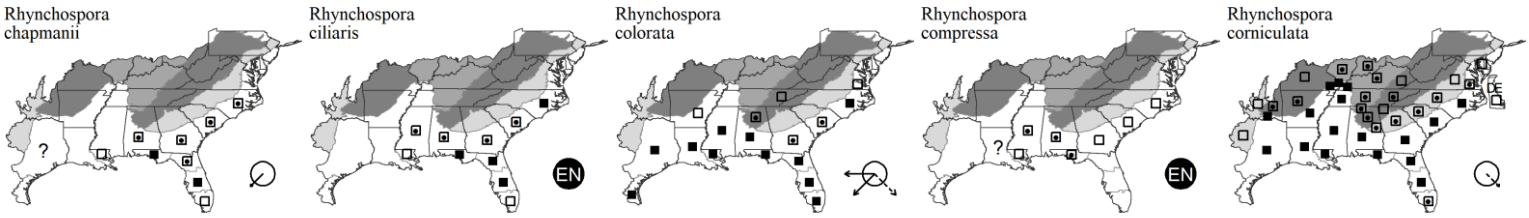
Rhynchospora chapmanii M.A. Curtis. CHAPMAN'S BEAKSEDGE. **Hab:** Pine savannas, seepage bogs, sandy margins of limesink (doline) ponds, and other wet, acid habitats. **Dist:** Se. NC south to s. FL and west to e. LA; Belize, Nicaragua. **Phen:** Jul-Sep. **Syn:** = FNA23, GW1, K1, K3, K4, RAB, WH3, Gale (1944), McMillan (2007); = *Rynchospora chapmanii* – S. NatureServe G4 (Apparently Secure).

Rhynchospora ciliaris (Michaux) C. Mohr. FRINGED BEAKSEDGE. **Hab:** Pine savannas, longleaf pine sandhill seeps. **Dist:** Se. NC south to s. FL and west to e. LA. **Phen:** Jul-Sep. **Syn:** = FNA23, GW1, K1, K3, K4, RAB, WH3, Gale (1944), McMillan (2007); = *Rynchospora ciliaris* – S. NatureServe G4 (Apparently Secure).

Rhynchospora colorata (Linnaeus) H. Pfeiffer. NARROWLEAF WHITETOP SEDGE. **Hab:** Wet pine savannas, ditches, dune swales, calcareous glades, usually in places with some source of alkalinity (calcareous rocks, shell, brackish water). **Dist:** Se. VA south to FL and west to TX; Mexico (Tabasco, Chiapas, Yucatán), Belize, Guatemala, Costa Rica, Venezuela; West Indies. **Phen:** May-Sep. **Syn:** = Ar, C, ETx1, FNA23, K1, K3, K4, NcTx, Va, WH3, McMillan (2007); = *Dichromena colorata* (Linnaeus) A.S. Hitchcock – Bah, F, G, GW1, RAB, S, Tx.

Rhynchospora compressa Carey ex Chapman. PAGODA BEAKSEDGE. **Hab:** Pine savannas. **Dist:** Se. NC south to Panhandle FL, west to e. LA. This species was reported for SC (Kartesz 1999), based on the South Carolina Plant Atlas (http://cricket.biol.sc.edu/herb/); McMillan (pers. comm.) states that the record is in error, based on a misidentified specimen. The species occurs in sc. GA (Jones & Coile 1988) and has since been found in SC by McMillan (2003) and in NC by E. Ungberg (specimen at NCU). **Syn:** = FNA23, GW1, K1, K3, K4, WH3, Gale (1944), McMillan (2007); = *Rynchospora compressa* – S, orthographic variant. NatureServe G4 (Apparently Secure).

Rhynchospora corniculata (Lamarck) A. Gray. SHORT-BRISTLED HORNED BEAKSEDGE. **Hab:** Pondcypress savannas in Carolina bays, swamp forests, other wetlands. **Dist:** Sometimes divided into two varieties: var. *corniculata* ranges from DE south to FL and west to LA, extending north into KY and MO; also in the West Indies. **Phen:** Jul-Sep. **Tax:** Var. *interior*, probably not worth recognition, is distinguished by a shorter and narrower achene, the summit barely broader than the base of the tubercle, and occurs in the Mississippi drainage. **Syn:** = Ar, ETx1, FNA23, GW1, Il, K1, K3, K4, Mo1, RAB, Tn, Va, WH3, McMillan (2007); = *Rynchospora corniculata* – S, orthographic variant; > *Rhynchospora corniculata* var. *corniculata* – C, F, G; > *Rhynchospora corniculata* var. *interior* Fernald – C, F, G, NcTx, Tx.



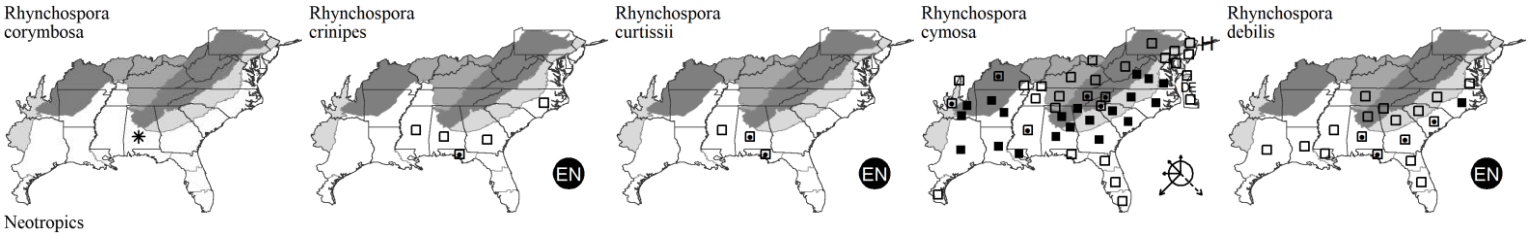
* ***Rhynchospora corymbosa*** (Linnaeus) Britton. **Hab:** Ditches, disturbed wetlands. **Dist:** Native of Old World tropics. **Phen:** May-Nov. **Comm:** See Barger et al. (2012) for additional information about the AL occurrence, as *R. indianolensis*. **Syn:** = K3, K4.

Rhynchospora crinipes Gale. ALABAMA BEAKSEDGE. **Hab:** Sand-clay bars and peaty stream banks of blackwater streams. **Dist:** Jul-Sep. Sc. NC (Sorrie et al. 1997) through sc. GA to FL Panhandle, west to s. AL; very scattered in occurrence. **Tax:** This very rare species is related to *R. filifolia*, but is a coarser plant, readily distinguishable by characters of the achene, culm, and leaves. Anderson (1988) discusses its systematics, habitat, and rarity. **Syn:** = FNA23, GW1, K1, K3, K4, WH3, Gale (1944), McMillan (2007). NatureServe G3 (Vulnerable).

Rhynchospora curtissii Britton. **Hab:** Pine flatwoods and bogs. **Dist:** An East Gulf Coastal Plain endemic, in Panhandle FL, AL, and s. MS (Sorrie & Leonard 1999); also reported from SC by Kral (1996) and for NC and SC by Kartesz (1999), but specimens so annotated are misidentified. **Syn:** = FNA23, GW1, K1, K3, K4, WH3, Gale (1944), McMillan (2007); = *Rynchospora smallii* – S. NatureServe G4 (Apparently Secure).

Rhynchospora cymosa Elliott. CYMOSE BEAKSEDGE. **Hab:** Wet to dry low grounds, diabase glades, ditches, powerline corridors, pine savannas, moist seepage on rock outcrops, other saturated areas. **Dist:** NJ south to FL, west to TX, north in the interior to nc. TN and around the Great Lakes; CA; West Indies; Central America. **Phen:** Jun-Sep. **Tax:** As explained by Kral (1999), this taxon warrants specific status. As explained by McMillan (2007), the name that should be applied to this taxon at species rank is *R. cymosa* Elliott. **Syn:** = *Rhynchospora globularis* (Chapman) Small var. *recognita* Gale – C, F, G, GrPl, Mo1, WV, Gale (1944); = *Rhynchospora recognita* (Gale) Kral – Ar, ETx1, FNA23, K1, K3, K4, Mi, NY, Pa, Va, McMillan (2007); = *Rynchospora cymosa* Elliott – S, misapplied; < *Rhynchospora globularis* (Chapman) Small – NcTx, RAB, W, WH3; < *Rhynchospora globularis* var. *globularis* – GW1.

Rhynchospora debilis Gale. SAVANNA BEAKSEDGE. **Hab:** Pine savannas, longleaf pine sandhill seeps, acid seeps and flatwoods inland. **Dist:** Se. VA south to n. peninsular FL and west to se. TX (Brown & Marcus 1998). **Phen:** Jul-Sep. **Comm:** Like a small version of *R. fascicularis*, often with several ascending, cespitose culms, each terminated by a single glomerule. **Syn:** = C, ETx1, F, FNA23, GW1, K1, K3, K4, RAB, Tn, Va, WH3, Gale (1944), McMillan (2007). NatureServe G4? (Apparently Secure).



Rhynchospora decurrens Chapman. SWAMP-FOREST BEAKSEDGE. **Hab:** Swamp forests and river marshes, especially along blackwater rivers. **Dist:** Se. NC and e. SC (McMillan & Porcher 2005) south to c. peninsular FL and west to s. MS (Sorrie & Leonard 1999). **Phen:** Jul-Aug. **Syn:** = FNA23, GW1, K1, K3, K4, RAB, WH3, Gale (1944), McMillan (2007); = *Rynchospora decurrens* – S, orthographic variant. NatureServe G3G4 (Vulnerable).

Rhynchospora distans (Michaux) Vahl. NARROW-FRUITED FASCICLED BEAKSEDGE. **Hab:** Pine savannas and limesink ponds. **Dist:** Se. VA south to s. FL and west to s. MS (Sorrie & Leonard 1999); West Indies. **Phen:** Jun-Sep. **Comm:** Appearing to merge with *R. wrightiana* on the outer Coastal Plain of NC. **Syn:** = Va, McMillan (2007); = *Rhynchospora fascicularis* (Michaux) Vahl var. *distans* (Michaux) Chapman – F, K1, Gale (1944); =

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

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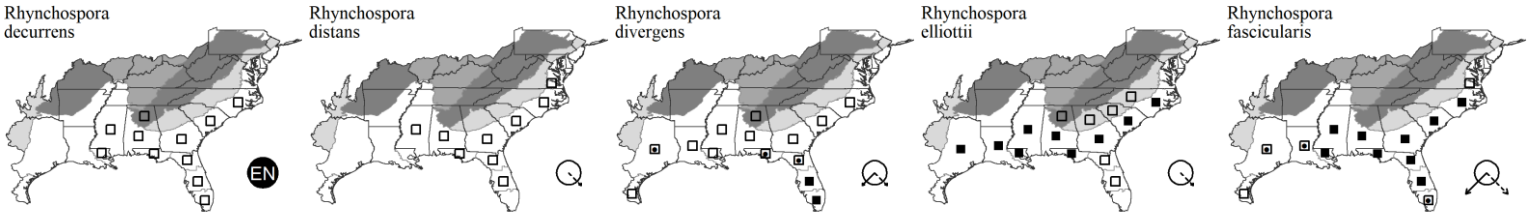
Rynchospora distans – S, orthographic variant; < *Rhynchospora fascicularis* (Michaux) Vahl – FNA23, G, GW1, K3, K4, RAB, WH3. NatureServe G5T4? (Apparently Secure).

Rhynchospora divergens Chapman ex M.A. Curtis. WHITE-SEEDED BEAKSEDGE. **Hab:** Wet pine savannas, especially in exposed sands. **Dist:** Se. NC south to s. FL and west to se. TX; Bahamas; Mexico (Chiapas), Belize. **Phen:** May-Sep. **ID Notes:** *Rhynchospora pusilla*, *Rhynchospora divergens*, and *Rhynchospora thornei* are all small, grass-like plants, very similar in appearance to one another. **Syn:** = Bah, ETx1, FNA23, GW1, K1, K3, K4, RAB, Tx, WH3, McMillan (2007); = *Rynchospora divergens* – S, orthographic variant. NatureServe G4 (Apparently Secure).

Rhynchospora elliottii A. Dietrich. ELLIOTT'S BEAKSEDGE. **Hab:** Pine savannas, ditches, other wet habitats, often weedy. **Dist:** Se. NC south to c. peninsular FL and west to e. TX; Bahamas. **Phen:** Jul-Sep. **ID Notes:** The achenes are typically flat or concave on one face, and flat or slightly convex on the other. See note under *R. microcarpa*. **Syn:** = Bah, ETx1, FNA23, GW1, K1, K3, K4, Tx, WH3, McMillan (2007); = *Rhynchospora schoenoides* (Elliott) Wood – RAB, Gale (1944); = *Rynchospora schoenoides* – S. NatureServe G5 (Secure).

Rhynchospora fascicularis (Michaux) Vahl. FASCICLED BEAKSEDGE. **Hab:** Pine savannas, limesink ponds, ditches. **Dist:** Se. VA south to s. FL and west to se. TX; West Indies. **Phen:** Jun-Sep. **Syn:** = Va, McMillan (2007); = *Rhynchospora fascicularis* (Michaux) Vahl var. *fascicularis* – F, K1, Gale (1944); = *Rynchospora fascicularis* – S; < *Rhynchospora fascicularis* (Michaux) Vahl – ETx1, FNA23, G, GW1, K3, K4, RAB, Tx, WH3. NatureServe G5T3T5 (Apparently Secure).



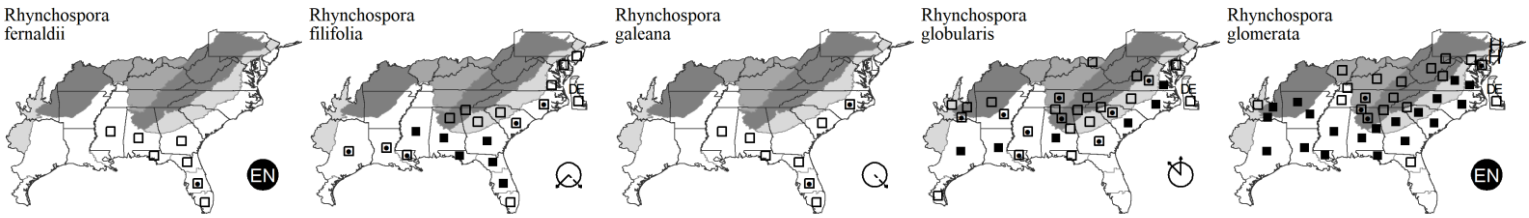
Rhynchospora fernaldii Gale. FERNALD'S BEAKSEDGE. **Hab:** Pine flatwoods. **Dist:** S. GA south to s. FL, west to s. MS. **Syn:** = FNA23, GW1, K1, K3, K4, WH3, Gale (1944), McMillan (2007). NatureServe G3G4 (Vulnerable).

Rhynchospora filifolia A. Gray. THREADLEAVED BEAKSEDGE. **Hab:** Sandy shores of limesink (doline) depressions, especially at the lower margin, wet pine savannas. **Dist:** S. NJ south to c. FL and west to e. TX; Cuba, Mexico (Tabasco), Belize, Nicaragua. **Phen:** Jul-Sep. **Syn:** = C, ETx1, F, FNA23, G, K1, K3, K4, RAB, Tx, Va, WH3, Gale (1944), McMillan (2007); = *Rynchospora filifolia* – S; < *Rhynchospora filifolia* A. Gray – GW1.

Rhynchospora galeana Naczi, W.M. Knapp, & Gerry Moore. SHORT-BRISTLE BEAKSEDGE. **Hab:** Wet pine savannas and associated wetlands. **Dist:** Se. NC south to s. FL and west to s. MS; West Indies. **Phen:** Jul-Sep. **Tax:** See Naczi, Knapp, and Moore (2010) for discussion of the need to replace the name *R. breviseta* because of an earlier-named Asian species. **Comm:** This species will colonize disturbances (roadsides, powerline corridors), but not aggressively. The leaf tips of *R. galeana* are acute and minutely serrulate, while those of the closely related *R. oligantha* are blunt and smooth; these characters are, however, often difficult to determine. **Syn:** = K3, K4, Naczi, Knapp, & Moore (2010); = *Rhynchospora breviseta* (Gale) Channell – FNA23, GW1, K1, RAB, WH3, Bridges & Orzell (2000), McMillan (2007), illegitimate name (a later homonym); = *Rynchospora oligantha* A. Gray var. *breviseta* Gale – Gale (1944); < *Rhynchospora oligantha* A. Gray – F, G; < *Rynchospora oligantha* – S.

Rhynchospora globularis (Chapman) Small. GLOBE BEAKSEDGE. **Hab:** Sandy or peaty depressions, wet ditches, powerline corridors, pine savannas, inland in acidic seeps and flatwoods. **Dist:** DE south to s. FL and west to c. TX and OK; north in the interior to nc. TN; disjunct around the Great Lakes. **Phen:** Jun-Sep. **ID Notes:** Both *R. globularis* and *R. pinetorum* tend to produce shorter plants with smaller glomerules than *R. recognita*. Occasional achenes of *R. globularis* exhibit the wide alveoli of *R. pinetorum* near the base or summit, with little or no horizontal ridging, but centrally have narrow alveoli with pronounced horizontal ridges. The opposite condition occasionally occurs in *R. pinetorum* achenes, with narrow alveoli and horizontal ridging basally or at the summit, but wide alveoli and little or no ridging centrally. **Syn:** = C, F, FNA23, G, Il, K3, K4, Tn, Tx, Va, Gale (1944), McMillan (2007); = *Rynchospora globularis* – S, orthographic variant; < *Rhynchospora globularis* (Chapman) Small – RAB, W, WH3; < *Rhynchospora globularis* var. *globularis* – Ar, ETx1, GW1, K1, NcTx.

Rhynchospora glomerata (Linnaeus) Vahl. CLUSTERED BEAKSEDGE. **Hab:** Pine savannas, bogs, acidic seeps inland, other wet habitats. **Dist:** S. NJ south to ne. FL, FL Panhandle, and west to e. TX, and inland in KY, TN, AR, and KS. **Phen:** Jul-Sep. **Syn:** = K4, Sorrie, LeBlond, & Weakley (2018a) in Weakley et al (2018b); = *Rhynchospora glomerata* (Linnaeus) Vahl var. *glomerata* – K1, Va, McMillan (2007); = *Rynchospora glomerata* (Linnaeus) Vahl var. *typica* Gale – Gale (1944); < *Rhynchospora glomerata* (Linnaeus) Vahl – Ar, C, ETx1, F, FNA23, G, GW1, Il, K3, NcTx, RAB, Tn, Tx, W, WH3, Naczi & Moyer (2017); < *Rynchospora glomerata* – S, orthographic variant. NatureServe G5T5? (Secure).



Rhynchospora gracilenta A. Gray. SLENDER BEAKSEDGE. **Hab:** Pine savannas, bogs, seeps. **Dist:** NJ south to ne. FL, FL Panhandle, and west to e. TX, north in the inland to nc. TN, se. KY (Brock 2020), and AR; Cuba; Mexico (Chiapas), Belize, Nicaragua. **Phen:** Jul-Sep. **Syn:** = Ar, C, ETx1, F, FNA23, G, GW1, K1, K3, K4, Pa, RAB, Tn, Tx, Va, W, WH3, Gale (1944), McMillan (2007); = *Rynchospora gracilenta* – S, orthographic variant. NatureServe G5 (Secure).

Rhynchospora grayi Kunth. GRAY'S BEAKSEDGE. **Hab:** Longleaf pine sandhills and other dry, sandy sites, pine rocklands. **Dist:** Se. VA south to s. FL, west to e. TX. **Phen:** Jun-Sep. **Syn:** = C, ETx1, F, FNA23, G, K1, K3, K4, RAB, Tx, Va, WH3, Gale (1944), McMillan (2007); = *Rynchospora grayi* – S. NatureServe G4 (Apparently Secure).

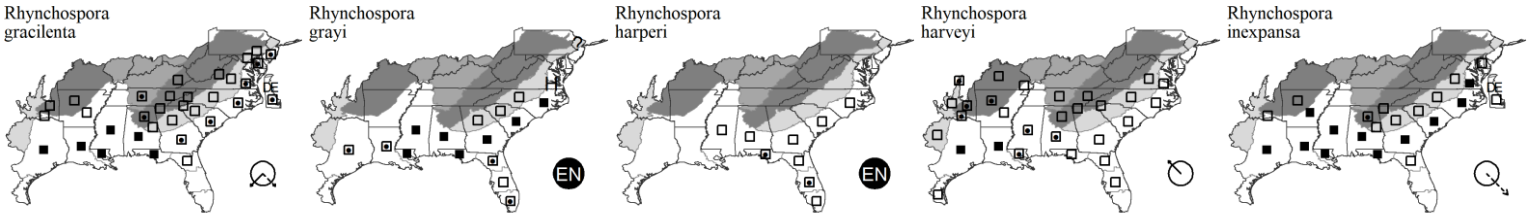
Rhynchospora harperi Small. HARPER'S BEAKSEDGE. **Hab:** Peaty limesink depression ponds (dolines), from standing water to the upper margins of the pond-shore. **Dist:** Se. NC south to sc. peninsular FL and west to s. AL and s. MS (Sorrie & Leonard 1999); Belize. See Nelson (1993)

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

for first SC record, and LeBlond (1997) for additional information on the species, especially its distribution. **Phen:** Jul-Sep. **Syn:** = FNA23, K1, K3, K4, WH3, Gale (1944), McMillan (2007); = *Rynchospora harperi* – S; < *Rhynchospora filifolia* A. Gray – GW1.

Rhynchospora harveyi W. Boott. HARVEY'S BEAKSEDGE. **Hab:** Pine savannas in the Coastal Plain, seepage bogs in the Sandhills, bogs in the Mountains and Piedmont. **Dist:** Se. VA south to ne. FL, FL Panhandle, and west to TX and OK, and north in the interior to nc. TN and MO. **Phen:** Jul-Aug. **Syn:** = C, ETx1, F, G, GrPl, GW1, K1, Mo1, NcTx, RAB, Tn, Tx, Va, W, Gale (1944), McMillan (2007); = *Rhynchospora harveyi* var. *harveyi* – Ar, FNA23, K3, K4; = *Rynchospora harveyi* – S; < *Rhynchospora harveyi* W. Boott – WH3. NatureServe G4 (Apparently Secure).

Rhynchospora inexpansa (Michaux) Vahl. NODDING BEAKSEDGE. **Hab:** Wet pine savannas, streamhead pocosins where frequently burned, usually in peaty situations, often weedy, colonizing disturbances. **Dist:** Se. VA south to ne. FL, FL Panhandle, and west to e. TX, AR, and se. OK (Singhurst, Mink, & Holmes 2012); West Indies. **Phen:** Jul-Sep. **Syn:** = Ar, C, ETx1, F, FNA23, G, GW1, K1, K3, K4, RAB, Tx, Va, WH3, Gale (1944), McMillan (2007); = *Rynchospora inexpansa* – S. NatureServe G5 (Secure).



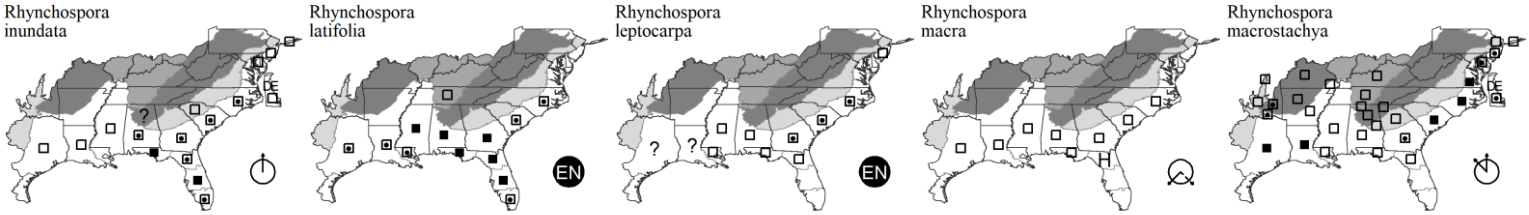
Rhynchospora inundata (Oakes) Fernald. NARROW-FRUIT HORNED BEAKSEDGE. **Hab:** In water of limesink dolines and clay-based Carolina bays. usually found in shallow water or at the lower margins of pond-shores, typically producing large colonies. **Dist:** Apparently ranging from e. MA south to s. FL and west to e. TX (the range, however, obscured by confusion with *R. careyana*) (Singhurst, Mink, & Holmes 2010). See Reid (2021) for information about its occurrence in Vermilion Parish, w. Louisiana. **Phen:** Jul-Sep. **Comm:** The relation of this species to *R. careyana* and to more northern entities of *R. inundata* remain unresolved. **Syn:** = C, F, FNA23, G, GW1, K1, K3, K4, NE, NY, McMillan (2007); = *Rynchospora inundata* – S; < *Rhynchospora inundata* (Oakes) Fernald – RAB, WH3.

Rhynchospora latifolia (Baldwin ex Elliott) W.W. Thomas. BROADLEAF WHITETOP SEDGE. **Hab:** Wet pine savannas. **Dist:** A Southeastern Coastal Plain endemic: se. NC south to s. FL and west to se. TX; disjunct in sc. TN (Coffee County). **Phen:** May-Sep. **Syn:** = ETx1, FNA23, K1, K3, K4, WH3, McMillan (2007); = *Dichromena latifolia* Baldwin ex Elliott – GW1, RAB, S, Tx. NatureServe G5 (Secure).

Rhynchospora leptocarpa (Chapman ex Britton) Small. **Hab:** Seepage bogs, pocosins, especially in openings. **Dist:** Coastal Plain: E. NC south to ne. FL, Panhandle FL, west to se. LA; disjunct in s. NJ. **Phen:** Jul-Sep. **Comm:** It appears that *R. leptocarpa* is a valid species, a southeastern Coastal Plain relative of the more northern and montane *R. capitellata* (Sorrie 2000; Moyer & Naczi 2016; Naczi & Moyer 2016). Its occurrence in NC is reported by Sorrie et al. (1997). Its occurrence in NJ is reported by Moyer & Naczi (2016). **Syn:** = K3, K4, WH3, McMillan (2007), Naczi & Moyer (2017); = *Rynchospora leptocarpa* – S; < *Rhynchospora capitellata* (Michaux) Vahl – ETx1, FNA23, GW1, K1, RAB, Tx, Gale (1944).

Rhynchospora macra (C.B. Clarke) Small. SOUTHERN WHITE BEAKSEDGE. **Hab:** *Sphagnum* bogs in frequently-burned streamhead pocosins, and in sandhill seepage bogs. **Dist:** Sc. NC south to ne. FL, FL Panhandle, and west to se. TX; Nicaragua; Puerto Rico. **Phen:** Jul-Sep. **Comm:** *R. macra* is a robust southern relative of *R. alba*. Like *R. alba* and *R. pallida*, it has scales which are at first bright white, "fading" in age to a medium tan or light brown. These three species are thus superficially most distinctive (from other *Rhynchospora*) in June, July, and August. The occurrence of this species in NC and SC is discussed by Sorrie et al. (1997). **Syn:** = ETx1, FNA23, GW1, K1, K3, K4, Tx, WH3, Gale (1944), McMillan (2007); = *Rynchospora macra* – S. NatureServe G3G4 (Vulnerable).

Rhynchospora macrostachya Torrey ex A. Gray. TALL HORNED BEAKSEDGE. **Hab:** Marshes, tidal marshes, swamps, upland depression ponds, other wetlands. **Dist:** E. MA south to ne. FL and west to e. TX, north in the interior to sc. TN, s. MI, MO, and KS; disjunct (historically) in s. ME. **Phen:** Jul-Sep. **Tax:** The recognition of varieties does not seem to be warranted. **Comm:** This is most readily distinguished from *R. corniculata*. *R. inundata*, and *R. careyana* by the large glomerules composed of numerous spikelets. **Syn:** = Ar, C, ETx1, FNA23, G, GrPl, GW1, K1, K3, K4, Mi, NcTx, NE, NY, RAB, Tn, Tx, Va, WH3, McMillan (2007); = *Rynchospora macrostachya* – S; > *Rhynchospora macrostachya* var. *colpophila* – F; > *Rhynchospora macrostachya* var. *macrostachya* – F, Mo1.



Rhynchospora marliniana Naczi, W.M. Knapp, & W.W. Thomas. MARLINS' BEAKSEDGE. **Hab:** Wet pine savannas and Florida wet prairies. **Dist:** FL Panhandle west through AL to MS; Central America in se. Mexico (Tabasco), Belize, ne. Honduras, and ne. Nicaragua. **Phen:** May-Aug. **Tax:** See Naczi, Knapp, & Thomas (2012) for more detailed information. *R. semiplumosa* Small seems to be this species by description and key (Small 1933), but the type specimen is *R. plumosa* (W. Knapp, pers. comm. 2012). **Syn:** = K3, K4, Naczi, Knapp, & Thomas (2012); = *Rynchospora semiplumosa* A. Gray – S, as to description, but not type; < *Rhynchospora plumosa* Elliott – FNA23, GW1, K1, RAB, WH3, Bridges & Orzell (2000), McMillan (2007).

Rhynchospora megalocarpa A. Gray. SANDHILL BEAKSEDGE. **Hab:** Xeric longleaf pine sandhills, Florida scrub. **Dist:** Se. NC south to s. FL, west to MS. **Phen:** Jun-Aug. **Syn:** = FNA23, K1, K3, K4, RAB, WH3, Gale (1944), McMillan (2007); = *Rynchospora dodecandra* Baldwin ex A. Gray – S. NatureServe G5 (Secure).

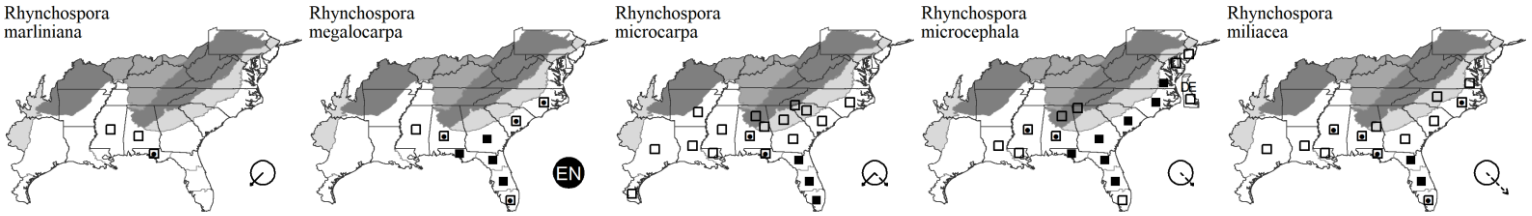
Rhynchospora microcarpa Baldwin ex A. Gray. SOUTHERN BEAKSEDGE. **Hab:** Swamp forests, clay-based Carolina bays, marl prairies, strand swamps, cypress woodlands. **Dist:** E. NC south to s. FL and west to TX; West Indies (Cuba, Puerto Rico), Bahamas, Belize. **Phen:** Jul-Aug. **Tax:**

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

This species is easily confused with *R. elliottii* and *R. perplexa*. *R. elliottii* is distinguished by leaves 4-6 mm wide, bristles longer than the tubercle, flattish achene faces, and a tubercle that is longer than broad. *R. microcarpa* and *R. perplexa* have leaves 1-3 mm wide and tubercles as broad as long or broader. In *R. microcarpa*, the achene is biconvex and the bristles are half as long as the achene to equaling the tubercle. In *R. perplexa*, the achene faces are flattish and the bristles are absent or rudimentary (< ½ as long as the achene). **Syn:** = Ar, ETx1, F, FNA23, GW1, K4, RAB, Tx, WH3, Gale (1944), McMillan (2007); < *Rhynchospora microcarpa* Baldwin ex A. Gray – Bah, K1, K3; > *Rynchospora edisoniana* Britton in Small – S; > *Rynchospora microcarpa* – S.

Rhynchospora microcephala (Britton) Britton ex Small. SMALL-HEADED BEAKSEDGE. **Hab:** Pine savannas, sandhill-pocosin ecotones. **Dist:** S. NJ south to s. FL and west to MS; Cuba. **Phen:** Jul-Oct. **Syn:** = C, F, FNA23, G, GW1, K1, K3, K4, RAB, Va, WH3, Gale (1944), McMillan (2007); = *Rynchospora microcephala* – S. NatureServe G5T5 (Secure).

Rhynchospora miliacea (Lamarck) A. Gray. MILLET BEAKSEDGE. **Hab:** Swamp forests, including maritime swamp forests. **Dist:** Se. VA south to s. FL and west to e. TX; West Indies. **Phen:** Jul-Aug. **Comm:** The inflorescence branches of *R. mixta* and (less commonly) *R. caduca* can spread at right angles from the culm, superficially resembling *R. miliacea*. The three can be separated by tubercle length: the tubercle of *R. miliacea* is 0.2-0.4 mm long, while those of *R. mixta* and *R. caduca* are 0.4-0.9 mm long. **Syn:** = C, ETx1, F, FNA23, G, GW1, K1, K3, K4, RAB, Va, WH3, Gale (1944), McMillan (2007); = *Rynchospora miliacea* – S. NatureServe G5 (Secure).



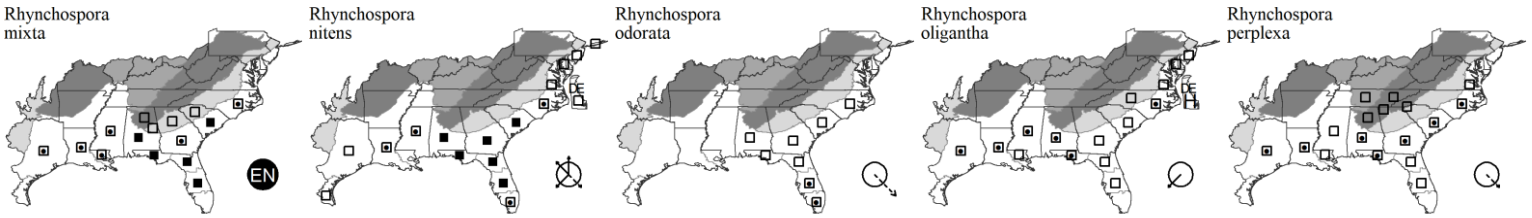
Rhynchospora mixta Britton. MINGLED BEAKSEDGE. **Hab:** Swamp forests, marshes. **Dist:** Ne. NC south to c. peninsular FL and west to e. TX. **Phen:** Jun-Aug. **Comm:** See notes under *R. miliacea*. **Syn:** = ETx1, FNA23, GW1, K1, K3, K4, RAB, S, Tx, WH3, Gale (1944), McMillan (2007); > *Rynchospora mixta* – S; > *Rynchospora prolifera* Small – S. NatureServe G5 (Secure).

Rhynchospora nitens (Vahl) A. Gray. SHORT-BEAKED BEAKSEDGE. **Hab:** Wet pine savannas, limesink (doline) ponds, ditches, disturbed wet areas, often weedy. **Dist:** Primarily a Coastal Plain endemic: MA south to s. FL and west to se. TX; lowlands around the Great Lakes; West Indies, Belize, Nicaragua. **Phen:** Jul-Aug. **Syn:** = C, ETx1, FNA23, K1, K3, K4, Mi, NcTx, NE, NY, Va, WH3, McMillan (2007); = *Psilocarya nitens* (Vahl) Wood – F, G, GW1, RAB, S, Tx. NatureServe G4? (Apparently Secure).

Rhynchospora odorata C. Wright ex Grisebach. FRAGRANT BEAKSEDGE. **Hab:** Maritime swamp forests and maritime wet grasslands. **Dist:** E. NC south to s. FL; West Indies and Bahamas. First reported for SC by Nelson & Kelly (1997). **Phen:** Jun-Aug. **Syn:** = Bah, F, FNA23, GW1, K1, K3, K4, RAB, WH3, Gale (1944), McMillan (2007); = *Rynchospora stipitata* Chapman – S. NatureServe G4 (Apparently Secure).

Rhynchospora oligantha A. Gray. FEATHER-BRISTLED BEAKSEDGE. **Hab:** Wet pine savannas, sandhill-pocosin ecotones, sandhill seepage bogs, sea-level fens, usually in rather peaty, acid places. **Dist:** S. NJ south to ne. FL, Panhandle FL, and west to se. TX; Belize, Nicaragua. Considered to be absent between NC and NJ prior to its discovery in e. VA (Fleming & Ludwig 1996). **Phen:** May-Aug. **ID Notes:** The leaf tips of *R. oligantha* are blunt and smooth, while those of the closely related *R. galeana* are acute and minutely serrulate; these characters are often difficult to determine, however. **Syn:** = C, ETx1, FNA23, GW1, K1, K3, K4, RAB, Tx, Va, WH3, Bridges & Orzell (2000), McMillan (2007); = *Rhynchospora oligantha* var. *oligantha* – Gale (1944); < *Rhynchospora oligantha* A. Gray – F, G; < *Rynchospora oligantha* – S.

Rhynchospora perplexa Britton. PINELAND BEAKSEDGE. **Hab:** Pine savannas, sandhill seepage bogs, inland in seepage bogs and acidic flatwoods. **Dist:** E. NC south to ne. FL, FL Panhandle, and west to TX, and north in the interior to ec. TN; West Indies. **Phen:** Jul-Sep. **Tax:** Var. *virginiana* Fernald, alleged to be endemic to se. VA, is alleged to differ in several characters, including larger spikelets (2.5-3.0 mm long vs. 2.0-2.5), the achene tubercles broadly rounded at the tip (rather than deltoid and acute). Also see note under *R. microcarpa*. **Syn:** = C, ETx1, FNA23, G, GW1, K1, K3, K4, RAB, Tn, Tx, Va, WH3, Gale (1944), McMillan (2007); = *Rynchospora perplexa* – S; < *Rhynchospora microcarpa* Baldwin ex A. Gray – Bah; > *Rhynchospora perplexa* var. *perplexa* – F; > *Rhynchospora perplexa* var. *virginiana* Fernald – F.



Rhynchospora pinetorum Britton & Small. SMALL'S BEAKSEDGE. **Hab:** Wet calcareous pine savannas, maritime wet grasslands. **Dist:** FL west to MS (Sorrie & Leonard 1999) and e. TX, apparently somewhat disjunct to se. NC and ne. SC, and also in the West Indies. **Phen:** Jun-Sep. **Comm:** See note under *R. globularis*. **Syn:** = K3, K4, McMillan (2007); = *Rhynchospora globularis* (Chapman) Small var. *pinetorum* (Small) Gale – ETx1, FNA23, GW1, K1, Gale (1944); = *Rynchospora pinetorum* – S; < *Rhynchospora globularis* (Chapman) Small – WH3.

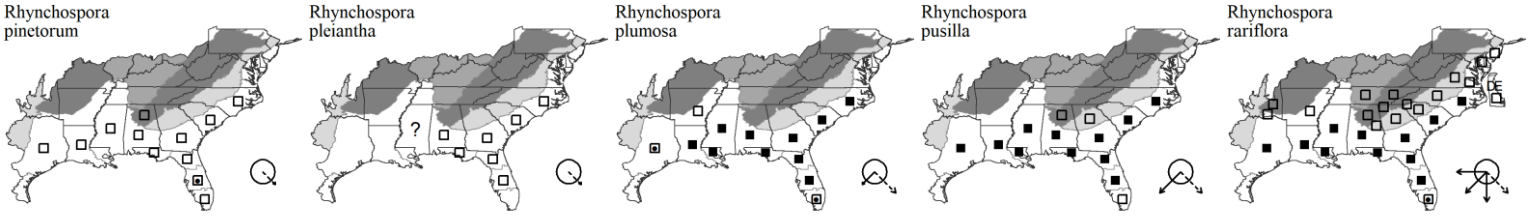
Rhynchospora pleiantha (Kükenthal) Gale. COASTAL BEAKSEDGE. **Hab:** Sandy margins of limesink depression ponds (dolines), typically in shallow water or at the lower margins of pond-shores. **Dist:** Se. NC south to c. peninsular FL, and Panhandle FL, west to se. AL; also in Cuba. **Phen:** Jul-Sep. **Syn:** = FNA23, GW1, K1, K3, K4, RAB, WH3, Gale (1944), McMillan (2007); = *Rynchospora fusca* – S, misapplied. NatureServe G2G3 (Imperiled).

Rhynchospora plumosa Elliott. PLUMED BEAKSEDGE. **Hab:** Pine savannas, sandhill-pocosin ecotones, especially where the sandy surface dries out in summer (on spodosols such as the Leon soil series). **Dist:** NC south to s. FL and west to se. TX; West Indies (Cuba); Belize, Honduras, Nicaragua. **Phen:** May-Aug. **Syn:** = Naczi, Knapp, & Thomas (2012); < *Rhynchospora plumosa* Elliott – Ar, ETx1, FNA23, GW1, K1, K3, K4, RAB, Tx, WH3, Bridges & Orzell (2000), McMillan (2007); > *Rynchospora plumosa* – S; > *Rynchospora semiplumosa* A. Gray – S, (as to type). NatureServe G5 (Secure).

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Rhynchospora pusilla Chapman ex M.A. Curtis. DWARF BEAKSEDGE. **Hab:** Wet pine savannas, especially in exposed wet sands of disturbed ground, such as roadsides. **Dist:** E. NC south to s. FL and west to e. TX; West Indies, Mexico (Tabasco, Chiapas), Belize, Guatemala, Nicaragua. **Phen:** Jun-Sep. **ID Notes:** *Rhynchospora pusilla*, *Rhynchospora divergens*, and *Rhynchospora thornei* are all small, grass-like plants, very similar in appearance to one another. **Syn:** = ETx1, FNA23, GW1, K1, K3, K4, Tx, WH3, McMillan (2007); = *Rhynchospora intermixta* C. Wright – RAB; = *Rynchospora intermixta* – S. NatureServe G4G5 (Apparently Secure).

Rhynchospora rariflora (Michaux) Elliott. FEW-FLOWER BEAKSEDGE. **Hab:** Wet pine savannas, seepage bogs in the fall-line Sandhills, bogs in the Piedmont and Mountains. **Dist:** S. NJ south to s. FL and west to e. TX; rarely inland, as in ec. TN, w. NC, nw. SC, n. GA, etc.; West Indies; Belize, Honduras, Nicaragua. **Phen:** Jul-Sep. **Comm:** Resembling *R. galeana* and *R. oligantha*, but the spikelets conspicuously smaller. **Syn:** = Ar, C, ETx1, F, FNA23, G, GW1, K1, K3, K4, RAB, Tx, Va, WH3, Gale (1944), McMillan (2007); = *Rynchospora rariflora* – S. NatureServe G5 (Secure).



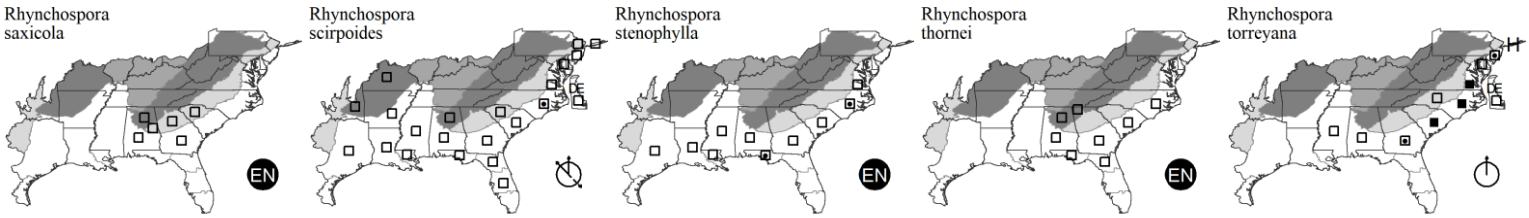
Rhynchospora saxicola Small. **Hab:** Seepages on granitic outcrops and Altamaha Grit glades. **Dist:** W. SC south into the Piedmont and rarely Coastal Plain of c. GA and ne. and ec. AL (Kral 1999). **Syn:** = K4, McMillan (2007); = *Rhynchospora globularis* (Chapman) Small var. *saxicola* (Small) Kükenthal – FNA23, K1; = *Rynchospora saxicola* – S. NatureServe G3Q (Vulnerable).

Rhynchospora scirpoides (Torrey) Grisebach. LONG-BEAK BEAKSEDGE. **Hab:** Limesink ponds, usually at the lower margins of pond-shores, wet pine savannas, beaver ponds, and other wetlands with "drawdown" hydrology. **Dist:** Se. MA south to n. peninsular FL, Panhandle FL, s. MS (Sorrie & Leonard 1999), se. OK, and TX (Singhurst, Bridges, & Holmes 2007); disjunct in the lowlands around the Great Lakes. **Phen:** Jul-Sep. **Syn:** = Ar, C, ETx1, FNA23, K1, K3, K4, Mi, NE, NY, Va, WH3, McMillan (2007); = *Psilocarya scirpoides* Torrey – GW1, RAB, S; > *Psilocarya scirpoides* var. *grimesii* Fernald & Griscom – F, G; > *Psilocarya scirpoides* var. *scirpoides* – F, G. NatureServe G4 (Apparently Secure).

Rhynchospora stenophylla Chapman. COASTAL BOG BEAKSEDGE. **Hab:** Peaty seepage bogs, streamhead pocosins, savanna-pocosin ecotones, usually growing in *Sphagnum*, especially where frequently burned. **Dist:** Se. NC south to nw. FL and west to s. MS; disjunct in se. VA (Southampton Co.) (Belden et al. 2004). Reported for GA by Sorrie (1998b). **Phen:** Jul-Sep. **Syn:** = ETx1, FNA23, GW1, K1, K3, K4, RAB, Va, WH3, Gale (1944), McMillan (2007); = *Rynchospora stenophylla* – S. NatureServe G4 (Apparently Secure).

Rhynchospora thornei Kral. THORNE'S BEAKSEDGE. **Hab:** In open sands in wet pine savannas underlain by marl, and nearby roadsides, moist limestone barrens and prairies (GA). **Dist:** Known from about 35 locations, in Coastal Plain of NC, SC, GA, ne. FL, Panhandle FL, and AL; also in Ridge and Valley region of AL and GA, and Black Belt region of AL. Discovered in SC (Georgetown Co.) by McMillan (2003). **ID Notes:** *Rhynchospora pusilla*, *Rhynchospora divergens*, and *Rhynchospora thornei* are all small, grass-like plants, very similar in appearance to one another. **Syn:** = FNA23, K1, K3, K4, WH3, McMillan (2007). NatureServe G3 (Vulnerable).

Rhynchospora torreyana A. Gray. TORREY'S BEAKSEDGE. **Hab:** Pine savannas, seepage bogs, often weedy. **Dist:** Se. MA south to GA, AL, and MS. **Phen:** Jul-Sep. **Syn:** = C, F, G, GW1, K1, K3, K4, NE, NY, RAB, Va, Gale (1944), McMillan (2007); = *Rynchospora torreyana* – S. NatureServe G4 (Apparently Secure).

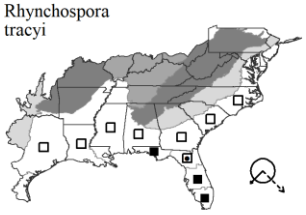


Rhynchospora tracyi Britton. TRACY'S BEAKSEDGE. **Hab:** Cypress savannas and graminoid-dominated depressions, in small, clay-based Carolina bays or shallow limesink ponds (dolines), typically in shallow water or at the lower margins of pond-shores; in s. FL often a monospecific dominant in marl prairies and marshes. **Dist:** S. NC south to s. FL, west to s. MS (Sorrie & Leonard 1999); disjunct in sw. LA and e. TX; West Indies (Bahamas, Cuba, Hispaniola); Central America (Belize). **Phen:** Jun-Sep. **Syn:** = Bah, ETx1, FNA23, GW1, K1, K3, K4, RAB, WH3, WI, McMillan (2007); = *Rynchospora tracyi* – S. NatureServe G4 (Apparently Secure).

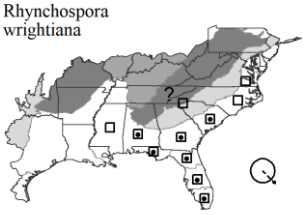
Rhynchospora wrightiana Boeckeler. WRIGHT'S BEAKSEDGE. **Hab:** Wet pine savannas. **Dist:** Se. VA south to c. FL and west to s. AL and s. MS; West Indies (Cuba, Puerto Rico). **Phen:** Jul-Sep. **Tax:** Appearing to merge with *R. fascicularis* var. *distans* on the outer Coastal Plain of NC. Leaves are most frequently filiform and < 1 mm wide; rarely flat and to 1.3 mm wide. **Syn:** = FNA23, GW1, K1, K3, K4, RAB, Va, WH3, WI, Gale (1944), McMillan (2007); < *Rynchospora wrightiana* – S. NatureServe G5 (Secure).

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Rhynchospora tracyi



Rhynchospora wrightiana



Schoenoplectiella K. Lye 2003 (LITTLE BULRUSH, LITTLE BULSEDGE)

A genus of ca. 45 species, annual (rarely perennial) herbs, subcosmopolitan, but especially tropical/subtropical and Asian. As demonstrated by Lye (2003), Jung & Choi (2010), Muasya et al. (2009), Shiels & Monfils (2012), and Shiels et al. (2014), *Schoenoplectiella* is morphologically, genetically, and phylogenetically distinct from *Schoenoplectus* and warrants generic status. The circumscription corresponds to *Schoenoplectus* sections *Supini* and *Actaeogeton*. References: Jung & Choi (2010); Lye (2003); Muasya et al (2009); Shiels & Monfils (2012); Shiels et al (2014); Smith (2002b) in FNA23 (2002b).

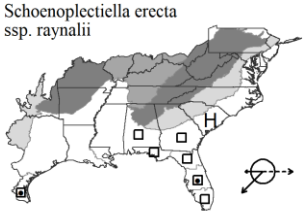
1 Perianth bristles absent; achenes 1.2-1.6 mm long, transversely rugose; plants bearing solitary pistillate (amphicarpic) flowers enclosed in the basal leaf sheaths, these differing in many ways from the "normal" flowers of the terminal inflorescence; [section *Schoenoplectiella*].
..... ***Schoenoplectiella erecta ssp. raynalii***

1 Perianth bristles 5-6; achenes 1.5-2.0 mm long, smooth, finely pitted, or finely papillose; plants with only "normal" terminal inflorescence; [section *Actaeogeton*].
..... ***Schoenoplectiella purshiana var. purshiana***

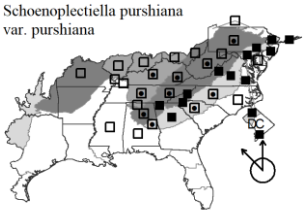
Schoenoplectiella erecta (Poiret) K. Lye *ssp.* ***raynalii*** (Schuyler) Beentje. **Hab:** Sandy or peaty, seasonally wet soils (such as on pond shores). **Dist:** Apparently ranging from SC (where not seen recently) south to s. peninsular FL (K. Bradley, [in prep.]; pers. comm. 2020), sw. GA, and s. AL; also in the tropics of both hemispheres. **Phen:** Sep-Oct. **Syn:** = K3, K4; = *Schoenoplectus erectus* (Poiret) Palla ex J. Raynal ssp. *raynalii* (Schuyler) K. Lye – FNA23, K1, WH3; ? *Scirpus erismaniae* Schuyler – GW1; < *Scirpus hallii* A. Gray – RAB, misapplied; > *Scirpus wilkensii* Schuyler – Tx.

Schoenoplectiella purshiana (Fernald) K. Lye *var.* ***purshiana***. BLUNTSCALE BULRUSH. **Hab:** Fens, depression marshes, marshes, shores. **Dist:** ME west to MN, south to nc. GA (Jones & Coile 1988), AL, MS, TN, and KY. **Phen:** Late Jun-Aug; Jul-Oct. **Syn:** = K3, K4, NY, Shiels & Monfils (2012); = *Schoenoplectus purshianus* (Fernald) M.T. Strong var. *purshianus* – NE, Pa; < *Schoenoplectus purshianus* (Fernald) M.T. Strong – FNA23, Il, K1, Mi, Mo1, Tn, Va; < *Scirpus purshianus* Fernald – C, F, GW1, RAB, W, WV. NatureServe G4G5T4T5 (Apparently Secure).

Schoenoplectiella erecta ssp. raynalii



Schoenoplectiella purshiana var. purshiana



Schoenoplectus (Reichenbach) Palla 1888 (BULRUSH, BULSEDGE)

A genus of about 50 species, herbs, cosmopolitan in distribution. Micromorphologic, anatomic, and molecular studies have confirmed earlier opinions based on morphology that *Schoenoplectus* is not closely related to *Scirpus* (Strong 1994, Smith 1995, Schuyler, pers. comm.). Most investigators now also favor the separation of *Bolboschoenus* from *Schoenoplectus* (Pignotti & Mariotti 2004). References: Goetghebeur in Kubitzki (1998b); Pignotti & Mariotti (2004); Shiels et al (2014); Smith (1995); Smith (2002b) in FNA23 (2002b); Strong (1994).

1 Main involucral bracts 2-8, spreading and foliaceous (the inflorescence thus appearing terminal); rhizomes bearing ovoid tubers; bristles persistent on the achene; achenes 2.5-5 mm long (including body and apiculus) ..... ***Bolboschoenus***

1 Main involucral bract 1 (rarely with an additional 1-2 lateral bracts), erect and terete or triangular, appearing as a continuation of the culm (the inflorescence thus appearing lateral, though in some species the longer inflorescence branches may overtop the bract); rhizomes not bearing tubers; bristles falling from the achene; achenes 1.0-4.5 mm long (including body and apiculus).
  2 Spikelets on stalks of varying lengths, at least some clearly not sessile.
    3 Culms distinctly triangular in cross-section, more sharply so above than below, nearly terete near the base; [section *Malacogeton*] .....
    ..... ***Schoenoplectus etuberculatus***
    3 Culms terete throughout, or obscurely triangular above; [section *Schoenoplectus*].
      4 Spikelets appearing dull gray-brown, the scales copiously covered with red-brown dots (as seen at 10×) 6-15 mm long; lower and middle scales (3.0-) 3.5-4.0 mm long; culms firm, not easily compressed ..... ***Schoenoplectus acutus var. acutus***
      4 Spikelets appearing reddish-brown, the scales not obviously dotted (as seen at 10×), 6-11 mm long; lower and middle scales (2.0-) 2.5-3.0 (-3.5) mm long; culms soft, easily compressed.
        5 Perianth bristles plumose; spikelets acute; culms obscurely triangular near the inflorescence ..... ***Schoenoplectus californicus***
        5 Perianth bristles retrorsely barbed; spikelets obtuse; culms terete throughout their length ..... ***Schoenoplectus tabernaemontani***
  2 Spikelets all sessile, in a cluster at one point (rarely with 1 or 2 short branches to 5 mm long).
    6 Spikelet solitary; leaves numerous; plant usually aquatic, the culms and leaves flaccid, supported by the water; [section *Malacogeton*] .....
    ..... ***Schoenoplectus subterminalis***

Key to Map Symbology: □ native; ◇ maybe exotic; △ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

6 Spikelets (1-) 2-several; leaves 1-4; usually of wet places, but the culms stiff and erect, not floating.
7 Cespitose annual or perennial; culms terete (or acutely triangular in *Schoenoplectiella mucronata*), 1-6 dm tall..... ***Schoenoplectiella***
7 Rhizomatous perennial; culms triangular in cross-section, usually 5-20 dm tall.
9 Sides of the culm strongly concave, wing-angled; culms 3-10 mm in diameter; main involucral bract 1-2.5 (-6) cm long; spikelet scale with apical notch 0.1-0.4 mm deep..... ***Schoenoplectus americanus***
9 Sides of the culm flat, slightly concave, or slightly convex; culms 1-6 mm in diameter; main involucral bract (1-) 3-20 cm long; spikelet scale with apical notch (0.3-) 0.5-1 mm deep.
10 Spikelets 3-35; achenes 1.9-2.6 mm long, biconvex; styles 2-fid..... ***Schoenoplectus deltarum***
10 Spikelets 1-5 (-10); achenes (2.0-) 2.5-3.5 mm long, biconvex or trigonous; styles 2-3-fid.
..... ***Schoenoplectus pungens var. pungens***

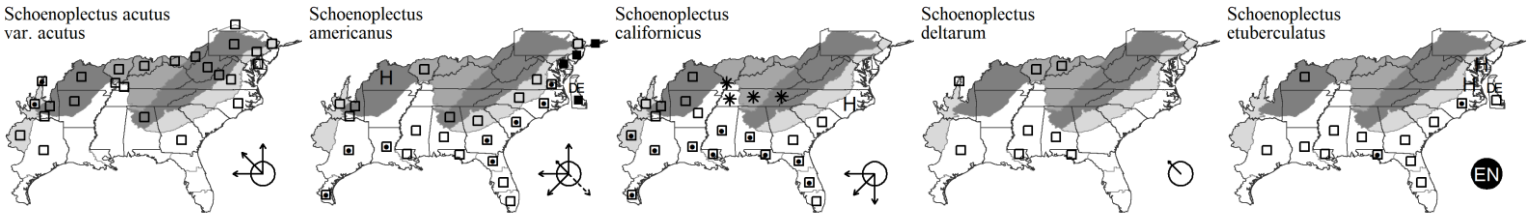
Schoenoplectus acutus (Muhlenberg ex Bigelow) Á. Löve & D. Löve *var.* ***acutus***. HARDSTEM BULRUSH, GREAT BULRUSH. **Hab:** Freshwater tidal marshes, calcareous spring marshes. **Dist:** The species is widespread in temperate North America; var. *acutus* is restricted to e. North America. **Phen:** Jun-early Aug; Aug-Oct. **Syn:** = Ar, FNA23, K1, K3, K4, NE, NY, Pa, Va, Smith (1995); = *Scirpus acutus* Muhlenberg ex Willdenow – C, F, G, GrPl, GW1, RAB, Tx, W, WV; < *Schoenoplectus acutus* – ETx1, Il, Mi, Mo1, NcTx.

Schoenoplectus americanus (Persoon) Volk ex Schinz & R. Keller. OLNEY THREESQUARE. **Hab:** Tidal freshwater to brackish marshes. **Dist:** NS west to WA, south to South America. **Phen:** Late May-Jun; Jun-Sep. **Tax:** Schuyler (1974) discussed the need to replace the name *S. olneyi* (as traditionally applied) with *S. americanus*, traditionally applied to what must now be called *S. pungens*. Because of this nomenclatural change, the interpretation of much information and records is now uncertain. **Syn:** = ETx1, FNA23, GrPl, Il, K1, K3, K4, Mi, Mo1, NE, NY, Va, WH3, Strong (1994); = *Scirpus americanus* Persoon – C; = *Scirpus olneyi* – F, G, GW1, RAB, S, Tx.

Schoenoplectus californicus (C.A. Meyer) Soják. GIANT BULRUSH, SOUTHERN BULRUSH, TULE, CALIFORNIA BULRUSH. **Hab:** Marshes. **Dist:** SC south to s. FL, west to TX, and extending s. into the New World tropics; on the west coast, from CA southward. **Phen:** Jul-Oct. **Syn:** = Ar, ETx1, FNA23, Il, K1, K3, K4, NcTx, Tx, WH3; = *Scirpus californicus* (C.A. Meyer) Steudel – GW1, S. NatureServe G5 (Secure).

Schoenoplectus deltarum (Schuyler) Soják. DELTA BULRUSH. **Hab:** Brackish marshes and other wetlands. **Dist:** AL and FL west to KS and se. TX. **Phen:** Jul-Oct. **Syn:** = FNA23, Il, K1, K3, K4, Mo1, WH3. NatureServe G3G4 (Vulnerable).

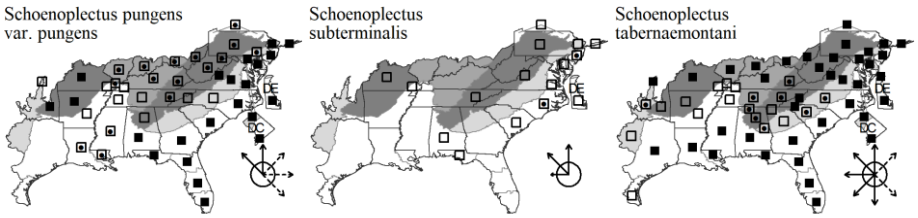
Schoenoplectus etuberculatus (Steudel) Soják. SWAMP BULRUSH, CANBY'S BULRUSH. **Hab:** Beaver ponds, on peat in small depression ponds, in flowing blackwater streams. **Dist:** DE south to c. peninsular FL and west to e. TX (the distribution rather discontinuous); substantially disjunct in s. MO and RI. **Phen:** Jul-Aug; Aug-Sep. **Comm:** The hybrid *S. etuberculatus* × *subterminalis* has been collected in Hoke Co, NC and Lexington County, SC; it has sterile, malformed achenes. **Syn:** = ETx1, FNA23, K1, K3, K4, Mo1, NE, Va, WH3, Strong (1994); = *Scirpus etuberculatus* (Steudel) Kuntze – C, F, G, GW1, RAB, S. NatureServe G3G4 (Vulnerable).



Schoenoplectus pungens (Vahl) Palla *var.* ***pungens***. COMMON THREESQUARE, CHAIRMAKER'S RUSH, SWORDGRASS. **Hab:** Tidal marshes, other marshes, inland salt marshes, rocky river beds, wet meadows, lake edges, moist fields. **Dist:** The species is circumboreal, ranging in North America from NL (Newfoundland) west to AK, south to South America; var. *pungens* is widespread. **Phen:** Mid May-Jun; Jun-Sep. **Tax:** This taxon has traditionally had the name *Scirpus americanus* applied to it; this name, however, is properly applied to the traditional *Scirpus olneyi*. *Schoenoplectus pungens* (or *Scirpus pungens*) becomes the correct name for this plant (Schuyler 1974). **Syn:** = FNA23, K1, K3, K4, Mo1, NE, NY, Va, Smith (1995); = *Scirpus pungens* Vahl var. *pungens* – C; < *Schoenoplectus pungens* – Ar, Il, Mi, NcTx, Tn, WH3, Strong (1994); < *Scirpus americanus* Persoon – F, G, GW1, RAB, S, W, WV, misapplied; < *Scirpus pungens* – GrPl, Pa. NatureServe G5T5 (Secure).

Schoenoplectus subterminalis (Torrey) Soják. SWAYING RUSH, WATER BULRUSH. **Hab:** Beaver ponds, bogs, blackwater creeks, peat mats, in highly acid water. **Dist:** NL (Newfoundland) west to s. AK, south to se. NC, nc. SC, MO, UT (?), and n. CA (the distribution discontinuous, especially southward); disjunct southwards in s. AL and Panhandle FL. **Phen:** May-Jun; Jun-Aug. **Comm:** The hybrid *S. etuberculatus* × *subterminalis* has been collected in Hoke Co, NC and Lexington County, SC; it has sterile, malformed achenes. **Syn:** = FNA23, Il, K1, K3, K4, Mi, Mo1, NE, NY, Pa, Strong (1994); = *Scirpus subterminalis* Torrey – C, F, G, GW1, RAB, S, W. NatureServe G5 (Secure).

Schoenoplectus tabernaemontani (C.C. Gmelin) Palla. SOFTSTEM BULRUSH, GREAT BULRUSH. **Hab:** Tidal marshes, freshwater marshes, sedge meadows, streambeds, riverbeds, floodplain pools, calcareous fens. **Dist:** NL (Newfoundland) west to AK, south to South America; also in Europe. **Phen:** Jun-Sep. **Syn:** = Ar, FNA23, Il, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Tn, Va, WH3, Smith (1995); = *Scirpus tabernaemontani* C.C. Gmelin – Pa, W; ? *Schoenoplectus validus* (Vahl) A. & D. Löve – Strong (1994); ? *Scirpus validus* Vahl – Bah, C, F, G, GrPl, GW1, RAB, S, Tx; > *Scirpus validus* var. *creber* Fernald – F, WV; > *Scirpus validus* var. *validus* – F.



Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Scirpus Linnaeus 1753 (BULRUSH, BULSEDGE)

A genus of about 20 species, herbs, of circumboreal distribution, also with species in Australia, Malaysia, and South America. The complex of species including *S. atrovirens*, *S. georgianus*, *S. hattorianus*, *S. flaccidifolius* are difficult to identify, and some have doubted their validity. Although further work on this group is needed, they do generally appear to behave as biological species despite their morphological similarity. Schuyler (1967) writes that "the remaining species in the key differ in minute characteristics and often the most satisfactory means of identification is by carefully comparing specimens of them. Despite the close morphological similarity of these species, their characteristics are reasonably constant even in areas where they coexist and occasionally hybridize." References: Schuyler (1967); Strong (1994); Whittemore & Schuyler (2002) in FNA23 (2002b).

1 Bristles smooth, without teeth along the margins, strongly contorted and greatly exceeding the achenes when extended.
  2 Scales usually with prominent green midribs; mature bristles mostly contained within the scales; achenes1.0-1.3 mm long, brown to purplish-brown when mature.
    3 Perianth bristles (extended) shorter than, equal to, or slightly exceeding the achene; mature culms lax, the inflorescences lopping over to (or nearly to) the ground, with 2-3 lateral inflorescences in addition to the terminal one; rays of the inflorescence scabrous throughout their lengths, ascending to divergent, with axillary bulblets ..... ***Scirpus lineatus***
    3 Perianth bristles (extended) exceeding the achene by 2-3×; mature culms rigid, nearly upright, with 0-2 lateral inflorescences in addition to the terminal one; rays of the inflorescence glabrous for most of their lengths (moderately scabrous toward outer end), ascending, lacking axillary bulblets ..... ***Scirpus pendulus***
  2 Scales usually with inconspicuous midribs; mature bristles exceeding the scales and giving the inflorescence a woolly appearance; achenes 0.6-1.0 mm long, whitish, pale, brown, dark brown or black. ..... ***Scirpus cyperinus***
1 Bristles with retrorse or antrorse teeth along the margins, strongly contorted to nearly straight, shorter than to greatly exceeding the achenes when extended (or bristles absent or nearly so in *S. georgianus*).
  7 Spikelets all solitary with distinct pedicels; mature scales with broad green midribs; achenes with protruding angles and concave sides ..... ***Scirpus divaricatus***
  7 Spikelets all or mostly in glomerules with the pedicels scarcely developed; mature scales with midribs not usually green; achenes less sharply trigonous, the sides convex, flat, or slightly concave.
    8 Culms with 10-20 leaves; spikelets broadly ovate; scales reddish-brown and, excluding the tips, about as wide as long ..... ***Scirpus polyphyllus***
    8 Culms with 2-10 leaves; spikelets broadly ovate to narrowly ovate; scales brown or black and, excluding the tips, mostly longer than wide.
      9 Bristle teeth thick-walled and sharp-pointed, densely arranged almost to the base of the bristle. ..... ***Scirpus expansus***
      9 Bristle teeth thin-walled and with rounded tips, mostly restricted to the upper 2/3 of the bristle (or bristles absent or nearly so in *S. georgianus*).
        12 Bristles 0-3, shorter than the achenes; teeth, if present, concentrated near the tips of the bristles ..... ***Scirpus georgianus***
        12 Bristles usually 5-6, shorter than to slightly longer than the achenes; teeth extending basally from the tips of all or at least some of the bristles. ..... ***Scirpus atrovirens***

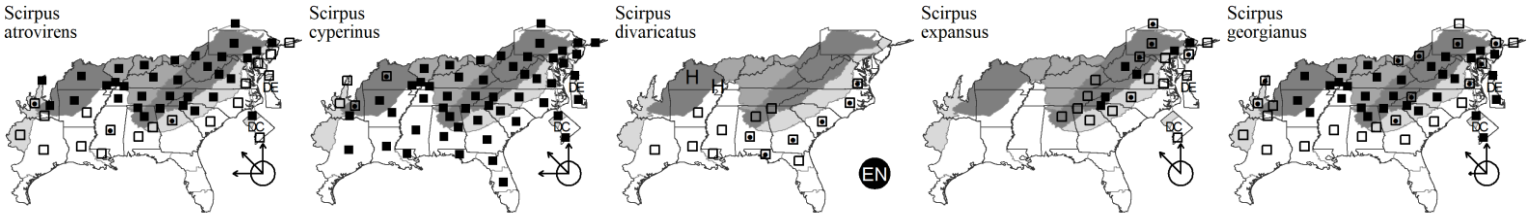
Scirpus atrovirens Willdenow. BLACK BULRUSH. **Hab:** Marshes, bogs, wet meadows. **Dist:** NL (Newfoundland) west to MN, south to GA and TX; disjunct in AZ. **Phen:** Late Jun-Sep. **Syn:** = Ar, ETx1, FNA23, GrPl, Il, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, Tn, Va, Schuyler (1967); = *Scirpus atrovirens* var. *atrovirens* – Tx; < *Scirpus atrovirens* Willdenow – GW1, RAB, S, W; < *Scirpus atrovirens* var. *atrovirens* – C, F, G, WV.

Scirpus cyperinus (Linnaeus) Kunth. WOOLLY BULRUSH, WOOLGRASS BULRUSH. **Hab:** Marshes, ditches, beaver ponds, disturbed wet ground. **Dist:** NL (Newfoundland) west to BC, south to c. peninsular FL, e. TX, and OR. **Phen:** (Jul-) Aug-Sep. **Tax:** The varieties (see synonymy) may be worthy of recognition. **Syn:** = Ar, FNA23, GrPl, GW1, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, RAB, Tn, W, WH3; < *Scirpus cyperinus* (Linnaeus) Kunth – C; > *Scirpus cyperinus* (Linnaeus) Kunth – G, S; > *Scirpus cyperinus* var. *cyperinus* – F, Il, Va, WV; > *Scirpus cyperinus* var. *pelius* Fernald – F, Il, Va, WV; > *Scirpus cyperinus* var. *rubricosus* (Fernald) Gilly – Tx; > *Scirpus eriophorum* Michaux – G, S; > *Scirpus rubricosus* Fernald – F, Il, WV.

Scirpus divaricatus Elliott. **Hab:** Swamp forests. **Dist:** Se. VA south to Panhandle FL, west to e. TX, s. TN, and s. MO. **Phen:** Jul-Sep. **Syn:** = Ar, C, ETx1, F, FNA23, G, GW1, K1, K3, K4, Mo1, RAB, S, Tn, Va, WH3, Schuyler (1967). NatureServe G5 (Secure).

Scirpus expansus Fernald. WOODLAND BULRUSH. **Hab:** Bogs, fens, marshes, streambeds. **Dist:** ME west to MI, south to ne. GA and OH. **Phen:** Jul-Sep. **Syn:** = C, F, FNA23, G, GW1, K1, K3, K4, Mi, NE, NY, Pa, RAB, Tn, Va, W, Schuyler (1967); = *Scirpus expanus* – WV, misspelling; < *Scirpus sylvaticus* Linnaeus – S, misapplied. NatureServe G4 (Apparently Secure).

Scirpus georgianus R.M. Harper. GEORGIA BULRUSH. **Hab:** Marshes, wet areas, ditches. **Dist:** PE west to NE, south to GA and e. TX. **Phen:** May-Sep. **Syn:** = Ar, ETx1, FNA23, GrPl, Il, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, S, Tn, Tx, Va, Schuyler (1967); = *Scirpus atrovirens* Willdenow var. *georgianus* (R.M. Harper) Fernald – F, G, WV; < *Scirpus atrovirens* Willdenow – GW1, RAB, W; < *Scirpus atrovirens* var. *atrovirens* – C.

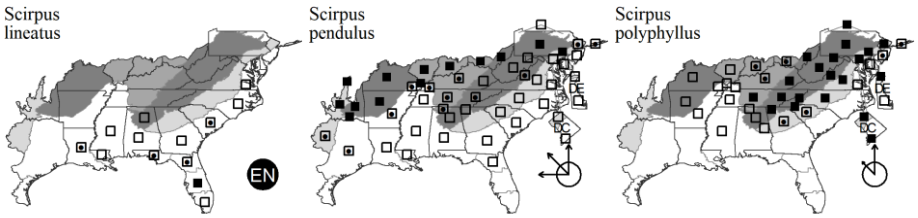


Scirpus lineatus Michaux. DROOPING BULRUSH. **Hab:** Swamp forests over limestone. **Dist:** Se. VA south to c. peninsular FL, west to LA. Reported for a single county (Tucker County) in WV (Harmon, Ford-Werntz, & Grafton 2006); this record here discounted. **Phen:** May-Jul. **Syn:** = C, FNA23, GW1, K1, K3, K4, Va, WH3, Schuyler (1967); = *Scirpus fontinalis* R.M. Harper – F, RAB, S; > *Scirpus fontinalis* var. *virginiana* Fernald – G.

Scirpus pendulus Muhlenberg. RUFOUS BULRUSH, NODDING BULRUSH. **Hab:** Fens, wet meadows and seeps over limestone, diabase, or other circumneutral rocks. **Dist:** ME west to MN, SD, and CO, south to NC, ne. FL, NM, and n. Mexico. **Phen:** Apr-Jul. **Syn:** = Ar, C, ETx1, FNA23, GrPl, GW1, Il, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, Va, W, WH3, Schuyler (1967); = *Scirpus lineatus* Michaux – F, G, RAB, S, WV, misapplied.

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Scirpus polyphyllus Vahl. **Hab:** Marshes, floodplain forests, mountain bogs, seeps, fens. **Dist:** MA and VT west to IL and s. MO, south to nc. GA (Jones & Coile 1988) and AL. **Phen:** Jul-Sep. **Syn:** = Ar, C, F, FNA23, G, GW1, Il, K1, K3, K4, Mo1, NE, NY, Pa, RAB, S, Tn, Va, W, WV, Schuyler (1967). NatureServe G5 (Secure).



Scleria P.J. Bergius 1765 (NUTRUSH, NUTSEDGE)

Contributed by Richard J. LeBlond

A genus of about 250 species, herbs, pantropical, extending into temperate regions. Recent work has brought clarity to portions of this genus occurring in the eastern United States, including the *S. ciliata* complex, where work remains to be done with *S. pauciflora*. Investigation of the *S. triglomerata* complex has led to the recognition of two older species, *S. nitida* and *S. flaccida*. When present, the hypogynium at the base of the achene is a critical identifying feature for many *Scleria* taxa. In some taxa, such as *S. baldwinii* and *S. georgiana*, the hypogynium is absent from the achene but remains attached to the summit of the pedicel. This little-understood condition may have descriptive potential. Hardened achenes are necessary for reliable identification to species. In the key, achene length includes hypogynium when present. The scale character applies only to the ultimate bracteate structure clasping the achene.

References: Bauters et al (2016); Bauters, Larridon, & Goetghebeur (2019); Core (1936); Fairey (1967); Goetghebeur in Kubitzki (1998b); Kessler (1987); LeBlond, Tessel, & Poindexter (2015); Reznicek, Fairey, & Whittemore (2002) in FNA23 (2002b).

Identification Notes: *Scleria* superficially resembles *Rhynchospora* in the field, but mature specimens are readily recognized by the terete white, gray, or black bony achenes. Hardened achenes are necessary for reliable identification to species. In the key, **achene length includes the achene body and hypogynium (when present)**. The scale character applies only to the ultimate bracteate structure clasping the achene.

1 Base of achene without hypogynium (a circular, angular, lobed, or tuberculate disk differing in texture and structure from the achene body), the achene base constricted, pitted, and/or ribbed, but appearing as a continuation of the achene body.
  3 Inflorescence of 2-9 sessile clusters along an axis up to 13 cm long, the individual spikelets 2-5 mm long; bracts (at least above proximal cluster) setaceous; [subgenus *Hypoporum*, section *Hypoporum*].
    4 Plants perennial with rhizomes; leaf blades usually pubescent, 1.5-5 mm wide; bract and scale margins long-ciliate; spikelets 4-5 mm long; achenes smooth.... ***Scleria distans var. distans***
    4 Plants annual with fibrous roots; leaf blades glabrous, 0.5-2 mm wide; bract and scale margins eciliate; spikelets 2-3 (-4) mm long; achenes reticulate-papillose to reticulate-verrucose.... ***Scleria verticillata***
  3 Inflorescence of a single cluster, the individual spikelets 4-10 mm long; bracts foliaceous; [subgenus *Trachylomia*, section *Trachylomia*].
    5 Triangular base of achene lacking pits in the three concave sides; achene 3-4 mm long.... ***Scleria baldwinii***
    5 Triangular base of achene with a pair of pits on each of the three sides; achene 2-3 mm long.... ***Scleria georgiana***
1 Base of achene with hypogynium.
  6 Achene body smooth (often longitudinally ribbed); hypogynium with 0, 8, or 9 tubercles.
    7 Hypogynium with 8 or 9 tubercles, the tubercle surface minutely papillate; [subgenus *Trachylomia*, section *Trachylomia*].... ***Scleria oligantha***
    7 Hypogynium not divided into tubercles, either smooth and angled/lobed, or minutely papillate and continuous (not lobed).
      12 Achene 1-2 mm long; culm 1-2 mm wide at base; leaves 1-3 mm wide.... ***Scleria minor***
      12 Achene 2-4 mm long; culm 2.5-6 mm wide at base; leaves 5-9 mm wide.
        13 Plants cespitose to short-rhizomatous; sheaths brown or stramineous to reddish, glabrous to glabrate on the ventral surface except for a pubescent and usually thickened summit; inflorescences terminal and lateral; achenes 2.0-3.3 mm long, (1.12-) avg. 1.25 (-1.38× as long as wide; hypogynium surface with laterally and apically rounded papillae; [of wet to mesic pinelands].... ***Scleria triglomerata***
        13 Plants long-rhizomatous or cespitose; sheaths purple to reddish, the ventral surface uniformly pubescent; inflorescences terminal only or terminal and lateral; achenes 2.5-4.0 mm long, (1.35-) avg. 1.45 (-1.54)× as long as wide; hypogynium surface with rounded or flattened papillae; habitats various.
          14 Plants usually cespitose; inflorescence terminal and lateral (a few culms in a clump can be terminal only); hypogynium surface with laterally flattened and apically triangular-acute to acuminate papillae, often resembling shards of glass or porcelain; [of coastal hammocks, oak woods near saltwater, and blackwater swamps].... ***Scleria flaccida***
          14 Plants usually long-rhizomatous; inflorescence terminal only; hypogynium surface with laterally and apically rounded papillae; [mostly of dry to dry-mesic pinelands and barrens].... ***Scleria nitida***
  6 Achene reticulate or papillose, rarely smooth (most often from apparent abortion or abnormal development); hypogynium with 3 tongue-shaped lobes, or 3 or 6 tubercles.
    15 Hypogynium of 3 tongue-shaped lobes appressed to the underside of the achene (appearing nearly bract-like); achene reticulate, the pits generally squarish or rectangular and arranged regularly in rows, rarely smooth (apparently by abortion or abnormal development); [subgenus *Scleria*, section *Foveolidia*].
      16 Achene pubescent (occasionally becoming glabrate); lower lateral inflorescences on long, filiform, usually drooping peduncles; bract of the uppermost lateral inflorescence usually reaching from 1/3-3/4 the length of the terminal internode; terminal internode 6-30 cm long.... ***Scleria muehlenbergii***
      16 Achene glabrous; lower lateral inflorescences sessile or on short-erect peduncles; bract of the uppermost lateral panicle usually reaching 3/4 the length of to exceeding the terminal internode; terminal internode 3-8 cm long.... ***Scleria reticularis***

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

15 Hypogynium with 3 or 6 tubercles; achene papillose, sometimes reticulate (if so, the pits generally variable in shape and not forming regular rows), or rarely smooth; [subgenus *Trachylomia*, section *Trachylomia*].
17 Leaves 1-2.5 mm wide; hypogynium with 6 tubercles; achene 1.0-2.5 mm long, the body papillate or roughened-reticulate.
18 Culms, leaves, and bracts copiously villous-ciliate with spreading hairs 0.5-1.0 mm long..... ***Scleria pauciflora var. caroliniana***
18 Culms, leaves, and bracts glabrous or sparsely hirtellous with hairs no more than 0.4 mm long..... ***Scleria pauciflora var. pauciflora***
17 Leaves 1-7 mm wide; hypogynium with 3 (sometimes deeply lobed) tubercles, achene papillate or roughened-reticulate, 2.0-3.5 mm long; or hypogynium tubercles 6 and achene epapillate and smoothish, 2.5-3.4 mm long.
20 Leaf blades (2.5-) 3-6 mm wide, at least some adaxial surfaces puberulent throughout, often ciliate with stiff hairs on margins and primary veins; terminal inflorescence primary bract 1.2-4.1 mm wide at widest point, its longer cilia 0.7-1.1 (-1.3) mm long; hypogynium disk 1.1-1.4 (-1.6) mm wide, (0.1-) 0.2-0.4 (-0.5) mm thick..... ***Scleria ciliata var. elliottii***
20 Leaf blades 1-3 (-3.5) mm wide, adaxial surface glabrous and eciliate, or glabrous and ciliate on margins, or puberulent and ciliate; terminal inflorescence primary bract 0.4-2.2 mm wide at widest point, its longer cilia (0-) 0.1-0.7 (-0.9) mm long; hypogynium disk (0.6-) 0.8-1.3 (-1.5) mm wide, 0.1-0.2 (-0.3) mm thick.
21 Plants ciliate (sometimes sparsely so) on leaf blade margins (also sometimes on primary nerves), culm angles, and margins of terminal inflorescence primary bract, the surfaces between margins or angles glabrous to puberulent..... ***Scleria ciliata var. ciliata***
21 Plants glabrous on leaf blade and culm surfaces, angles, and margins (terminal inflorescence primary bract often ciliate or scabrous on margins, rarely smooth); sheaths, especially lowest, usually puberulent..... ***Scleria ciliata var. glabra***

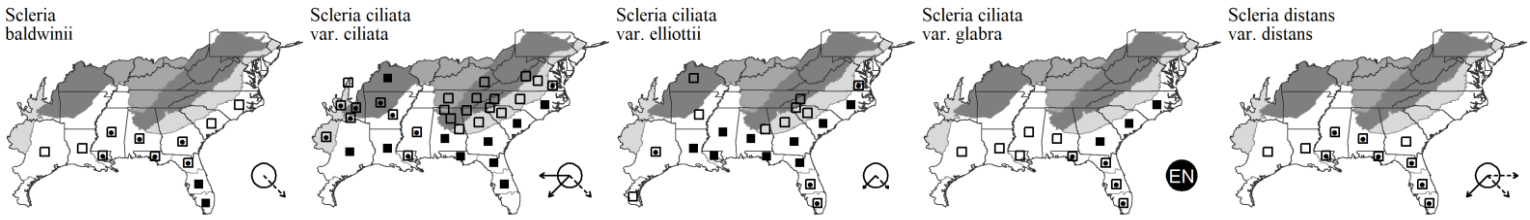
Scleria baldwinii (Torrey) Steudel. BALDWIN'S NUTRUSH. **Hab:** Wet pine or pondcypress savannas, under *Pinus serotina*, *P. palustris*, and/or *Taxodium ascendens*. **Dist:** Se. NC south to s. FL and west to se. TX; also in Cuba and the Bahamas (Sorrie & LeBlond 1997). **Phen:** Jun-Jul. **ID Notes:** *Scleria baldwinii* is a more robust plant, with larger achenes, than *S. georgiana*. **Syn:** = ETx1, FNA23, GW1, K1, K3, K4, RAB, Tx, WH3, WI, Fairey (1967); > *Scleria baldwinii* (Torrey) Steudel – S; > *Scleria costata* (Britton) Small – S. NatureServe G4 (Apparently Secure).

Scleria ciliata Michaux *var*. ***ciliata***. HAIRY NUTRUSH. **Hab:** Wet to dry sandy thickets and pine flatwoods, typically on sandy soil. **Dist:** VA south to FL, west to MO and TX; West Indies; Mexico and Central America. **Phen:** May-Aug. **Syn:** = Ar, ETx1, FNA23, GrPl, S, Va, WI, Fairey (1967), LeBlond, Tessel, & Poindexter (2015); < *Scleria ciliata* – C, F, G, GW1, K3, K4, Mo1, NcTx, RAB, Tn, Tx, W, WH3; < *Scleria ciliata* Michaux var. *ciliata* – K1. NatureServe G5TNR (Not Yet Ranked).

Scleria ciliata Michaux *var*. ***elliottii*** (Chapman) Fernald. BROAD-LEAVED HAIRY NUTRUSH. **Hab:** Pine savannas, pine flatwoods, pine-oak woodlands, meadows, bogs, and clay-based Carolina bays, typically on loamy sands. **Dist:** VA south to FL, west to TX, MO, OK. **Phen:** May-Sep. **Tax:** The descriptions of *S. elliottii* in S and of *S. ciliata* Michaux var. *elliottii* (Chapman) Fernald in F do not include the entity here treated as *S. bellii*. **Syn:** = ETx1, F, FNA23, GrPl, WI, Fairey (1967), LeBlond, Tessel, & Poindexter (2015); = *Scleria elliottii* Chapman – S, Va; < *Scleria ciliata* – C, G, GW1, K3, K4, Mo1, NcTx, RAB, Tx, W, WH3; < *Scleria ciliata* Michaux var. *ciliata* – K1.

Scleria ciliata Michaux *var*. ***glabra*** (Chapman) Fairey. SMOOTH NUTRUSH. **Hab:** Pine savannas and pine flatwoods. **Dist:** E. NC south to s. FL, west to e. TX. **Tax:** Plants with minor to moderate amounts of pubescence on culms and leaves are frequent in some areas, and not readily assignable to either S. ciliata var. ciliata or var. glabra. Glabrous/glabrate plants are more common on the outer Coastal Plain. *S. ciliata* var. *curtissii* (Britton) Kessler (=*S. pauciflora* Muhl. ex Willd. var. *curtissii* (Britton) Fairey) is currently of uncertain taxonomic standing. It is distinguished by its reticulate, non-papillose achenes, but such a condition has been observed in achenes with the hypogynium lobing of both *S. ciliata* and *S. pauciflora* (as suggested by the synonymy), and may only represent a form or condition. {not yet mapped}. **Syn:** = ETx1, FNA23, K1; = *Scleria brittonii* Core ex Small – K3, K4, S, Tx; < *Scleria ciliata* – C, F, G, RAB, Tx, W; > *Scleria ciliata* (Britton) Kessler – Fairey (1967), Kessler (1987); < *Scleria ciliata* Michaux var. *glabra* (Chapman) Fairey – WH3; > *Scleria ciliata* Michaux var. *glabra* (Chapman) Fairey – Fairey (1967), Kessler (1987); > *Scleria pauciflora* Muhl. ex Willd. var. *curtissii* (Britton) Fairey – K1.

Scleria distans Poiret *var*. ***distans***. RIVERSWAMP NUTRUSH. **Hab:** Moist sandy or peaty soil of pine savannas and flatwoods, boggy areas, and wet openings along roads. **Dist:** GA south to s. FL west to TX; West Indies; Mexico, Central and South America; Africa. **Phen:** May-Oct. **Syn:** = Bauters, Larridon, & Goetghebeur (2019); < *Scleria distans* Poiret – ETx1, FNA23, K3, K4, WH3, WI; < *Scleria hirtella* Swartz – GW1, K1, S, Fairey (1967), Kessler (1987), misapplied; ? *Scleria nutans* Kunth – Tx.

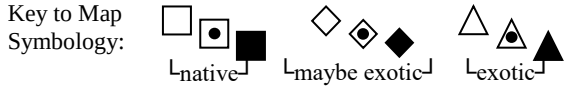


Scleria flaccida Steudel. FLACCID NUTRUSH. **Hab:** Coastal hammocks, maritime forests, oak woods and thickets near saltwater, blackwater swamps. **Dist:** Scattered along the outer Coastal Plain from se. VA to s. FL and west to LA. **Tax:** This is a poorly known species, with more locations likely to be found upon re-examination of *S. triglomerata* and *S. nitida* specimens. The often pendulus and capillary lateral peduncles suggest *S. oligantha*, another swamp species. *S. oligantha* is most readily separated by its 8-9-lobed hypogynium with minute rounded papillae. **Syn:** = F; < *Scleria nitida* Willdenow – G; < *Scleria triglomerata* Michaux – C, FNA23, GW1, K1, K3, K4, RAB, S, WH3.

Scleria georgiana Core. GEORGIA NUTRUSH. **Hab:** Pine savannas, cypress savannas, depression meadows, mostly on the outer Coastal Plain. **Dist:** E. NC south to s. FL, west to TX; and in the West Indies, Central and South America. **Phen:** Jun-Aug. **Comm:** See note under *S. baldwinii*. **Syn:** = ETx1, FNA23, GW1, K1, K3, K4, RAB, Tx, WH3, Fairey (1967); = *Scleria gracilis* Elliott – S, name preoccupied. NatureServe G4 (Apparently Secure).

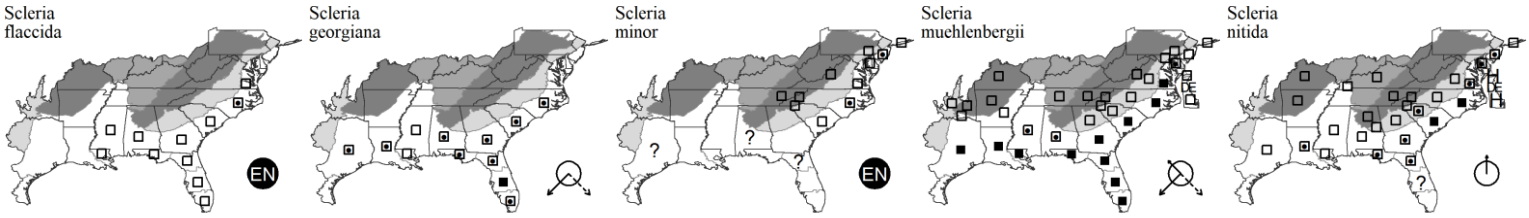
Scleria minor (Britton) W. Stone. SLENDER NUTRUSH. **Hab:** Wet savannas and peaty seepages in the Coastal Plain and Sandhills, bogs in the Mountains. **Dist:** NY (Long Island) and NJ south to FL, west to se. TX. **Phen:** Jun-Aug. **Syn:** = C, F, FNA23, G, K1, K3, K4, NY, Pa, RAB, Tn, Tx, Va, W, Fairey (1967); < *Scleria triglomerata* Michaux – GW1, S.

Scleria muehlenbergii Steudel. PITTED NUTRUSH. **Hab:** Open wet sand, pine savannas and flatwoods, depression meadows, cypress savannas, limesink ponds, bogs. **Dist:** NY (Long Island), NJ, and NC south to FL, west to TX, north in the interior to MO and IN; West Indies and Bahamas (Sorrie & LeBlond 1997); Mexico and Central America. **Phen:** Jun-Sep. **Tax:** Also see notes under *S. reticularis*. In normal specimens, the achene



reticulation ridges are sharp-edged and steeply sloped (compare *S. reticularis*). The achene pubescence is often tawny, and achenes appearing superficially glabrous often have a tawny residue under magnification. **Comm:** *S. muehlenbergii* is adapted to a variety of freshwater wetland habitats, while *S. reticularis* is primarily restricted to the drawdown zones of limesink (doline) ponds and clay-based Carolina bays. **Syn:** = Ar, ETx1, FNA23, Il, K1, K3, K4, NY, Tn, Va; = *Scleria muhlenbergii* Steudel – F, Tx, orthographic variant; = *Scleria reticularis* var. *pubescens* Britton – G, Mo1, Fairey (1967); = *Scleria setacea* Poiret – S; < *Scleria muhlenbergii* Steudel – Pa; < *Scleria reticularis* Michaux – Bah, C, GW1, RAB, W, WH3.

Scleria nitida Willdenow. SHINING NUTRUSH. **Hab:** Dry sandy or rocky soil of pine/scrub oak woodlands, ridgetop forests at lower elevations in the Mountains such as pine/oak heaths, and heath balds. **Dist:** MA, VA, and KY south to FL, west to LA and MO (also see note under *S. triglomerata*); reported from LA, but documentation not located. Although widespread at least historically in the Carolinas, it does not appear to be common anywhere. **Phen:** May-Oct. **Syn:** = F; < *Scleria nitida* Willdenow – G; < *Scleria triglomerata* Michaux – C, FNA23, GW1, K1, K3, K4, Mo1, NE, RAB, S, W, WH3, Fairey (1967).



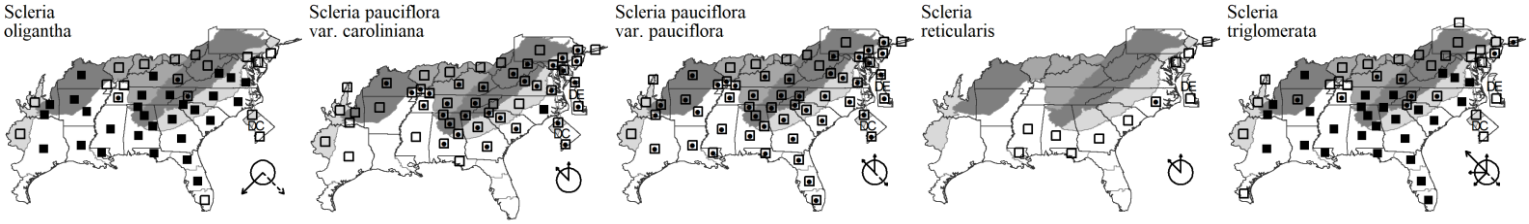
Scleria oligantha Michaux. FEW-FLOWERED NUTRUSH. **Hab:** Dry to moist forests and woodlands, swamp forests. **Dist:** NJ and MO south to c. peninsular FL and TX; Puerto Rico; Mexico and Central America. Reported as new to MD (Longbottom, Naczi, & Knapp 2016). **Phen:** Jun-Sep. **Comm:** The long, filiform, arching lateral peduncles are distinctive (but see *S. flaccida*). **Syn:** = Ar, C, ETx1, F, FNA23, G, GW1, Il, K1, K3, K4, Mo1, NcTx, RAB, S, Tn, Tx, Va, W, WH3, Fairey (1967), LeBlond, Tessel, & Poindexter (2015). NatureServe G5 (Secure).

Scleria pauciflora Muhlenberg ex Willdenow *var. **caroliniana*** Alph. Wood. CAROLINA NUTRUSH. **Hab:** Pine savannas. **Dist:** NH west to MI, south to n. FL, TN, and MO. **Phen:** Jun-Sep. **Syn:** = Ar, F, FNA23, G, GrPl, Il, K1, K3, K4, NE, Tn, Va, Fairey (1967), LeBlond, Tessel, & Poindexter (2015); < *Scleria ciliata* – WH3; < *Scleria pauciflora* – C, GW1, Mo1, NY, Pa, RAB, S, W.

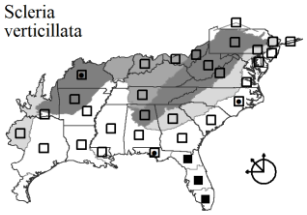
Scleria pauciflora Muhlenberg ex Willdenow *var. **pauciflora***. PAPILLOSE NUTRUSH. **Hab:** Wet to dry pine flatwoods, pine savannas, depression meadows. **Dist:** NJ west to KS, south to FL and TX; Cuba. **Phen:** Jun-Sep. **Tax:** Typification of *S. pauciflora* is controversial and unresolved at this time (Fairey & Whittemore 1999). **Syn:** = Ar, F, FNA23, G, GrPl, Il, K1, K3, K4, Mi, NE, Tn, Va, Fairey (1967), LeBlond, Tessel, & Poindexter (2015); < *Scleria ciliata* – WH3; < *Scleria pauciflora* – C, ETx1, GW1, Mo1, Pa, RAB, S, Tx, W.

Scleria reticularis Michaux. NETTED NUTRUSH. **Hab:** Limesink ponds, clay-based Carolina bays. **Dist:** MA south to FL, west to e. LA, north to IN, MI, and WI. Reports from Mexico are based on *S. muehlenbergii*. **Phen:** Jun-Sep. **Comm:** See notes under *S. muehlenbergii*. In normal specimens, the achene reticulation ridges are soft-edged and obliquely sloped. Occasional stipitate-capitate fungal growth on the achene has been mistaken for pubescence (a condition perhaps restricted to herbarium specimens), apparently contributing to the unwarranted agglomeration of this distinctive taxon and *S. muehlenbergii*. There is controversy about typification of the name *Scleria reticularis* (Camelbeke, Reznicek, & Goetghebeur 2003). **Syn:** = ETx1, F, FNA23, K1, K3, K4, Mi, NE, NY, S; = *Scleria reticularis* var. *reticularis* – G, Fairey (1967); < *Scleria muhlenbergii* Steudel – Pa; < *Scleria reticularis* Michaux – C, GW1, RAB, W, WH3.

Scleria triglomerata Michaux. TALL NUTRUSH. **Hab:** Wet to mesic pine flatwoods, pine savannas, and hardwood forests. **Dist:** VT and ON west to MN, south to s. FL and TX; *S. triglomerata* sensu lato also occurs in Puerto Rico and Mexico, and may include *S. nitida* and *S. flaccida*. **Phen:** May-Sep. **Syn:** = F, G, Il, Tn, Va; < *Scleria triglomerata* Michaux – Ar, C, ETx1, FNA23, GrPl, GW1, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, RAB, S, Tx, W, WH3, WV, Fairey (1967).



Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



Scleria verticillata Muhlenberg ex Willdenow. SAVANNA NUTRUSH, LOW NUTRUSH. **Hab:** Wet calcareous pine savannas of the outer Coastal Plain, freshwater marshes and maritime wet grasslands on barrier islands influenced by salt spray and shell deposits, wet calcareous or mafic fens or seepages in the mountains, calcareous grasslands, also apparently spreading to ditches along Coastal Plain 'marl' roads (made from coquina limestone gravel). This species is a distinct calciphile, with only scattered occurrences in most of our area (north of FL). **Dist:** MA and ON west to MN, south to FL and TX. Previous reports of a much broader distribution (West Indies; Mexico, Central America, and South America) are based on other species segregated form *S. verticillata*. **Phen:** Jul-Sep. **ID Notes:** The roots are strongly fragrant. **Syn:** = Ar, Bah, C, ETx1, F, FNA23, G, GW1, Il, K1, K3, K4, Mi, Mo1, NE, NY, Pa, RAB, S, Tn, Tx, Va, WH3, Bauters, Larridon, & Goetghebeur (2019), Fairey (1967). NatureServe G5 (Secure).

103. POACEAE Barnhart 1895 (GRASS FAMILY) [in POALES]

A family of about 771 genera and 12,074 species, herbs (and some shrubs and trees), cosmopolitan. Tribal classification largely follows FNA (2003a, 2007a), with some changes based on subsequent research, as for instance in the Chloridoideae (Peterson, Romaschenko, & Johnson 2010a). Key to genera adapted in large part from FNA.References: Blomquist (1948); Clark & Kellogg (2007) in FNA24 (2007a); HC; Peterson, Romaschenko, & Johnson (2010a, 2010b).

Grass classification from Soreng et al. (2015). Genera and upper-level taxa with one or more native species in bold.

"BOP" CLADE
- subfamily Oryzoideae {or Ehrhartioideae? See Kellogg 2015 in Kubitzki}
  - tribe Oryzeae
    - subtribe Oryzinae: *Leersia, Oryza*
    - subtribe Zizaniinae: *Luziola, Zizania, Zizaniopsis*
- subfamily Bambusoideae
  - supertribe Arundinarodae
    - tribe Arundinarieae
      - subtribe Arundinariinae: *Arundinaria, Phyllostachys, Pleioblastus, Pseudosasa, Sasa*
  - supertribe Bambusoideae
    - tribe Bambuseae
      - subtribe Bambusinae: *Bambusa*
- subfamily Pooideae
  - tribe Brachyelytreae: *Brachyelytrum*
  - tribe Meliceae: *Glyceria, Melica, Schizachne*
  - tribe Stipeae: *Eriocoma, Nassella, Oryzopsis, Patis, Piptatheropsis, Piptatherum, Piptochaetium*
  - tribe Diarrheneae: *Diarrhena*
  - tribe Brachypodieae: *Brachypodium*
  - supertribe Poodae
    - tribe Poeae (CHLOROPLAST GROUP 1 Aveneae type)
      - subtribe Torreyochloinae: *Amphibromus, Torreyochloa*
      - subtribe Aveninae: *Arrhenatherum, Avena, Koeleria, Lagurus, Rostraria, Sphenopholis, Trisetum*
      - subtribe Phalaridinae: *Phalaris*
      - subtribe Anthoxanthinae: *Anthoxanthum*
      - subtribe Brizinae: *Briza*
      - subtribe Agrostidinae: *Agrostis, Ammophila, Calamagrostis, Gastridium, Lachnagrostis, Limnodea, Polypogon*
    - tribe Poeae (CHLOROPLAST GROUP 2 Poeae type)
      - incertae sedis: *Avenula*
      - subtribe Coleanthinae: *Puccinellia, Sclerochloa*
      - subtribe Miliinae: *Milium*
      - subtribe Poinae: *Alopecurus, Apera, Cinna, Phleum, Poa*
      - subtribe Airinae: *Aira, Avenella*
      - subtribe Holcinae: *Deschampsia, Holcus*
      - subtribe Loliinae: *Festuca* (incl. *Vulpia*), *Lolium* (incl. *Schedonorus*)
      - subtribe Dactylidinae: *Dactylis*
      - subtribe Cynosurinae: *Cynosurus*
      - subtribe Parapholiinae: *Desmazeria, Hainardia, Parapholis*
  - supertribe Triticodae
    - tribe Bromeae: *Bromus*
    - tribe Triticeae
      - subtribe Hordeinae: *Agropyron, Elymus, Hordeum, Pascopyrum, Secale*
      - subtribe Triticinae: *Aegilops, Thinopyrum, Triticum*

"PACMAD" CLADE

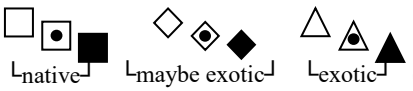
Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

103. POACEAE

subfamily Aristidoideae
tribe Aristideae: *Aristida*
subfamily Panicoideae
tribe Chasmanthieae: *Chasmanthium*
supertribe Panicodae
tribe Paniceae
incertae sedis: *Sacciolepis*
subtribe Anthephorinae: *Digitaria*
subtribe Dichantheliinae: *Dichanthelium*
subtribe Boivinellinae: *Alloteropsis, Amphicarpum, Echinochloa, Oplismenus*
subtribe Melinidinae: *Eriochloa, Megathyrsus, Melinis, Urochloa*
subtribe Panicinae: *Panicum*
subtribe Cenchrinae: *Cenchrus* (incl. *Pennisetum*), *Setaria, Paspalidium?, Stenotaphrum*
tribe Paspaleae
subtribe Paspalinae: *Axonopus, Paspalum*
subtribe Otachyriinae: *Hymenachne, Steinchisma*
subtribe Arthropogoninae: *Coleataenia, Phanopyrum*
supertribe Andropogonodae
tribe Andropogoneae
incertae sedis: *Chrysopogon, Imperata, Tripidium*
subtribe Arthraxoninae: *Arthraxon*
subtribe Tripsacinae: *Tripsacum, Zea*
subtribe Coicinae: *Coix*
subtribe Rottboelliinae: *Elionurus, Eremochloa, Mnesithea* (incl. *Coelorachis, Hackelochloa*), *Rottboellia*
subtribe Sorghinae: *Sorghastrum, Sorghum*
subtribe Saccharinae: *Erianthus, Microstegium, Miscanthus, Saccharum s.s.*
subtribe Andropogoninae: *Andropogon, Hyparrhenia, Schizachyrium*
subtribe Anthistiriinae: *Bothriochloa, Heteropogon*
subfamily Arundinoideae
tribe Arundineae: *Arundo*
tribe Molinieae: *Molinia, Phragmites*
subfamily Danthonioideae
tribe Danthonieae: *Cortaderia, Danthonia*
subfamily Chloridoideae
tribe Eragrostideae
subtribe Unioliinae: *Uniola*
subtribe Eragrostidinae: *Eragrostis, Neeragrostis*
tribe Zoysieae
subtribe Zoysiinae: *Zoysia*
subtribe Sporobolinae: *Sporobolus* (incl. *Calamovilfa, Crypsis, Spartina*)
tribe Cynodonteae
incertae sedis: *Dactyloctenium*
subtribe Gouiniinae: *Triplasis*
subtribe Cteniinae: *Ctenium*
subtribe Gymnopogoninae: *Gymnopogon*
subtribe Eleusininae: *Chloris, Cynodon, Dinebra, Diplachne, Disakisperma, Eleusine, Enteropogon, Eustachys, Leptochloa, Lepturus*
subtribe Pappophorinae: *Tridens*
subtribe Traginae: *Tragus*
subtribe Monanthochloinae: *Distichlis* (incl. *Monanthochloa*)
subtribe Boutelouinae: *Bouteloua* (incl. *Buchloe, Opizia*)
subtribe Muhlenbergiinae: *Muhlenbergia*

Identification Notes: key based on Stapleton (2007). Other genera are grown and may be expected to persist and vegetatively spread or potentially truly naturalize in our area.

1 Plant a shrub or tree (the culms perennial, woody, to 25 m tall), with complex branching systems from the upper nodes; leaves strongly dimorphic, those of the main culm sheathing, those of the branches or culm tips pseudopetiolate ..... ***Key A***
1 Plant an herb (the culms annual, not truly woody, to 5 m tall), lacking complex branching systems from the upper nodes; leaves not dimorphic, none of them pseudopetiolate.

Key to Map Symbology: 

* : waif
EN : endemic
H : historic
N : no
P : planted
? : questionable
X : extirpated

2 Plant a robust grass, culms usually > 2 m tall and usually > 5 mm in diameter at the base ..... ***Key B***
2 Plant a small to medium grass, culms < 2 m tall and usually also < 5 mm in diameter at the base.
3 Spikelets either modified into asexual, purplish bulblets, or partially or wholly concealed either by spines, hooks, and/or involucres, or partially or wholly concealed by being imbedded in a fleshy rachis or cob.
4 Fertile spikelets either absent (spikelets modified into asexual, purplish bulblets) or variously spiny or bead like ..... ***Key C***
4 Fertile spikelets embedded in a fleshy rachis (resembling a rattail) or a cob ..... ***Key D***
3 Spikelets apparent, not covered, concealed, embedded, or modified by spines, hooks, or involucres.
5 Spikelets 2-flowered, often dorsally compressed, falling entire at maturity (the abscission below the glumes), the upper floret usually bisexual, the lower one male or sterile.
6 Glumes often as long as or longer than the lemmas and concealing the florets; spikelets usually arranged in obvious pairs or triplets, with 1 spikelet sessile or shortly pedicellate and the other 1 (or 2) spikelets pedicellate (the pedicellate sometimes vestigial or absent) ..... ***Key E***
6 Glumes (the lower or both) shorter than the lemmas (or the glumes absent); spikelets not organized in pairs or triplets ..... ***Key F***
5 Spikelets 1-, 2-, or many-flowered, usually terete or somewhat laterally compressed, either abscising at maturity above the glumes or if 2-flowered then both florets bisexual, or the upper sterile.
7 Inflorescence of one or more spikes, the spikelets sessile (or very short-pedicelled) on the spike axis, 1-more per node, characteristically in 2-more ranks (these either on opposite sides of the axis or crowded on one side), the individual spikelets borne more-or-less touching one another.
8 Spikelets borne in a single terminal spike or raceme (an extension of the culm), usually 2-ranked on opposite sides of the axis ..... ***Key G***
8 Spikelets borne on 1-many spikes (the spikes themselves arranged digitately, subdigitately, or racemosely on the culm) in 2 (or more) rows; spikelets often on one side of the spike axis ..... ***Key H***
7 Inflorescence paniculate, sometimes somewhat to very congested, but then not as above.
9 Spikelets with a single bisexual floret, and no staminate, sterile, or reduced florets present.
10 Glumes absent or reduced to tiny rudiments; palea 1-keeled; [of wetlands] ..... ***Key I***
10 Glumes present; palea various; [habitats various].
11 Inflorescences dense and spikelike, symmetrical, cylindrical or ovoid, unbranched ..... ***Key J***
11 Inflorescences loose and open, or if relatively dense, then with discernible branches, and thus lobed or asymmetrical.
12 Lemmas awnless ..... ***Key K***
12 Lemmas awned ..... ***Key L***
9 Spikelets with 2-many florets, including bisexual, staminate, reduced, or sterile flowers.
13 Glumes (one or both) nearly equaling or surpassing the most apical lemma of the spikelet, therefore partially or completely concealing the florets ..... ***Key M***
13 Glumes (both) shorter than the most apical lemma of the spikelet, therefore the florets largely visible ..... ***Key N***

Key A - bamboo grasses (woody trees and shrub grasses) (tribe *Bambuseae*)

1 Rhizomes pachymorph, having root-bearing internodes thicker than the culm; culms usually in single clumps ..... ***Bambusa***
1 Rhizomes leptomorph, root-bearing internodes thinner than the culm; culms solitary or in many connected clumps.
2 Mid-culm branches consistently 2, unequal, rarely with a smaller central third branch ..... ***Phyllostachys***
2 Mid-culm branches not consistently 2, initially 1-9.
6 Mid-culm branches (1-) 2-7; branches and leaves small to medium relative to culm size; [native] ..... ***Arundinaria***
6 Mid-culm branches 1 (-3); branch and leaves often very large relative to culm size; [alien].
..... ***Pseudosasa***

Key B - robust herbaceous grasses

1 Inflorescence an array of spikes, the spikelets closely imbricate in 2 rows along the rachis of the spikes, the spikes alternate along the primary inflorescence axis; [tribe *Zoysieae*; subtribe *Sporobolinae*] ..... ***Spartina***
1 Inflorescence otherwise, either the spikelets embedded or in grooves in an thickened rachis, or the inflorescence a slender or broad panicle.
2 Spikelets embedded in the thickened rachis (the inflorescence thus like an ear of corn), or fitting into grooves in the thickened rachis (the inflorescence thus cylindrical and resembling a rat's tail). Spikelets unisexual, with male and female spikelets in separate inflorescences or in different parts of the same inflorescence; [tribe *Andropogoneae*].
3 Racemes of mixed sex (female below, male above) ..... ***Tripsacum***
3 Racemes of single sex ..... ***Zea***
2 Spikelets not embedded or fitting into grooves in the rachis, the inflorescence a slender or broad panicle (the spikelets visibly separate and often pedicelled).
4 Spikelets with a single floret, this unisexual (either pistillate or staminate); plants with aerenchymatous culms, [plants of seasonally or tidally flooded wetlands]; [tribe *Oryzeae*].
5 Pistillate spikelets on the upper branches of the panicle, staminate spikelets on the lower branches; lemmas and paleas clasping along their margins; plants annual ..... ***Zizania***
5 Pistillate and staminate spikelets intermingled on the same branches of the inflorescence; lemma margins free; plants perennial ..... ***Zizaniopsis***
4 Spikelets with 2 or more florets, at least some of these bisexual; plants without aerenchymatous culms, [plants of uplands or temporarily to seasonally flooded wetlands].
6 Spikelets with 2-8 florets, these bisexual.
7 Leaves primarily basal; [tribe *Danthonieae*] ..... ***Cortaderia***
7 Leaves cauline; [tribe *Arundineae*].
8 Lemmas pilose; rachilla glabrous; plants short-rhizomatous (somewhat clumped); culms to 10 m tall; [plants of uplands or saturated or temporarily flooded wetlands] ..... ***Arundo***
8 Lemmas glabrous; rachilla sericeous; plants long rhizomatous; culms to 4 m tall; [plants of uplands or saturated, tidally flooded, or seasonally flooded wetlands] ..... ***Phragmites***
6 Spikelets almost always with 2 florets, the lower florets sterile or staminate (sometimes reduced to lemmas or completely absent).
9 Spikelets falling separately, not attached to rachis segments, stalks, or bristles; spikelets <2× as long as wide; [tribe *Paniceae*].
10 Spikelets (at least the terminal) subtended by 1-many stiff, terete bristles ..... ***Setaria***
10 Spikelets not subtended by stiff bristles.

Key to Map Symbology:

11 Fertile lemma rugose with cross-venation..... ***Megathyrsus***
11 Fertile lemma smooth or hairy, not rugose..... ***Panicum***
9 Spikelets falling with attached rachis segments, stalks, or bristles; spikelets >3× as long as wide; [tribe *Andropogoneae*].
12 Pedicelled spikelet differing from the sessile in shape and sex (sometimes represented only by a pedicel).
13 Inflorescence of 2-13 digitate (whorled) racemes borne at the summit of a peduncle, the peduncle subtended by a raceme sheath ..... ***Andropogon***
13 Inflorescence a panicle, the branches not subtended by sheaths.
14 Pedicelled spikelet represented by pedicel only; apex of sheath bearing 2 auricles 1-10 mm long; [native]..... ***Sorghastrum***
14 Pedicelled spikelet present, staminate; apex of sheath truncate; [alien]..... ***Sorghum***
12 Pedicelled spikelet similar to the sessile spikelet, both fertile.
15 Spikelets falling separately from the persistent rachis..... ***Miscanthus***
15 Spikelets falling in pairs together with sections of the disarticulating rachis ..... ***Erianthus***

Key C - bur, bead, or bulblet grasses of various tribes

1 Fertile spikelets absent (spikelets modified into asexual, purplish bulblets) or variously spiny or bead like; [tribe *Poeae*]..... ***Poa***
1 Fertile spikelets variously spiny or bead-like.
2 Pistillate spikelets concealed within a hard, beadlike shell, this white, black, or variously colored; [tribe *Andropogoneae*]..... ***Coix***
2 Spikelets concealed in a variously spiny bur, this green or tan, sometimes with pink or purple shading. ..... ***Cenchrus***

Key D - rattail or cob grasses

1 All spikelets unisexual, the pistillate and staminate spikelets either in separate inflorescences, or the pistillate spikelets below the staminate spikelets in the same inflorescence; leaves 9-120 mm wide; [tribe *Andropogoneae*].
2 Pistillate spikelets below the staminate in the same inflorescence..... ***Tripsacum***
2 Pistillate and staminate spikelets in separate inflorescences, the pistillate inflorescences axillary, staminate inflorescences terminal..... ***Zea***
1 Some spikelets bisexual; leaves 1-25 mm wide.
3 Spikelets with 2-7 florets, the lower bisexual and fertile, the upper sometimes sterile; [tribe *Triticeae*]..... ***Aegilops***
3 Spikelets with at most 2 florets, the lower staminate or sterile, the upper bisexual, staminate, or sterile.
4 Culms 2-45 cm tall; leaves 1-6 mm wide; plants annual (perennial in *Eremochloa* and *Stenotaphrum*).
5 Plants obviously and prominently rhizomatous (*Eremochloa*) or stoloniferous (*Stenotaphrum*); lower glume with pectinate margins (*Eremochloa*) or irregularly toothed (*Stenotaphrum*)
6 Plant rhizomatous; lower glume with pectinate margins; [commonly naturalized turf grass and roadside weed]; [tribe *Andropogoneae*]..... ***Eremochloa***
6 Plant stoloniferous; lower glume irregularly toothed; [naturalized turf grass and allegedly also native]; [tribe *Paniceae*]..... ***Stenotaphrum***
5 Plants annual; lower glume with smooth and cartilaginous margins (or absent); [rare waifs]; [tribe *Poeae*]. ..... ***Parapholis***
4 Culms 30-400 cm tall; leaves 2-25 mm wide; plants annual or perennial; [tribe *Andropogoneae*].
8 Lower glumes of the sessile spikelets rough, rugose, pitted, tuberculate or alveolate between the keels..... ***Mnesithea***
8 Lower glumes of the sessile spikelets smooth or scabrous.
9 Pedicels at least partially fused to the rame axes ..... ***Rottboellia***
9 Pedicels appressed, but not fused, to the rame axes. ..... ***Mnesithea***

Key E - grasses of tribe *Andropogoneae* (also including grasses also keyed in Keys B, C, and D)

1 Leaves ovate-lanceolate, 2-10 cm long, 2.5-7× as long as wide; plants weak-stemmed annuals, branching, decumbent, rooting at the lower nodes; [alien weeds].
2 Leaves cordate-clasping at base; spikelets not paired, unaccompanied by a vestige..... ***Arthraxon***
2 Leaves tapering to a broadly cuneate base; spikelets paired (one of the pair sometimes vestigial)..... ***Microstegium***
1 Leaves lanceolate to linear, either longer or proportionately narrower; plants either perennial or coarse annuals with erect and mostly unbranched culms.
3 Spikelets embedded in the thickened rachis (the inflorescence thus like an ear of corn), or fitting into grooves in the thickened rachis (the inflorescence thus cylindrical and resembling a rat's tail), or the pistillate inflorescences enclosed in a hard, bead-like, pearly-white, modified bract.
4 Spikelets unisexual, with male and female spikelets in separate inflorescences or in different parts of the same inflorescence.
5 Internode narrower than and more-or-less enclosed by the female spikelet..... ***Coix***
5 Internode broader than and more-or-less enclosing the female spikelet.
6 Racemes of mixed sex, female flowers below, and male above..... ***Tripsacum***
6 Racemes of single sex, the female inflorescences (“ears”) borne on axillary branches, the male inflorescences (“tassels”) terminal on the culm..... ***Zea***
4 Spikelets, or at least one of each pair, bisexual.
7 Culms 2-45 cm tall; leaves 1-5 mm wide; plants perennial, obviously and prominently rhizomatous; lower glume with pectinate margins; [commonly naturalized turf grass and roadside weed]..... ***Eremochloa***
7 Culms 30-400 cm tall; leaves 2-25 mm wide; plants annual or perennial, cespitose or short-rhizomatous; lower glume winged or not, but not pectinate.
8 Lower glumes of the sessile spikelets rough, rugose, pitted, tuberculate or alveolate between the keels..... ***Mnesithea***
8 Lower glumes of the sessile spikelets smooth or scabrous.
9 Pedicels at least partially fused to the rame axes..... ***Rottboellia***
9 Pedicels appressed, but not fused, to the rame axes ..... ***Mnesithea***
3 Spikelets not embedded or fitting into grooves in the rachis, the rachis slender (the spikelets visibly separate and often pedicelled).

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

11 Pedicelled spikelet similar to the sessile spikelet, both fertile.
12 Spikelets falling separately from the persistent rachis.
13 Panicle contracted, spikelike; glumes membranous ..... ***Imperata***
13 Panicle loose; glumes cartilaginous or coriaceous ..... ***Miscanthus***
12 Spikelets falling in pairs together with sections of the disarticulating rachis.
..... ***Erianthus***
11 Pedicelled spikelet differing from the sessile in shape and sex (sometimes represented only by a pedicel).
16 Spikelets awned, the awn 10-20 cm long.
..... ***Heteropogon***
16 Spikelets awned or not, if awned the awn < 5 cm long.
18 Inflorescence a panicle, the branches not subtended by sheaths.
19 Pedicelled spikelet represented by pedicel only; apex of sheath bearing 2 auricles 1-10 mm long; [native] ..... ***Sorghastrum***
19 Pedicelled spikelet present, staminate; apex of sheath truncate; [alien] ..... ***Sorghum***
18 Inflorescence of 1-13 digitate (whorled) racemes borne at the summit of a peduncle, the peduncle subtended by a raceme sheath.
20 Racemes 1 per peduncle and raceme sheath ..... ***Schizachyrium***
20 Racemes 2-13 per peduncle and raceme sheath.
21 Pedicels of the pedicelled (reduced or absent) spikelets terete or slightly flattened and grooved on one side only ..... ***Andropogon***
21 Pedicels of the pedicelled (reduced or absent) spikelets strongly flattened and grooved on both sides, the central portion thin or membranous.....
..... ***Bothriochloa***

Key F - grasses of tribe *Paniceae* (also including grasses keyed as well in Keys B, C, D, and H)

1 Inflorescences spikelike branches, the spikelets partially embedded in the rachises ..... ***Stenotaphrum***
1 Inflorescences panicles or spikes (if spikes, the spikelets not embedded.
2 Spikelets (at least the terminal) subtended by 1-many stiff, terete bristles.
3 Bristles persistent on the inflorescence, each spikelet disarticulating above the bristles ..... ***Setaria***
3 Bristles falling with the spikelets at maturity (the disarticulation at the base of the fascicles) ..... ***Cenchrus***
2 Spikelets not subtended by stiff bristles.
4 Inflorescences of spikelike branches 1-3.7 cm long, the branch extending 2.5-4 mm beyond the attachment of the distal spikelets ..... ***Setaria***
4 Inflorescences not as above.
5 Upper florets laterally compressed ..... ***Melinis***
5 Upper florets dorsally compressed.
6 Lower glumes or lower lemmas awned.
7 Leaves > 10× as long as wide; ligules absent or of hairs ..... ***Echinochloa***
7 Leaves < 8× as long as wide; ligules present, membranous or of hairs.
..... ***Oplismenus***
6 Lower glumes and lower lemmas unawned.
9 Lemma margins flat, hyaline; lower glumes absent or < ¼ the length of the upper glume.
10 Subterranean (cleistogamous) inflorescences present; aerial inflorescences with elongate rachises; spikelets of the aerial inflorescences often sterile; spikelets glabrous; leaves either with a white cartilaginous margin or prominently ciliate; [of the Coastal Plain] ..... ***Amphicarpum***
10 Subterranean inflorescences absent; aerial inflorescences either with digitate or subdigitate branches and glabrous spikelets, or with elongate rachises and conspicuously pubescent spikelets; spikelets of the aerial inflorescences fertile; spikelets glabrous, ciliate, or pubescent; leaves various (often not as above); [collectively widespread]
11 Inflorescence a narrow panicle with the branches strongly ascending to appressed; spikelets ellipsoid to obovoid; [of Coastal Plain pinelands]
..... ***Anthenantia***
11 Inflorescence either a panicle with digitate or subdigitate clusters of spikelike branches or a broad panicle with widely divergent branches; [widespread] ..... ***Digitaria***
9 Lemma margins not hyaline, frequently involute; lower glumes various (absent, < ¼ the length, to longer than the upper glume).
12 Spikelets subtended by a cuplike callus ..... ***Eriochloa***
12 Spikelets not subtended by a cuplike callus.
13 Leaves primarily lacking ligules (at least the upper, and often all, leaves without ligules, if vestigial ligules present, these of hairs).....
..... ***Echinochloa***
13 Leaves with ligules, these either membranous or of hairs.
14 Lower (sterile) palea indurate and expanding the spikelet at maturity, as long as the lower (sterile) lemma; lower and upper florets standing apart from one another at maturity; outer surface of the upper (fertile) palea with compound papillae ..... ***Steinchisma***
14 Lower (sterile) palea membranous, not expanding the spikelet at maturity, usually shorter than lower (sterile) lemma, or absent; lower and upper florets closely appressed at maturity; outer surface of the upper (fertile) palea lacking compound papillae.
15 Inflorescence of 1-sided, spikelike primary branches.
16 Spikelets with lower lemmas (and lower glumes, if present) adjacent to the branch axes.
17 Lower glumes absent ..... ***Axonopus***
17 Lower glumes present on at least most spikelets ..... ***Urochloa***
16 Spikelets with upper lemmas (and upper glumes, if present) adjacent or appressed to the branch axes.
18 Both glumes absent from all or most spikelets ..... ***Paspalum eglume***
18 Upper or both glumes present on all spikelets.
19 Lower glumes usually absent; upper lemmas smooth to slightly rugose ..... ***Paspalum***
19 Lower glumes present; upper lemmas rugose and verrucose ..... ***Urochloa***
15 Inflorescence either paniculate with well-developed secondary branchlets or if the primary branches spikelike, then the spikelets not borne in a 1-sided arrangement on the spicate branches.
20 Inflorescences dense, the spikelets obscuring most of the internal branches ..... ***Sacciolepis***
20 Inflorescences open panicles, or if narrowed, all or nearly all the panicle branches readily visible.
21 First glume 5-7.5 mm long, nearly as long as sterile lemma; fertile lemma 1/3 length of sterile lemma; rachilla prolonged between the florets ..... ***Phanopyrum***

Key to Map Symbology:

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21 First glume shorter, or if this long, then at most 3/4 length of sterile lemma; fertile lemma > ½ the length of the sterile lemma; rachilla not prolonged between the florets.
22 Plant developing a terminal ("spring") inflorescence usually before mid-summer, followed by lateral ("autumnal") inflorescences from lower, mid, and/or upper nodes, these often included or hidden among the fascicles of smaller "autumnal" leaves; often developing a rosette of overwintering basal leaves ..... ***Dichanthelium***
22 Plant developing a terminal inflorescence usually after mid-summer, the lateral inflorescences, when present, from the upper nodes, usually appearing at the same time as the terminal panicle, and not hidden by dense fascicles of smaller leaves; plants lacking a rosette of overwintering basal leaves.
23 Spikelets tuberculate ..... ***Kellochloa***
23 Spikelets smooth, not tuberculate.
24 Panicle < 2 cm wide at maturity.
25 Spikelets > 4.5 mm long; first glume > 2.4 mm long; ligule 4-6 mm long; [of coastal dunes] ..... ***Panicum***
25 Spikelets < 4 mm long; first glume < 2.1 mm long; ligule < 2 mm long; [not of coastal dunes].
26 Blades involute, 1.5-4 mm wide; culms wiry ..... ***Coleataenia***
26 Blades flat, the larger 6-20 mm wide; culms stout.
27 Panicles constricted, 0.3-1.6 cm wide; spikelets subsessile to short-pediceled; summit of fertile palea not enclosed by fertile lemma ..... ***Panicum***
27 Panicles > 1 cm wide; spikelets short to long-pediceled; summit of fertile palea enclosed by fertile lemma ... ***Coleataenia***
24 Panicle > 2 cm wide at maturity.
28 Fertile lemmas rugose with cross-venation between the main parallel veins ..... ***Megathyrsus***
28 Fertile lemmas not rugose.
29 Lower primary panicle branches in whorls of 4-7 at the nodes, stiffly spreading, naked on the proximal ½, the axils strongly pilose; lower culm internodes appressed papillose-pubescent; first glume acuminate, ½ as long as spikelet; fertile lemma chestnut brown at maturity ..... ***Panicum***
29 Plants without the above combination of characters.
30 Plants from a cluster of fibrous roots, without rhizomes or hard knotty crowns, annual ..... ***Panicum***
30 Plants with rhizomes or hard knotty crowns, perennial.
31 Plants with hard crowns, lacking rhizomes; fertile lemma 1.2-1.6 mm long ..... ***Coleataenia***
31 Plants with rhizomes; fertile lemma 1.6-4 mm long.
32 Rhizomes about 1 cm thick with pubescent scale-like leaves; lower portion of culm hard, nearly woody ..... ***Panicum***
32 Rhizomes less than 1 cm thick with glabrous scale-like leaves; culms not woody.
33 First glume truncate apically ..... ***Panicum***
33 First glume acute to obtuse.
34 Culms slightly compressed below; ligules 0.5 mm long or less; spikelet pedicels appressed, the spikelets subsecund, usually some obliquely bent above the first glume; fertile lemma 1.8-2.2 mm long ..... ***Coleataenia***
34 Culms terete; ligules 1-6 mm long; at least some spikelet pedicels spreading, spikelets not at all secund, essentially straight; fertile lemma 2-4 mm long ..... ***Panicum***

Key G - wheat grasses of tribe *Triticeae* (and a few unrelated mimics)

1 Spikelets 2-7 at all or most nodes; [tribe *Triticeae*].
2 Spikelets 2-5 at each node (if 3, all 3 sessile). ..... ***Elymus***
2 Spikelets 3 at each node (the central spikelets usually sessile, the lateral pedicellate) ..... ***Hordeum***
1 Spikelets 1 at all or most nodes.
6 Spikelets placed edgewise to the rachis; first glume lacking except in the terminal spikelet; [tribe *Poeae*] ..... ***Lolium***
6 Spikelets placed flatwise to the rachis; first glume present; [tribe *Triticeae*].
7 Plants annuals; glumes often with lateral teeth or awns; glumes rounded or keeled; [aliens, rare out of cultivation].
8 Glumes rounded; spikelets in some species embedded into the thickened rachis ..... ***Aegilops***
8 Glumes keeled; spikelets never embedded in a thickened rachis ..... ***Triticum***
7 Plants perennials; glumes without lateral teeth or awns; glumes keeled; [natives or aliens].
..... ***Elymus***

Key H - finger grasses

1 Spikelets 2-flowered, often dorsally compressed, falling entire at maturity (the abscission below the glumes), the upper floret usually bisexual, the lower one male or sterile; [tribe *Paniceae*]
2 Lemma margins hyaline, flat; lower glumes various (absent, < ¼ the length, or longer than the upper glume) ..... ***Digitaria***
2 Lemma margins not hyaline, frequently involute; lower glumes absent or < ¼ the length of the upper glume.
3 Spikelets with lower lemmas (and lower glumes, if present) adjacent to the branch axes.
4 Lower glumes absent ..... ***Axonopus***
4 Lower glumes present on at least most spikelets ..... ***Urochloa***
3 Spikelets with upper lemmas (and upper glumes, if present) adjacent or appressed to the branch axes.
5 Both glumes absent from all or most spikelets ..... ***Paspalum eglume***
5 Upper or both glumes present on all spikelets.
6 Lower glumes usually absent; upper lemmas smooth to slightly rugose ..... ***Paspalum***
6 Lower glumes present; upper lemmas rugose and verrucose ..... ***Urochloa***
1 Spikelets 1-, 2-, or many-flowered, usually terete or somewhat laterally compressed, either abscising at maturing above the glumes or if 2-flowered then both florets bisexual, or the upper sterile; [tribes *Cynodonteae* and *Zoysieae*]

Key to Map Symbology: □ native; ◇ maybe exotic; △ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

7 Spikes normally solitary (rarely 2), divergent at the summit of the culm; second glume with a recurved spine arising from the back; fresh plants aromatic with a citrus odor; [tribe *Cynodonteae*; subtribe "incertae sedis"] ..... ***Ctenium***
7 Spikes normally 2 or more, alternate, digitate, subdigitate, or verticillate along the main inflorescence axis; second glume lacking a recurved spine; fresh plants not aromatic with a citrus odor.
8 Spikes arranged along the central inflorescence axis alternately, solitary at each node.
9 Spikelets with 1 bisexual floret, sometimes also with modified male, sterile, or rudimentary florets above the fertile floret.
10 Spikelets with modified male, sterile, or rudimentary florets above the fertile floret; [plants of uplands]; [tribe *Cynodonteae*; subtribe *Boutelouinae*] ..... ***Bouteloua***
10 Spikelets lacking any modified florets; [plants of wetlands, primarily saline and coastal]; [tribe *Zoysieae*; subtribe *Sporobolinae*] ..... ***Spartina***
9 Spikelets with 2 or more bisexual florets (sometimes also with additional reduced florets); [tribe *Cynodonteae*; subtribe *Eleusininae*].
11 Ligules 4-8 (-15) mm long, acute to attenuate, entire (lacerate only by tearing) ..... ***Diplachne***
11 Ligules 0.3-5.4 mm long, truncate to obtuse, erose or entire. ..... ***Dinebra***
8 Spikes arranged along the central inflorescence axis in a digitate, subdigitate, or verticillate manner, all or most nodes with 2 or more spikes; [tribe *Cynodonteae*].
13 Spikelets with 1 fertile floret (there may also be 1 or more sterile florets); [tribe *Cynodonteae*; subtribe *Eleusininae*].
14 Spikelets lacking sterile florets ..... ***Cynodon***
14 Spikelets with 1 or more sterile florets.
15 Lowest lemmas awned (rarely unawned); upper glumes acute to acuminate, mucronate or short-awned ..... ***Chloris***
15 Lowest lemmas unawned (or with an awn to 1.2 mm long); upper glumes truncate or bilobed, sometimes short-awned from between the lobes ..... ***Eustachys***
13 Spikelets with 2 or more fertile florets.
16 Spikes to 7 cm long, terminating in a point (the spikes acuminate); [tribe *Cynodonteae*; subtribe "incertae sedis"] ..... ***Dactyloctenium***
16 Spikes to 22 cm long, terminating in a functional or rudimentary spikelet (the spikes acute to obtuse); [tribe *Cynodonteae*; subtribe *Eleusininae*]. ..... ***Eleusine***

Key I - rice grasses, of tribe *Oryzeae* (also including grasses keyed as well in Key B)

1 Lemma margins free; plants perennial.
2 Plants either < 1 m tall or a floating aquatic with lax stems to 1.5 m long ..... ***Luziola***
2 Plants 1-4 m tall, emergent, the stems stout, not lax ..... ***Zizaniopsis***
1 Lemmas and paleas clasping along their margins; plants annual or perennial.
3 Spikelets either pistillate or staminate, the upper branches of the panicle with pistillate spikelets, the lower branches with staminate spikelets; grains terete ..... ***Zizania***
3 Spikelets bisexual; grains laterally flattened.
4 Glumes absent and also lacking glume-like sterile florets subtending the floret; lemmas and paleas pectinately ciliate-hispid on the margins; [native] ..... ***Leersia***
4 Glumes absent or greatly reduced, glume-like sterile florets subtending the fertile floret; lemmas and paleas glabrous or pubescent, but not pectinately ciliate hispid on the margins; [introduced] ..... ***Oryza***

Key J - dense spike grasses

2 Glumes awned; [tribe *Poeae*].
4 Glume awn 0.7-3 mm long; lemmas not awned ..... ***Phleum***
4 Glume awn 3-8 mm long; lemmas awned ..... ***Polypogon***
2 Glumes unawned. ..... ***Alopecurus***

Key K - grasses with 1 floret and unawned lemmas

1 Spikelets 18-32 mm long; [tribe *Poeae*] ..... ***Avena***
1 Spikelets 0.7-10.8 mm long.
3 Florets with a conspicuous tuft of hairs on the callus; [tribe *Zoysieae*; subtribe *Sporobolinae*] ..... ***Calamovilfa***
3 Florets not conspicuously hairy on the callus.
4 Lemma 1-veined; ligule of hairs; grain becoming mucilaginous when wet; [tribe *Zoysieae*; subtribe *Sporobolinae*] ..... ***Sporobolus***
4 Lemma 1-5-veined; ligule a membrane (the summit sometimes ciliolate); grain not becoming mucilaginous when wet.
5 Lemmas faintly 5-veined; lower glume longer than the lemma; palea much shorter than the lemma (or absent); [tribe *Poeae*] ..... ***Agrostis***
5 Lemmas strongly 3-veined; lower glume shorter than (rarely equaling) the lemma; palea about equaling the lemma; [tribe *Cynodonteae*; subtribe *Muhlenbergiinae*] ..... ***Muhlenbergia***

Key L - grasses with 1 floret and awned lemmas

1 Lemma awn 3-branched (the lateral 2 sometimes very reduced compared to the central); [tribe *Aristideae*] ..... ***Aristida***
1 Lemma awned with a simple awn.
2 Upper glumes present, 1-veined; lower glumes absent or much shorter than the upper glumes and veinless; [tribe *Brachyelytreae*] ..... ***Brachyelytrum***
2 Both glumes present, 1-many-veined.
3 Lemma hardened, distinctly different than the glumes in texture when mature; [tribe *Stipeae*].
5 Leaves > 4 mm wide.

Key to Map Symbology:
* : waif
EN : endemic
H : historic
N : no
P : planted
? : questionable
X : extirpated

..... ***Nassella***

5 Leaves < 4 mm wide.
8 Florets 6-13 mm long; awns 30-120 mm long.
9 Palea flat, shorter than or equal to the lemma; lemma margin convolute or not overlapping; [alien species, rare in our area] ..... ***Nassella***
9 Palea grooved, longer than the lemma; lemma margins involute, fitting into the paleal groove; [native species, collectively widespread in our area] .. ***Piptochaetium***
8 Florets 1.5-4.5 mm long; awns 1-35 mm long ..... ***Nassella***

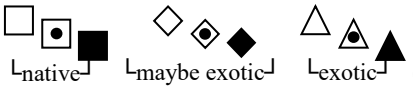
3 Lemma neither hardened nor distinctly different than the glumes in texture when mature.
12 Spikelets 18-32 mm long; [tribe *Poeae*] ..... ***Avena***
12 Spikelets 1.1-8 mm long.
13 All spikelets sessile or subsessile and arrayed along inflorescence axes (racemes) divergent from the central axis (but not both overlapping one another and clearly ranked on one side of the axis, so as to be keyed under Key H).
14 Lower glumes 0.9-4 mm long; spikelets disarticulating below the glumes, the spikelet falling as a whole; spikelets appressed to divergent from the raceme axes; sheaths not strongly overlapping; [tribe *Cynodonteae*; subtribe *Eleusininae*] ..... ***Dinebra***
14 Lower glumes (2-) 3.5-7 mm long; spikelets disarticulating above the glumes (which remain on the inflorescence); spikelets strongly appressed to the raceme axes; sheaths strongly overlapping (at least on the upper culm), hiding the culm; [tribe *Cynodonteae*; subtribe "*incertae sedis*"] ..... ***Gymnopogon***
13 Spikelets pedicellate and arrayed in a more complex and open panicle.
16 Spikelets articulated below the glumes, the spikelet falling intact, leaving a naked pedicel; [tribe *Poeae*] ..... ***Cinna***
16 Spikelets articulated above the glumes, the floret falling, leaving the glumes attached to the pedicels.
17 Lemmas faintly 5-veined; awn from the back of the lemma; lower glume longer than the lemma; palea much shorter than the lemma (or absent); [tribe *Poeae*] ..... ***Agrostis***
17 Lemmas strongly 3-veined; awn from the tip of the lemma; lower glume shorter than (rarely equaling) the lemma; palea about equaling the lemma; [tribe *Cynodonteae*; subtribe *Muhlenbergiinae*] ..... ***Muhlenbergia***

Key M - grasses with 2+ florets, these exceeded and usually concealed by the glumes

1 Spikelets disarticulating below the glumes, the spikelets falling as a whole or in clusters; [tribe *Poeae*] ..... ***Holcus***
1 Spikelets disarticulating above the glumes, the glumes remaining attached to the pedicel.
2 Spikelets dimorphic, paired, each pair consisting of a lower spikelet with sterile florets and an upper spikelet one with fertile florets; [tribe *Poeae*] ..... ***Cynosurus***
2 Spikelets monomorphic.
3 Spikelets each with 1 fertile (bisexual) floret, with 1-several sterile florets, either towards the base or towards the tip of the spikelet.
4 Fertile floret basal, with 1-several sterile florets towards the tip of the spikelet; [tribe *Cynodonteae*; subtribe "*incertae sedis*"] ..... ***Gymnopogon***
4 Fertile floret terminal, with 1-several sterile florets towards the base of the spikelet (the sterile florets sometimes knoblike or like tufts of hairs, and not obviously like florets); [tribe *Poeae*].
5 Spikelets with 2 florets, the lower floret staminate and of similar size as the upper, pistillate or bisexual floret; lemma of the lower floret awned; lemma of the upper floret unawned or awned ..... ***Arrhenatherum***
5 Spikelets with 2-3 florets, the lower 1-2 florets staminate or sterile, either highly reduced to knobs or tufts of hairs, or shorter than to longer than the terminal, bisexual floret; lemma of the lower florets either awned or unawned; lemma of the upper floret unawned.
6 Lower sterile florets 2, shorter than to exceeding the bisexual floret; fresh leaves with sweet vanilla odor when crushed; lemma of the lower florets awned or unawned ..... ***Anthoxanthum***
6 Lower sterile florets 1-2, either highly reduced to knobs or tufts of hairs, or consisting of linear to lanceolate lemmas up to ¾ as long as the bisexual floret; all lemmas unawned ..... ***Phalaris***
3 Spikelets each with 2 or more fertile florets.
8 Spikelets 18-50 mm long; glumes 9-11-veined; [tribe *Poeae*] ..... ***Avena***
8 Spikelets 2.5-20 mm long; glumes 1-7-veined.
9 Lemma awns apical or dorsal (arising from the apex of the lemma or from the back of the lemma in its upper half). ..... ***Danthonia***
9 Lemma awns basal (arising from the lower half of the lemma); [tribe *Poeae*].
11 Rachilla glabrous, not prolonged beyond the upper floret; spikelets 1.7-3.8 mm long ..... ***Aira***
11 Rachilla hairy, prolonged beyond the upper floret as a bristle; spikelets 2.5-7 mm long
12 Lemma awn 4-8 mm long, geniculate, exserted beyond the tips of the glumes; lemmas minutely scabrous, dull; leaf blades involute, appearing filiform (rounded in cross-section); ligule 0.5-3 (-5) mm long ..... ***Avenella***
12 Lemma awn 2-3 mm long, straight or nearly so, scarcely (or not at all) exserted beyond the tips of the glumes; lemmas smooth, shiny; leaf blades flat or folded at the midvein (V-shaped in cross-section); ligule 3-10 (-17) mm long ..... ***Deschampsia***

Key N - grasses with 2+ florets, these readily visible by extending past the glumes

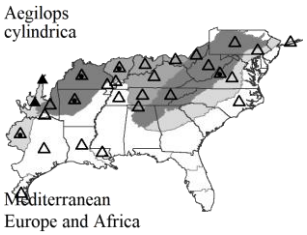
1 Plants dioecious; plants strongly rhizomatous-clonal; [plants of saline situations, coastal or more rarely inland]; [tribe *Cynodonteae*; subtribe *Monanthochloinae*] ..... ***Distichlis***
1 Plants bisexual; plants cespitose or weakly short- rhizomatous; [plants of various habitats, including saline].
2 Lemmas 1-3-nerved, the nerves strong and obvious; spikelets 1-27 mm long.
3 Lemma nerves hairy; lemmas slightly to strongly 2-lobed, the midnerve shortly excurrent between the 2 lobes; [tribe *Cynodonteae*; subtribe *Tridentinae*].
4 Palea glabrous or with hairs < 0.5 mm long; plants perennial; inflorescences exserted, conspicuous ..... ***Tridens***
4 Palea long-ciliate on the upper half, the hairs 0.5-2 mm long; plants annual; inflorescences often largely hidden in the upper sheath ..... ***Triplasis***
3 Lemma nerves glabrous; lemmas not at all lobed.
5 Mature spikelets stiff; grains protruding, with a bottle-neck-like beak; [tribe *Diarrheneae*] ..... ***Diarrhena***
5 Mature spikelets not stiff; grains neither protruding, nor shaped with a bottleneck-like beak.

Key to Map Symbology:  ←rare ←uncommon ←common (see introduction for more)

* : waif : endemic H : historic N : no P : planted ? : questionable X : extirpated

6 Florets 3-34 per spikelet; lemmas unawned; [tribe *Eragrostideae*; subtribe *Eragrostidinae*] ..... ***Eragrostis***
6 Florets 2-3 per spikelet; lemmas awned or unawned; [tribe *Poeae*] ..... ***Sphenopholis***
2 Lemmas 5-many-nerved, the nerves often obscure; spikelets 2-70 mm long.
7 Sheaths united for at least ½ their length.
8 Spikelets in dense one-sided clusters on a few stiff branches; spikelets strongly flattened; [tribe *Poeae*] ..... ***Dactylis***
8 Spikelets in open or somewhat congested panicles, not as above; spikelets slightly to not at all flattened.
9 Lemmas awned. ..... ***Bromus***
9 Lemmas unawned.
11 Lower glumes 1-veined; [plants of wetlands] ..... ***Glyceria***
11 Lower glumes 3-7-veined; [plants of mesic to dry habitats] ..... ***Melica***
7 Sheaths completely free or united at most up to ½ their length.
12 Basal 1-8 florets of the spikelet sterile.
13 Ligule membranous (the membrane apex ciliate); lower 1-4 florets sterile; disarticulation above the glumes and between the florets; [of various, usually moist, habitats, collectively widespread]; [tribe *Centotheceae*] ..... ***Chasmanthium***
13 Ligule of hairs; lower 2-8 florets sterile; disarticulation below the glumes (the spikelet falling whole); [of coastal dunes, from se. VA southward and westward]; [tribe *Eragrostideae*; subtribe *Uniolinae*] ..... ***Uniola***
12 Lowermost florets of the spikelet fertile; [tribe *Poeae*].
14 Lemmas about as broad as long, spreading at a ca. 90° angle to the rachilla ..... ***Briza***
14 Lemmas longer than broad, ascending at an acute angle to the rachilla.
17 Callus of the lemmas hairy ..... ***Poa***
17 Callus of the lemma glabrous.
18 Lemmas awned.
19 Plant annual; stamen 1 ..... ***Festuca***
19 Plant perennial; stamens 3.
20 Leaf blades often involute, 0.2-3 mm wide, not auriculate at the base ..... ***Festuca***
20 Leaf blades flat, 3-12 mm wide, auriculate at the base ..... ***Lolium***
18 Lemmas unawned.
21 Leaf tips blunt, cupped like the prow of a row-boat ..... ***Poa***
21 Leaf tips acuminate, planar or keeled (but not as above).
22 Leaf blades often involute, 0.2-3 mm wide, or flat and 3-12 mm wide, not auriculate at the base ..... ***Festuca***
22 Leaf blades flat, 3-12 mm wide, auriculate at the base ..... ***Lolium***

Aegilops Linnaeus 1753 (GOATGRASS)



A genus of about 23 species, annuals, of w. Asia east to the Mediterranean region. References: Saufferer (2007) in FNA24 (2007a); Tucker (1996).

* ***Aegilops cylindrica*** Host. JOINTED GOATGRASS. **Hab:** Fields, pastures, roadsides, other disturbed areas. **Dist:** Native of Mediterranean Europe and w. Asia. **Phen:** Apr-Aug. **Syn:** = Ar, C, ETx1, F, FNA24, G, GrPl, HC, Il, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, Tn, Tx, Va, Tucker (1996). NatureServe GNR (Not Yet Ranked).

Agrostis Linnaeus 1753 (BENTGRASS)

A genus of about 220 species, primarily temperate. References: Harvey (2007a) in FNA24 (2007a); Tucker (1996).

1 Palea 1/2-3/4 as long as the lemma, 0.6-1.2 mm long; plants introduced, often (though not always) in disturbed habitats; plants flowering Jun-Oct; [subgenus *Agrostis*].
2 Ligule mostly 0.5-2 mm long, truncate; panicle branches naked toward the base, diffuse when in fruit, the spikelets well-separated ..... ***Agrostis capillaris***
2 Ligule mostly 2.5-6 mm long, acute, rounded, or truncate; panicle branches (some of them) with spikelets to near the base, the spikelets usually agglomerated.
3 Leaves 3-8 mm wide; inflorescence triangular-ovoid, the branches widely spreading at maturity, usually reddish; plant with rhizomes, without stolons ..... ***Agrostis gigantea***
3 Leaves mostly 1-3 mm wide; inflorescence narrowly ovoid, the branches ascending at maturity, usually tan; plant without rhizomes, with or without stolons ... ***Agrostis stolonifera***
1 Palea < 2/5 as long as the lemma, 0-0.5 mm long; plants native, typically in more or less natural habitats; plants flowering Mar-Nov; [subgenus *Vilfa*].
4 Lemma usually awned (sometimes unawned), the awn inserted near the tip, 4-10 mm long, straight, very delicate and flexuous; annual, flowering Apr-Jun ..... ***Agrostis elliottiana***
4 Lemma awned or not, the awn (when present) inserted either near the middle of the lemma or near the apex, 0-6 mm long, straight or bent, neither delicate nor flexuous; perennial, flowering Mar-Nov.
7 Spikelets 1.2-2 mm long; anthers 0.3-0.6 mm long; lemma never awned; plants flowering Mar-Jul ..... ***Agrostis hyemalis***
7 Spikelets 1.8-3.5 (-3.7) mm long; anthers 0.3-1.5 mm long; lemma awnless or awned; plants flowering Jun-Nov.
8 Leaves (at least the basal) mostly involute, 1-2 (-3) mm wide; panicle branches mostly forking well beyond the middle; anthers 0.4-0.8 mm long ..... ***Agrostis scabra***
8 Leaves flat, 2-6 mm wide; panicle branches mostly forking at or below the middle; anthers 0.3-1.2 mm long.
9 Lemma 1.8-3 mm long, minutely but copiously scabrous (at 20× or more); anthers 0.7-1.2 mm long; spikelets (2.3-) 2.7-3.5 (-3.7) mm long, usually clustered near the tips of the branchlets; panicle branches scabrous; culms to 15 dm tall; [of wet savannas and other wet habitats of the Coastal Plain].... ***Agrostis altissima***

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

9 Lemma 1.4-2 mm long, glabrous; anthers 0.3-0.6 mm long; spikelets (1.8-) 2.2-2.7 (-3.2) mm long, usually not clustered near the tips of the branchlets; panicle branches glabrous to scabrous; culms to 10 dm tall; [of various habitats, nearly throughout our area] **.....*Agrostis perennans***

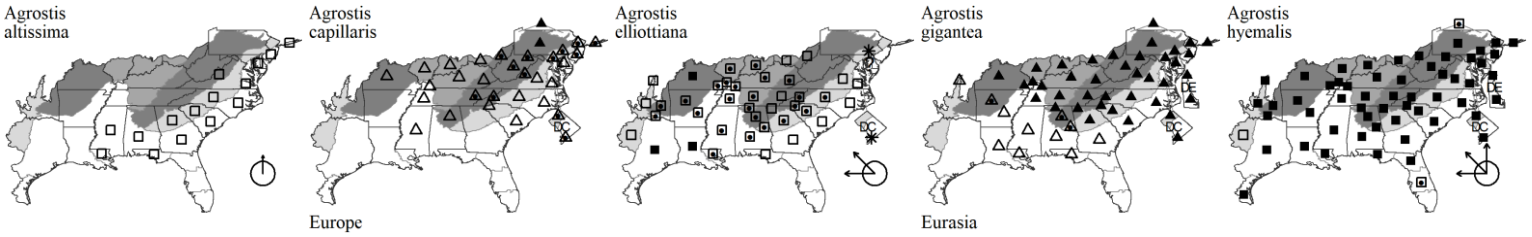
Agrostis altissima (Walter) Tuckerman. COASTAL BOG BENTGRASS. **Hab:** Wet pine savannas, sinkhole ponds, edges of swamp forests. **Dist:** MA (?) and NJ south to se. LA, primarily on the Coastal Plain. **Phen:** Oct-Nov. **Syn:** = F, HC, Pa, Va, Tucker (1996); = *Agrostis perennans* var. *elata* (Pursh) A.S. Hitchcock – C, G, S; < *Agrostis perennans* (Walter) Tuckerman – FNA24, GW1, K1, K4, RAB, WH3.

* ***Agrostis capillaris*** Linnaeus. RHODE ISLAND BENTGRASS, COLONIAL BENTGRASS, BROWNTOP. **Hab:** Meadows, roadsides, disturbed areas. **Dist:** Native of Europe (and possibly n. North America). **Phen:** Jun-Aug. **Syn:** = C, FNA24, Il, K1, K3, K4, Meso6, Mi, Mo1, NE, NY, Pa, Tn, Va, Tucker (1996); = *Agrostis tenuis* Sibthorp – G, HC, RAB, S, W, WV; > *Agrostis tenuis* var. *tenuis* – F.

Agrostis elliottiana J.A. Schultes. ELLIOTT'S BENTGRASS, SOUTHERN BENTGRASS. **Hab:** Dry soils of barrens, fields, and rock outcrops. **Dist:** MD west to s. OH, and e. KS, south to Panhandle FL (Gadsden County) and c. TX. **Phen:** Apr-Jun. **Syn:** = Ar, C, ETx1, F, FlGr, FNA24, G, HC, Il, K1, K3, K4, Mo1, NcTx, NE, Pa, RAB, S, Tn, Tx, Va, W, WH3, Tucker (1996). NatureServe G5 (Secure).

* ***Agrostis gigantea*** Roth. REDTOP, BLACK BENTGRASS. **Hab:** Fields, pastures, roadsides, disturbed areas. **Dist:** Native of Eurasia. **Phen:** Jun-Oct. **Syn:** = Ar, C, F, FNA24, Il, K1, K3, K4, Meso6, Mi, Mo1, NE, NY, Pa, Tn, Va, W, Tucker (1996); = *Agrostis alba* – HC, WV, misapplied; = *Agrostis stolonifera* Linnaeus var. *major* (Gaudin) Farwell – G; >< *Agrostis alba* – S, misapplied; < *Agrostis stolonifera* Linnaeus – GW1, RAB, WH3.

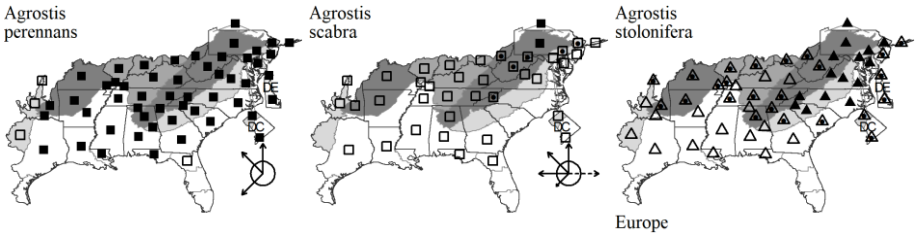
Agrostis hyemalis (Walter) Britton, Sterns, & Poggenburg. TICKLEGRASS, SMALL BENTGRASS, HAIRGRASS. **Hab:** Moist to dry fields, meadows, and roadsides, sometimes also in barrens or thin soils over outcrops. **Dist:** ME west to WI, south to FL and TX. **Phen:** Mar-Jul. **Syn:** = Ar, ETx1, F, FlGr, FNA24, Il, K1, K3, K4, Mi, NE, NY, Pa, Tn, Tx, Va, WH3, WV, Tucker (1996); = *Agrostis hiemalis* – GW1, HC, orthographic variant; = *Agrostis hyemalis* var. *hyemalis* – C, G, Mo1; < *Agrostis hiemalis* – NcTx, S, W, orthographic variant; < *Agrostis hyemalis* (Walter) Britton, Sterns, & Poggenburg – RAB.



Agrostis perennans (Walter) Tuckerman. UPLAND BENT, AUTUMN BENTGRASS. **Hab:** Mesic to dry forests, woodlands, barrens, clearings, disturbed areas, and also in a variety of wetlands such as bogs, fens, seepage swamps, and depressions. **Dist:** NL (Newfoundland) west to MN, south to n. FL and TX; c. Mexico south to c. South America. **Phen:** Apr-May; Aug-Nov. **Tax:** Var. *aestivalis* may be worthy of recognition. **Syn:** = ETx1, HC, Il, Meso6, Mi, Mo1, NcTx, NE, NY, Tx, Va, WV, Tucker (1996); = *Agrostis perennans* var. *perennans* – C, G, S; < *Agrostis perennans* (Walter) Tuckerman – Ar, FNA24, GW1, K1, K3, K4, Pa, RAB, Tn, W, WH3, (also see A. altissima); > *Agrostis perennans* var. *aestivalis* Vasey – F; > *Agrostis perennans* var. *perennans* – F. NatureServe G5 (Secure).

Agrostis scabra Willdenow. FLY-AWAY GRASS, ROUGH BENTGRASS. **Hab:** Bogs, fens, seeps, meadows, old fields, other open habitats. **Dist:** Throughout North America, though mainly in cooler climates (ne. and w. United States, Canada), south to s. Mexico; ne. Asia. **Phen:** Jun-Nov. **Syn:** = ETx1, FlGr, FNA24, GW1, Il, K1, K3, K4, Mi, NE, NY, Pa, Tn, Tx, Va, WH3, Tucker (1996); = *Agrostis hyemalis* (Walter) Britton, Sterns, & Poggenburg var. *scabra* (Willdenow) Blomquist – C; = *Agrostis hyemalis* (Walter) Britton, Sterns, & Poggenburg var. *tenuis* (Tuckerman) Gleason – G; = *Agrostis scabra* var. *scabra* – HC; < *Agrostis hyemalis* (Walter) Britton, Sterns, & Poggenburg – NcTx, RAB, W; > *Agrostis scabra* var. *scabra* – F.

* ***Agrostis stolonifera*** Linnaeus. CREEPING BENTGRASS. **Hab:** Disturbed areas, wet, moist, or dry. **Dist:** Native of Europe. **Phen:** Jun-Oct. **Syn:** = Ar, ETx1, FlGr, K1, K3, K4, Mi, NE, NY, Pa, Tn, Va; = *Agrostis alba* – S, misapplied; > *Agrostis alba* Linnaeus var. *alba* – F, misapplied; > *Agrostis alba* Linnaeus var. *palustris* (Hudson) Persoon – F, misapplied; > *Agrostis palustris* Hudson – HC, Tx, WV, Tucker (1996); < *Agrostis stolonifera* Linnaeus – FNA24, GW1, RAB, W, WH3; > *Agrostis stolonifera* Linnaeus – HC, Tx, Tucker (1996); > *Agrostis stolonifera* var. *compacta* Hartman – G; > *Agrostis stolonifera* var. *palustris* – C, Il, Meso6, Mo1; > *Agrostis stolonifera* var. *stolonifera* – C, G.



Aira Linnaeus 1753 (HAIR GRASS)

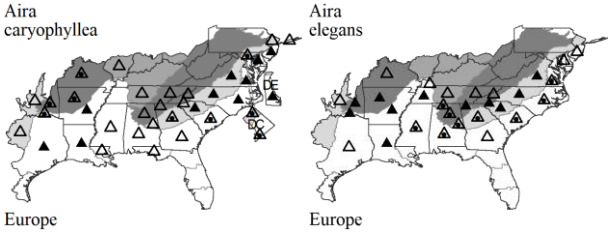
A genus of 8-9 species, annuals, native of Europe, n. Africa, and w. Asia. References: Tucker (1996); Wipff (2007b) in FNA24 (2007a).

2 Pedicels usually 1-2× as long as the spikelets; lemma of both the lower floret and the upper floret with an awn 2-4 mm long**.....*Aira caryophyllea***
2 Pedicels usually 2-8× as long as the spikelets; lemma of upper floret with an awn 1.5-2.5 mm long, lemma of the lower floret awnless or with a minute awn < 1 mm long**.....*Aira elegans***

* ***Aira caryophyllea*** Linnaeus. SILVER HAIR GRASS. **Hab:** Fields, roadsides, disturbed areas. **Dist:** Native of Europe. **Phen:** May-Jul. **Syn:** = C, FlGr, G, HC, K1, Meso6, Mi, Mo1, RAB, Va, WH3, Tucker (1996); = *Aira caryophyllaea* – Il, misspelling; = *Aira caryophyllea* var. *caryophyllea* – Ar, ETx1, FNA24, K3, K4, NE, NY, Tn; = *Aspris caryophyllea* (Linnaeus) Nash – S. NatureServe GNR (Not Yet Ranked).

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated

* ***Aira elegans*** Willdenow ex Roemer & J.A. Schultes. ELEGANT HAIR GRASS, ANNUAL SILVER HAIRGRASS. **Hab:** Fields, roadsides, disturbed areas. **Dist:** Native of Europe. Reported for Calloway County, KY (Abbott & Thompson 2019). **Phen:** May-Jun. **Syn:** = G, HC, K1, K4, Mo1, RAB, Tx, Va; = *Aira caryophyllea* Linnaeus var. *capillaris* (Mertens & W.D.J. Koch) Mutel – Ar, ETx1, FNA24, NcTx, Tn; = *Aira elegantissima* Schur – C, K3, Tucker (1996), Tucker (1996); = *Aspris capillaris* (Host) A.S. Hitchcock – S. NatureServe GNR (Not Yet Ranked).



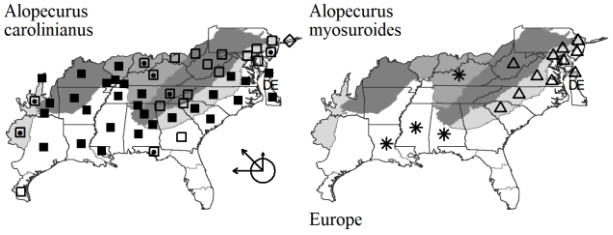
Alopecurus Linnaeus 1753 (FOXTAIL GRASS)

A genus of about 36 species, north temperate and temperate South America. References: Crins (2007b) in FNA24 (2007a); Tucker (1996).

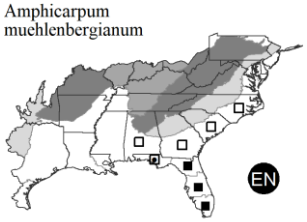
1 Glumes 4-6 mm long, acute or acuminate.
..... ***Alopecurus myosuroides***
1 Glumes 2-3.2 mm long, obtuse or truncate.
..... ***Alopecurus carolinianus***

Alopecurus carolinianus Walter. CAROLINA FOXTAIL GRASS. **Hab:** Moist fields, ditches, forests, bottomlands. **Dist:** MA west to BC, south to n. FL and CA. **Phen:** Apr-Jul. **Syn:** = Ar, C, ETx1, F, FlGr, FNA24, G, GW1, HC, Il, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, WH3, WV, Tucker (1996); = *Alopecurus ramosus* Poiret – S. NatureServe G5 (Secure).

* ***Alopecurus myosuroides*** Hudson. SLENDER FOXTAIL GRASS. **Hab:** Moist fields, roadsides. **Dist:** Native of Europe. **Phen:** Apr-May. **Syn:** = C, ETx1, F, FNA24, G, HC, K1, K3, K4, Mi, NE, NY, RAB, S, Tx, WV, Tucker (1996). NatureServe GNR (Not Yet Ranked).



Amphicarpum Kunth 1829 (PEANUT-GRASS)



The genus consists only of the two species treated here, remarkable for their dimorphic spikelets, some of them cleistogamous and subterranean, others aerial and chasmogamous. A series of publications over the past century make *Amphicarpum* one of the best studied "useless" grasses anywhere (Holm 1896; Weatherwax 1934; Gray & Fairbrothers 1971; McNamara & Quinn 1977; Cheplick & Quinn 1982, 1983, 1986, 1987, 1988a, 1988b; Cheplick 1989; et seq.). References: Cheplick & Quinn (1982); Cheplick & Quinn (1983); Cheplick & Quinn (1986); Cheplick & Quinn (1987); Cheplick & Quinn (1988a); Cheplick & Quinn (1988b); Cheplick (1988); Cheplick (1989); Wipff (2003g) in FNA25 (2003a).

Amphicarpum muehlenbergianum (J.A. Schultes) A.S. Hitchcock. FLORIDA PEANUT-GRASS, BLUE MAIDEN-CANE. **Hab:** Natural depression ponds, flatwoods ponds, clay-based Carolina bays. **Dist:** A Southeastern Coastal Plain endemic: FL and s. AL north to se. NC, rare north of s. GA. **Phen:** Aug-Oct. **Tax:** The spelling of the epithet has been disputed. The original spelling of the basionym by J.A. Schultes is *Milium mühlenbergianum* and the '*ü*' is altered to '*ue*' under the Shenzhen Code; Muhlenberg variably used a spelling with or without an umlaut and there is no basis in the Code for "correction" of the epithet to '*muhlenbergianum*'. **Comm:** First found in NC in the late 1980s by M. Boyer. **Syn:** = K1, K3, K4; = *Amphicarpon floridanum* Chapman – S; = *Amphicarpum muhlenbergianum* (J.A. Schultes) A.S. Hitchcock – FlGr, FNA25, GW1, HC, RAB, WH3, orthographic variant. NatureServe G4 (Apparently Secure).

Andropogon Linnaeus 1753 (BROOMSEDGE, BLUESTEM)

A genus of about 100-110 species, mainly tropical. Campbell's work (1983, 1986, 2003) has greatly clarified the taxonomy of *Andropogon* in e. North America. Great confusion and disagreement were previously the rule in dealing with the *Andropogon virginicus-A. glomeratus* complex. Campbell's careful morphologic work has provided workable technical characters which distinguish the taxa he recognizes. I have generally followed Campbell (1983, et seq.) in his circumscriptions of taxa, but have differed in decisions of rank; see Weakley et al. (2011) for discussion. Taxa differing in numerous morphologic characters, with different (though overlapping) geographic ranges, with different ecological preferences (often rather narrowly segregated by hydrology), and (when they do occur in proximity to one another) showing little or no sign of introgression or hybridization are probably better treated as biological species. Thus, I have treated a number of Campbell's varieties as species. Several of his

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

"variants" also warrant taxonomic recognition, at varietal or specific rank (Campbell 1986; Weakley et al. 2011). The issue of the separation of *Schizachyrium* from *Andropogon*, the membership of each genus, the morphological characters that are key and diagnostic (when characters are in conflict), and the reciprocal monophyly of each genus remain very uncertain. For now, I retain the predominant usage of recent decades of separating the two genera, and allocate the species to genera on the pragmatic character of single racemes (*Schizachyrium*) vs. 2 or more racemes (*Andropogon*), but that may well prove erroneous.References: Bridges & Orzell (2018a); Bridges & Orzell (2020a) in Weakley et al (2020); Campbell (1983); Campbell (1986); Campbell (2003) in FNA25 (2003a); Deshmuke, Shende, & Reddy (2022); Sorrie (2020b) in Weakley et al (2020); Weakley & Schori (2018) in Weakley et al (2018a); Weakley et al (2011); Wipff & Shaw (2018d).

While the dispersal units are still attached to one another, the rachis internodes form a continuous and more-or-less straight rachis. The dispersal units attached together in an unbranched sequence are termed a raceme, whose length is a useful character. Two or more racemes are attached digitately at the summit of the peduncle (in *Schizachyrium* only a single raceme is found). The number of racemes attached is an important character. A raceme sheath subtends the peduncle, often more or less surrounding the peduncle and the racemes. The length of the peduncle (distance between the points of attachment of the raceme sheath and the racemes) is an important character. The length and width (at its widest point, and spread and flattened) of the raceme sheath are very useful characters, used throughout the key. The racemes, peduncle and subtending raceme sheath make up an inflorescence unit. The overall inflorescence is more-or-less complexly branched; its overall size and shape are very useful in recognizing the various taxa, but variation in such a subjective (and environmentally plastic) character has added to the taxonomic confusion in *Andropogon*. The use of inflorescence shape in the key has been minimized, but is often mentioned in the discussion of each species. The number of inflorescence units per plant varies from species to species, in some species rarely exceeding 10, in others ranging upward to 500 or 600. The absence or presence of hairs immediately below the raceme sheath is useful in some groups.

There are several important characters of the foliage. *Andropogon capillipes*, *A. dealbatus*, and *A. cretaceus* have culm sheaths and leaf blades that are strongly glaucous; this is usually very obvious, but can be tested for by running the finger along the surface of the leaf (a white coating of wax will come off on the finger). The key often calls for the ligule length; measure the longest portion of the undivided portion of the ligule. The ligule often has an erose or ciliate upper margin; measure the length of the cilia. The length of leaf blade is measured from the ligule to the leaf apex; do not include the leaf sheath, which is often long and (especially late in the year) only loosely sheathing the culm or even divergent it. Whether the leaf sheaths are antrorsely scabrous or smooth is better determined by touch than by sight. Choose several mid-culm sheaths, run one's finger downward and upward along the sheath surface (near the collar is best). If the sheath is antrorsely scabrous one will feel a somewhat greater resistance to moving the finger downward than upward.

Identification Notes: A thorough understanding of the architecture of the inflorescences of *Andropogon* is necessary in order to identify them successfully. The parts will be described, beginning from the apex of a branch of the inflorescence. Spikelets occur in pairs, the sessile spikelet (usually just referred to as the spikelet) and the pedicelled spikelet, which is usually vestigial or absent (except in *A. gerardi*) and sterile (except in *A. gerardi*, where it is staminate). The first or lower glume of the sessile spikelet has two keels, and the presence and location of antrorse prickle hairs (scabrousness) is an important character in the *A. glomeratus* complex. The length of the sessile spikelet is an important character; it should be measured exclusive of the awn, borne at the apex of the lemma. Awn length is also a useful taxonomic character. The pedicelled spikelet is borne on the pedicel, which is attached at the base of the sessile spikelet and typically angles away from it at about a 45 degree angle. The rachis internode extends from the base of one sessile spikelet to the next sessile spikelet above, breaking apart (upon dehiscence) just below the next spikelet and remaining attached to the sessile spikelet below. The dispersal unit consists of a sessile spikelet sitting in the V shape formed by (on one side) the pedicel and pedicelled spikelet and (on the other side) the rachis internode. Both the pedicel and the rachis internode are usually pubescent with long hairs, and the color of those hairs and their distribution are useful characters. Sometimes culm sheath scabrousness is discernible by touch only near the sheath summit.

1 Pedicellate spikelet staminate, as large as the sessile, fertile spikelet; sessile spikelets > 7 mm long; [section *Andropogon*] ..... ***Andropogon gerardi***

1 Pedicellate spikelet sterile, vestigial or absent; sessile spikelets < 7 mm long; [section *Leptopogon*].

3 Leaves strongly glaucous (often nearly white with a powdery wax that can be rubbed off on the fingers), glabrous.

4 Ligule membrane (0.9-) 1.5 (-2.0) mm long, with cilia 0-0.2 mm long; leaf blades usually (33-) avg. 40 (-75) cm long; pubescence beneath raceme sheaths moderate to dense; raceme sheaths (2.0-) 2.4-3.6 (-4.4) cm long, (1.3-) 2.0-2.5 (-3.0) mm wide ..... ***Andropogon cretaceus***

4 Ligule membrane (0.2-) 0.4 (-0.5) mm long, with cilia 0.3-1.2 mm long; leaf blades (12-) avg. 19 (-38) cm long; pubescence beneath raceme sheaths absent to dense; raceme sheaths (2.1-) 2.9-4.3 (-6.0) cm long, (2.7-) 3.1-3.8 (-5.5) mm wide.

5 Summit of branchlet below attachment of raceme sheath glabrous; raceme sheaths (2.1-) 2.6-3.8 (-4.9) cm long; spikelets (2.6-) 3.2-3.5 (-3.9) mm long; racemes (1.4-) 1.7-2.4 (-3.2) cm long; leaves 2-5 mm wide, averaging 3.5 mm; upper floret lemma awn 0.6-1.5 mm long, averaging 1.1 mm ..... ***Andropogon capillipes***

5 Summit of branchlet below attachment of raceme sheath pubescent with hairs 2-4 mm long; raceme sheaths (2.4-) 3.2-4.8 (-6.0) cm long; spikelets (3.0-) 3.5-3.9 (-4.4) mm long; racemes (1.5-) 2.0-3.0 (-4.0) cm long; leaves 2.5-6.5 mm wide, averaging 5 mm; upper floret lemma awn 0.9-2.1 mm long, averaging 1.4 mm ..... ***Andropogon dealbatus***

3 Leaves green (to somewhat glaucous, but never powdery white), pubescent or glabrous.

6 Upper culm sheaths distinctly broadened and strongly overlapping, often largely hiding the raceme sheaths before senescence (but in some forms with the raceme sheaths strongly exserted); culms mostly < 1 m tall (to 1.4 m tall) ..... ***Andropogon gyrans***

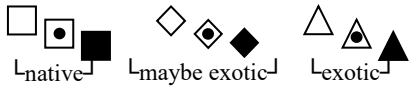
6 Upper culm sheaths reduced, not strongly overlapping, not hiding the raceme sheaths after anthesis; culms mostly > 1 m tall (except *A. perangustatus*, *A. tracyi*, *A. subtenuis*, and small forms of *A. virginicus*).

7 Many or all peduncles longer than the subtending raceme sheaths at maturity, racemes then fully exserted above the apex of the raceme sheath.

9 Inflorescence branches arching outward in pronounced curves; racemes (1.2-) 1.5-2.1 (-2.6) cm long; lemma awns (2-) avg. 7 (-11) mm long; spikelets (4.1-) 4.4-4.6 (-5.0) mm long ..... ***Andropogon brachystachyus***

9 Inflorescence branches erect; racemes (2.2-) 2.5-6 cm long; lemma awns 5-20 mm long; spikelets (3.8-) 4.4-6.5 (-7.5) mm long.

10 Stems < 0.9 m tall; leaves < 2 mm wide; some racemes usually fully included within raceme sheaths at maturity on peduncles < 10 mm long; anthers often marcescent ..... ***Andropogon subtenuis***

Key to Map Symbology: 

* : waif
EN : endemic
H : historic
N : no
P : planted
? : questionable
X : extirpated

10 Stems > 1 m tall; leaves usually > 3 mm wide; racemes rarely included within raceme sheaths at maturity, peduncles rarely < 15 mm long; anthers rarely marcescent.
12 Sessile spikelets 4-5 mm long; lemma awns mostly 5-10 mm long; rachis internode pubescence more or less evenly distributed along the internode; inflorescence peduncles mostly less than 9 cm long.
.....***Andropogon arctatus***
12 Sessile spikelets 5-7 mm long; lemma awns mostly 10-25 mm long; rachis internode with longest hairs concentrated towards its apex; inflorescence peduncles 10-17 cm long.
.....***Andropogon ternarius***
7 Peduncles all shorter than the subtending raceme sheaths at maturity, at least the bases of the racemes not exserted above the apex of the raceme sheath.
16 Inflorescence units with (2-) 4-7 (-13) racemes; raceme sheaths (4.1-) 5.3-8.0 (-10-1) mm wide; hairs of the rachis internode and pedicel yellow-tawny when dry .....***Andropogon mohrii***
16 Inflorescence units with 2-5 (-7) racemes; raceme sheaths (1.5-) 2.0-4.8 (-6.3) mm wide; hairs of the rachis internode and pedicel gray to whitish when dry.
17 Post-flowering peduncles (at least some of them) > 15 mm long.
18 Culm sheaths antrorsely scabrous (often hirsute as well).
20 Ligules (1.0-) 1.2 (-2.0) mm long, with cilia 0-0.3 mm long; keels of first glume scabrous only above middle .....
.....***Andropogon glomeratus***
20 Ligules (0.6-) 0.8 (-1.3) mm long, with cilia 0.2-0.9 mm long; keels of first glume often scabrous below middle.....
.....***Andropogon tenuispatheus***
18 Culm sheaths not scabrous (often hirsute).
21 Culms usually > 1.2 m tall; leaf blades often > 30 cm long and > 3 mm wide; inflorescence units usually > 20/culm.
22 Inflorescence branches arching outward in pronounced curves; awn mostly < 1 cm long; spikelets (4.1-) 4.4-4.6 (-5.0) mm long; anther > 1.7 mm long.....***Andropogon brachystachyus***
22 Inflorescence branches erect; awn mostly >1 cm long; spikelets (3.0-) 3.3-3.8 (-4.5) mm long; anther < 1.5 mm long.
.....***Andropogon tenuispatheus***
21 Culms < 1.2 m tall; leaf blades < 30 cm long and < 3 mm wide; inflorescence units rarely > 20/culm.
25 Ligules (0.2-) 0.4 (-0.5) mm long, with cilia (0.1-) 0.2-0.8 mm long; spikelets (4-) 4.8-5.0 (5.5) mm long; racemes 2 per inflorescence unit
.....***Andropogon tracyi***
25 Ligules (0.4-) 0.6-1.1 (-1.5) mm long, with cilia 0-0.3 mm long; spikelets (3-) 3.4-5.1 (-5.5) mm long; racemes 2-4 per inflorescence unit.
26 Ligules (0.4-) 0.6 (-0.8) mm long, with cilia 0-0.3 mm long.....***Andropogon subtenuis***
26 Ligules (0.8-) 1.1 (-1.5) mm long, with cilia 0-0.1 mm long.....***Andropogon perangustatus***
17 Post-flowering peduncles < 10 mm long.
27 Culm sheaths antrorsely scabrous (often hirsute as well); leaf blades usually > 35 cm long.
28 Ligules (0.6-) 0.8 (-1.3) mm long (usually < 1 mm long), with cilia 0.2-0.9 mm long; raceme sheaths (1.5-) 2.0-2.5 (-3.0) mm wide (usually < 2.5 mm wide); keels of first glume often scabrous below the middle .....***Andropogon tenuispatheus***
28 Ligules (0.7-) 1.2 (-2.2) mm long (usually > 1 mm long), with cilia 0.0-0.3 mm long; raceme sheaths (2.0-) 2.4-3.4 (-4.7) mm wide (usually > 2.5 mm wide); keels of first glume scabrous only above the middle, smooth below.
29 Inflorescences oblong to obpyramidal; spikelets (3.8-) 4.1-4.4 (-5.0) mm long; anthers usually not marcescent within spikelet; mature peduncles (4 -) 11-35 (-60) mm long (usually some of them > 10 mm long) .....***Andropogon glomeratus***
29 Inflorescences (linear to) oblong; spikelets (3.4-) 3.6-3.8 (-4.6) mm long; anthers usually marcescent within spikelets; mature peduncles (2-) 3-5 (-8) mm long.....***Andropogon hirsutior***
27 Culm sheaths not scabrous (often hirsute); leaf blades < 35 cm long (except in *A. glomeratus* var. *pumilus*).
31 Leaves glabrous.
32 Ligules (0.8-) 1.1 (-1.5) mm long, with cilia 0-0.1 mm long; basal leaves often filiform, < 1.5 mm wide, strongly erect.....
.....***Andropogon perangustatus***
32 Ligules (0.2-) 0.5 (-0.8) mm long, with cilia 0.2-1.3 mm long; basal leaves usually > 2 mm wide, soon arching.
34 Stems < 1 m tall; inflorescence units < 14 per stem; spikelets (3.5-) 4.0-4.5 (-5.2 mm long; raceme sheaths (4.0-) 4.9-7.9 (-9.5) cm long, (1.5-) 2.5-4.3 (-5.0) mm wide; peduncles (1-) 5-25 (-50) mm long; racemes 2-4 (-7) per inflorescence unit, at least some inflorescence units (especially at culm and branch apices) with 3 or more racemes .....***Andropogon subtenuis***
34 Stems > 1 m tall; inflorescence units usually > 14 per stem; spikelets (3.0-) 3.5-3.7 (-4.2) mm long; raceme sheaths (2.8-) 3.3-4.7 (-6.7) cm long, (3.0-) 3.2-3.8 (-5.2) mm wide; peduncles (2-) 3-4 (-6) mm long; racemes 2-4 (-7) per inflorescence unit, at least some inflorescence units (especially at culm and branch apices) with 3 or more racemes .....***Andropogon virginicus var. 1***
31 Leaves pubescent, at least on the margin near the collar.
35 Keels of first glume often scabrous below the middle; leaves usually > 44 cm long.....***Andropogon tenuispatheus***
35 Keels of first glume scabrous only above middle; leaves usually < 31 cm long.
36 Pubescence of young culm sheaths appressed; spikelets usually > 4 mm long; hairs on rachis internode and sterile pedicel dense, long; callus hairs 1.5-5 mm long.....***Andropogon longiberbis***
36 Pubescence of young culm sheaths spreading; spikelets mostly < 4 mm long; hairs on rachis internode and sterile pedicel rather sparse and short; callus hairs 1-2.5 mm long.
.....***Andropogon virginicus var. virginicus***

Andropogon arctatus Chapman. FLORIDA BLUESTEM. **Hab:** Wet pinelands, pineland bogs, rarely moist disturbed ground. **Dist:** N. FL west to w. Panhandle of FL and adjacent s. AL, south to s. FL. The curious record from Pamlico County, NC (the specimen at GH, collected by Randolph and Randolph in 1922, annotated as *A. arctatus* by Campbell) is likely a waif. **Phen:** Sep-Nov. **Syn:** = K4, Bridges & Orzell (2018a); < *Andropogon arctatus* Chapman – FlGr, FNA25, HC, K1, K3, S, WH3, Campbell (1983).

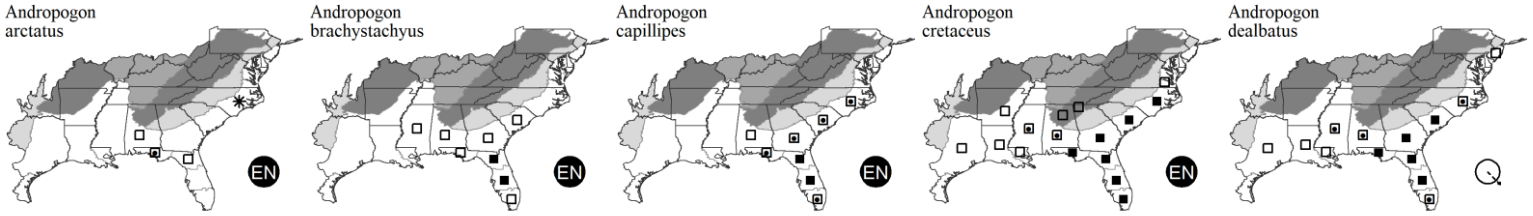
Andropogon brachystachyus Chapman. SHORTSPIKE BLUESTEM. **Hab:** Moist to wet pinelands, natural pond margins, bogs, disturbed roadsides. **Dist:** Se. SC (McMillan et al. 2002) south to FL, south to s. FL, west to e. FL Panhandle. *A. brachystachyus* has been considered by some to range north to NC. **Phen:** Jul-Dec. **Syn:** = FlGr, FNA25, K1, K3, K4, WH3, Campbell (1983); = *Andropogon brachystachys* – GW1, HC, S, orthographic variant. NatureServe G4 (Apparently Secure).

Andropogon capillipes Nash. DRYLAND WHITE BLUESTEM. **Hab:** Dry to mesic pine flatwoods, sandhills, adjacent roadbanks. **Dist:** Se. NC south to s. FL and west to s. AL. **Phen:** Sep-Nov. **Tax:** See *A. dealbatus* for discussion of these two taxa. The type of *A. capillipes* (collected by

A.H. Curtiss in FL) is of this taxon; Nash (1900) states that it occurs "in dry soil, North Carolina to Florida" and emphasizes that it is "abundantly distinct from *A. virginicus*, to which it is related". **Syn:** = FlGr, HC, Weakley et al (2011), Weakley et al (2018a); = *Andropogon virginicus* var. *glaucus "drylands variant"* – Campbell (1983); < *Andropogon capillipes* Nash – GW1, K1, K3, S; < *Andropogon dealbatus* (C. Mohr) Weakley & LeBlond – K4; < *Andropogon virginicus* Linnaeus – RAB; < *Andropogon virginicus* var. *glaucus* Hackel – F, FNA25, WH3.

Andropogon cretaceus Weakley & Schori. PURPLE BLUESTEM, CHALKY BLUESTEM. **Hab:** Wet pine savannas, pine flatwoods, maritime forests, ditches, wet disturbed sites. **Dist:** Se. VA south to c. peninsular FL and west to e. TX (Singhurst, Sorrie, & Holmes 2012). **Phen:** Aug-Nov. **Tax:** Although sometimes included in the past in either *A. glomeratus* or *A. virginicus*, this species is distinctive and easily recognized in the field (even from a car at 60 m.p.h.) by the combination of blue color, height of well over 1 m (taller than the other glaucous bluestems), and semi-bushy inflorescence. See Weakley et al. (2018a) for explanation of the need for a new name for this species, *A. glaucopsis* being preoccupied. **Syn:** = FlGr, K4, Sorrie (2020b) in Weakley et al (2020), Weakley & Schori (2018) in Weakley et al (2018a); = *Andropogon glaucopsis* Elliott ex Beal – GW1, K1, K3, Va, Weakley et al (2011), misapplied; = *Andropogon glomeratus* var. *glaucopsis* (Elliott ex Beal) A.S. Hitchcock – FNA25, WH3, Campbell (1983); = *Andropogon virginicus* var. *glaucopsis* (Elliott) A.S. Hitchcock – F, HC; < *Andropogon glomeratus* (Walter) Britton, Sterns, & Poggenburg – ETx1, S; < *Andropogon virginicus* Linnaeus – RAB; >< *Andropogon virginicus* var. *glaucus* Hackel – Ar, misapplied.

Andropogon dealbatus (C. Mohr) Weakley & LeBlond. WETLAND WHITE BLUESTEM. **Hab:** Wet pine savannas, ditches adjacent to savannas, depressional wetlands. **Dist:** S. NJ south to s. FL and west to e. TX; also in the Bahamas (Sorrie & LeBlond 1997). **Phen:** Aug-Dec (-Jul). **Tax:** Campbell (1983) informally described two "variants" of *A. virginicus* var. *glaucus*. *A. capillipes* is clearly a species distinct from *A. virginicus*; moreover, the substantial morphological and ecological differences between Campbell's two "variants" (which he describes as nearly always sharply distinct, even when growing in close proximity) warrant recognition as good species (Weakley et al. 2011). **Syn:** = FlGr, Weakley & Schori (2018) in Weakley et al (2018a), Weakley et al (2011); = *Andropogon virginicus* var. *glaucus "wetlands variant"* – Campbell (1983); < *Andropogon capillipes* Nash – GW1, K1, K3, S; < *Andropogon dealbatus* (C. Mohr) Weakley & LeBlond – K4; < *Andropogon virginicus* Linnaeus – RAB; < *Andropogon virginicus* var. *glaucopsis* (Elliott) A.S. Hitchcock – HC; < *Andropogon virginicus* var. *glaucus* Hackel – F, FNA25, WH3.



Andropogon gerardi Vitman. BIG BLUESTEM, TURKEYFOOT. **Hab:** In a wide variety of habitats, usually rather dry, such as longleaf pine sandhills, glades, cliffs, and rock outcrops, in the Piedmont in woodlands, former prairie-like sites, woodlands, open forests, and river-scour grasslands, in the Mountains in glades, riverside scour areas, and rarely in grassy balds, ascending to at least 1600 m over mafic rocks (on Old Field Bald, Watauga and Ashe counties, NC). **Dist:** QC west to SK, south to FL and AZ. **Phen:** Jul-Nov. **Tax:** Some favor treating *A. hallii* Hackel as a subspecies of *A. gerardi* (Wipff 1996c); I do not agree, but if that course is followed, then our eastern taxon becomes *A. gerardi* ssp. *gerardi*. **Syn:** = G, HC, K3, K4, NY, Tx, WV; = *Andropogon gerardii* Vitman – Ar, C, FlGr, FNA25, GW1, Il, K1, Mi, NE, Pa, RAB, Tn, Va, W, WH3, orthographic variant; = *Andropogon gerardii* ssp. *gerardii* – ETx1, NcTx; = *Andropogon provincialis* Lamarck – S; > *Andropogon gerardi* var. *gerardi* – F; > *Andropogon gerardii* var. *chrysocomus* – Mo1; > *Andropogon gerardii* var. *gerardii* – Mo1. NatureServe G5 (Secure).

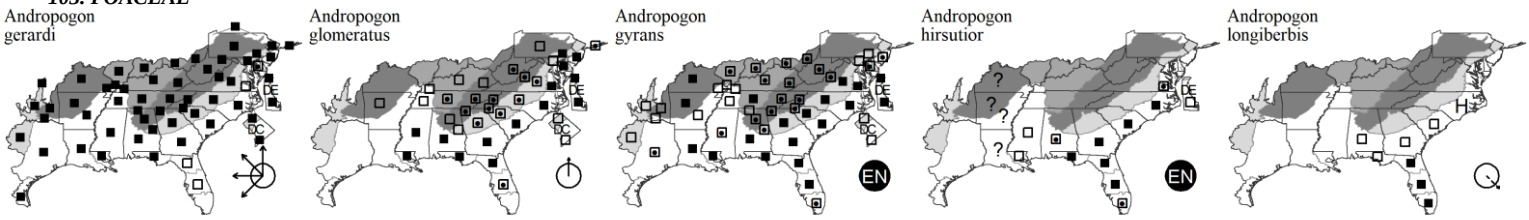
Andropogon glomeratus (Walter) Britton, Sterns, & Poggenburg. COMMON BUSHY BLUESTEM. **Hab:** Swamps, wet pine savannas, pine flatwoods, bogs, fens, depression ponds, wet disturbed sites. **Dist:** S. MA south to c. peninsular FL and west to s. MS, primarily on the Coastal Plain, but scattered inland to w. PA, WV, c. KY, c. TN and AR. **Phen:** Aug-Nov. **Syn:** = Ar, K4, Sorrie (2020b) in Weakley et al (2020), Weakley et al (2011), Wipff & Shaw (2018d); = *Andropogon glomeratus* (Walter) Britton, Sterns, & Poggenburg var. *glomeratus* – FlGr, FNA25, K1, K3, NE, NY, Va, WH3, Campbell (1983), Campbell (1986); = *Andropogon virginicus* var. *abbreviatus* (Hackel) Fernald & Griscom – C, F, G, GW1, WV; < *Andropogon glomeratus* (Walter) Britton, Sterns, & Poggenburg – ETx1, HC, Il, Pa, S, Tn, Tx, W; < *Andropogon virginicus* Linnaeus – RAB.

Andropogon gyrans W.W. Ashe. ELLIOTT'S BLUESTEM. **Hab:** Dry to moist forests, woodlands, longleaf pine sandhills, pine savannas, fields, and disturbed areas. **Dist:** S. NJ west to s. IN, s. IL, s. MO, south to s. FL and TX. **Phen:** Jul-Nov. **Tax:** Campbell (1983) argued that the name *A. elliottii* should be replaced by *A. gyrans*; Ward (2004c) argues for retention of the traditional *A. elliottii*. We here follow Campbell (1983). **Syn:** = C, Il, NcTx, Pa, Tn, Va, W; = *Andropogon elliottii* Chapman – WV; = *Andropogon gyrans* var. *gyrans "common variant"* – Campbell (1983); > *Andropogon campyloracheus* Nash – RAB, S; < *Andropogon elliottii* Chapman – HC, Tx; > *Andropogon elliottii* Chapman – RAB, S; > *Andropogon elliottii* var. *elliottii* – F, G; > *Andropogon elliottii* var. *gracilior* Hackel – F, G; > *Andropogon elliottii* var. *projectus* Fernald & Griscom – G; < *Andropogon gyrans* var. *gyrans* – ETx1, FlGr, FNA25, K1, K3, K4, Mo1, WH3.

Andropogon hirsutior (Hackel) Weakley & LeBlond. HAIRY BLUESTEM. **Hab:** Wet pine savannas, pine flatwoods, adjacent ditches, other wet disturbed sites. **Dist:** E. MD south to c. peninsular FL, west to se. LA. Material west of the Mississippi River appears to be of this taxon, but needs additional study. **Phen:** Sep-Nov. **Tax:** See discussion in Weakley et al. (2011) for reasons for recognition of this taxon at specific rank. **Syn:** = FlGr, K3, K4, Sorrie (2020b) in Weakley et al (2020), Weakley et al (2011); = *Andropogon glomeratus* (Walter) Britton, Sterns, & Poggenburg var. *hirsutior* (Hackel) C. Mohr – FNA25, K1, Va, WH3, Campbell (1983); = *Andropogon virginicus* var. *hirsutior* (Hackel) A.S. Hitchcock – Tx; < *Andropogon glomeratus* (Walter) Britton, Sterns, & Poggenburg – ETx1, HC, S, Tn; < *Andropogon virginicus* Linnaeus – RAB; ? *Andropogon virginicus* var. *glaucopsis* (Elliott) A.S. Hitchcock – G, misapplied.

Andropogon longiberbis Hackel. LONGBEARD BLUESTEM. **Hab:** Dry sandy soils of sandhills and dunes, calcareous wet pinelands and dry pine rocklands (this may be another new species, under study). **Dist:** Se. NC south to s. and w. FL; Bahamas. **Phen:** Sep-Oct (-Aug). **Tax:** The Florida plants in calcareous situations may represent an undescribed species. **Syn:** = FlGr, FNA25, HC, K1, K3, K4, S, WH3, Campbell (1983). NatureServe G5 (Secure).

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated



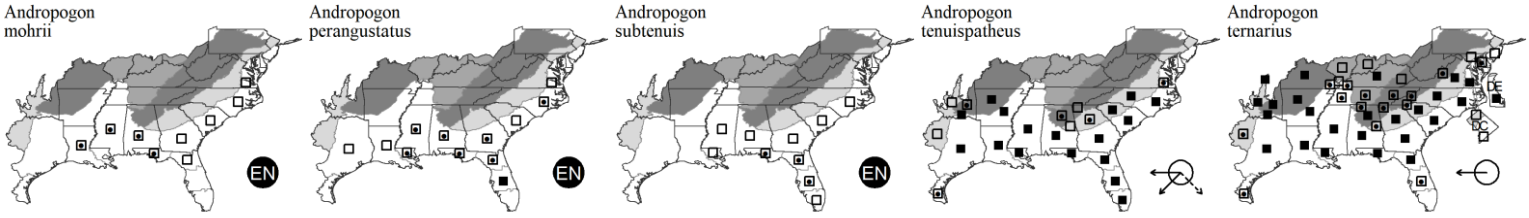
Andropogon mohrii (Hackel) Hackel. TAWNY BLUESTEM, BOG BLUESTEM. **Hab:** Wet pine savannas, sphagnous bogs. **Dist:** Se. VA south to n. FL, west to LA. **Phen:** Sep-Nov. **Syn:** = C, F, FlGr, G, GW1, HC, K1, K3, K4, RAB, S, Va; = *Andropogon liebmannii* Hackel var. *pungensis* (Ashe) C.S. Campbell – FNA25, WH3, Campbell (1983). NatureServe G4? (Apparently Secure).

Andropogon perangustatus Nash. NARROWLEAF BLUESTEM. **Hab:** Wet pinelands, clay-based Carolina bays, other depression wetlands, and boggy wetlands. **Dist:** E. VA south to c. peninsular FL, west to e. TX. **Phen:** Aug-Dec. **Comm:** Growth form, general appearance, and habitat (dense bluish tussocks with very narrow leaves and long ligules, growing in wet areas such as clay-based Carolina bays) make *A. perangustatus* readily recognizable. **Syn:** = FlGr, HC, S, Va; = *Andropogon gyrans* Ashe var. *stenophyllus* (Hackel) C.S. Campbell – ETx1, FNA25, K1, K3, K4, WH3, Campbell (1983). NatureServe G5T4 (Apparently Secure).

Andropogon subtenuis Nash. NASH'S BLUESTEM. **Hab:** Longleaf pine flatwoods, dry-mesic to mesic southern Florida grasslands. **Dist:** Se. NC south to c. peninsular FL, west to se. LA. **Phen:** Sep-Nov. **Syn:** = Tx, by mention; = *Andropogon gyrans* var. *gyrans "tenuous variant"* – Campbell (1983); < *Andropogon elliottii* Chapman – HC, RAB, S; < *Andropogon gyrans* var. *gyrans* – FlGr, FNA25, K1, K4, WH3.

Andropogon tenuispatheus (Nash) Nash. MARITIME BUSHY BLUESTEM. **Hab:** Maritime wet grasslands, brackish marsh edges, calcareous wet grasslands, interdune swales and ponds, seepages in limestone areas, prairies, moist disturbed sites. **Dist:** Se. VA and c. OK south to s. FL and c. and s. TX, south into Central America; West Indies. **Phen:** Aug-Nov. **Tax:** Excluded from the concept of *A. tenuispatheus* is *A. eremicus* Wipff & Shaw (Wipff & Shaw 2018d), of sw. United States. **Syn:** = K4, Va, Sorrie (2020b) in Weakley et al (2020), Wipff & Shaw (2018d); = *Andropogon glomeratus* (Walter) Britton, Sterns, & Poggenburg var. *pumilus* Vasey ex Dewey – FlGr, FNA25, K1, K3, WH3, Campbell (1986); = *Andropogon glomeratus* (Walter) Britton, Sterns, & Poggenburg var. *pumilus "robust variant"* Vasey ex Dewey – Campbell (1983); < *Andropogon glomeratus* (Walter) Britton, Sterns, & Poggenburg – Bah, ETx1, HC, NcTx, S, Tx; < *Andropogon virginicus* Linnaeus – RAB.

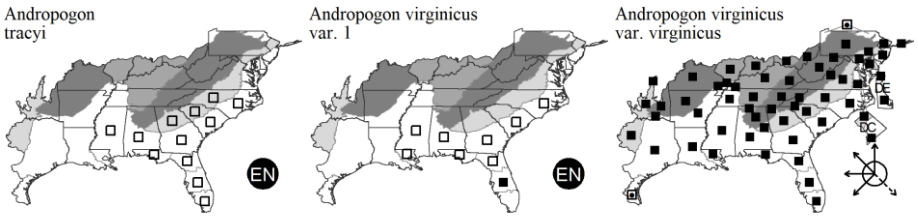
Andropogon ternarius Michaux. SPLITBEARD BLUESTEM. **Hab:** Longleaf pine sandhills, dry to moist soils of woodlands and openings. **Dist:** DE west to KY and s. MO, south to FL and TX. **Phen:** Sep-Oct. **Tax:** *A. cabinisii* Hackel, sometimes treated as *A. ternarius* var. *cabanisii* (Hackel) Fernald & Griscom, is endemic in s. and c. peninsular FL. **Syn:** = HC, K4, S, Tx; = *Andropogon ternarius* var. *ternarius* – Ar, FlGr, FNA25, K1, Mo1, Va, Campbell (1983); < *Andropogon ternarius* Michaux – C, ETx1, G, Il, K3, NcTx, RAB, Tn, W, WH3; > *Andropogon ternarius* var. *glaucescens* (Lamson-Scribner) Fernald & Griscom – F; > *Andropogon ternarius* var. *ternarius* – F. NatureServe G5T5? (Secure).



Andropogon tracyi Nash. TRACY'S BLUESTEM. **Hab:** Dry sandy or clayey soils of longleaf pine sandhills, Florida scrub, disturbed sites. **Dist:** E. NC south to s. FL and west to MS. **Phen:** Sep-Nov. **Syn:** = FlGr, FNA25, HC, K1, K3, K4, S, WH3, Campbell (1983). NatureServe G4? (Apparently Secure).

Andropogon virginicus Linnaeus *var. **1***. SMOOTH BLUESTEM. **Hab:** Longleaf pine savannas. **Dist:** NC south to peninsular FL, west to e. LA. Known from NC and SC (Berkeley and Marion counties; P. McMillan, pers. comm.). **Tax:** This entity has glaucous stem internodes and glabrous leaves. Although treated by Campbell (1983) as the informal 'smooth variant', decades of additional observations of this taxon by Southeastern Coastal Plain field botanists suggest that it warrants formal taxonomic recognition. **Syn:** = *Andropogon virginicus* Linnaeus var. *virginicus "smooth variant"* – Campbell (1983), Campbell (1986); < *Andropogon virginicus* Linnaeus – RAB, S; < *Andropogon virginicus* Linnaeus var. *virginicus* – FlGr, FNA25, HC, K1, K3, K4, WH3.

Andropogon virginicus Linnaeus *var. **virginicus***. OLD-FIELD BROOMSTRAW, BROOMSEDGE, "SEDGE GRASS", "SAGE GRASS", "BROOM SAGE". **Hab:** Old fields, roadbanks, disturbed sites. **Dist:** MA west to MI and e. KS, south to FL and e. TX; West Indies; Central America. **Phen:** Sep-Oct (-Dec). **Tax:** Campbell (1983) recognized 3 'variants' within *A. virginicus* var. *virginicus*; the 'deceptive variant' he later (1986) described formally as var. *decipiens* (see above). The 'old-field variant' is the common 'variant' in much of our area, occurring abundantly and weedily. It has green stem internodes and the leaves usually pubescent, at least on the margins near the collar. The 'smooth variant' is known only from the Coastal Plain and is apparently rare in our area. **Syn:** = Ar, Mo1, NY; = *Andropogon virginicus* Linnaeus var. *virginicus "oldfield variant"* – Campbell (1983), Campbell (1986); < *Andropogon virginicus* Linnaeus – Bah, ETx1, Il, Mi, NcTx, Pa, RAB, S, Tn, W; > *Andropogon virginicus* var. *tetrastachyus* (Elliott) Hackel – F; < *Andropogon virginicus* Linnaeus var. *virginicus* – C, FlGr, FNA25, G, HC, K1, K3, K4, NE, Tx, Va, WH3, WV; >< *Andropogon virginicus* Linnaeus var. *virginicus* – F.



Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Anthenantia Palisot de Beauvois 1812 (SILKYSCALE)

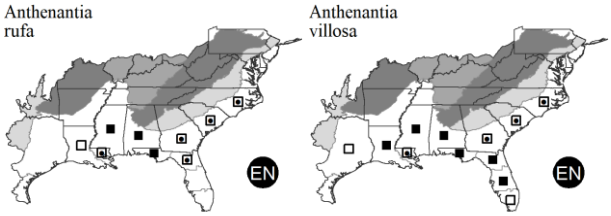
A genus of 4-5 species, of se. North America and tropical America, if *Leptocoryphium* is included in *Anthenantia*, as it appears it should be (Acosta et al. 2014). Clayton & Renvoize (1986) state that "*Anthenantia* is the etymologically correct version of three alternative spellings given by Beauvois". *Anthenantia* has a C4 photosynthetic pathway. References: Acosta et al (2014); Clayton & Renvoize (1986); Crins (1991); Kral (2004); Wipff & Shaw (2018e); Wipff (2003f) in FNA25 (2003a).

2 Leaves weakly if at all geniculate and auriculate at junction of blade and sheath, ascending to erect (lacking a sharp bend outward at the summit of the sheath), medium green; blade (3-) 4-8 (-10) mm wide, the proximal margins glabrous or sometimes ascending pilose-ciliate; pigmentation of leaves, spikelets and their trichomes variously reddish or purplish; fertile lemma red-brown to nearly black, leaf tip with a very short taper to a blunt or rounded apex; lower sheaths crowded and keeled (therefore distichous) ..... ***Anthenantia rufa***

2 Leaves strongly geniculate and auriculate at junction of blade and sheath, spreading, usually squarrose (with a sharp bend outward at the summit of the sheath), yellowish green; blade 4-10 (-15) mm wide, the proximal margins ciliate at least basally with ascending strumose-hirsute cilia; pigment of leaves, spikelets and their trichomes usually with little or any red; fertile lemma brown; leaf tip with a long taper to a sharp apex; lower sheaths not crowded, keeled, or distichous ..... ***Anthenantia villosa***

Anthenantia rufa (Elliott) J.A. Schultes. PURPLE SILKYSCALE. **Hab:** Wet pine savannas in the outer Coastal Plain, seepage bogs and moist sandhill-pocosin ecotones in the fall-line sandhills. **Dist:** Se. NC south to n. FL and west to w. LA. **Phen:** Sep-Oct. **Comm:** *A. rufa* inhabits much wetter habitats than the similar *A. villosa*, and is more typical of the outer Coastal Plain. Plants without culms are reminiscent of the Liliaceae. **Syn:** = FlGr, FNA25, Kral (2004); = *Anthaenantia rufa* (Elliott) J.A. Schultes – GW1, HC, K1, RAB, S, Tx, WH3, Crins (1991), orthographic variant; < *Anthenantia rufa* (Elliott) J.A. Schultes – K3, K4.

Anthenantia villosa (Michaux) Palisot de Beauvois. GREEN SILKYSCALE. **Hab:** Longleaf pine sandhills, especially in submesic swales. **Dist:** Se. NC south to s. FL and west to e. TX. **Phen:** Sep-Oct. **Comm:** *A. villosa* is found in drier habitats than *A. rufa*, most typically in upland swales in the sandhills. Kral (2004) has segregated a new species, *A. texana* Kral, of the w. Gulf Coastal plain, previously confused with *A. villosa*. **Syn:** = ETx1, FlGr, K3; = *Anthenantia villosa* var. *villosa* – K4; < *Anthaenantia villosa* (Michaux) Palisot de Beauvois – HC, K1, RAB, S, Tx, WH3, Crins (1991), orthographic variant; < *Anthenantia villosa* (Michaux) Palisot de Beauvois – FNA25. NatureServe G4G5 (Apparently Secure).



Anthoxanthum Linnaeus 1753 (VERNAL GRASS)

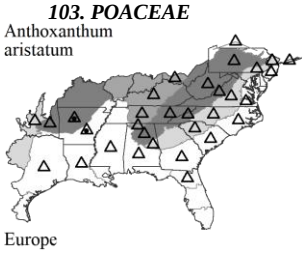
A genus of about 10 species (as here circumscribed to exclude *Hierochloe*) and *Ataxia*), perennials and annuals, of temperate and Mediterranean Eurasia. Tucker (1996), Soreng et al. (2003), and Allred & Barkworth in FNA (2007a) all include *Hierochloe* into a more broadly circumscribed *Anthoxanthum*, but this has been challenged and now appears premature or unwise. We here follow a circumscription that accepts *Anthoxanthum* s.s., *Hierochloe*, and *Ataxia* (which does not occur in our area). References: Allred & Barkworth (2007) in FNA24 (2007a); Soreng et al (2003); Tucker (1996).

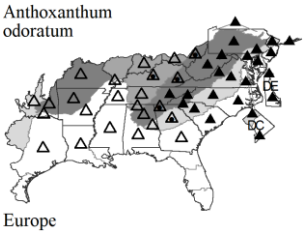
2 Annual, geniculate; ligules 0.5-2 mm long; glumes glabrous; leaves 1-2 mm wide ..... ***Anthoxanthum aristatum***

2 Perennial, erect; ligules (1-) 2-3 mm long; glumes villous throughout or at least on the keel; leaves 2-5 mm wide ..... ***Anthoxanthum odoratum***

* ***Anthoxanthum aristatum*** Boissier. ANNUAL VERNAL GRASS. **Hab:** Roadsides, disturbed areas. **Dist:** Native of Europe. **Phen:** Apr-Jun. **Tax:** This taxon has sometimes been treated at varietal or subspecific rank under *A. ovatum* Lagasca y Segura or under *A. odoratum* Linnaeus. Morphological, cytological, and molecular evidence are not in concordance, and it seems best to retain it at species rank and flexible affinities. **Syn:** = Ar, C, ETx1, FlGr, FNA24, G, HC, Il, K1, K4, Pa, RAB, S, Va, WH3, Tucker (1996); = *Anthoxanthum ovatum* Lagasca y Segura var. *aristatum* (Boissier) Pérez Lara – K3, NE, NY; = *Anthoxanthum puelii* Lecoq & Lamotte – F, WV. NatureServe G4G5 (Apparently Secure).

* ***Anthoxanthum odoratum*** Linnaeus. SWEET VERNAL GRASS. **Hab:** Lawns, roadsides, disturbed areas. **Dist:** Native of Europe. **Phen:** Apr-Jun. **Comm:** *A. odoratum* is a familiar grass of suburban areas and roadsides, and its pollen is known as a major cause of spring hay fever. From a letter from Charles Darwin to J.D. Hooker, in June 1855: "Have just made out my first grass, hurrah! hurrah! I must confess that fortune favours the bold, for, as good luck would have it, it was the easy *Anthoxanthum odoratum*: nevertheless it is a great discovery; I never expected to make out a grass in all my life, so hurrah! It has done my stomach surprising good…". **Syn:** = Ar, C, ETx1, F, FNA24, G, HC, Il, K3, Meso6, Mi, Mo1, NE, NY, Pa, RAB, S, Tn, Va, W, WV, Tucker (1996); = *Anthoxanthum odoratum* ssp. *odoratum* – K1. NatureServe GNRTNR (Not Yet Ranked).





Aristida Linnaeus 1753 (THREE-AWN GRASS)

A genus of about 250-300 species, widespread in the tropics, subtropics, and warm temperate zones. Cerros-Tlatilpa, Columbus, & Barker (2011) discuss the phylogeny of the genus. References: Allred (1984); Allred (1985); Allred (1986); Allred (2003d) in FNA25 (2003a); Henrard (1929); Kesler, Anderson, & Hermann (2003); Peet (1993); Ward (2001).

Identification Notes: The awns must be dry and relatively mature to assume their characteristic positions (immature awns and moist mature awns are erect and parallel). It is sometimes useful to dry a collection unpressed. Beware, however, that drying followed by dispersal can take place very quickly under the right conditions (such as the dashboard of a hot car!).

1 Plant a perennial, forming dense tussocks, the leaves primarily basal, usually very numerous, mostly > 3 dm long, either 0.5-1.5 mm wide and almost always tightly involute, or 1-3 mm wide and flat or folded; flowering only in the growing season following fire.
..... ***Aristida beyrichiana***

1 Plant an annual or perennial, forming small tufts (or solitary), the leaves primarily cauline, usually few, mostly < 3 dm long (if as long as 3 dm then > 2 mm wide), flat to slightly folded, but not wiry; flowering not strongly triggered by fire.

4 First glume 3-7 nerved.
..... ***Aristida oligantha***

4 First glume 1-2-nerved.

6 Central awns spirally coiled at the base (above the awn column), like a corkscrew, ½ to 3 full turns (when dry).

7 Lateral awns 5-13 mm long, spreading ..... ***Aristida basiramea***

7 Lateral awns 1-4 mm long, erect

8 First glume 1/2 to 2/3 as long as the second glume; lemma 6-11 mm long, glabrous to scaberulous..... ***Aristida curtissii***

8 First glume as long as or nearly as long as the second glume; lemma 3-8 mm long, sparsely appressed-pubescent..... ***Aristida dichotoma***

6 Central awns straight to curved (or contorted at the base).

9 Lateral awns < ½ as long as the central awn.

13 Central awn (8-) 12-27 mm long; lateral awns (1-) 6-18 mm long ..... ***Aristida geniculata***

13 Central awn mostly 1-10 (-14) mm long; lateral awns 0-5 (-8) mm long..... ***Aristida longespica***

9 Lateral awns > ½ as long as the central awn.

14 Sheaths lanose or floccose (the hairs kinked and intertwined); nodes of the panicle axis with tufts of lanose or floccose hairs .....
..... ***Aristida lanosa***

14 Sheaths glabrous to pilose (the hairs straight and usually appressed, not intertwined); nodes of the panicle axis glabrous or pilose.

15 Awn column (the connivent awns twisted together) or lemma beak (slender, narrowed, and twisted portion of lemma body below the awns) 7-30 mm long; lemma body (including the beak, if present) separated from the awns (or awn column) by an articulation zone, the awns (or awn column) disarticulating at maturity from the lemma.

16 Panicle spiciform, broadest near the middle, dense, the spikelets overlapping strongly; awns (10-) 20-30 mm long, borne at the summit of a twisted lemma beak 7-30 mm long; culms simple or with very few branches; plants perennial ..... ***Aristida spiciformis var. spiciformis***

16 Panicle almost corymbiform, broadest above the middle, open, the spikelets overlapping only slightly; awns 30-40 mm long, not including the 8-15 mm long column formed by the twisting together of the 3 awn bases; culms often much-branched; plants annual ..... ***Aristida tuberculosa***

15 Awn column or lemma beak absent or < 7 mm long; lemma body not separated from the awns by an articulation zone.

17 Main lower branches of the panicle divergent from the culm and with pulvini..... ***Aristida purpurea var. longiseta***

17 Main lower branches of the panicle (or pedicels in racemose species) ascending to appressed and lacking pulvini.

18 Spikelets borne singly at each node of the main axis, the inflorescence thus a spike or raceme ..... ***Aristida mohrii***

18 Spikelets 2 or more per node of the main axis at most nodes (a few nodes may have single spikelets), often with side branches present as well, the inflorescence thus a panicle (less commonly a raceme).

20 Central awn 15-40 mm long; first glume prominently 2-keeled, (8-) 9-14 mm long when mature..... ***Aristida palustris***

20 Central awn 8-25 mm long; first glume either 1-keeled and 6-14 mm long, or weakly 2-keeled and 5.5-9 (-10) mm long when mature.

21 Central awn about 2× as thick as the lateral awns, divergent to reflexed; first glume 1-keeled or weakly 2-keeled; [moist to wet habitats].

22 Basal internode of the culm 0.3-0.6 mm wide; most nodes of the inflorescence with 1-2 spikelets; all awns spreading, the central spirally twisted basally and often contorted by as much as 180 degrees (best seen in fresh material); central awn 15-20 mm long, lateral awns 11-16 mm long, the ratio of the lateral:central awn length 0.69-0.80; lemma callus beard 0.6-1.0 mm long .....
..... ***Aristida simpliciflora***

22 Basal internode of the culm 0.7-1.2 mm wide; most nodes of the inflorescence with 3 or more spikelets; central awn spreading to slightly deflexed, not spirally twisted basally, the lateral awns ascending to erect (best seen in fresh material); central awn 13-22 mm long, lateral awns 8-15 mm long, the ratio of the lateral:central awn length 0.55-0.69; lemma callus beard 0.2-0.6 mm long .....
..... ***Aristida virgata***

21 Central awn < 1.5× as thick as the lateral awns, erect to divergent; first glume 1-keeled (rarely weakly 2-keeled); [dry habitats].

23 Culms mostly > 10 dm tall and 3-6 mm in diameter near the base; awns 8-15 mm long; panicle branches > 4 cm long; callus ca. 1.0 mm long..... ***Aristida condensata***

Key to Map Symbology: □ native; ◇ maybe exotic; △ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

23 Culms 5-8 (-10) dm tall and 1-4 mm in diameter near the base; awns 12-25 mm long; panicle branches 1-4 cm long; callus 0.4-0.8 mm long.
24 First glume 1-4 mm longer than the second glume (rarely about equal to it); awns 15-25 mm long, straight or slightly contorted at the base; leaf blades 1-3 mm wide, usually curling..... ***Aristida purpurascens***
24 First glume shorter than or about equal to the second glume; awns 12-18 mm long, spirally contorted at the base; leaf blades about 1 mm wide, usually not curling..... ***Aristida tenuispica***

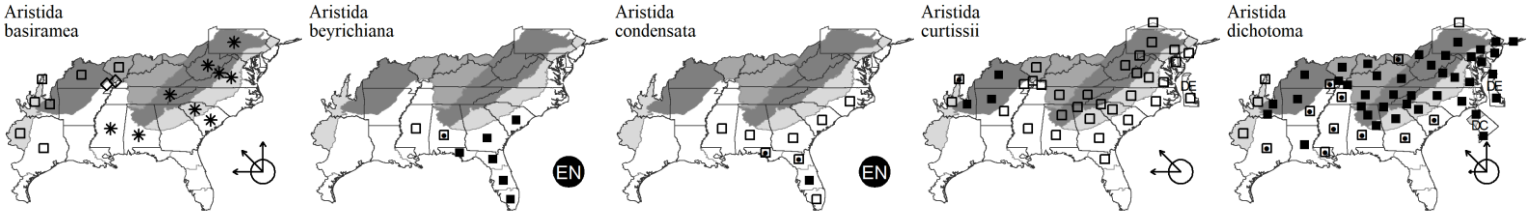
Aristida basiramea Engelmann ex Vasey. FORKTIP THREE-AWN. **Hab:** Sandy soils; introduced eastwards. **Dist:** Native of mw. United States. ME and ON south to SC (FNA), AL, TX, and CO (FNA). **Phen:** Jul-Oct. **Syn:** = ETx1, F, FlGr, FNA25, G, HC, Il, K1, K3, K4, Mi, Mo1, NcTx, NE, NY; = *Aristida basiramea* var. *basiramea* – C; < *Aristida basiramea* Engelmann ex Vasey – Tx.

Aristida beyrichiana Trinius & Ruprecht. SOUTHERN WIREGRASS. **Hab:** Sandhills, savannas, from very dry to seasonally saturated soils. **Dist:** S. SC south to s. FL, west to s. MS. **Phen:** Sep-Nov. **Comm:** See Peet (1993) for discussion of the taxonomy and ecology of this species; also see comments under *A. stricta*, which also apply here. Ward (2001) proposes varietal status for *A. stricta* and *A. beyrichiana*. **Syn:** = K1, K3, K4, Peet (1993); = *Aristida stricta* Michaux var. *beyrichiana* (Trinius & Ruprecht) D.B. Ward – WH3, Ward (2001); < *Aristida stricta* Michaux – FNA25, GW1, HC, RAB, S, Allred (1986), Kesler, Anderson, & Hermann (2003).

Aristida condensata Chapman. BIG THREE-AWN. **Hab:** Dry sandy soils of longleaf pine sandhills, sandy pine rocklands of s. FL. **Dist:** Sc. NC south to s. FL, west to s. MS (Sorrie & Leonard 1999). **Phen:** Aug-Oct. **Syn:** = FlGr, FNA25, HC, K1, K3, K4, RAB, S, WH3, Allred (1986). NatureServe G4? (Apparently Secure).

Aristida curtissii (A. Gray ex S. Watson & Coulter) Nash. CURTISS'S THREE-AWN. **Hab:** Roadsides, disturbed areas, bare eroding soil. **Dist:** ME west to WY, south to n. FL, AR, OK, and CO, perhaps largely or adventive east of the Mississippi River. **Phen:** Jul-Oct. **Tax:** See Allred (1986) for a discussion of the rationale for reducing *A. curtissii* to a variety of *A. dichotoma*. Cronquist (1991) reduces it to a variety of the more western *A. basiramea* Engelmann ex Vasey. For now, and for simplicity, I prefer to retain the two as species. **Syn:** = G, HC, Il, K4, RAB, S, Va; = *Aristida basiramea* Engelmann ex Vasey var. *curtissii* (A. Gray ex S. Watson & Coulter) Shinners – Ar, C; = *Aristida dichotoma* Michaux var. *curtissii* A. Gray – F, FlGr, FNA25, K1, K3, Pa, Tn, W, WH3, WV, Allred (1986); < *Aristida basiramea* Engelmann ex Vasey – Tx.

Aristida dichotoma Michaux. FORK-TIP THREE-AWN. **Hab:** Roadsides, fields, disturbed areas, bare eroding soil. **Dist:** ME west to WI, south to n. FL and TX. **Phen:** Aug-Nov. **Comm:** See *A. curtissii* for comments. **Syn:** = C, ETx1, G, HC, Il, K4, Mi, Mo1, NcTx, RAB, S, Tx, Va; = *Aristida dichotoma* var. *dichotoma* – Ar, F, FlGr, FNA25, K1, K3, NE, NY, Pa, Tn, W, WH3, WV, Allred (1986). NatureServe G5T5? (Secure).



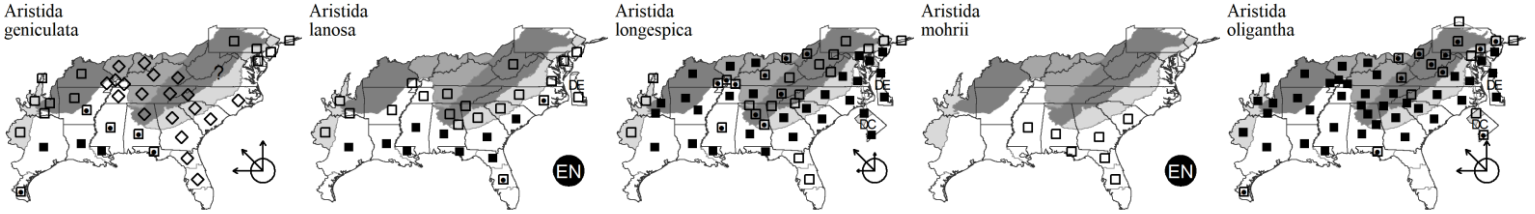
Aristida geniculata Rafinesque. NORTHEASTERN SLIM-SPIKE THREE-AWN. **Hab:** Dry open habitats, disturbed areas. **Dist:** The distribution and habitats of *A. geniculata* and *A. longespica* in our area are poorly known, pending further field and herbarium investigation. **Phen:** Aug-Oct. **Comm:** The phylogenetic study of Cerros-Tlatilpa, Columbus, & Barker (2011) suggests that this taxon is not closely related to *A. longespica*, and should be given species rank. **Syn:** = NY; = *Aristida longespica* var. *geniculata* (Rafinesque) Fernald – Ar, C, ETx1, FlGr, HC, K1, Mo1, NcTx, NE, Pa, Va, WH3; > *Aristida intermedia* Lamson-Scribner & C.R. Ball – F, G, S, Tx; > *Aristida intermedia* var. *intermedia* – Il; < *Aristida longespica* Poiret – RAB, W, WV; > *Aristida longespica* Poiret – G, Tx; < *Aristida longespica* var. *geniculata* (Rafinesque) Fernald – FNA25, K3, Allred (1986); > *Aristida longespica* var. *geniculata* (Rafinesque) Fernald – F, Il.

Aristida lanosa Muhlenberg ex Elliott. WOOLLYSHEATH THREE-AWN. **Hab:** Dry sandy soils of longleaf pine sandhills and fields. **Dist:** NJ south to FL, west to TX, north in the interior to MO and OK. **Phen:** Aug-Nov. **Comm:** Var. *macera*, usually dismissed as yet another Fernaldian "variety" known only from se. VA, needs further evaluation. **Syn:** = Ar, C, ETx1, FlGr, FNA25, Il, K1, K3, K4, NcTx, RAB, S, Tn, Tx, Va, WV, Allred (1986); > *Aristida lanosa* var. *lanosa* – F, G, HC; > *Aristida lanosa* var. *macera* Fernald & Griscom – F, G, HC. NatureServe G5 (Secure).

Aristida longespica Poiret. SOUTHEASTERN SLIM-SPIKE THREE-AWN. **Hab:** Disturbed areas. **Dist:** The distribution and habitats of *A. geniculata* and *A. longespica* in our area are poorly known, pending further field and herbarium investigation. **Phen:** Aug-Oct. **Syn:** = NY, S; = *Aristida longespica* var. *longespica* – Ar, C, ETx1, F, FlGr, FNA25, HC, K1, K3, Mo1, NcTx, NE, Pa, Va, WH3, Allred (1986); < *Aristida longespica* Poiret – G, RAB, Tx, W, WV; > *Aristida longespica* var. *longespica* – Il; < *Aristida longispica* – Mi, orthographic variant. NatureServe G5T5? (Secure).

Aristida mohrii Nash. MOHR'S THREE-AWN. **Hab:** Longleaf pine sandhills, Florida scrub, dry pine flatwoods. **Dist:** Panhandle FL and sw. GA west to s. AL; apparently disjunct in SC (Chesterfield and Richland counties). **Phen:** Aug-Oct. **Syn:** = FlGr, FNA25, HC, K1, K3, K4, S, WH3, Allred (1986). NatureServe G1 (Critically Imperiled).

Aristida oligantha Michaux. PRAIRIE THREE-AWN. **Hab:** Rock outcrops in thin soil, roadsides, fields, disturbed areas. **Dist:** VT west to SD, south to FL and TX, scattered elsewhere as a weed. **Phen:** May-Nov. **Syn:** = Ar, C, ETx1, F, FlGr, FNA25, G, HC, Il, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV, Allred (1986). NatureServe G5 (Secure).



Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

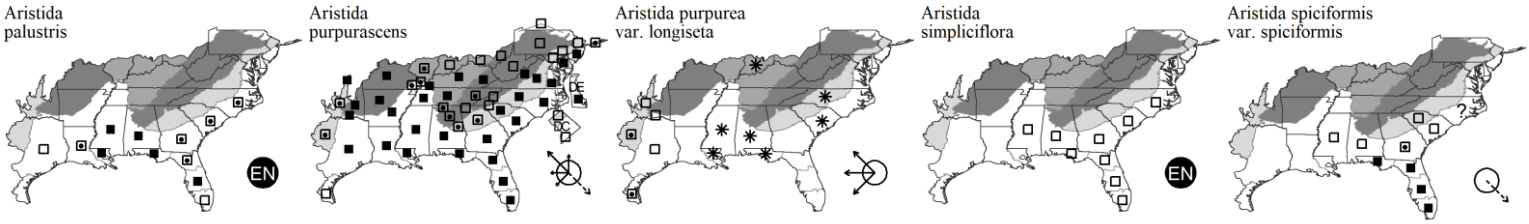
Aristida palustris (Chapman) Vasey. LONGLEAF THREE-AWN. **Hab:** Wet pine savannas and flatwoods, limesink depressions. **Dist:** Se. NC south to FL, west to TX; apparently disjunct on the Cumberland Plateau of KY. **Phen:** Aug-Oct. **Syn:** = C, ETx1, FlGr, FNA25, K1, K3, K4, S, WH3, Allred (1986); = *Aristida affinis* (J.A. Schultes) Kunth – F, G, GW1, HC, RAB, Tx, misapplied. NatureServe G4 (Apparently Secure).

Aristida purpurascens Poiret. ARROWFEATHER. **Hab:** Dry habitats, especially in dry sandy or rocky soils. **Dist:** MA west to WI and KS, south to FL and TX. **Phen:** Aug-Oct (-Jul). **Comm:** In the Sandhills of NC and SC occurring in two forms, one green, the other strongly glaucous-blue. **Syn:** = C, G, HC, Il, Mi, NcTx, Pa, RAB, S, Tx, Va, W, WV; = *Aristida purpurascens* var. *purpurascens* – Ar, ETx1, FlGr, FNA25, K1, K3, K4, Mo1, NE, NY, Tn, WH3, Allred (1986); > *Aristida purpurascens* var. *minor* Vasey – F; > *Aristida purpurascens* var. *purpurascens* – F. NatureServe G5T5 (Secure).

Aristida purpurea Nuttall *var*. ***longiseta*** (Steudel) Vasey. RED THREE-AWN. **Hab:** Rocky and sandy areas, eastwards adventive in disturbed areas. **Dist:** MB west to BC, south to TX, CA, and Mexico; adventive eastwards. Also reported from NC, but the collection is from a Soil Conservation Service test nursery, and there is no evidence of naturalization. **Phen:** Aug-Oct. **Syn:** = C, ETx1, FNA25, K1, K3, K4, NcTx, Allred (1986); = *Aristida longiseta* Steudel – G, HC, Tx; > *Aristida longiseta* var. *robusta* Merrill – F. NatureServe G5T5? (Secure).

Aristida simpliciflora Chapman. SOUTHERN THREE-AWN, CHAPMAN'S THREE-AWN. **Hab:** Wet pine savannas. **Dist:** Sw. GA west through the FL Panhandle and c. AL to s. MS (Sorrie & Leonard 1999), and south into c. peninsular FL; northward apparently as a rarity in se. NC and e. SC. **Phen:** Oct-Nov. **Comm:** SC (Berkeley County) (McMillan & Porcher 2005) and se. NC. *A. simpliciflora* was believed to be a Gulf Coastal Plain endemic until found by R. LeBlond in 1999 in wet savannas in se. NC (Green Swamp savannas, Brunswick County; Old Dock Savanna, Columbus County; and The Neck Savanna, Pender County). It is reported for sw. GA (Jones & Coile 1988, Kartesz 1999). Harper also reports it for c. GA. **Syn:** = FlGr, FNA25, HC, K1, K3, K4, S, WH3, Allred (1986). NatureServe G3G4 (Vulnerable).

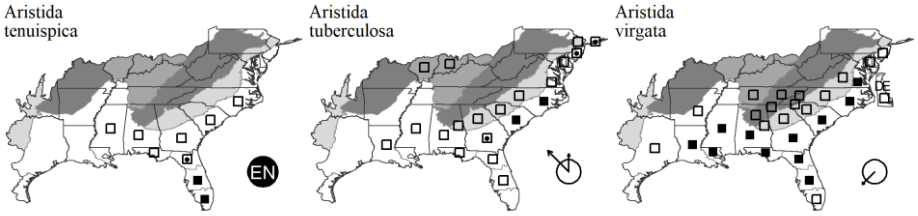
Aristida spiciformis Elliott *var*. ***spiciformis***. BOTTLEBRUSH THREE-AWN, SPIKE THREE-AWN. **Hab:** Wet pine savannas and seepage areas. **Dist:** E. SC (McMillan et al. 2002) south to s. FL, west to MS; West Indies (Cuba, Puerto Rico). **Phen:** Aug-Oct. **Comm:** Allred (1986) also reports this species from NC, but the documentation is unknown to me. A second variety, var. *antillarum* Catasús, is endemic to Cuba and Puerto Rico. **Syn:** = WI; < *Aristida spiciformis* – FNA25, GW1, HC, K1, K4, RAB, S, WH3, Allred (1986).



Aristida tenuispica A.S. Hitchcock. SOUTHERN ARROWFEATHER. **Hab:** Pine flatwoods, Florida wet prairies, other sandy habitats. **Dist:** NC south to FL and west to MS. **Phen:** Jun-Dec. **Syn:** = HC, S; = *Aristida purpurascens* Poiret var. *tenuispica* (A.S. Hitchcock) Allred – FlGr, FNA25, K1, K3, K4, WH3, Allred (1986).

Aristida tuberculosa Nuttall. DUNE THREE-AWN, SAND THREE-AWN, SEASIDE NEEDLEGRASS. **Hab:** Longleaf pine sandhills, coastal dunes, other dry, sandy habitats such as sandy roadsides. **Dist:** Se. NH south to NJ and disjunct in e. VA in the outer Coastal Plain; from sc. NC south to c. FL and Panhandle FL, west to s. MS (Sorrie & Leonard 1999), mostly in the inner Coastal Plain; and also near the Great Lakes in sw. MI, n. IN, n. IL, s. WI, se. MN, and e. IA. **Phen:** Aug-Oct. **Comm:** The curious trimodal distribution is unexplained. Voss & Reznicek (2012) comment that "the distinctive twisted column of awns is shorter in material from near the head of Lake Michigan than in specimens from the East Coast of the United States". **Syn:** = C, F, FNA25, G, HC, Il, K1, K3, K4, Mi, NE, NY, RAB, S, Va, WH3, Allred (1986). NatureServe G5 (Secure).

Aristida virgata Trinius. **Hab:** Moist to wet pine savannas, wet pine flatwoods, mountain bogs (Henderson Co., NC), other moist habitats. **Dist:** S. NJ south to FL, west to TX, primarily on the Coastal Plain; Central America. **Phen:** Jul-Nov. **Tax:** The phylogenetic study of Cerros-Tlatilpa, Columbus, & Barker (2011) appears to confirm that this taxon is not closely related to *A. purpurascens*, and should therefore be accorded species rank. **Syn:** = C, F, G, GW1, HC, RAB, S, Tx, Va; = *Aristida purpurascens* Poiret var. *tenuispica* (A.S. Hitchcock) Allred – Meso6, misapplied; = *Aristida purpurascens* Poiret var. *virgata* (Trinius) Allred – Ar, ETx1, FlGr, FNA25, K1, K3, K4, Tn, WH3, Allred (1986).



Arrhenatherum Palisot de Beauvois 1812 (FALSE OATGRASS)

A genus of about 6 species, perennials, of the Mediterranean region and e. Asia. References: Hatch (2007b) in FNA24 (2007a); Tucker (1996).

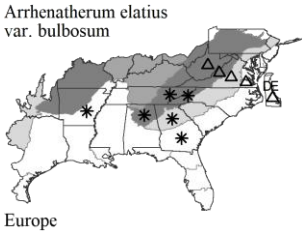
1 Base of culm consisting of a series of adjacent (moniliform) corms 5-10 mm in diameter.....***Arrhenatherum elatius var. bulbosum***
1 Base of culm not swollen or cormose, 2-4 mm thick.....***Arrhenatherum elatius var. elatius***

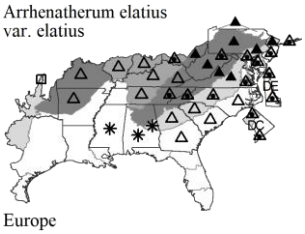
* ***Arrhenatherum elatius*** (Linnaeus) Palisot de Beauvois ex J. Presl & C. Presl *var*. ***bulbosum*** (Willdenow) Spenner. TUBER OATGRASS, ONION COUCH. **Hab:** Meadows, fields, and roadsides. **Dist:** Native of Europe. This variety was apparently cultivated for the edible tubers in Bronze Age Europe (Tucker 1996). **Phen:** May-Jun. **Comm:** Cited for VA in HC. **Syn:** = Ar, C, F, G, HC, K1, K3, K4, Va, WV, Tucker (1996); = *Arrhenatherum elatius*

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

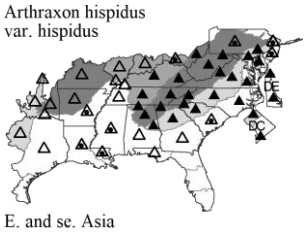
ssp. *bulbosum* (Willdenow) Schübler & G. Martens – FNA24, Mi, NE; = *Arrhenatherum elatius* var. *tuberosum* Thiel. – S; < *Arrhenatherum elatius* – GW1, Il, Tn, W. NatureServe GNRTNR (Not Yet Ranked).

Arrhenatherum elatius (Linnaeus) Palisot de Beauvois ex J. Presl & C. Presl *var*. ***elatius***. TALL OATGRASS. **Hab:** Meadows, fields, roadsides. **Dist:** Native of Europe. **Phen:** May-Jun. **Comm:** Documented for SC (Bradley et al. [in prep.]). **Syn:** = Ar, C, F, G, HC, K1, K3, K4, Mo1, S, Va, WV, Tucker (1996); = *Arrhenatherum elatius* ssp. *elatius* – FNA24, NE, NY; < *Arrhenatherum elatius* – GW1, Il, Mi, RAB, Tn, W; > *Arrhenatherum elatius* var. *biaristatum* (Petermann) Petermann – Pa; > *Arrhenatherum elatius* (Linnaeus) Palisot de Beauvois ex J. Presl & C. Presl var. *elatius* – Pa.





Arthraxon Palisot de Beauvois 1812 (BASKET GRASS)



A genus of about 7 species, annuals and perennials, native of the tropical and subtropical Old World. References: Kiger (1971); Thieret (2003d) in FNA25 (2003a); van Welzen (1981).

Identification Notes: Sometimes confused (especially before flowering) with *Microstegium*, but *Arthraxon* has distinctly cordate-clasping leaves, which *Microstegium* lacks. Also vegetatively similar to *Oplismenus*.

* ***Arthraxon hispidus*** (Thunberg) Makino *var*. ***hispidus***. BASKET GRASS. **Hab:** Moist ditches, bottomlands, disturbed areas. **Dist:** Native of se. Asia. **Phen:** Sep-Nov. **Comm:** Like *Microstegium*, *Arthraxon* is steadily and aggressively increasing its abundance acrosss most of our region. **Syn:** = ETx1, FNA25, NY, Va, van Welzen (1981); < *Arthraxon hispidus* – C, FlGr, GW1, Il, K1, K3, Mo1, NE, Pa, Tn, WH3, Kiger (1971); > *Arthraxon hispidus* var. *cryptatherus* (Hackel) Honda – F, G, HC, RAB, W.

Arundinaria Michaux 1803 (CANE)

Contributed by Alan S. Weakley and Jimmy K. Triplett

A genus of 3 species, woody grasses (bamboos), native of se. United States. *Arundinaria* was much reduced by the foraging of free-range livestock in the eighteenth and early nineteenth centuries and by fire suppression in the late nineteenth century and throughout the twentieth century. "Canebrakes," large areas dominated by cane, were described in many historical accounts and apparently occupied large parts of the landscape of the Coastal Plain, also occurring in the Piedmont and low Mountains. References: Clark & Triplett (2007) in FNA24 (2007a); Judziewicz et al (2000); McClure (1963); McClure (1973); Triplett, Weakley, & Clark (2006); Tucker (1988); Ward (2009c).

Unkeyed taxa: *Arundinaria species 1*

1 Primary branches with 0-1 compressed basal internodes (in the basalmost 1 cm or so); culm internodes usually sulcate (with a groove extending upward from the node, sometimes partly obscured by the branch); culm leaves deciduous; culms to 10 m tall; rhizomes lacking air canals; foliage leaf blades 0.8-1.3 cm wide ..... ***Arundinaria gigantea***

1 Primary branches with 2-5 compressed basal internodes (in the basalmost 1 cm or so); culm internodes usually terete; culm leaves persistent to tardily deciduous; culms to 4 m tall; rhizomes with or without longitudinal air canals (visible in cross-section as a cylinder of hollow canals 1 mm or less from the outer surface); foliage leaf blades 0.8-2 cm wide.

2 Foliage blades chartaceous, deciduous, abaxial surfaces pilose or glabrous, weakly tessellate; primary branches usually < 35 cm long, basal nodes of primary branches not developing secondary branches; top knot blades 12-22.5 cm long; rhizomes with or without air canals..... ***Arundinaria appalachiana***

2 Foliage blades coriaceous, persistent, abaxial surfaces densely pubescent or glabrous, strongly tessellate; primary branches usually > 50 cm long, basal nodes of primary branches developing secondary branches; top knot blades 20-30 cm long; rhizomes with air canals..... ***Arundinaria tecta***

Arundinaria appalachiana Triplett, Weakley, & L.G. Clark. HILL CANE. **Hab:** Dry to moist forests on slopes. **Dist:** Sw. NC and se. TN south to nw. SC, n. GA and ne. AL, primarily in the southwestern end of the Blue Ridge, but extending east, south, and west into adjacent provinces. **Tax:** *Arundinaria appalachiana* was named in 2006 (Triplett, Weakley, & Clark 2006), but had been noticed beginning in 1900 by botanists R.M. Harper, W.C. Coker, W.W. Ashe, and C.D. Beadle. **Comm:** The short plants (often only knee-high, though sometimes head-high) on mountain slopes south of Asheville are autumn-deciduous, whereas our other species are evergreen. **Syn:** = FNA24, K3, K4, Tn, Triplett, Weakley, & Clark (2006), Ward (2009c); < *Arundinaria gigantea* (Walter) Muhlenberg – GW1, RAB; < *Arundinaria gigantea* ssp. *tecta* (Walter) McClure – K1, Judziewicz et al (2000), McClure (1973); < *Arundinaria tecta* (Walter) Muhlenberg – HC, S, Tucker (1988).

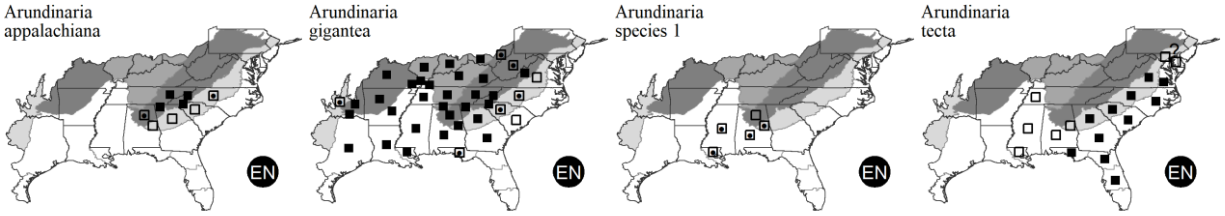
Arundinaria gigantea (Walter) Muhlenberg. GIANT CANE, RIVER CANE. **Hab:** Bottomland and riparian forests, lower slopes and bluffs along streams, seeps, stream banks, and extending into less mesic and even dry settings on circumneutral or alkaline soils over limestone or dolomite, or in loess deposits along the Mississippi River. **Dist:** S. OH south to FL and e. TX. **Phen:** Apr-Jul. **Tax:** There has been much disagreement over the recognition of one, two, or several taxa of cane in the Southeastern United States. This species reaches heights of 6-7 (-10) m and is supposed to flower only once every 40-50 years. *A. macrosperma* Michaux is controversial; it has sometimes been considered to be a synonym of *A. gigantea* or to represent hybridization or introgression between *A. gigantea* and *A. tecta*. **Syn:** = F, FlGr, FNA24, HC, Il, K3, K4, Mo1, NcTx, S, Tn, Va, WV, Triplett, Weakley, & Clark (2006), Tucker (1988); = *Arundinaria gigantea* ssp. *gigantea* – ETx1, K1, McClure (1973); = *Arundinaria macrosperma* Michaux – Ward (2009c); <

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

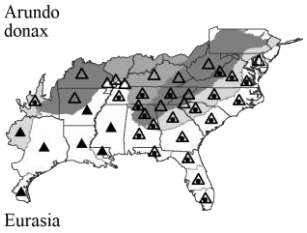
Arundinaria gigantea (Walter) Muhlenberg – C, GW1, RAB, WH3; > *Arundinaria gigantea* ssp. *gigantea* – Judziewicz et al (2000); > *Arundinaria gigantea* (Walter) Muhlenberg ssp. *macrosperma* (Michaux) McClure – Judziewicz et al (2000).

Arundinaria species 1. ALABAMA CANE. **Hab:** As far as known, endemic to AL. **Comm:** This species seems to be a stabilized species of hybrid origin between *A. gigantea* and *A. tecta*. Under study by Jimmy Triplett. {not yet keyed}.

Arundinaria tecta (Walter) Muhlenberg. SWITCH CANE, SMALL CANE, MUTTON GRASS. **Hab:** Pine savannas, pocosins, canebrakes, blackwater swamps, Piedmont seeps, generally (but not solely) in wetlands. **Dist:** Primarily of the Southeastern Coastal Plain, but extending to the eastern Gulf Coastal plain and also Piedmont: e. MD to FL and s. AL. **Phen:** Apr-Jul. **Tax:** *A. tecta* is a smaller plant than *A. gigantea* (normally 1-2 m tall, but reaching heights of up to 4 m where fire-suppressed), and flowers more frequently, supposedly every 3-4 years (Tucker 1988), probably actually in response to fire. Taxon sampling suggests that even if *A. tecta* was at one time distributed west along the coastal plain from Florida to Louisiana, many contemporary populations of switch-cane-like plants may in fact be admixed with *A. gigantea*. Additional investigations are necessary to determine the extent to which *A. tecta* in the Gulf Coast region has been replaced by hybrids (see *Arundinaria species 1*). **Syn:** = FlGr, FNA24, K3, K4, Tn, Va, Triplett, Weakley, & Clark (2006); = *Arundinaria gigantea* (Walter) Muhlenberg – Ward (2009c); < *Arundinaria gigantea* (Walter) Muhlenberg – C, GW1, RAB, WH3; < *Arundinaria gigantea* ssp. *tecta* (Walter) McClure – K1, Judziewicz et al (2000), McClure (1973); < *Arundinaria tecta* (Walter) Muhlenberg – F, HC, S, Tucker (1988). NatureServe G5T5 (Secure).



Arundo Linnaeus 1753 (GIANT REED)



A genus of 3 species, widespread in the tropics, subtropics and warm-temperate areas. References: Allred (2003b) in FNA25 (2003a); Hardion et al (2014).

* ***Arundo donax*** Linnaeus. GIANT REED. **Hab:** Roadsides, waste dumps, other disturbed areas. **Dist:** Native of the Old World (most likely w. Asia) (Hardion et al. 2014). **Phen:** Sep-Aug. **Tax:** Horticultural forms with leaves transversely striped white and green have been treated as var. *versicolor*, but are better considered as only a form or cultivar. **Syn:** = Ar, Bah, ETx1, F, FlGr, FNA25, Il, K1, K3, K4, Meso6, Mo1, NcTx, RAB, S, Tn, Tx, Va, WH3; > *Arundo donax* var. *donax* – HC; > *Arundo donax* var. *versicolor* (P. Miller) Stokes – HC.

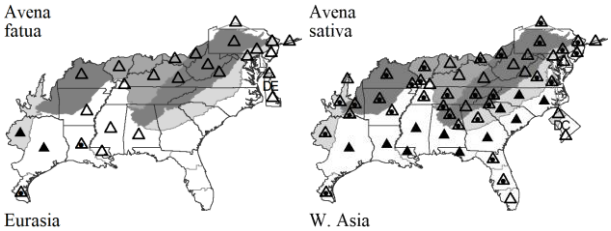
Avena Linnaeus 1753 (OATS)

A genus of about 29 species, native of temperate and boreal Eurasia and n. Africa. References: Baum (2007) in FNA24 (2007a); Tucker (1996).

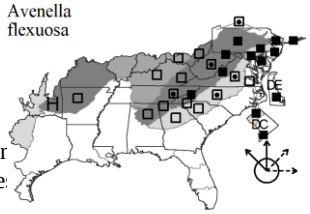
1 Florets disarticulating from the glumes at maturity (the glumes remaining attached to the plant); lemmas pubescent with brown hairs; lemmas with long bent awns; callus bearded with hairs up to ¼ as long as the lemmas ..... ***Avena fatua***
1 Florets not disarticulating from the glumes at maturity; lemmas glabrous or scabrous (rarely sparsely strigose); lemmas unawned or with relatively straight awns; callus glabrous ..... ***Avena sativa***

* ***Avena fatua*** Linnaeus. WILD OATS. **Hab:** Disturbed areas. **Dist:** Native of Europe and c. Asia. **Phen:** May-Sep. **Comm:** {needs herbarium checks; no records shown on VA Atlas}. **Syn:** = Ar, C, ETx1, F, FNA24, G, HC, Il, K1, K3, K4, Meso6, Mi, NcTx, NE, NY, Pa, WH3; = *Avena fatua* var. *fatua* – Mo1, Tx. NatureServe GNR (Not Yet Ranked).

* ***Avena sativa*** Linnaeus. OATS. **Hab:** Fields and disturbed areas, commonly planted but not long-persistent. **Dist:** Native of Middle East. **Phen:** Mar-Jul. **Comm:** An important crop, but apparently only a weed until transported from the Middle East to the moister central Europe, where cultivated beginning about 3000 BP (Hancock 2004). **Syn:** = Ar, ETx1, FlGr, FNA24, G, HC, Il, K1, K3, K4, Meso6, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, W, Tucker (1996); = *Avena fatua* ssp. *sativa* – Tx; = *Avena fatua* Linnaeus) var. *sativa* (Linnaeus) Haussknecht – Mo1; > *Avena sativa* var. *orientalis* (Schreber) Alefeld – F; > *Avena sativa* var. *sativa* – F. NatureServe GNR (Not Yet Ranked).



Avenella Koch ex Steudel 1840 (HAIRGRASS)



Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more)

* : waif
EN : endemic
H : historic

N : no
P : plar
? : que

103. POACEAE

A monotypic genus, perennial, circumboreal, formerly often included in *Deschampsia*. References: Barkworth (2007n) in FNA24 (2007a); Chiapella (2007); Tucker (1996).

Avenella flexuosa (Linnaeus) Drejer. COMMON HAIRGRASS, WAVY HAIRGRASS. **Hab:** Grassy balds, high elevation rocky summits, rocky or sandy woodlands. **Dist:** Circumboreal, ranging south in North America to n. GA, OH, WI, and MN; disjunct in AR and OK, and in Mexico. **Phen:** Apr-Aug. **Syn:** = Mi, NY, Va, Chiapella (2007); = *Aira flexuosa* Linnaeus – S; = *Deschampsia flexuosa* – Ar, C, FNA24, G, HC, Il, K3, K4, K4, Meso6, NE, Pa, RAB, Tn, W, WV, Tucker (1996); > *Deschampsia flexuosa* (Linnaeus) Trinius var. *flexuosa* – F, K1; > *Deschampsia flexuosa* var. *montana* (Linnaeus) Grisebach – F, K1.

Axonopus Palisot de Beauvois 1812 (CARPETGRASS)

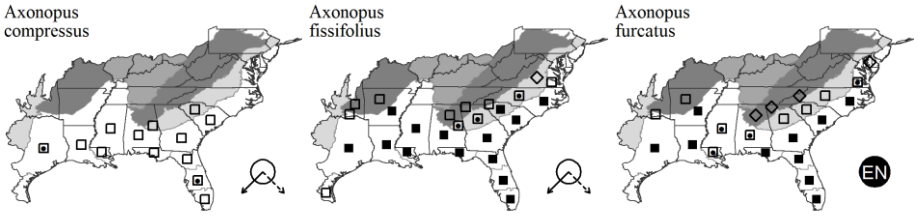
A genus of ca. 100 species, primarily tropical and subtropical. Phylogenetic studies suggest that *Axonopus* may be included in *Paspalum*. References: Barkworth (2003n) in FNA25 (2003a).

1 Spikelets 4-6 mm long ..... ***Axonopus furcatus***
1 Spikelets 1.5-2.8 mm long.
  2 Spikelets 2.0-3.5 mm long; leaf blades mostly (3-) 8-10 (-20) mm wide ..... ***Axonopus compressus***
  2 Spikelets 1.5-2.2 (-2.8) mm long; leaf blades mostly 2-4 (-6) mm wide ..... ***Axonopus fissifolius***

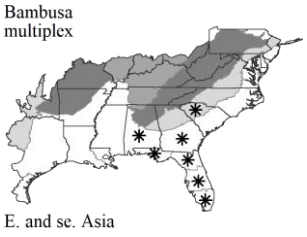
Axonopus compressus (Swartz) Palisot de Beauvois. SOUTHERN CARPETGRASS, TROPICAL CARPETGRASS. **Hab:** Moist disturbed areas, lawns. **Dist:** Probably native in the se. United States, from SC south to s. FL, west to TX; West Indies; Mexico to South America. Reported for VA by Hitchcock & Chase (1951). **Phen:** May-Nov. **Comm:** Sometimes used as a lawn grass in the deep South. **Syn:** = Bah, ETx1, FNA25, GW1, HC, K1, K3, K4, Meso6, S, Tx, WH3. NatureServe G5 (Secure).

Axonopus fissifolius (Raddi) Kuhlmann. COMMON CARPETGRASS. **Hab:** Pine flatwoods, sandy forests, fields, roadsides, lawns. **Dist:** VA south to FL, west to TX and OK, and extending into tropical America (to Argentina). **Phen:** May-Dec. **Syn:** = Ar, ETx1, FlGr, FNA25, K1, K3, K4, Meso6, NcTx, Va, WH3; ? *Axonopus affinis* Chase – GW1, HC, RAB, Tx, W. NatureServe G5 (Secure).

Axonopus furcatus (Flüggé) A.S. Hitchcock. BIG CARPETGRASS. **Hab:** Maritime forests, other sandy forests, bottomlands, roadsides, calcareous wet meadows, lawns. **Dist:** Se. VA south to FL, west to TX and AR, mainly Coastal Plain but scattered inland; apparently adventive in e. MD (Knapp et al. 2011). **Phen:** Mar-Dec. **Syn:** = Ar, C, ETx1, F, FlGr, FNA25, G, GW1, HC, K1, K3, K4, RAB, S, Tx, Va, WH3. NatureServe G5 (Secure).



Bambusa Schreber 1789 (BAMBOO)



A genus of ca. 100 species, trees and shrubs, native to tropical and subtropical Asia. References: Stapleton (2007a) in FNA24 (2007a).

* ***Bambusa multiplex*** (Loureiro) Raeuschel ex Schultes & Schultes f. HEDGE BAMBOO, DWARF BAMBOO, ORIENTAL HEDGE BAMBOO. **Hab:** Disturbed areas, spread vegetatively from horticultural use. **Dist:** Native of se. Asia. Reported as naturalized or persistent in portions of the southeastern United States, including GA, FL Panhandle, and FL peninsula. **Syn:** = FNA24, HC, K4, WH3; > *Bambusa multiplex* var. *multiplex* – FlGr. NatureServe GNR (Not Yet Ranked).

Bothriochloa Kuntze 1891 (BEARDGRASS, CANE BLUESTEM)

A genus of ca. 35 species, widespread in tropical and subtropical regions of the Old and New World. References: Allred & Gould (1983); Allred (2003g) in FNA25 (2003a); Scrivanti & Antón (2011); Vega (2000).

3 Pedicellate spikelets much shorter than the sessile spikelets.
..... ***Bothriochloa torreyana***
3 Pedicellate spikelets about as long as the sessile spikelets.
  7 Lower glumes of the sessile spikelets with a dorsal pit ..... ***Bothriochloa pertusa***
  7 Lower glumes of the sessile spikelets without a dorsal pit ..... ***Bothriochloa ischaemum var. songarica***

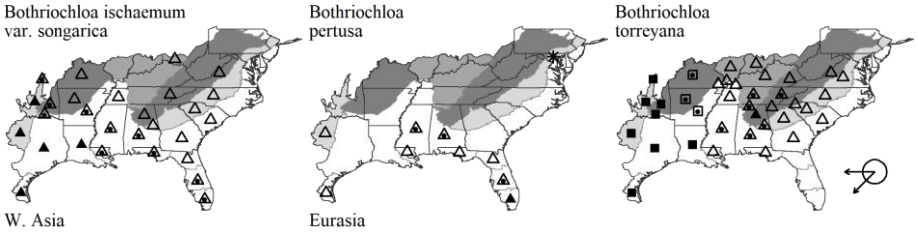
* ***Bothriochloa ischaemum*** (Linnaeus) Keng *var*. ***songarica*** (Ruprecht ex Fischer & C.A. Meyer) Celarier & Harlan. KING RANCH BLUESTEM, KR BLUESTEM, YELLOW BLUESTEM. **Hab:** Highway medians and margins, other disturbed places. **Dist:** Native of s. Europe and w. Asia. Reported for SC (Kartesz 1999) and GA (Carter, Baker, & Morris 2009). Reported for s. MO (Thomas 2017). "This species, along with *B. laguroides* [*torreyana*], appear to be spreading steadily, especially along the I-81 corridor where they are conspicuous during the late Summer and Fall flowering and fruiting

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

season" (Virginia Botanical Associates 2019). **Phen:** May-Nov (-Apr). **Syn:** = ETx1, K1, NcTx, Tx, WH3, Vega (2000); < *Andropogon ischaemum* Linnaeus – HC; < *Bothriochloa ischaemum* – Ar, FlGr, FNA25, K3, K4. NatureServe G5TNR (Not Yet Ranked).

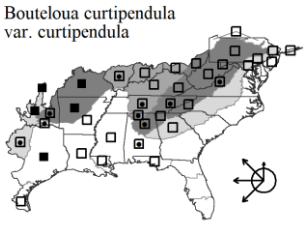
* ***Bothriochloa pertusa*** (Linnaeus) A. Camus. PITTED BLUESTEM. **Hab:** Disturbed areas, especially over calcareous substrates (like roadsides, pastures, and disturbed prairies of the Black Belt). **Dist:** Native of Eurasia. Introduced at scattered sites in e. North America, including FL, LA, MD, MS (FNA, Kartesz 1999), and AL (Diamond, England, & Dykes 2013). **Phen:** Oct-Jan. **Syn:** = Bah, FlGr, FNA25, K1, K3, K4, Tx, WH3, Vega (2000); = *Andropogon pertusus* (Linnaeus) Willdenow – HC. NatureServe GNR (Not Yet Ranked).

Bothriochloa torreyana (Steudel) Scrivanti & Antón. SILVER BLUESTEM. **Hab:** Dry, sandy prairies and other grasslands, eastwards in road medians and other disturbed areas. **Dist:** MO and NV south to w. LA, TX, CA, and Mexico; adventive elsewhere (the exact boundaries of the native distribution obscure). Reported for SC (Kartesz 1999), ne. GA (Jones & Coile 1988; Allred & Gould 1983), e. TN, and c. TN (Chester et al. 1993), s. MO (Thomas 2017), in some cases as *B. saccharoides* var. *torreyana*. **Phen:** May-Nov. **Tax:** The morphological distinctions and geography provide a strong basis for treating this taxon at specific rank, a case argued for and with additional chemical evidence by Scrivanti & Antón (2011). **Syn:** = Scrivanti & Antón (2011); = *Bothriochloa laguroides* (A.P. de Candolle) Herter ssp. *torreyana* (Steudel) Allred & Gould – Ar, ETx1, FlGr, FNA25, K1, K3, K4, Mo1, NcTx, Tn, WH3, Allred & Gould (1983), Vega (2000); = *Bothriochloa saccharoides* (Swartz) Rydberg var. *torreyana* (Steudel) Gould – Tx; < *Bothriochloa laguroides* – Il. NatureServe G5T5 (Secure).



Bouteloua Lagasca y Segura 1805 (GRAMA)

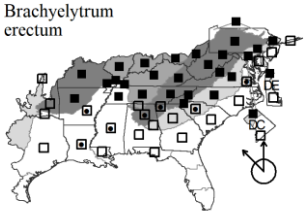
A genus of about 40 species, of the Western Hemisphere. The genus has recently been treated broadly, as by Peterson, Romaschenko, & Herrera Arrieta (2015), but Wipff (2021) and others prefer narrower genera. Sectional classification follows Peterson, Romaschenko, & Herrera Arrieta (2015). References: Columbus (1999); Gould (1979); Herrera Arrieta, Peterson, & de la Cerda Lemus (2004); Peterson, Romaschenko, & Herrera Arrieta (2015); Snow (2003c) in FNA25 (2003a); Wipff (2003b) in FNA25 (2003a); Wipff (2021).



Bouteloua curtipendula (Michaux) Torrey *var*. ***curtipendula***. SIDE-OATS GRAMA. **Hab:** Prairies, dry rocky slopes and bluffs over calcareous rocks (such as limestone, dolomite, or calcareous shale) or ultramafic rocks (such as serpentine or metabasalt), limestone glades. **Dist:** S. CT west to MT, south to VA, e. TN, nw. GA, AL, Panhandle FL (Gadsden County), TX, AZ, and CA; also in Central and South America. The older literature refers to *B. curtipendula* as introduced in SC, but the single specimen documenting its occurrence there appears to be from experimental plantings at Clemson University; there is apparently no evidence of its establishment there. *B. curtipendula* is now sometimes included in seed mixes, and appears as a waif or short-term introduction, including in the Piedmont of SC (K. Bradley, pers.comm., 2020). *B. curtipendula* occurs on serpentine in the Piedmont of GA (J. Allison, pers. comm.). **Phen:** Jul-Sep. **ID Notes:** Var. *caespitosa* Gould & Kapadia is cespitose rather than rhizomatous and enters our region only along its western edge. **Syn:** = Ar, C, ETx1, FlGr, FNA25, K1, K3, K4, Mo1, NcTx, NE, NY, Tx, Va, Gould (1979); < *Bouteloua curtipendula* – F, G, HC, Il, Mi, Pa, RAB, S, Tn, Tx, W, WH3, WV, Peterson, Romaschenko, & Herrera Arrieta (2015). NatureServe G5T5 (Secure).

Brachyelytrum Palisot de Beauvois 1812 (SHORTHUSK)

The only other species of the genus is *B. japonicum* Hackel, of s. Japan, Korea, and ec. China (Saarela et al. 2003, Tucker 1988). References: Campbell, Garwood, & Specht (1986); Saarela et al (2003); Stephenson & Saarela (2007) in FNA24 (2007a); Stephenson (1971); Tucker (1988); Voss (1972).



Brachyelytrum erectum (Schreber) Palisot de Beauvois. COMMON SHORTHUSK. **Hab:** Mesic forests, in the Mountains at lower elevations than *B. aristosum*). **Dist:** MA, NY, OH, MI, and s. WI south to Panhandle FL and e. TX. **Phen:** Jun-Aug. **Syn:** = Ar, ETx1, FlGr, FNA24, Il, K1, K3, K4, Mi, Mo1, NE, NY, Pa, Tn, Va, WH3, WV, Saarela et al (2003), Tucker (1988); = *Brachyelytrum erectum* var. *erectum* – C, F; < *Brachyelytrum erectum* (Schreber) Palisot de Beauvois – G, HC, RAB, S, W.

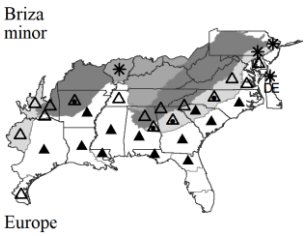
Briza Linnaeus 1753 (QUAKING GRASS)

A genus of 3 species, annuals and perennials, native of Eurasia. The genus is here circumscribed following Essi, Longhi-Wagner, & de Souza-Chies (2017), removing the South American species often formerly included. References: Essi, Longhi-Wagner, & de Souza-Chies (2017); Isabel, Quintanar, & Medina (2018); Snow (2007a) in FNA24 (2007a); Tkach et al (2020); Tucker (1996).

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

103. POACEAE

* ***Briza minor*** Linnaeus. LESSER QUAKING GRASS. **Hab:** Fields, roadsides, powerline rights-of-way, other disturbed areas. **Dist:** Native of Europe. **Phen:** Apr-Jun. **Syn:** = Ar, C, ETx1, F, FNA24, G, GW1, HC, Il, K1, K3, K4, Meso6, NcTx, NE, RAB, S, Tx, Va, WH3, Essi, Longhi-Wagner, & de Souza-Chies (2017), Isabel, Quintanar, & Medina (2018), Tucker (1996). NatureServe GNR (Not Yet Ranked).



Bromus Linnaeus 1753 (BROME-GRASS, BROME)

A genus of about 150 species, north temperate and South American. References: McKenzie & Ladd (1995); McNeill (1976); Pavlick & Anderton (2007) in FNA24 (2007a); Pavlick (1995); Sales (1993); Sales (1994); Tucker (1996).

Unkeyed taxa: *Bromus arvensis*, *Bromus hordeaceus ssp. pseudothominei*

1 Lemmas compressed and strongly keeled (the whole spikelet thus strongly laterally flattened); first glume 3-9-nerved; [section *Ceratochloa*] ..... ***Bromus catharticus var. catharticus***

1 Lemmas rounded or weakly keeled (the whole spikelet therefore terete to somewhat laterally flattened); first glume either 3-5-nerved or 1-3-nerved.

2 First glume 3-5 nerved (at least 3 nerves well-developed).

4 Panicle compact, the lateral branches erect or ascending, the pedicels < 10 mm long (shorter than the spikelets) ..... ***Bromus hordeaceus ssp. hordeaceus***

4 Panicle relatively open, the lateral branches erect, ascending, or spreading, the pedicels > 15 mm long (longer than the spikelets).

6 Margins of the lemmas involute in fruit, wrapping around the grain, exposing the rachilla ..... ***Bromus secalinus***

6 Margins of the lemmas gaping, overlapping in fruit.

8 Panicle branches stiff; lemma awns 5-12 mm long, straight ..... ***Bromus commutatus***

8 Panicle branches flexuous and lax; lemma awns 7-15 mm long, flexuous ..... ***Bromus japonicus***

2 First glume 1 (-3) nerved (only 1 nerve well-developed).

9 Longer lemma awns 10-60 mm long; plants annual; [introduced species of disturbed habitats]; [section *Genea*].

12 First glume 7-14 mm long; second glume 9-17 mm long; lemma awns 18-30 mm long ..... ***Bromus sterilis***

12 First glume 5-7 mm long; second glume 8-11 mm long; lemma awn (7-) 10-17 mm long ..... ***Bromus tectorum***

9 Longer lemma awns 1-6 (-8) mm long; plants perennial; [native and introduced species, collectively of disturbed and natural habitats]; [section *Bromopsis*].

13 Plants with creeping rhizomes, forming clonal colonies; both surfaces of leaves glabrous or glabrescent ..... ***Bromus inermis***

13 Plants not strongly rhizomatous, the stems solitary or tufted; surfaces of leaf blades usually pubescent (sometimes sparsely so).

14 Pedicels erect or ascending, mostly shorter than the spikelet; leaves 2-3 mm wide; [introduced, of disturbed habitats] ..... ***Bromus erectus***

14 Pedicels ascending at first, later arching-drooping, mostly longer than the spikelet; leaves 4-15 mm wide; [native, mostly of forests].

17 Lower surface of leaf with a conspicuous satiny sheen (when fresh); summit of sheath opposite the ligule with a conspicuous tuft of hairs ..... ***Bromus nottowayanus***

17 Lower surface of leaf lacking a conspicuous satiny sheen; summit of sheath opposite the ligule lacking a conspicuous tuft of hairs ..... ***Bromus pubescens***

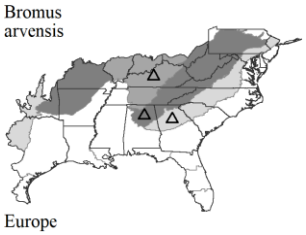
* ***Bromus arvensis*** Linnaeus. **Hab:** Disturbed areas. **Dist:** Native of Europe. Reported as introduced for nc. GA (Jones & Coile 1988), for VA, MD, PA, and NJ (Kartesz 1999), and for KY (Campbell 2007). **Phen:** May-Jul. **Comm:** {not yet keyed}. **Syn:** = C, F, FNA24, HC, Il, K1, NY, Pa; < *Bromus arvensis* Linnaeus – K3, K4.

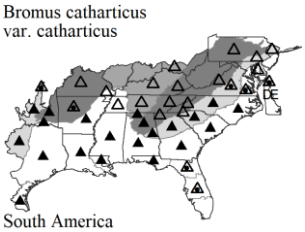
* ***Bromus catharticus*** Vahl *var*. ***catharticus***. RESCUE GRASS. **Hab:** Cultivated fields, roadsides, disturbed areas. **Dist:** Native of South America. **Phen:** Mar-Jul. **Syn:** = FNA24, K4, Va; ? *Bromus catharticus* – Ar, ETx1, F, FlGr, G, HC, Il, K1, Meso6, NcTx, RAB, Tn, W, WH3, Pavlick (1995), Tucker (1996); ? *Bromus unioloides* Kunth – S; > *Bromus willdenowii* Kunth – C, Mo1. NatureServe GNRTNR (Not Yet Ranked).

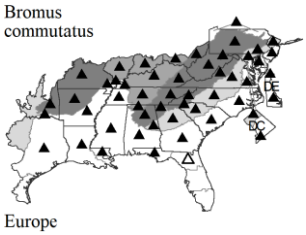
* ***Bromus commutatus*** Schrader. HAIRY CHESS, MEADOW BROME. **Hab:** Disturbed areas. **Dist:** Native of Europe. The relationship and relative distribution of this species and *Bromus racemosus* is poorly known for our area. **Phen:** Apr-Aug. **Comm:** See *Bromus racemosus* for further comments. **Syn:** = Ar, C, F, FlGr, FNA24, HC, Il, K1, Mi, Mo1, NE, NY, Pa, S, Tn, Tx, WH3, WV, Pavlick (1995), Tucker (1996); < *Bromus commutatus* Schrader – RAB; < *Bromus racemosus* Linnaeus – G, K3, K4, W.

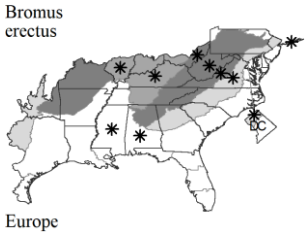
* ***Bromus erectus*** Hudson. SHORT-BRANCHED BROME. **Hab:** Disturbed areas. **Dist:** Native of Europe. **Syn:** = C, F, FNA24, G, HC, Il, K1, K3, K4, Mi, NE, NY, S, WV, Pavlick (1995). NatureServe GNR (Not Yet Ranked).

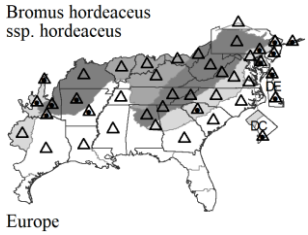
* ***Bromus hordeaceus*** Linnaeus *ssp*. ***hordeaceus***. SOFT CHESS, LOPGRASS. **Hab:** Fields, disturbed areas. **Dist:** Native of Europe. **Phen:** Jun-Jul. **Comm:** See Bradley et al. [in prep.] for discussion about its occurrence in SC. **Syn:** = Ar, FNA24, Il, K1, K3, K4, Mi, Mo1, NE, NY, Va, Pavlick (1995); < *Bromus hordeaceus* – C, ETx1, NcTx, Pa, Tn, Tucker (1996); ? *Bromus mollis* Linnaeus – F, G, HC, RAB, misapplied.











* ***Bromus hordeaceus*** Linnaeus *ssp*. ***pseudothominei*** (P.M. Smith) H. Scholz. SOFT CHESS. **Hab:** Disturbed areas. **Dist:** Native of Europe. **Phen:** May-Jul. **Syn:** = Ar, Il, K3, K4, Mo1, NE, NY; < *Bromus hordeaceus* – ETx1.

* ***Bromus inermis*** Leysser. SMOOTH BROME, HUNGARIAN BROME, AWNLESS BROME. **Hab:** Fields, roadsides, clearings, other disturbed areas. **Dist:** Native of Europe. **Phen:** Jun-Jul. **Syn:** = Ar, C, ETx1, FNA24, G, HC, Il, K3, K4, Mi, Mo1, NY, Pa, RAB, S, Tn, Va, W, WV, Pavlick (1995), Tucker (1996); > *Bromus inermis* ssp. *inermis* – NE; > *Bromus inermis* ssp. *inermis* var. *inermis* – K1; > *Bromus inermis* var. *inermis* – F.

* ***Bromus japonicus*** Thunberg. JAPANESE CHESS, JAPANESE BROME. **Hab:** Fields, roadsides, gardens, other disturbed areas. **Dist:** Native of Asia. **Phen:** May-Jul. . **Comm:** Mapping is unusually speculative. **Syn:** = Ar, C, ETx1, FlGr, FNA24, G, Il, K1, Mi, Mo1, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va,

Key to Map Symbology: □⊡■ └native┘ ◇◈◆ └maybe exotic┘ △◬▲ └exotic┘ ←rare ←uncommon ←common (see introduction for more)

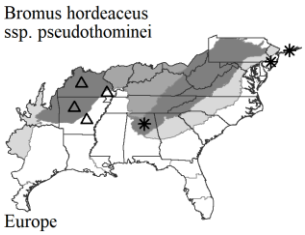
* : waif EN : endemic H : historic

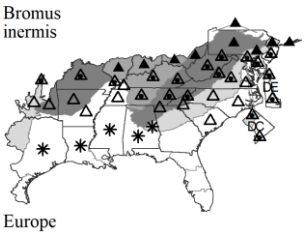
N : no P : planted ? : questionable X : extirpated

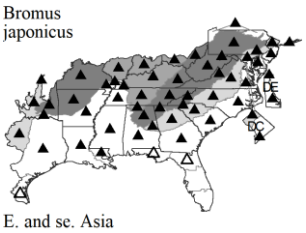
W, WH3, WV, Pavlick (1995), Tucker (1996); < *Bromus arvensis* Linnaeus – K3, K4; > *Bromus japonicus* var. *japonicus* – F, HC; > *Bromus japonicus* var. *porrectus* Hackel – F, HC.

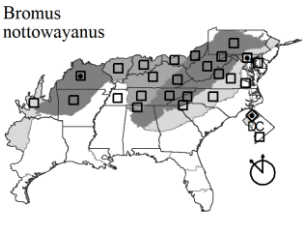
Bromus nottowayanus Fernald. SATIN BROME, NOTTOWAY RIVER BROME, VIRGINIA BROME. **Hab:** Moist forests, especially along small stream bottoms. **Dist:** The range of this species is poorly known, owing to confusion between it, *B. pubescens* and *B. latiglumis*. It is apparently known from MD, VA, and NC, west to TN, IL, IN, MO, and AR. Reported for Mountains of SC (Pickens County) (Bradley et al. [in prep.]). **Phen:** Jun-Aug. **Tax:** McKenzie & Ladd (1995) report on the biology and taxonomy of this species. **Comm:** Probably more common than portrayed in the map. **Syn:** = Ar, C, F, FNA24, HC, Il, K1, K3, K4, Mi, Mo1, NY, Tn, Va, Pavlick (1995); < *Bromus latiglumis* (Shear) A.S. Hitchcock – Tucker (1996); < *Bromus pubescens* Muhlenberg ex Willdenow – ETx1; < *Bromus purgans* Linnaeus – RAB.

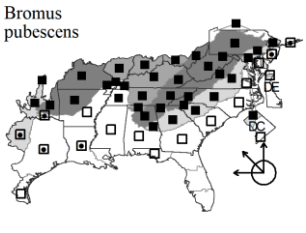
Bromus pubescens Muhlenberg ex Willdenow. COMMON EASTERN BROME, CANADA BROME, HAIRY WOODLAND BROME. **Hab:** Mesic forests, generally on rocky slopes. **Dist:** S. ON west to AB, south to FL, TX, and (reportedly) AZ. **Phen:** May-Aug. **Syn:** = Ar, C, FlGr, FNA24, Il, K1, K3, K4, Mi, Mo1, NE, NY, Pa, Tn, Tx, Va, W, WH3, Pavlick (1995), Tucker (1996); = *Bromus laeviglumis* – S; = *Bromus purgans* Linnaeus – F, G, WV, rejected name; < *Bromus pubescens* Muhlenberg ex Willdenow – ETx1, NcTx; < *Bromus purgans* Linnaeus – RAB, S, rejected name; > *Bromus purgans* var. *laeviglumis* (Lamson-Scribner ex Shear) Swallen – HC; > *Bromus purgans* var. *purgans* – HC.







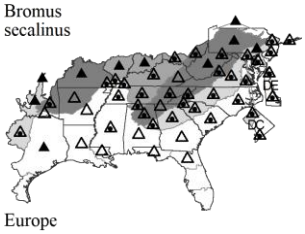


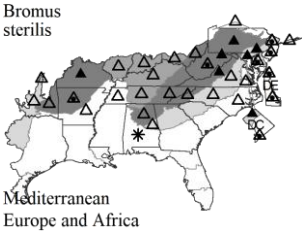


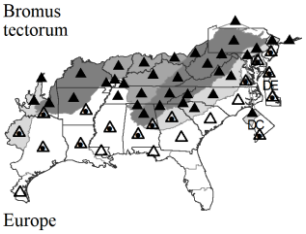
* ***Bromus secalinus*** Linnaeus. CHEAT, COMMON CHESS, RYE-BROME. **Hab:** Disturbed areas. **Dist:** Native of Europe. **Phen:** May-Aug. . **Syn:** = Ar, C, ETx1, F, FlGr, FNA24, G, HC, Il, K1, K3, Mi, Mo1, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV, Pavlick (1995), Tucker (1996). NatureServe GNR (Not Yet Ranked).

* ***Bromus sterilis*** Linnaeus. BARREN BROME, POVERTY BROME, CHEATGRASS. **Hab:** Disturbed areas. **Dist:** Native of s. Europe. **Phen:** May-Jun. **Syn:** = Ar, C, F, FNA24, G, HC, Il, K1, K3, K4, Mi, Mo1, NE, NY, Pa, RAB, S, Tn, Va, W, WV, Pavlick (1995), Sales (1993), Sales (1994), Tucker (1996). NatureServe GNR (Not Yet Ranked).

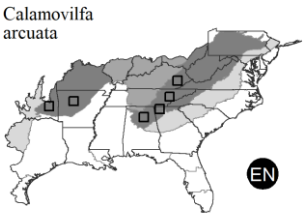
* ***Bromus tectorum*** Linnaeus. DOWNY BROME, DOWNY CHESS, DOWNY CHEAT, JUNEGRASS, CHEATGRASS. **Hab:** Disturbed areas. **Dist:** Native of Europe. **Phen:** Apr-Jun. **Syn:** = Ar, C, ETx1, F, FlGr, FNA24, G, HC, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WV, Pavlick (1995), Tucker (1996); ? *Bromus tectorum* ssp. *tectorum* – Sales (1993), Sales (1994); > *Bromus tectorum* var. *tectorum* – Mo1, NcTx. NatureServe GNRTNR (Not Yet Ranked).







Calamovilfa (A. Gray) Hackel ex Lamson-Scribner & Southworth 1890 (SAND-REED)



A genus of about 5 species, perennial herbs, of e. and c. North America. Peterson et al. (2014a, 2014b) have recommended including *Calamovilfa* in *Sporobolus*, which may be warranted. An alternative would be splitting *Sporobolus* into monophyletic genera, of which *Calamovilfa* would be one, likely in an expanded circumscription to include apparently closely related components of *Sporobolus*, such as the *S. floridanus* group. We here retain *Calamovilfa* at generic rank while considering the best long-term solution. References: Peterson et al (2014a); Peterson et al (2014b); Thieret (1966); Thieret (2003b) in FNA25 (2003a).

Calamovilfa arcuata K.E. Rogers. CUMBERLAND SANDREED. **Hab:** Riverside scours, usually in areas of sandstone cobble. **Dist:** Ouachita Mountains of w. AR and e. OK; Cumberland Plateau of TN (Morgan and Cumberland counties), KY (McCreary County), AL (Blount County), and GA (Walker County) (Zomlefer et al. 2018). **Tax:** See Rogers (1970) for detailed information. **Syn:** = Ar, FNA25, K1, K3, Tn, Thieret (1966); = *Sporobolus arcuatus* (K.E. Rogers) P.M. Peterson – K4, Peterson et al (2014a), Peterson et al (2014b). NatureServe G2G3 (Imperiled).

Cenchrus Linnaeus 1753 (BURGRASS, SANDSPUR)

A genus of about 90-150 species, primarily tropical and subtropical. The circumscription of *Cenchrus* is here treated broadly, including *Pennisetum* (Chemisquy et al. 2010). Others have disagreed, including Wipff & Shaw (2018a), who prefer to treat our species in *Cenchrus* s.s., *Pennisetum*, and *Cenchropsis*. References: Chemisquy et al (2010); Crins (1991); Donadío et al (2009); Herrera Arrieta & Peterson (2018); Stieber & Wipff (2003) in FNA25 (2003a); Verloove (2012); Ward (2010b); Wipff & Shaw (2018a); Wipff (2003k) in FNA25 (2003a).

Identification Notes: Spikelets of *Cenchrus* are subtended by an involucre of spines and/or bristles which are (in many of our species) fused into a bur. Bristles are narrow-based and terete. Spines are broad-based, and somewhat flattened (not terete) in cross-section, at least basally.

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

103. POACEAE

1 Bristles plumose or antrorsely scabrous, free or fused < ½ their lengths.
  2 Primary bristles (immediately subtending each spikelet) scabrous.
    Cenchrus purpureus
  2 Primary bristles conspicuously long-ciliate.
    5 Fascicles not disarticulating from the rachises; fascicles 33-160 per cm of inflorescence; panicles 4-200 cm long; leaves 7-70 mm wide
      Cenchrus americanus
    5 Fascicles disarticulating from the rachises at maturity; fascicles 8-37 per cm of inflorescence; panicles 2-32 cm long; leaves 2-13 mm wide.
      Cenchrus ciliaris
1 Bristles glabrous, retrorsely scabrous, or strigose, usually at least some bristles fused > ½ their lengths.
  8 Involucre of bristles only, these not fused into a bur; perennial, to 2 m tall ***Cenchrus myosuroides***
  8 Involucre of spines fused into a coherent bur, sometimes also with bristles; annual or perennials, to 1 m tall.
    9 Spines in a single whorl, subtended by numerous smaller, narrower, free outer bristles.
      10 Spines fused at the base only, the lower surfaces with 1-3 grooves ***Cenchrus biflorus***
      10 Spines fused for >1/3 their length, the lower surfaces not grooved.
        11 Rachis internodes 0.8-1.7 mm long; most of the outer bristles equal to or slightly longer than the flattened inner bristles (spines)
          Cenchrus brownii
        11 Rachis internodes 2-4 mm long; most of the outer bristles much shorter than the flattened inner bristles (spines) ***Cenchrus echinatus***
    9 Spines in multiple whorls or irregular in their disposition (if few and in a single whorl, then not subtended by smaller, narrower bristles).
      12 Plants perennial, long-lived, clump-forming; burs not imbricate, usually glabrous; leaf blades 1-3.5 mm wide ***Cenchrus gracillimus***
      12 Plants annual or perennial, short-lived and not clump-forming; burs imbricate, usually pubescent, leaf blades (1-) 3-14.2 mm wide.
        13 Burs (excluding the spines) 9-16 mm long, 4-6 mm wide, the spines 4-8 mm long; spikelets 1 (-2) per bur, concealed; leaf blades 3-14 mm wide
          Cenchrus tribuloides
        13 Burs (excluding the spines) 5.5-12 mm long, 2.5-6 mm wide, the spines 2-7 mm long; spikelets 2-4 per bur, exserted at the tip; leaf blades 1-5 (-7) mm wide.
          14 Spines stout, 6-10 (-40), 2-5 mm long; spikelets 3.5-6 mm long ***Cenchrus incertus***
          14 Spines slender, 45-75, 3.5-7 mm long; spikelets 6-8 mm long ***Cenchrus longispinus***

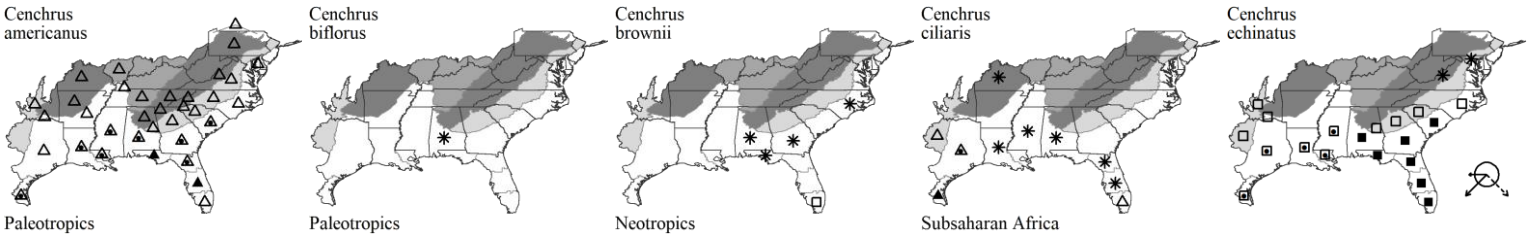
* ***Cenchrus americanus*** (Linnaeus) Morrone. PEARL MILLET. **Hab:** Fallow fields, other disturbed areas. **Dist:** Native of the Old World (Africa and tropical Asia). **Phen:** May-Dec. **Syn:** = FlGr, K3, K4, Chemisquy et al (2010); = *Cenchrus spicatus* (Linnaeus) Cavanilles – Verloove (2012); = *Pennisetum glaucum* (Linnaeus) R. Brown – ETx1, FNA25, HC, Il, K1, RAB, Tn, Va, WH3; = *Setaria glauca* (Linnaeus) Palisot de Beauvois – WV; ? *Chaetochloa lutescens* (Weigel) Stuntz – S; > *Pennisetum americanum* (Linnaeus) Leeke ssp. *americanum* – Mo1.

* ***Cenchrus biflorus*** Roxburgh. INDIAN SANDBUR. **Hab:** Disturbed areas, ballast, presumably only a waif. **Dist:** Native of Africa and s. Asia. Reported from ballast in Mobile, AL. **Syn:** = FNA25, HC, K3, K4, NY. NatureServe GNR (Not Yet Ranked).

Cenchrus brownii Roemer & J.A. Schultes. SLIM-BRISTLED SANDSPUR. **Hab:** Disturbed areas, maritime grasslands. **Dist:** S. FL (where apparently native), elsewhere in the se. United States (NC, GA, AL, where presumably introduced); West Indies; Central America, n. South America. The sole known NC specimen was collected in 1885 by Gerald McCarthy in NC "in locis navalibus et vastis". **Phen:** Mar-Dec. **Syn:** = Bah, FlGr, FNA25, K1, K3, K4, WH3, Ward (2010b); ? *Cenchrus viridis* Sprengel – HC, S, misapplied. NatureServe G4G5 (Apparently Secure).

* ***Cenchrus ciliaris*** Linnaeus. BUFFELGRASS. **Hab:** Disturbed areas. **Dist:** Native of Africa. **Phen:** Apr-Nov. **Syn:** = Bah, FlGr, K3, K4, Mo1, Tx, Chemisquy et al (2010); = *Pennisetum ciliare* (Linnaeus) Link – ETx1, FNA25, HC, Wipff & Shaw (2018a); = *Pennisetum ciliare* var. *ciliare* – K1. NatureServe GNR (Not Yet Ranked).

Cenchrus echinatus Linnaeus. SOUTHERN SANDSPUR, BRISTLY SANDSPUR, HEDGEHOG GRASS, CADILLO. **Hab:** Fields, roadsides, disturbed areas. **Dist:** NC (and DC?) south to FL, west to CA, south into the tropical America. The basis for the record for w. VA in FNA is not clear. **Phen:** Jun-Oct (-May). **Syn:** = Bah, C, ETx1, FlGr, FNA25, HC, K1, K3, K4, NcTx, RAB, S, Tx, WH3, Crins (1991), Ward (2010b). NatureServe G5 (Secure).



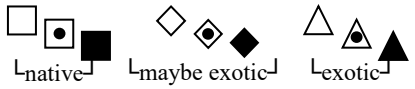
Cenchrus gracillimus Nash. SANDHILL SANDSPUR. **Hab:** Longleaf pinelands, other sandy habitats. **Dist:** N. FL, s. and e. GA, s. AL, and s. MS; West Indies (Cuba, Jamaica). **Syn:** = Bah, FNA25, HC, K1, K4, S, WH3, Ward (2010b). NatureServe G4? (Apparently Secure).

Cenchrus incertus M.A. Curtis. COASTAL SANDSPUR, GRASSBUR. **Hab:** Fields, roadsides, disturbed areas. **Dist:** VA south to FL, west to AR and KS; West Indies; Mexico to South America. **Phen:** (May-) Jul-Oct. **Tax:** Ward (2010b) argues convincingly that the name *C. spinifex* is very uncertainly applied to our species and should not be taken up. **Syn:** = Bah, C, F, G, HC, K3, K4, RAB, S, Tx, Va, Crins (1991), Ward (2010b); = *Cenchrus spinifex* Cavanilles – Ar, ETx1, FlGr, FNA25, K1, NcTx, NE, NY, Tn, WH3. NatureServe GNR (Not Yet Ranked).

Cenchrus longispinus (Hackel) Fernald. NORTHERN SANDSPUR, COMMON SANDSPUR. **Hab:** Fields, roadsides, disturbed areas, lawns. **Dist:** ME west to OR, south to FL, TX, and CA. **Phen:** May-Oct. **Syn:** = Ar, C, ETx1, F, FlGr, FNA25, Il, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, W, Crins (1991); = *Cenchrus pauciflorus* Bentham – G, HC, S, WV, misapplied. NatureServe G5 (Secure).

Cenchrus myosuroides Kunth. BIG SANDSPUR. **Hab:** Shell middens, maritime hammocks, coastal berms, roadsides, disturbed areas. **Dist:** SC south to FL, west to TX; West Indies; Mexico to South America. **Phen:** Jan-Dec. **Syn:** = Bah, ETx1, FlGr, FNA25, HC, K1, K3, K4, S, Tx, WH3, Crins (1991), Ward (2010b); = *Cenchropsis myosuroides* (Kunth) Nash – Wipff & Shaw (2018a). NatureServe G4 (Apparently Secure).

* ***Cenchrus purpureus*** (Schumacher) Morrone. ELEPHANT GRASS, NAPIER GRASS. **Hab:** Swamps, wet grasslands, disturbed areas. **Dist:** Native of Africa. Naturalized in FL north to the FL-GA border, and in AL (Diamond & Woods 2009). **ID Notes:** A giant grass, to 4 m tall. **Syn:** = K3, K4, Chemisquy et al (2010), Verloove (2012); = *Pennisetum purpureum* Schumacher – Bah, ETx1, FNA25, HC, K1, WH3. NatureServe GNR (Not Yet Ranked).

Key to Map Symbology: 

←rare ←uncommon ←common (see introduction for more)

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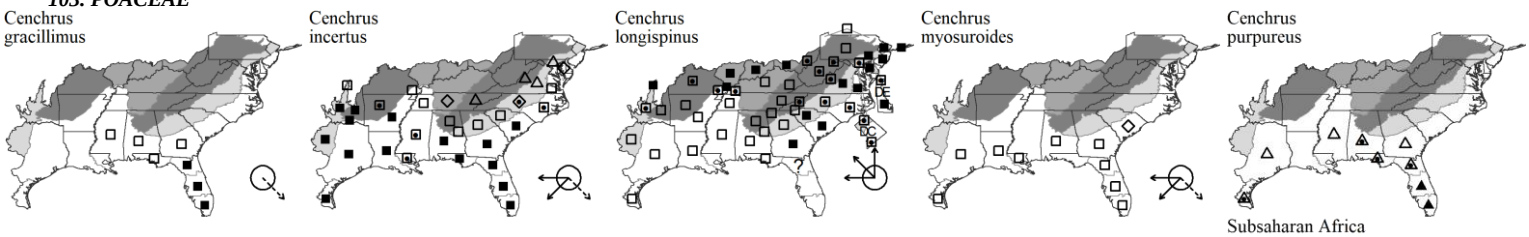
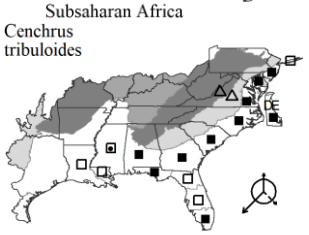


Cenchrus tribuloides Linnaeus. DUNE SANDSPUR. **Hab:** Dunes, sandy fields, sandy woodlands in the outer Coastal Plain. **Dist:** NY (Long Island) south to FL, west to TX, south into tropical America. **Phen:** Aug-Oct. **Comm:** This is the sandspur so familiar to (and disliked by) beach-goers in much of our area. **Syn:** = Bah, C, F, FlGr, FNA25, HC, K1, K3, K4, NY, Pa, RAB, S, Va, W, WH3, Crins (1991), Ward (2010b). NatureServe G5 (Secure).



Chasmanthium Link 1827 (SPANGLEGRASS, SPIKEGRASS)

A genus of 5 species, perennials, endemic to se. North America. References: Sánchez-Ken & Clark (2003) in FNA25 (2003a); Wipff & Jones (1994); Yates (1966a); Yates (1966c).

1 Panicle branches elongate, pendulous; spikelets (15-) 20-40 mm long, with 6-20 flowers ..... ***Chasmanthium latifolium***
1 Panicle branches short, erect or ascending; spikelets 5-18 mm long, with 2-8 (-11) flowers.
  2 Fully-developed spikelets 12-18 mm long, 8-12 mm wide.
    3 Axils of the spikelets and panicle branches glabrous; empty lemmas 9 (-12); [se. NC south to c. peninsular FL and e. FL Panhandle] ..... ***Chasmanthium nitidum***
    3 Axils of the spikelets and panicle branches with a tuft of long hairs; empty lemmas 2-4; [w. FL Panhandle west to e. LA (Florida parishes)] ..... ***Chasmanthium ornithorhynchum***
  2 Fully-developed spikelets 4-9 mm long, 3-7 mm wide.
    4 Collar (junction of leaf and sheath) glabrous or nearly so; leaves 3-7 mm wide ..... ***Chasmanthium laxum***
    4 Collar (junction of leaf and sheath) pilose; leaves 6-12 mm wide. ..... ***Chasmanthium sessiliflorum var. sessiliflorum***

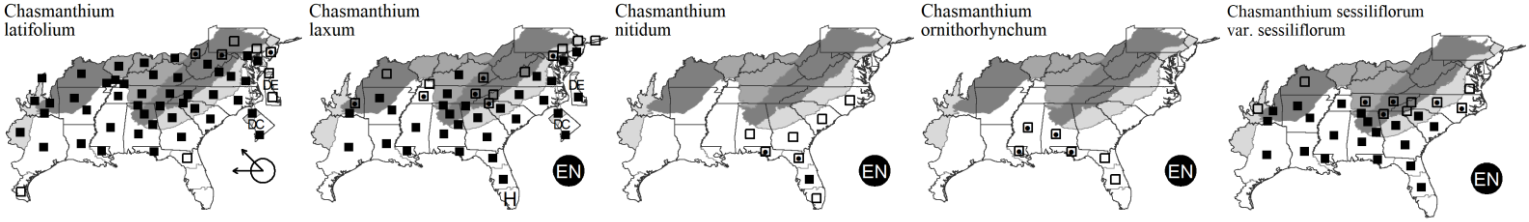
Chasmanthium latifolium (Michaux) Yates. RIVER OATS, FISH-ON-A-STRINGER. **Hab:** Riverbanks, streambanks, bottomland forests, seepages and glades over mafic or calcareous rock, usually in nutrient-rich soils, also now cultivated widely as a native plant ornamental, but can be quite aggressive. **Dist:** NJ, OH, IL, and KS south to ne. and Panhandle FL and TX. **Phen:** Jun-Oct. **Syn:** = Ar, C, ETx1, FlGr, FNA25, GW1, Il, K1, K3, K4, Mi, Mo1, NcTx, Pa, Tn, Tx, Va, W, WH3, Yates (1966a), Yates (1966c); = *Uniola latifolia* Michaux – F, G, HC, RAB, S, WV. NatureServe G5 (Secure).

Chasmanthium laxum (Linnaeus) Yates. SLENDER SPIKEGRASS. **Hab:** Savanna-pocosin ecotones, sandhill-pocosin ecotones, moist hardwood swamps, other moist habitats. **Dist:** S. NY, KY, and OK south to s. FL and e. TX. **Phen:** May-Oct. **Comm:** See *C. sessiliflorum* for comments on the suggestion that these two taxa are only varietally or subspecifically distinct. **Syn:** = Ar, C, ETx1, FNA25, GW1, K1, K3, K4, NY, Pa, Tn, Tx, Va, W, Yates (1966a), Yates (1966c); = *Chasmanthium laxum* ssp. *laxum* – Mo1; = *Chasmanthium laxum* var. *laxum* – NcTx, WH3, Wipff & Jones (1994); = *Uniola laxa* (Linnaeus) Britton, Sterns, & Poggenburg – F, G, HC, RAB, S. NatureServe G5 (Secure).

Chasmanthium nitidum (Baldwin) Yates. SHINY SPANGLEGRASS. **Hab:** Blackwater swamp forests. **Dist:** A Southeastern Coastal Plain endemic: se. NC south to c. FL and west to se. AL. **Phen:** May-Nov. **Syn:** = FlGr, FNA25, GW1, K1, K3, K4, WH3, Yates (1966a), Yates (1966c); = *Uniola nitida* Baldwin – HC, RAB, S. NatureServe G3G4 (Vulnerable).

Chasmanthium ornithorhynchum (Steudel) Yates. BIRDBILL SPIKEGRASS. **Hab:** Blackwater swamp forests. **Dist:** S. AL and w. FL Panhandle west to e. LA (Florida Parishes). Also reported for NC and SC (FNA 2003a; Kartesz 2020), apparently in error, as no evidence has been found to support a distribution in the Carolinas. **Phen:** Jun-Sep. **Syn:** = FlGr, FNA25, GW1, K1, K3, K4, WH3, Yates (1966a), Yates (1966c); = *Uniola ornithorhyncha* Steudel – S. NatureServe G4 (Apparently Secure).

Chasmanthium sessiliflorum (Poiret) Yates *var. **sessiliflorum***. LONGLEAF SPIKEGRASS. **Hab:** Moist to dryish hardwood forests, swamps, other moist habitats. **Dist:** Se. VA, n. TN, n. AR, and e. OK south to sc. peninsular FL and ec. TX. **Phen:** Aug-Oct. **Tax:** This species and *C. laxum* are morphologically somewhat similar, but their treatment as infrataxa of a single species is completely unwarranted. They frequently co-occur (especially on the Gulf Coastal Plain), growing side by side, and show no sign of intergradation. **Syn:** < *Chasmanthium laxum* ssp. *sessiliflorum* (Poiret) L.G. Clark – Mo1; < *Chasmanthium laxum* (Linnaeus) Yates var. *sessiliflorum* (Poiret) L. Clark – NcTx, WH3, Wipff & Jones (1994); < *Chasmanthium sessiliflorum* (Poiret) Yates – Ar, C, FlGr, FNA25, GW1, K1, K3, K4, Tn, Tx, Va, W, Yates (1966a), Yates (1966c); < *Uniola longifolia* Lamson-Scribner – S; < *Uniola sessiliflora* Poiret – F, G, HC, RAB.



Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Chloris Swartz 1788 (FINGER-GRASS, CHLORIS)

A genus 0f 55-60 species, annuals or perennials, mainly tropical and Southern Hemisphere. References: Barkworth (2003e) in FNA25 (2003a); Peterson, Romaschenko, & Herrera Arrieta (2015); Wipff & Shaw (2018a).

Unkeyed taxa: *Chloris gayana*

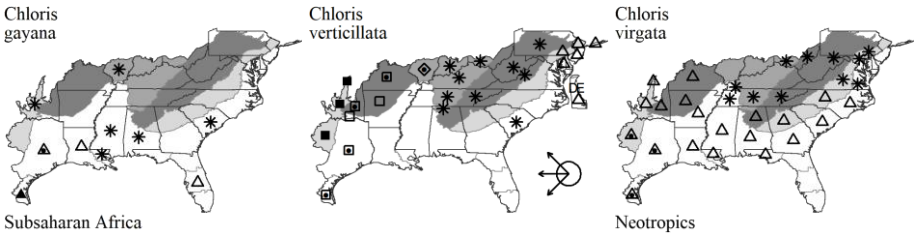
1 Inflorescence verticillate, typically the panicle branches in 2-5 verticils; perennial; fertile lemma inconspicuously appressed-pilose; spikelets not imbricate ..... ***Chloris verticillata***

1 Inflorescence digitate, the panicle branches in a single verticil at the apex of the culm; annual; lemma conspicuously long-ciliate; spikelets imbricate..... ***Chloris virgata***

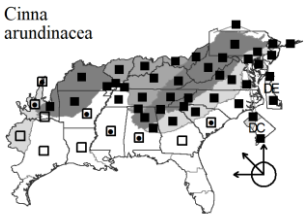
* ***Chloris gayana*** Kunth. RHODES GRASS. **Hab:** Pastures (where planted for forage), disturbed areas, roadsides; eastwards in waste areas near wool-combing mills, other disturbed areas (perhaps only a waif). **Dist:** Native of Africa. **Phen:** Apr-Dec. **Comm:** {not keyed}. **Syn:** = Bah, ETx1, F, FlGr, FNA25, HC, Il, K1, K3, K4, Meso6, NcTx, NE, S, Tx, WH3. NatureServe GNR (Not Yet Ranked).

Chloris verticillata Nuttall. WINDMILL-GRASS, TUMBLE WINDMILL-GRASS. **Hab:** Disturbed areas, bottomland fields. **Dist:** IA, SD, WY south to n. AR, s. TX, NM, AZ, and Mexico; scattered elsewhere as introductions or waifs. **Syn:** = Ar, C, ETx1, F, FNA25, G, HC, Il, K1, K3, K4, Mo1, NcTx, NE, NY, Pa, Tx. NatureServe G5 (Secure).

* ***Chloris virgata*** Swartz. FEATHER WINDMILL-GRASS, FEATHER FINGER-GRASS, SHOWY CHLORIS. **Hab:** Roadsides, other disturbed areas. **Dist:** Native of tropical America. **Phen:** May-Nov. **Syn:** = Ar, C, ETx1, F, FlGr, FNA25, G, HC, Il, K1, K3, K4, Meso6, Mo1, NcTx, NE, NY, RAB, Tn, Tx, WH3. NatureServe G5 (Secure).



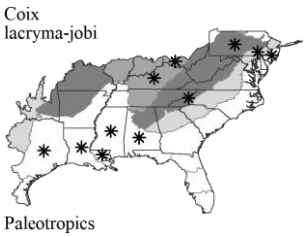
Cinna Linnaeus 1753 (WOODREED)



A genus of about 4 species, of temperate Eurasia, North America, and South America. References: Brandenburg & Thieret (2000); Brandenburg (2007c) in FNA24 (2007a); Brandenburg, Blackwell, & Thieret (1991); Tucker (1996).

Cinna arundinacea Linnaeus. COMMON WOODREED, SWEET WOODREED. **Hab:** Bottomland forests, rocky bars in rivers, tidal freshwater marshes, other low, wet habitats. **Dist:** NB and MN south to s. GA (Carter, Baker, & Morris 2009) and TX. **Phen:** Jul-Oct. **Syn:** = Ar, C, ETx1, FNA24, G, GW1, Il, K1, K3, K4, Mi, Mo1, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WV, Tucker (1996); > *Cinna arundinacea* var. *arundinacea* – F, HC; > *Cinna arundinacea* var. *inexpansa* Fernald & Griscom – F, HC.

Coix Linnaeus 1753 (JOB'S-TEARS)



A genus of about 5 species, native t o tropical Asia. References: Thieret (2003g) in FNA25 (2003a).

* ***Coix lacryma-jobi*** Linnaeus. JOB'S-TEARS. **Hab:** Disturbed areas, perhaps merely a waif. **Dist:** Native of tropical Asia. Reported for se. PA (Rhoads & Block 2007), TN (Thieret in FNA 2003a), c. KY (Kartesz 2010), and s. NJ (Kartesz 1999; Kartesz 2010). **Phen:** Jul-Sep. **Syn:** = ETx1, FNA25, K1, K3, K4, NY, Pa, S. NatureServe GNR (Not Yet Ranked).

Coleataenia Grisebach 1879

Contributed by Richard J. LeBlond

A genus of 8 species, perennials, of s. North America and the West Indies to South America. Named as *Sorengia* by Zuloaga, Scataglini, & Morrone (2010), but this name proved to be illegitimate, and was replaced by *Coleataenia* (Soreng 2010). References: Freckmann & Lelong (2003c) in FNA25 (2003a); LeBlond (2018a) in Weakley et al (2018a); Lelong (1986); Mabberley (2020); Soreng (2010); Weakley et al (2011); Zuloaga & Morrone (1996); Zuloaga, Scataglini, & Morrone (2010).

1 Glumes and sterile lemmas not keeled along midvein; apices of fertile lemmas glabrous; panicle < 1 cm wide, 3-12 cm long; leaf blades 4-19 cm long, 1-4 mm wide, involute at maturity; culms wiry ..... ***Coleataenia tenera***

1 Glumes and sterile lemmas keeled along midvein; apices of fertile lemmas with a minute tuft of stiff hairs; panicles < 1 to > 20 cm wide, 9-40 cm long; leaf blades 8-50 cm long, 2-12 mm wide, flat (sometimes drying involute); culms wiry to stout.

2 Plants with rhizomes; fertile lemma 1.6-4.0 mm long.

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

3 Rhizomes short and stout, usually < 4 cm long, > 4 mm wide and ascending; spikelets (2.5-) 2.7-3.9 mm long, acuminate, often falcate distally; first glume with 3-5 prominent nerves; leaves to 50 cm long and 18 mm wide..... ***Coleataenia anceps ssp. anceps***

3 Rhizomes long and slender, usually > 3 cm long, < 5 mm wide and spreading; spikelets 2.2-2.8 mm long, acute to short-acuminate, not noticeably falcate distally; first glume with 1-3 prominent nerves; leaves to 30 (-40) cm long and 10 mm wide..... ***Coleataenia anceps ssp. rhizomata***

2 Plants with hard crowns, cespitose, lacking rhizomes; fertile lemma 1.2-2.0 mm long.

5 Ligule of white hairs 0.5-3 mm long; culms to 1 m long; cauline blades 2-8 mm wide, usually pilose adaxially near the base; spikelets 2.0-4.0 mm long; upper leaves usually shorter than the panicle.

6 Ligules 0.5-1.5 mm long; spikelets 2.4-4.0 mm long, 3.5-5× as long as wide, erect on pedicels; first glume 1.3-2.9 mm long, > ½-¾ as long as the spikelet . ..... ***Coleataenia longifolia ssp. combsii***

6 Ligules 1-3 mm long; spikelets 2.4-4.0 mm long, 2.5-4 × as long as wide, often obliquely set on pedicels; first glume 0.9-1.4 mm long, about 2/5-1/2 as long as the spikelet..... ***Coleataenia longifolia ssp. longifolia***

5 Ligule a tawny membrane 0.5-1.0 mm long, often erose or lacerate, or with a minute ciliate fringe; culms to 1.8 m long; cauline blades 4-12 mm wide, usually glabrous; spikelets 1.6-2.8 mm long; upper leaves usually equaling or exceeding the panicle.

7 Spikelets 2.4-2.8 mm long, long-acuminate, usually < 0.7 mm wide; fertile lemma often conspicuously stipitate..... ***Coleataenia pulchra***

7 Spikelets 1.6-2.5 mm long, short-acuminate, usually > 0.7 mm wide; fertile lemma estipitate to short stipitate.

8 Culms to 1.8 m long; mature panicle < 1/3 as wide as long, the branches erect; spikelets 2.0-2.5 mm long..... ***Coleataenia rigidula ssp. condensa***

8 Culms to 1 m long; mature panicle ½ to nearly as wide as long, the branches ascending to spreading; spikelets 1.6-2.2 mm long..... ***Coleataenia rigidula ssp. rigidula***

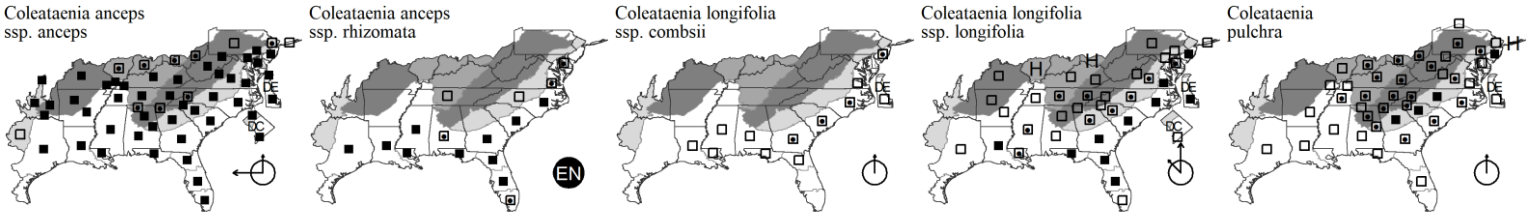
Coleataenia anceps (Michaux) Soreng *ssp.* ***anceps***. BEAKED PANIC GRASS. **Hab:** Moist sandy woods, swamps, sloughs, roadsides, fields, waste places, often weedy. **Dist:** NY (Long Island), NJ west to IL, south to FL and TX. **Phen:** Jun-Oct. **Comm:** The leaves of ssp. *rhizomata* tend to be hairier than those of ssp. *anceps*. **Syn:** = NY, Va, Soreng (2010), Weakley et al (2011); = *Panicum anceps* – HC, S, WV; = *Panicum anceps* ssp. *anceps* – Ar, FNA25, Tn; = *Panicum anceps* Michaux var. *anceps* – F, G, RAB, Lelong (1986); = *Sorengia anceps* (Michaux) Zuloaga & Morrone ssp. *anceps* – Zuloaga, Scataglini, & Morrone (2010); < *Coleataenia anceps* – FlGr, Il, K3, K4; < *Panicum anceps* – C, ETx1, GW1, K1, NcTx, Pa, Tx, W, WH3.

Coleataenia anceps (Michaux) Soreng *ssp.* ***rhizomata*** (A.S. Hitchcock & Chase) Soreng. SMALL BEAKED PANIC GRASS. **Hab:** Moist to dry sandy or loamy pinelands, maritime forests, ditches. **Dist:** E. MD south to s. FL, west to e. TX, on the Coastal Plain, and rarely inland. **Phen:** Jul-Oct. **Comm:** See note under ssp. *anceps*. Robust plants collected without basal portion can resemble *C. rigidula* ssp. *condensa*. Sheaths in ssp. *rhizomata* are sparsely to densely villous, especially near the margin, while those of ssp. *condensa* are glabrous to appressed pubescent distally. The first glume in *C. anceps* ssp. *rhizomata* is 1/3-1/2 as long as the spikelet, and in *C. rigidula* ssp. *condensa* ½-2/3 as long as the spikelet. **Syn:** = Va, Soreng (2010), Weakley et al (2011); = *Panicum anceps* ssp. *rhizomatum* (A.S. Hitchcock & Chase) Freckmann & Lelong – FNA25, Tn; = *Panicum anceps* Michaux var. *rhizomatum* (A.S. Hitchcock & Chase) Fernald – F, G, RAB, Lelong (1986); = *Panicum rhizomatum* A.S. Hitchcock & Chase – HC, S; = *Sorengia anceps* (Michaux) Zuloaga & Morrone ssp. *rhizomata* (A.S. Hitchcock & Chase) Zuloaga & Morrone – Zuloaga, Scataglini, & Morrone (2010); < *Coleataenia anceps* – FlGr, K3, K4; < *Panicum anceps* – C, ETx1, GW1, K1, NcTx, Tx, WH3.

Coleataenia longifolia (Torrey) Soreng *ssp.* ***combsii*** (Lamson-Scribner & C.R. Ball) Soreng. COMBS PANIC GRASS. **Hab:** Pond shores, depression meadows, cypress savannas, marshes, low woods. **Dist:** Scattered on the outer Coastal Plain from NS (LeBlond in Weakley et al. 2018a), se. MA, NJ, se. VA, se. NC, e. SC, e. GA, and FL, west to se. LA. **Phen:** Jul-Oct. **Syn:** = K3, K4, Va, Soreng (2010), Weakley et al (2011); = *Panicum combsii* Lamson-Scribner & C.R. Ball – HC, S; = *Panicum longifolium* Torrey var. *combsii* (Lamson-Scribner & C.R. Ball) Fernald – F, G, RAB; = *Panicum rigidulum* Bosc ex Nees ssp. *combsii* (Lamson-Scribner & C.R. Ball) Freckmann & Lelong – FNA25; = *Panicum rigidulum* Bosc ex Nees var. *combsii* (Lamson-Scribner & C.R. Ball) Lelong – K1, Lelong (1986); = *Sorengia longifolia* (Torrey) Zuloaga & Morrone ssp. *combsii* (Lamson-Scribner & C.R. Ball) Zuloaga & Morrone – Zuloaga, Scataglini, & Morrone (2010); < *Coleataenia longifolia* (Torrey) Soreng – FlGr; < *Panicum longifolium* – C, Pa, Tx, WH3.

Coleataenia longifolia (Torrey) Soreng *ssp.* ***longifolia***. LONG-LEAVED PANIC GRASS. **Hab:** Wet sandy or peaty soils of bogs, savannas, pond shores, depression meadows. **Dist:** NS, NH, MA, PA, and IN south to FL, west to TX. **Phen:** Jul-Oct. **Syn:** = K3, K4, NY, Va, Soreng (2010), Weakley et al (2011); = *Panicum longifolium* – HC, S; = *Panicum longifolium* Torrey var. *longifolium* – G, RAB; = *Panicum rigidulum* Bosc ex Nees ssp. *pubescens* (Vasey) Freckmann & Lelong – Ar, FNA25, Tn; = *Panicum rigidulum* Bosc ex Nees var. *pubescens* (Vasey) Lelong – ETx1, K1, W, Lelong (1986); = *Sorengia longifolia* (Torrey) Zuloaga & Morrone ssp. *longifolia* – NE, Zuloaga, Scataglini, & Morrone (2010); < *Coleataenia longifolia* (Torrey) Soreng – FlGr; < *Panicum longifolium* – C, GW1, Mi, Pa, Tx, WH3; > *Panicum longifolium* Torrey var. *longifolium* – F; > *Panicum longifolium* var. *pubescens* (Vasey) Fernald – F.

Coleataenia pulchra (F. Dietrich) Mabberley & LeBlond. TALL FLAT PANIC GRASS. **Hab:** Marshes, low woods, ditches, swamps, shores, meadows, beaver marshes. **Dist:** CT and NY west to IN, south to GA, LA, and ne. TX. **Phen:** Aug-Oct. **Tax:** Mabberley (2020) explains the nomenclatural reasons for replacing *C. stipitata* with *C. pulchra*. **Syn:** = Mabberley (2020); = *Coleataenia longifolia* (Torrey) Soreng ssp. *elongata* (Pursh) Soreng – Soreng (2010), Zuloaga, Scataglini, & Morrone (2010); = *Coleataenia stipitata* (Nash) LeBlond – Il, K3, K4, NY, Va, Weakley et al (2011); = *Panicum agrostoides* Sprengel var. *elongatum* (Pursh) Lamson-Scribner – G; = *Panicum rigidulum* Bosc ex Nees ssp. *elongatum* (Pursh) Freckmann & Lelong – FNA25, Tn; = *Panicum rigidulum* Bosc ex Nees var. *elongatum* (Pursh) Lelong – K1, W, Lelong (1986); = *Panicum stipitatum* Nash – F, HC, Pa, RAB, S, WV; = *Sorengia longifolia* (Torrey) Zuloaga & Morrone ssp. *elongata* (Scribner) Zuloaga & Morrone – NE; < *Panicum rigidulum* – C, GW1, WH3.



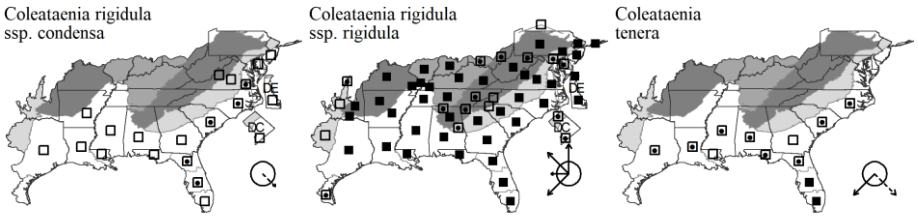
Coleataenia rigidula (Bosc ex Nees) LeBlond *ssp.* ***condensa*** (Nash) LeBlond. DENSE PANIC GRASS. **Hab:** Marshes, meadows, low woods, ditches, stream and pond shores, freshwater tidal shores. **Dist:** Coastal Plain south from se. MA to FL, west to se. TX and AR; disjunct in the West Indies. **Phen:** Sep-Oct. **Comm:** Usually readily identified by its tall stature and compact inflorescence, somewhat resembling a large *Hymenachne hemitomon*, with which it occasionally occurs. See note under *C. anceps* ssp. *rhizomata*. **Syn:** = K3, K4, Va, Weakley et al (2011); = *Coleataenia condensa* (Nash) Mohlenbrock – Il; = *Panicum agrostoides* Sprengel var. *condensum* (Nash) Fernald – F, RAB; = *Panicum condensum* Nash – HC, S; < *Coleataenia longifolia* (Torrey) Soreng ssp. *rigidula* (Bosc ex Nees) Soreng – Soreng (2010); < *Coleataenia rigidula* (Bosc ex Nees) LeBlond – FlGr; < *Panicum agrostoides* – G; < *Panicum*

Key to Map Symbology: □ native ◇ maybe exotic △ exotic ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated

rigidulum – Bah, C, GW1, Pa, Tx, WH3; < *Panicum rigidulum* Bosc ex Nees ssp. *rigidulum* – FNA25; < *Panicum rigidulum* Bosc ex Nees var. *rigidulum* – K1, Lelong (1986); < *Sorengia longifolia* (Torrey) Zuloaga & Morrone ssp. *rigidula* (Bosc ex Nees) Zuloaga & Morrone – Zuloaga, Scataglini, & Morrone (2010).

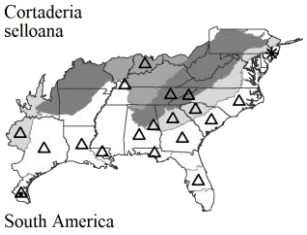
Coleataenia rigidula (Bosc ex Nees) LeBlond *ssp.* ***rigidula***. REDTOP PANIC GRASS. **Hab:** Wet sandy or peaty soils low woods, meadows, marshes, shores, swamps, ditches, often weedy. **Dist:** ME and MI south to FL and TX; also in CA and BC; disjunct in Central America. **Phen:** Jul-Oct. **Syn:** = K3, K4, NY, Va, Weakley et al (2011); = *Coleataenia rigidula* (Bosc ex Nees) LeBlond – Il; = *Panicum agrostoides* – S, WV; = *Panicum agrostoides* Sprengel var. *agrostoides* – G, RAB; = *Panicum rigidulum* Bosc ex Nees var. *rigidulum* – W; < *Coleataenia longifolia* (Torrey) Soreng ssp. *rigidula* (Bosc ex Nees) Soreng – Soreng (2010); < *Coleataenia rigidula* (Bosc ex Nees) LeBlond – FlGr; > *Panicum agrostoides* Sprengel var. *agrostoides* – F, HC; > *Panicum agrostoides* var. *ramosius* (C. Mohr) Fernald – F, HC; < *Panicum rigidulum* – C, GW1, Meso6, Mi, NcTx, Pa, Tx, WH3; < *Panicum rigidulum* Bosc ex Nees ssp. *rigidulum* – Ar, FNA25, Tn; < *Panicum rigidulum* Bosc ex Nees var. *rigidulum* – ETx1, K1, Lelong (1986); < *Sorengia longifolia* (Torrey) Zuloaga & Morrone ssp. *rigidula* (Bosc ex Nees) Zuloaga & Morrone – Zuloaga, Scataglini, & Morrone (2010).

Coleataenia tenera (Beyrich ex Trinius) Soreng. SOUTHEASTERN PANIC GRASS. **Hab:** Limesink ponds, depression meadows, cypress savannas, wet pinelands, bogs. **Dist:** Coastal Plain from se. NC to FL, west to e. TX; West Indies; Mexico and Central America. **Phen:** Jun-Sep. **ID Notes:** The rhizomes produce lines of closely spaced culms. Though 0.5-1 m tall, the culms are very narrow and inconspicuous. **Syn:** = FlGr, K3, K4, Soreng (2010), Weakley et al (2011); = *Panicum tenerum* Beyrich ex Trinius – Bah, ETx1, FNA25, GW1, HC, K1, Meso6, RAB, S, Tx, WH3, Lelong (1986); = *Sorengia tenera* (Beyrich ex Trinius) Zuloaga & Morrone – Zuloaga, Scataglini, & Morrone (2010). NatureServe G4 (Apparently Secure).



Cortaderia Stapf 1897 (PAMPASGRASS)

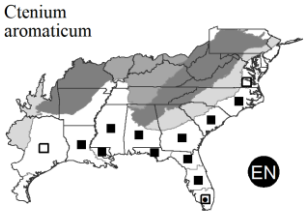
A genus of ca. 20 species, native to South America. References: Allred (2003c) in FNA25 (2003a).



* ***Cortaderia selloana*** (Schultes & Schultes f.) Ascherson & Graebner. PAMPASGRASS. **Hab:** Barrier island marsh edges, other disturbed areas. **Dist:** Native of South America. **Phen:** Aug-Nov. **Comm:** This grass is a popular ornamental, sometimes escaping. **Syn:** = FlGr, FNA25, HC, K1, K3, K4, Meso6, NcTx, RAB, WH3. NatureServe GNR (Not Yet Ranked).

Ctenium Panzer 1813 (TOOTHACHE GRASS)

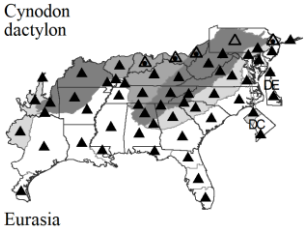
A genus of about 20-22 species, of tropical and subtropical Africa and the Americas. References: Barkworth (2003h) in FNA25 (2003a); Longhi-Wagner & Renvoize (2004).



Ctenium aromaticum (Walter) Alph. Wood. TOOTHACHE GRASS, ORANGE GRASS, WILD GINGER. **Hab:** Wet savannas, pocosin-savanna ecotones, seepage bogs, sandhill-pocosin ecotones, sandhill seeps. **Dist:** Southeastern Coastal Plain endemic: se. VA south to FL and west to LA and e. TX (Singhurst, Keith, & Holmes 2005). **Phen:** May-Aug (or later in response to late summer fires). **Comm:** The entire plant is aromatic and numbs the mouth, tongue, and lips when chewed, hence the specific epithet and common names. Like many species of the longleaf pine ecosystem, toothache grass generally flowers only following fire (MacRoberts & MacRoberts 1992). Sterile clumps can be recognized by the rather broad, bicolored leaves (bluish on the upper surface, bright green on the lower surface). **Syn:** = C, F, FlGr, FNA25, G, GW1, HC, K1, K3, K4, RAB, Va, WH3; = *Campulosus aromaticus* (Walter) Trinius – S. NatureServe G5 (Secure).

Cynodon L.C. Richard 1805 (BERMUDA GRASS)

A genus of ca. 9 species, native to the tropical Old World. References: Barkworth (2003i) in FNA25 (2003a).



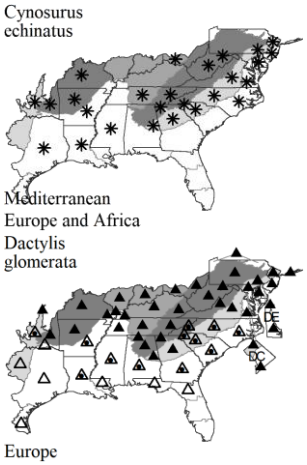
* ***Cynodon dactylon*** (Linnaeus) Persoon. BERMUDA GRASS, SCUTCH GRASS. **Hab:** Lawns, gardens, roadsides, pastures, fields, disturbed areas. **Dist:** Native of Eurasia. **Phen:** May-Oct. **Tax:** *C. dactylon* is here treated broadly; various authors have recognized additional taxa at specific or varietal rank (see discussion in FNA). **Syn:** = Ar, Bah, C, ETx1, F, G, HC, Il, K1, K3, Meso6, Mi, Mo1, NcTx, Pa, RAB, Tn, Tx, W, WH3, WV; < *Capriola dactylon* (Linnaeus) Kuntze – S; > *Cynodon dactylon* var. *affinis* (Caro & Sánchez) Romero Zarco – K4; < *Cynodon dactylon* var. *dactylon* – K4; > *Cynodon dactylon* var. *dactylon* – FNA25, NE, NY, Va. NatureServe GNRTNR (Not Yet Ranked).

Cynosurus Linnaeus 1753 (DOGTAIL)

A genus of 8 species, annuals and perennials, native of the Mediterranean region and w. Asia. References: Long (2007) in FNA24 (2007a); Tucker (1996).

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

* ***Cynosurus echinatus*** Linnaeus. ROUGH DOGTAIL, BRISTLY DOGTAIL. **Hab:** Lawns, roadsides. **Dist:** Native of s. Europe. **Phen:** May-Jun. **Syn:** = Ar, C, ETx1, F, FNA24, HC, K1, K3, K4, Mi, Mo1, NY, Pa, RAB, Va, WV, Tucker (1996). NatureServe GNR (Not Yet Ranked).



Dactylis Linnaeus 1753 (ORCHARD GRASS)

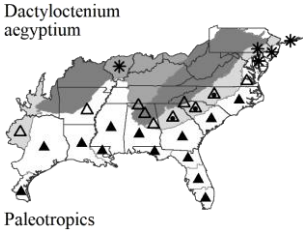
A genus of 1 variable species, perennial, native of Eurasia. References: Allred (2007a) in FNA24 (2007a); Tucker (1996).

* ***Dactylis glomerata*** Linnaeus. ORCHARD GRASS, COCK'S-FOOT. **Hab:** Pastures, fields, woodland edges, roadsides. **Dist:** Native of Europe. **Phen:** Apr-Oct. **Tax:** In Europe there are various chromosome races, often accorded subspecies or species status. Their status in North America has been little investigated. Haines (2011) reports that only tetraploids have been found in New England. See various references cited in Tucker (1996) for further information about these taxa in Europe. **Syn:** = Ar, C, ETx1, FlGr, FNA24, G, HC, Il, Meso6, Mi, Mo1, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV; > *Dactylis glomerata* ssp. *aschersoniana* (Graebner) Thellung – K1; > *Dactylis glomerata* ssp. *glomerata* – K1, K3, K4, Tucker (1996); > *Dactylis glomerata* ssp. *lobata* (Drejer) Lindberg – K3, K4; > *Dactylis glomerata* var. *ciliata* Petermann – F; > *Dactylis glomerata* var. *detonsa* Fries – F; > *Dactylis glomerata* var. *glomerata* – F.

Dactyloctenium Willdenow 1809 (CROWFOOT GRASS)

A genus of 10-13 species, of Africa and Australia. References: Hatch (2003b) in FNA25 (2003a).

* ***Dactyloctenium aegyptium*** (Linnaeus) Willdenow. CROWFOOT GRASS. **Hab:** Beach dunes, coastal strands, and other coastal areas, lawns, roadsides, disturbed areas. **Dist:** Native of Old World tropics. **Phen:** Jun-Nov. **Syn:** = Ar, Bah, C, ETx1, F, FNA25, G, HC, Il, K1, K3, K4, Meso6, NcTx, NE, NY, RAB, S, Tx, Va, WH3. NatureServe G5 (Secure).



Danthonia A.P. de Candolle 1805 (OAT-GRASS)

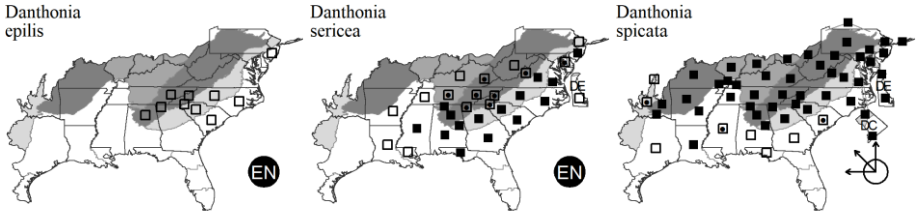
A genus of about 20 species, of North America, Europe, and the Americas, but the generic limits are unclear. References: Darbyshire (2003) in FNA25 (2003a).

1 Lemma teeth (flanking the awn) 0.8-1.8 mm long, triangular, acuminate; glumes 8-13 mm long ..... ***Danthonia spicata***
1 Lemma teeth (flanking the awn) (1.8-) 2.0-4.5 mm long, setaceous; glumes 9-19 mm long.
  3 Sheaths villous; lemmas herbaceous in texture, villous on the back and sides; awn twisted at base several times, forming an awn column 2.5-3 mm long..... ***Danthonia sericea***
  3 Sheaths glabrous; lemmas membranaceous in texture, villous only on the margins and toward the base; awn twisted at base a single time, forming a loose awn column 0.5-1.5 mm long ..... ***Danthonia epilis***

Danthonia epilis Lamson-Scribner. BOG OAT-GRASS. **Hab:** Peaty bogs in the Coastal Plain and Mountains, seeps around rock outcrops in the Piedmont and Mountains, granitic domes. **Dist:** The range is apparently bogs in pinelands from NJ to SC, in mountain bogs and on granitic domes in NC, SC, and GA, in seepage in the Cumberland Plateau and Blue Ridge of TN and AL. **Phen:** Apr-Jun. **Comm:** This taxon appears to be valid, with a distinct range, habitat, and variety of morphologic characters separating it from *D. sericea*, but further study is needed. Material from the mountains seems to differ from Coastal Plain material. RAB's description of the habitat as "dry woods, rare; pied. of N.C." appears to be in error. Blomquist listed the taxon (as a variety) for bogs in the mountains of sw. NC. It has since been found in bogs in the Sandhills region of NC and in seepage bogs in the adjacent Piedmont. **Syn:** = F, HC, K1, K3, K4, S; = *Danthonia sericea* var. *epilis* (Lamson-Scribner) Blomquist – C, RAB; < *Danthonia sericea* Nuttall – FNA25, Tn.

Danthonia sericea Nuttall. SILKY OAT-GRASS, DOWNY DANTHONIA. **Hab:** Dry woodlands, especially common in sandy soils in the Coastal Plain, dry oak, oak-pine, and pine forests in the Piedmont and low Mountains, and on dry acidic cliffs and rock outcrops, roadsides and woodland margins. **Dist:** Primarily a Coastal Plain species northward, ranging from e. MA south to FL and west to LA. **Phen:** Mar-Jun. **Comm:** Reported for WV by Vanderhorst et al. (2013). **Syn:** = Ar, ETx1, F, FlGr, HC, K1, K3, K4, S, Tx, Va, W, WH3; = *Danthonia sericea* var. *sericea* – C, G, RAB; < *Danthonia sericea* Nuttall – FNA25, Tn.

Danthonia spicata (Linnaeus) Palisot de Beauvois ex Roemer & J.A. Schultes. POVERTY OAT-GRASS, MOONSHINE GRASS, 'CURLY DAN'. **Hab:** Dry woodlands, rock outcrops, shale barrens. **Dist:** NL (Newfoundland) and BC south to FL and NM. **Phen:** May-Aug. **Syn:** = Ar, C, ETx1, FlGr, FNA25, G, HC, Il, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV; > *Danthonia allenii* Austin – F; > *Danthonia spicata* var. *longipila* Lamson-Scribner & Merrill – F; > *Danthonia spicata* var. *spicata* – F. NatureServe G5 (Secure).



Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more)

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? : questionable
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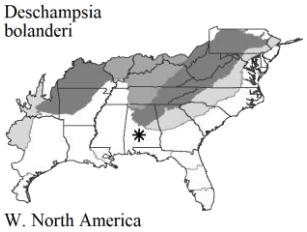
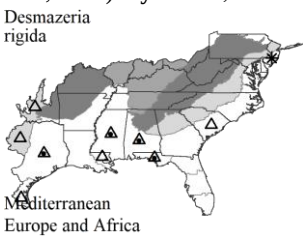
Deschampsia Palisot de Beauvois 1812 (HAIRGRASS)



A genus of about 20-40 species, perennials and annuals, north and south temperate. References: Barkworth (2007n) in FNA24 (2007a); NE; Tucker (1996).

Unkeyed waifs: *Deschampsia bolanderi*

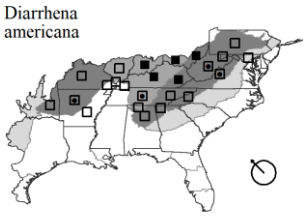
* ***Deschampsia bolanderi*** (Thurber) Saarela. SCRIBNER'S GRASS. **Hab:** Disturbed areas. **Dist:** Native of w. North America. The collection was made in March 2005 from Dauphin Island at Shell Mound Park, a Native American shell midden community; plants may have been introduced as a contaminant in birdseed (H. Horne, pers. comm., 2017). **Syn:** = K4; = *Scribneria bolanderi* (Thurber) Hackel – FNA24. NatureServe G4 (Apparently Secure).



Desmazeria Dumortier 1822

A genus of about 7 species, annuals, native of the Mediterranean region. References: Soreng et al (2003); Tucker (2007b) in FNA24 (2007a).

* ***Desmazeria rigida*** (Linnaeus) Tutin. FERN GRASS. **Hab:** Shell mounds (SC), railroad tracks, stock pens, waste areas around wool-combing mills, other disturbed areas, perhaps only a waif in the northern parts of our area. **Dist:** Native of Mediterranean Europe. **Phen:** Mar-May. **Syn:** = ETx1, FlGr, FNA24, K1, NcTx, NE, WH3; = *Catapodium rigidum* (Linnaeus) Dony – K3, K4, Tx, Soreng et al (2003); > *Catapodium rigidum* ssp. *rigidum* – NY. NatureServe GNR (Not Yet Ranked).



Diarrhena Palisot de Beauvois 1812 (BEAKGRAIN, TWINGRASS)

Depending on circumscription, a genus of either 2 species of perennial grasses of e. North America, or of ca. 6 species of e. North America and e. Asia. References: Brandenburg (2007a) in FNA24 (2007a); Brandenburg, Estes, & Collins (1991).

Diarrhena americana Palisot de Beauvois. EASTERN BEAKGRAIN. **Hab:** Rich moist forests, usually over calcareous rocks. **Dist:** W. VA and WV west to IN, south to TN, sw. NC, and nw. GA (Jones & Coile 1988); disjunct in MO. **Phen:** Jul-Aug; Aug-Oct. **Comm:** This species forms large clonal patches. **Syn:** = Ar, ETx1, FNA24, Il, K1, K3, K4, Mo1, NcTx, NcTx, Pa, Tn, Va, Brandenburg, Estes, & Collins (1991); = *Diarrhena americana* var. *americana* – C, G, WV; < *Diarina festucoides* Rafinesque – S; < *Diarrhena americana* Palisot de Beauvois – F, HC, W.

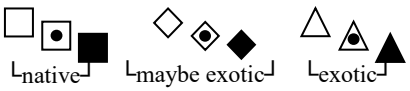
Dichanthelium (A.S. Hitchcock & Chase) Gould 1974 (WITCHGRASS)

Contributed by Richard J. LeBlond

A genus of 70-100 species, perennials, of temperate and tropical America. Hitchcock & Chase (1910) established *Dichanthelium* as a subgenus, and it was elevated to genus by Gould (1974). Radford *et al.* (1968) significantly reduced the number of *Dichanthelium* taxa recognized by Hitchcock & Chase (1910, 1950), especially in the groups treated as sections *Dichanthelium* (formerly section *Dichotoma*) and *Lanuginosa* in Freckmann & Lelong (2003). Gould & Clark (1978) made further reductions in the number of recognized taxa. Subsequent work has determined the reductions were excessive. Gould & Clark nearly admitted as much. In their treatment of one species group, they wrote: "The recognition of only four species and six varieties in this complex to which almost 50 species names have been applied admittedly is somewhat arbitrary and certainly not entirely satisfactory".

Dichanthelium is one of the most complex and confusing genera in our region. A taxon that is distinct in one part of its range may be indistinguishable from another taxon elsewhere. This is particularly true of Coastal Plain species adapted to natural (and now human) disturbances. Although hybridization is frequently suspected in *Dichanthelium*, documentation of natural hybrids is rare. The genus requires careful collection and close observation of several characters. Mature spikelets are essential; in most species, autumnal spikelets have the same dimensions as vernal spikelets. When collecting plants in the autumnal stage, try to select specimens still possessing their vernal leaf blades and panicles, even though these will be senescent. It is also important to collect the whole plant, with the basal rosette intact (whether senescent or of current year's growth). When several plants are growing together, compare the culm, leaf, and spikelet features for differences, as multiple species are often present in the same microhabitat

When analyzing the character of the culm internodes and nodes, begin with the first elongate internode above the base (the lowest internode is often very short and uncharacteristic). Determining whether a node is bearded is often difficult. A bearded node usually is characterized by pubescence that is longer, denser, and/or of a different orientation or structure than adjacent pubescence on the internode. Nodes with short and appressed pubescence generally are not regarded as bearded. Lower nodes are more likely to be bearded than upper nodes. Some internodes are described as "crisp-puberulent". This condition is characterized by a dense covering of minute hairs mostly less than 0.1 mm long, and usually crimped or curved; glandular hairs or protuberances are often intermixed. When analyzing sheaths, look at those on the lower half of the culm. Senescent vernal sheaths often lose their pubescence (though in some species hair papillae are evident). All references in the key to sheath glabrousness or pubescence is without regard to the presence or absence of marginal hairs (cilia). A sheath that is glabrous except for marginal cilia is called glabrous. All culm leaves should be analyzed for blade characters; in general, the key relies on the size and character of the vernal blades. A "cordate" blade is one

Key to Map Symbology: 

←rare ←uncommon ←common (see introduction for more)

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where the basal lobes of the blade extend outward and partially surround the culm when the culm is enclosed by the sheath. As with sheaths, references in the key to blade glabrousness or pubescence is without regard to marginal cilia. The ligule is an important diagnostic character for many *Dichanthelium* taxa; at least three ligules per specimen should be examined before making conclusions about its structure and length. Ligules form a distinct ring from a cartilaginous base at the inner summit of the sheath; in some species the ligule is membranous, but in most it is ciliate. Care must be taken to distinguish the pubescence of the ligule from any pubescence emanating from the inner surface of the blade base, and from marginal cilia. Ligules of senescent vernal leaves frequently lose their integrity. Spikelet shape as well as length should be determined only from mature spikelets. Measure the length from the base of the first glume (usually at an articulation) to the apex of the second glume or sterile lemma (whichever is longer). A micrometer is essential for determining the length of spikelets, first glumes, ligules, and various pilosity features. Sometimes one-tenth of a millimeter is important in separating two *Dichanthelium* taxa.

Certain characters, particularly node bearding, cordate/non-cordate blade bases, and ligule length, can be quite variable, and an effort has been made to account for this variability in the key. Nonetheless, some specimens just will not "fit", and the road not taken may have to be reconsidered. Wipff (2020) made new combinations for 15 entities previously named as species in *Panicum*, but provided no arguments or discussion for the recognition. They are here included in synonymy until their validity can be determined. References: Davidse & Pohl (1992); Freckmann & Lelong (2002); Freckmann & Lelong (2003a) in FNA25 (2003a); Freckmann (1981); Gould & Clark (1978); Gould (1974); Hansen & Wunderlin (1988); Hitchcock & Chase (1910); LeBlond (2001a); LeBlond (2011) in Weakley et al (2011); LeBlond (2016); LeBlond (2017a) in Weakley et al (2017); LeBlond (2017b) in Weakley et al (2017); LeBlond (2017c) in Weakley et al (2017); LeBlond (2018b) in Weakley et al (2018a); LeBlond (2019a) in Weakley et al (2019a); LeBlond (2020); LeBlond et al (2017); LeBlond, Townsend, & Ludwig (2020); Lelong (1984); Schuyler (1996); Silveus (1942); Thomas (2008); Thomas (2021); Wipff (2020).

Identification Notes: *Dichanthelium* is most readily (though not consistently) separated from *Panicum* by the following combination of features: plants producing over-wintering rosettes of leaves often shorter and broader than the culm leaves; plants producing simple culms with terminal panicles in spring or early summer, then producing terminal panicles on primary branches, followed by often hidden or obscured panicles on secondary (etc.) branching. Virtually all treatments refer to two flowering phases: vernal (or primary), and autumnal (or secondary). Little understood is that almost all taxa in the genus appear to have three flowering periods. An intermediate stage between vernal and autumnal was recognized by Hitchcock & Chase (1910), who wrote: "In this group there is an intermediate stage of branching, in which the plants do not show the characteristic vernal nor autumnal habit". Silveus (1942) also recognized the intermediate stage, and described its features for several taxa. The three floral stages are, in phenological order: panicle terminating the culm (vernal stage), panicles terminating the primary branches (intermediate or aestival stage), and panicles on secondary branches (autumnal stage). Complicating matters, the three stages tend to overlap, and the autumnal stage in most species begins in summer, not autumn. Also, the autumnal stage can rebranch two or more times. As in the terminal vernal inflorescences, the intermediate stage panicles at the ends of the primary branches tend to disarticulate later in the season. On most specimens collected in the autumnal stage, the only evidence of the primary branching stage (besides the branch itself) is the presence of some intermediate-sized blades subtending the later autumnal fascicles, along with evidence of the branch having lost its terminal portion. Autumnal inflorescences are usually short-exserted and more-or-less hidden among the fascicled leaves, sometimes even partly included in the sheaths. This treatment relies on the vernal and autumnal stages for distinguishing among the many taxa, as key characters from the intermediate stage have not been developed. Care must be taken to distinguish the pubescence of the ligule from any pubescence emanating from the inner surface of the blade base, and from marginal cilia. Some taxa have what is referred to as a double ligule: a dense ring of short hairs 0.5-1 mm long at the ventral summit of the sheath, and behind it a ring of longer hairs 1-5 mm long called the pseudoligule, which is attached to the base of the blade. At first glance, the hairs appear to form a single structure. The true, short ligule is most easily seen toward the edges (excluding cilia), and by tilting the blade away from the sheath axis.

1 Plants densely tufted, often cushion-forming; leaves basally disposed, the blades ascending or spreading-ascending, not forming a distinct rosette of basal leaves shorter than the culm leaves; autumnal culms branching basally or from the lower nodes ..... ***Key A***
1 Plants less densely or sparsely tufted, not cushion-forming; leaves well-distributed on the culm, usually much longer than the short, often broad and spreading basal rosette leaves; autumnal culms usually branching from the mid and upper nodes.
  2 Spikelets 3.3-5.2 mm long ..... ***Key B***
  2 Spikelets 0.8-3.2 mm long.
    3 Spikelets 2.1-3.2 mm long.
      4 Larger culm blades 13-25 mm wide ..... ***Key C***
      4 Larger culm blades < 13 mm wide.
        5 Culm nodes (at least the lower) bearded ..... ***Key D***
        5 Culm nodes not bearded, the lowermost sometimes puberulent or sparsely hairy ..... ***Key E***
    3 Spikelets 0.8-2.0 mm long.
      6 Lower culm internodes variously hairy ..... ***Key F***
      6 Lower culm internodes glabrous ..... ***Key G***

Key A - Plants densely tufted, often cushion-forming; leaves basally disposed, the blades ascending or spreading-ascending, not forming a distinct rosette of basal leaves shorter than the culm leaves; autumnal culms branching basally or from the lower nodes

1 Spikelets 2.4-4.5 mm long.
  2 Nodes, internodes, and sheaths glabrous; blades 4-13 cm, 5-8 mm, the surfaces smooth, glabrous; spikelets 2.4-2.9 mm long, glabrous; not known to produce axillary (autumnal) inflorescences ..... ***Dichanthelium nudicaule***
  2 Nodes bearded or otherwise pubescent; internodes and sheaths variously pubescent to glabrate; blades 6-35 cm, 2-5 mm, one or both surfaces scabrous and often pubescent; spikelets 1.7-4.5 mm long, glabrous or pubescent; plants produce axillary (autumnal) inflorescences.
    3 Spikelets 2.8-3.8 (-4.5) mm long, the second glume and sterile lemma pointed or beaked and extended beyond the summit of the fertile lemma; first glume 1.2-2 mm long ..... ***Dichanthelium depauperatum***
    3 Spikelets 1.7-2.8 mm long, the second glume and sterile lemma blunt or broadly pointed, not extending beyond the summit of the fertile lemma; first glume 0.7-1.2 mm long ..... ***Dichanthelium linearifolium***
1 Spikelets 0.9-2.3 mm long.
  4 Longer blades > 6 cm; if only 6 cm, then sheaths retrorsely long-pilose (*D. laxiflorum*).
    6 Longer blades 10-35 cm long, 2-4 mm wide; sheaths glabrous to variously pilose, but not conspicuously retrorsely long-pilose; nodes variously pubescent to glabrate; spikelets 1.7-2.3 (-2.8) mm long ..... ***Dichanthelium linearifolium***

Key to Map Symbology:

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6 Longer blades 6-18 cm long, 7-12 mm wide; sheaths conspicuously retrorsely long-pilose; nodes bearded with retrorse or spreading hairs; spikelets (1.4-) 1.9-2.3 (-2.5) mm long ..... ***Dichanthelium laxiflorum***

4 Longer blades 1.5-6 cm; sheaths glabrous or pubescent, but not retrorsely long-pilose.

7 Blades 1-3 mm wide, glabrous, eciliate or basally ciliate; spikelets 0.9-1.2 (-1.4) mm long. ..... ***Dichanthelium chamaelonche***

7 Blades 3-8 mm wide; spikelets 1.1-2.1 mm long (or if < 1.5 mm long, then blades either pubescent on one or both surfaces or ciliate to the apex).

9 Spikelets pubescent, 1.5-2.1 mm long; blade surfaces glabrous ..... ***Dichanthelium strigosum var. leucoblepharis***

9 Spikelets glabrous, 1.1-1.8 mm long; blade surfaces pubescent or glabrous.

10 Blades glabrous, or sparsely pilose only near the adaxial base; spikelets 1.4-1.8 mm long ..... ***Dichanthelium strigosum var. glabrescens***

10 Blades pilose, at least abaxially; spikelets 1.1-1.6 mm long ..... ***Dichanthelium strigosum var. strigosum***

Key B - Spikelets 3.3-5.2 mm long

1 Nodes (at least the lower) densely bearded with retrorse hairs; spikelets 3.3-5.2 mm long; ligule ciliate, the membranous base minute or obsolete.

2 Ligule 2.5-4 mm long; lower internodes pubescent with long ascending or spreading hairs; blades 8-15 cm long, 10-25 mm wide; first glume 1.8-2.5 mm long ..... ***Dichanthelium ravenelii***

2 Ligule 0.3-1.3 mm long; lower internodes glabrous or pubescent with ascending hairs; blades 5-14 cm long, either 4-13 or 12-40 mm wide; first glume 1.2-2.2 mm long. ..... ***Dichanthelium boscii***

1 Nodes glabrous, pubescent, or sparsely pilose; spikelets (2.4-) 3.3-4.2 mm long; ligules membranous, ciliate, or both.

5 Ligule 1.6-3 mm long; blades 4-9 mm wide, > 10× as long as wide ..... ***Dichanthelium oligosanthes***

5 Ligule 0.2-1.5 mm long; if larger blades < 9 mm wide and mostly 15× or more as long, then ligule 0.5-1 mm long.

6 Larger blades 2-6 (-8) mm wide, 10-15× or more as long as wide (if shorter, then culms arising from hard corm-like bases and culms with 8-14 leaves); spikelets basally attenuate. ..... ***Dichanthelium fusiforme***

6 Larger blades 6-35 mm wide, mostly 10× or less as long as wide; spikelet bases rounded to narrowed.

11 Ligules 1-1.5 mm long; blades 5-10 cm long by 6-15 mm wide, glabrous or pubescent, basally rounded; spikelets glabrous to pubescent ..... ***Dichanthelium scribnerianum***

11 Ligules 0.3-1 mm long; blades 7-35 cm long by 8-35 mm wide, glabrous or scabrous, basally cordate or rounded; spikelets pubescent to glabrate. ..... ***Dichanthelium clandestinum***

Key C - Spikelets 2.1-3.2 mm long, larger leaves 13-25 mm wide

1 Culm nodes, at least the lower, bearded (often retrorsely).

2 Nodes with a viscid band below the beard; internodes and sheaths velvety-pubescent; vernal culm blades 9-20 cm long, 9-20 mm wide ..... ***Dichanthelium scoparium***

2 Nodes without a viscid band below the beard; internodes and sheaths glabrous, the lower sometimes sparsely hairy; vernal culm blades 3.5-14 cm long, 7-15 mm wide ..... ***Key to the Dichanthelium dichotomum group***

1 Culm nodes glabrous or pubescent, but not bearded.

3 Second glume and sterile lemma acute to short-acuminate, some in a given specimen 0.3 mm or more longer than fertile lemma.

4 Ligule an eciliate membrane; peduncle scabrous; first glume 0.3-0.6 (-0.8) mm long, reniform to suborbicular ..... ***Dichanthelium scabriusculum***

4 Ligule a ciliate membrane or entirely ciliate; peduncle smooth; first glume 0.7-1.6 mm long, broadly ovate to lanceolate. ..... ***Dichanthelium yadkinense***

3 Second glume and sterile lemma blunt to subacute, shorter than, equaling, or barely exceeding fertile lemma, never by as much as 0.3 mm.

8 Lower sheaths papillose-hispid with spreading hairs; ligule a membrane 0.4-0.9 mm long; leaf blades 10-28 cm long ..... ***Dichanthelium clandestinum***

8 Lower sheaths glabrous, puberulent, or softly villous basally; ligule either a membrane 0-0.3 mm long or a ciliate membrane 0.4-0.7 mm long; leaf blades 5-18 cm long.

11 Culms erect; blades more nearly symmetrical; spikelets 2.0-3.2 mm long; sterile lemma apex usually blunt to rounded ..... ***Dichanthelium commutatum ssp. commutatum***

11 Culms basally decumbent; blades strongly asymmetrical-falcate; spikelets 3.0-3.2 mm long; sterile lemma apex usually pointed ..... ***Dichanthelium commutatum ssp. joorii***

Key D - Spikelets 2.1-3.2 mm long, larger culm blades < 13 mm wide, at least the lower culm nodes bearded with a usually spreading-ascending collar of dense and/or longish hairs

1 Ligule with a dense ring of short hairs 0.5-1 mm long, and behind it a ring of longer hairs 1-5 mm long called the pesudoligule (see introduction for discussion of the so-called double ligule).

3 Plants velvety-pubescent throughout; nodes retrorsely bearded; internode pubescence retrorse to spreading; blades usually ciliate above base as well as basally; mature vernal panicles 3-7 cm long, 2-5 cm wide, about 2/3 as wide as long ..... ***Dichanthelium malacophyllum***

3 Plants densely pubescent to glabrate, but lacking velvety pubescence; nodes with spreading to ascending pubescence (sometimes retrorse in *D. villosissimum*); internode pubescence ascending, appressed, or spreading; blades ciliate only at base (sometimes appearing ciliate laterally in *D. ovale* var. *ovale*); mature vernal panicles 4-10 cm long, nearly or equally as wide.

4 Lower internodes with retrorse or spreading hairs to 3+ mm long; blade adaxial surface pilose with hairs to 4+ mm long, these appressed and angled away from the leaf axis; spikelets 2.1-2.5 mm long ..... ***Dichanthelium villosissimum var. villosissimum***

4 Lower internodes pilose with (spreading-) ascending to appressed hairs, or nearly glabrous; blade adaxial surface sparsely appressed-pubescent to glabrate; spikelets 2.1-3.1 mm long.

5 Culm blades 3-8 mm wide, usually sparsely appressed-pubescent on both surfaces, eciliate or ciliate at base only; spikelets 2.1-2.5 mm long ..... ***Dichanthelium ovale var. addisonii***

5 Culm blades 3-8 mm wide, usually sparsely appressed-pubescent on both surfaces, eciliate or ciliate at base only; spikelets 2.1-2.5 mm long ..... ***Dichanthelium ovale var. ovale***

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

103. POACEAE

1 Ligule a single structure, without a pseudoligule.
- 6 Ligule 2-5 mm long, ciliate ..... ***Key to the Dichanthelium acuminatum group***
- 6 Ligule < 2 mm long, ciliate or membranous.
  - 7 Ligule a stramineous to light brown membrane, with or without terminal cilia; peduncle antrorsely scabrous but not hairy.
    - 8 Panicle rachis smooth, pellucid-punctate; first glume 0.3-0.6 (-0.8) mm long, as broad as or broader than long, truncate to obtuse; larger leaves 10-25 cm long, 8-15 mm wide; ligule 0.5-1.3 mm long; lowest elongate culm internode > 2 mm in diameter; lowest nodes usually glabrous or pubescent..... ***Dichanthelium scabriusculum***
    - 8 Panicle rachis scabrous or smooth, not pellucid-punctate; first glume 0.5-1.1 mm long, longer than wide, rounded to acute; larger leaves 3.5-12 cm long, 3-9 mm wide; ligule 0.1-0.6 mm long; lowest elongate culm internode < 2 mm in diameter; lowest nodes retrorsely bearded or glabrous.
      - 9 Lowest nodes usually retrorsely bearded; ligules (0.1-) 0.3-0.6 mm long; largest vernal blades 7-12 cm long, (4.5-) 6-9 mm wide; panicle peduncle scabrous; spikelets ovate-lanceolate, acute, 2.0-2.4 mm long; first glume lanceolate, blunt to acute; fertile lemma smooth ..... ***Dichanthelium cryptanthum***
      - 9 Lowest nodes usually glabrous; ligules 0.1-0.2 (-0.3) mm long; largest vernal blades 3.5-7 cm long, 3-6 mm wide; panicle peduncle smooth; spikelets elliptic, blunt to acute, 1.6-2.2 mm long; first glume ovate to rotund, rounded to acute; fertile lemma papillose ..... ***Dichanthelium lucidum***
  - 7 Ligule entirely of white hairs; peduncle variously hairy or glabrous, but not antrorsely scabrous.
    - 10 Culms with a viscid band below the retrorsely bearded nodes; internodes, sheaths, and blades velvety-pubescent ..... ***Dichanthelium scoparium***
    - 10 Culms without a viscid band below the retrorsely, spreading, or antrorsely bearded nodes; internodes and sheaths not velvety-pubescent, blades velvety-pubescent in some.
      - 12 Nodes retrorsely bearded; larger vernal leaves 7-15 mm wide.
        - 13 Sheaths retrorsely pilose with hairs 2-3 mm long; basal leaves usually numerous, ascending, similar in size and shape to the culm leaves; culms branching only at the base in autumnal phase ..... ***Dichanthelium laxiflorum***
        - 13 Sheaths glabrous or pilose (if pilose, then hairs not both retrorse and 2-3 mm long); basal leaves rosette-forming, usually much shorter than culm leaves; culms branching above base in autumnal phase.
          - 14 Plants rarely > 1 m in length; lower internodes glabrous to sparsely hairy; vernal cauline leaves 3-7; spikelets 1.8-2.8 mm long, elliptic to lance-ovate, blunt to acute, glabrous or pubescent ..... ***Key to the Dichanthelium dichotomum group***
          - 14 Plants often > 1 m in length; lowest internodes moderately to densely villous; vernal cauline leaves 6-15; spikelets 1.8-2.2 mm long, obovoid to broadly ellipsoid, rounded to blunt, pubescent ..... ***Dichanthelium mundum***
      - 12 Nodes spreading to antrorsely bearded; larger vernal leaves 3-10 mm wide.
        - 15 Culm internodes glabrous to sparsely pilose; culm nodes bearded with long retrorse hairs; blade surfaces glabrous to velvety-pubescent ..... ***Key to the Dichanthelium dichotomum group***
        - 15 Culm internodes, at least the lower, strigose, pilose, or villous; culm nodes bearded with ascending or spreading hairs; blade surfaces glabrous or variously hairy.
          - 16 Lower nodes bearded with erect-ascending, soft, and long hairs; mid-culm blades usually 20× or more as long as wide.
            - 17 Spikelets (3.0-) 3.2-3.8 mm long, fusiform, pointed at summit, attenuate at base, with both glumes attached 0.3-0.5 mm below sterile lemma, the autumnal spikelets 3.5-3.8 mm long; larger vernal blades 3-6 mm wide, the lower and mid-culm blades of similar width; autumnal blades involute ..... ***Dichanthelium fusiforme***
            - 17 Spikelets 1.8-3.1 mm long, obovate, blunt, and the base not attenuate except in *D. arenicoloides* with autumnal spikelets 2.3-3.1 mm long; larger vernal blades 2-8 mm wide, the lower usually wider and often shorter than mid-culm blades; autumnal blades involute or flat.
              - 18 Longest vernal blades to 16 cm, widest vernal blades 4-8 mm, usually longitudinally wrinkled; vernal and autumnal spikelets 2.3-3.1 mm long; autumnal blades flat, the larger to 9 cm × 2-4 mm ..... ***Dichanthelium angustifolium***
              - 18 Longest vernal blades to 6 (*D. aciculare*) or 12 (*D. arenicoloides*) cm long, 2-5 mm wide, not noticeably wrinkled; vernal spikelets 1.5-2.8 mm long, autumnal spikelets either 1.5-2.3 (*D. aciculare*) or 2.3-3.1 (*D. arenicoloides*); autumnal blades involute, the larger to 6 cm × 1.5 mm.
                - 19 Longest vernal blades to 6 (-8) cm, widest vernal blades 2-5 mm; vernal and autumnal spikelets 1.7-2.3 mm long, blunt, not attenuate, the glumes attached <0.2 mm below sterile lemma; first glumes 0.6-0.9 mm long; larger autumnal blades to 3 cm by 1 mm..... ***Dichanthelium aciculare***
                - 19 Longest vernal blades to 12 cm, widest vernal blades 3-4 (-5) mm; vernal spikelets 2.1-2.8 mm long; autumnal spikelets 2.3-3.1 mm long, pointed, attenuate, the glumes attached 0.3-0.5 mm below sterile lemma; first glumes 0.7-1.5 mm long; larger autumnal blades to 6 cm by 1.5 mm ..... ***Dichanthelium arenicoloides***
          - 16 Lower and often mid-culm nodes bearded with spreading, stiffish, and short-to-long hairs; mid-culm blades usually 15× or less as long as wide.
            - 20 Blades stiff, often longitudinally ribbed, at least the lower villous or strongly pilose on the abaxial surface, and pilose to hirsute on the adaxial surface, at least proximally.
              - 21 Spikelets 2.3-3.0 mm long; ligule < 1 mm long; mid-culm blades 4-8 mm wide ..... ***Dichanthelium consanguineum***
              - 21 Spikelets 1.7-2.0 (-2.3) mm long; ligule 1-2.5 mm long; mid-culm leaves 2-5 mm wide ..... ***Dichanthelium filiramum***
            - 20 Blades not noticeably stiff nor longitudinally ribbed, pubescent or strigose underneath, glabrous above or with a few long hairs near the base.
              - 22 Spikelet bases strongly attenuate, apices blunt to beaked; first glume (2/5-) ½-2/3 (-4/5) as long as spikelet, attached 0.3-0.5 (-0.7) mm belong expansion of second glume and sterile lemma; larger vernal blades 3-6 (-7) mm wide ..... ***Dichanthelium malacon***
              - 22 Spikelet bases not noticeably attenuate, apices rounded to obtuse; first glume < ½ as long as spikelet, attached < 0.3 mm below expansion of second glume and sterile lemma; larger vernal blades 5-12 mm wide.
                - 23 Culms 50-140 cm long; lowest internodes usually purplish; leaf sheaths often viscid-spotted; leaf blades glabrous abaxially, glabrous and scabrous adaxially; spikelets 1.8-2.2 mm long ..... ***Dichanthelium mundum***
                - 23 Culms 15-60 cm long; lowest internodes usually olive- or bluish-green; leaf sheaths not viscid-spotted; leaf blades appressed-pubescent abaxially, glabrous and smooth to appressed pubescent adaxially; spikelets 2.1-3.1 mm long.
                  - 24 Spikelets 2.5-3.1 mm long; lower culm blades usually glabrous adaxially except for long hairs at or near the margin (appearing ciliate), appressed-pubescent abaxially ..... ***Dichanthelium ovale var. ovale***
                  - 24 Spikelets 2.1-2.6 mm long; lower culm blades usually sparsely appressed-pubescent on both surfaces, eciliate or ciliate at the base only ..... ***Dichanthelium ovale var. addisonii***

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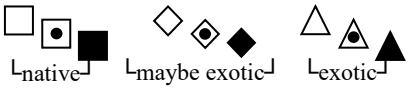
Key E - Spikelets 2.1-3.2 mm long, larger culm blades < 13 mm wide, culm nodes not bearded, the lowermost sometimes puberulent or sparsely pilose

1 Ligule 1.6-4 mm long ..... ***Dichanthelium oligosanthes***
1 Ligule < 1.5 mm long.
2 Leaf blades, at least the lower, cordate or subcordate at the base, 4-25 mm wide.
5 Internodes crisp-puberulent; larger culm blades 4-8 (-11) cm long, 5-10 (-12) mm wide, broadest near the base; spikelets 2.1-2.7 mm long; first glumes 0.7-0.9 mm long ..... ***Dichanthelium commutatum ssp. ashei***
5 Internodes glabrous to sparsely pubescent, larger culm blades 5-18 cm long, 5-25 mm wide, broadest near the middle or broadly linear; spikelets 2.0-3.7 mm long; first glumes 0.5-2.6 mm long.
7 Culms erect; blades more nearly symmetrical; spikelets 2.0-3.2 mm long; sterile lemma apex usually blunt to rounded ..... ***Dichanthelium commutatum ssp. commutatum***
7 Culms basally decumbent; blades strongly asymmetrical-falcate; spikelets 3.0-3.2 mm long; sterile lemma apex usually pointed ..... ***Dichanthelium commutatum ssp. joorii***
2 Leaf blades tapering to the base, 2-12 mm wide.
8 Ligule a stramineous to light brown membrane, with or without terminal cilia.
10 Panicle rachis smooth, pellucid-punctate; first glume 0.3-0.6 (-0.8) mm long, as broad as or broader than long, truncate to obtuse; larger leaves 10-25 cm long, 8-15 mm wide; ligule 0.5-1.3 mm long; lowest elongate culm internode > 2 mm in diameter; lowest nodes usually glabrous or pubescent ..... ***Dichanthelium scabriusculum***
10 Panicle rachis scabrous or smooth, not pellucid-punctate; first glume 0.5-1.1 mm long, longer than wide, rounded to acute; larger leaves 3.5-12 cm long, 3-9 mm wide; ligule 0.1-0.6 mm long; lowest elongate culm internode < 2 mm in diameter; lowest nodes retrorsely bearded or glabrous.
11 Lowest nodes usually retrorsely bearded; ligules (0.1-) 0.3-0.6 mm long; largest vernal blades 7-12 cm long, (4.5-) 6-9 mm wide; panicle peduncle scabrous; spikelets ovate-lanceolate, acute, 2.0-2.4 mm long; first glume lanceolate, blunt to acute; fertile lemma smooth ..... ***Dichanthelium cryptanthum***
11 Lowest nodes usually glabrous; ligules 0.1-0.2 (-0.3) mm long; largest vernal blades 3.5-7 cm long, 3-6 mm wide; panicle peduncle smooth; spikelets elliptic, blunt to acute, 1.6-2.2 mm long; first glume ovate to rotund, rounded to acute; fertile lemma papillose ..... ***Dichanthelium lucidum***
8 Ligule of short white hairs or absent.
12 Leaves basally disposed, usually matted or cushion-forming, larger than the mid and upper culm leaves; blade margins uniformly papillose-ciliate; culms branching only at the base, 0.5-3.5 dm tall; internodes glabrous or sparsely pubescent ..... ***Dichanthelium strigosum var. leucoblepharis***
12 Basal leaves usually rosette-forming, not matted or cushion-forming, usually much smaller than culm leaves; blade margins glabrous, or ciliate only below the middle (or sometimes papillose-ciliate throughout in *D. portoricense* ssp. *patulum*, which has densely puberulent internodes); culms branching at the nodes in age, 1.5-7.5 dm tall.
14 Blades of mid-culm leaves typically long and stiff, acuminate, linear or narrowly lanceolate, usually > 10× as long as wide, only 2-6 mm wide when < 8 cm long.
15 Vegetative parts glabrous (spikelets pubescent, lowest internodes and sheaths sometimes sparsely pubescent, blades and sheaths sometimes ciliate); mature panicles less than ¼ as wide as long, the branches erect-ascending, the spikelets often subsecund; autumnal blades 4-10 cm long, involute, < 2 mm wide; spikelets 1.8-2.2 mm long. ..... ***Dichanthelium neuranthum***
15 Vegetative parts pubescent, at least in the lower portion of plant; mature panicles usually more than half as wide as long, the branches spreading-ascending, the spikelets not noticeably subsecund; autumnal blades 1-6 cm long, involute and < 2 mm wide in *D. aciculare* and *D. arenicoloides*, or to 9 cm long, flat and 2-4 mm wide in *D. angustifolium* (autumnal blade dimensions not yet known for *D. wilcoxianum*); spikelets 1.5-3.2 mm long.
18 Spikelets (3.0-) 3.2-3.8 mm long, fusiform, pointed at summit, attenuate at base, with both glumes attached 0.3-0.5 mm below sterile lemma, the autumnal spikelets 3.5-3.8 mm long; larger vernal leaf blades 3-6 mm wide, the lower and mid-culm leaf blades of similar width; autumnal leaf blades involute ..... ***Dichanthelium fusiforme***
18 Spikelets 1.8-3.1 mm long, obovate, blunt, and the base not attenuate (except in *D. arenicoloides* with autumnal spikelets 2.3-3.1 mm long); larger vernal leaf blades 2-8 mm wide, the lower usually wider and often shorter than mid-culm leaf blades; autumnal leaf blades involute or flat.
19 Longest vernal blades to 16 cm, widest vernal leaf blades 4-8 mm, usually longitudinally wrinkled; vernal and autumnal spikelets 2.3-3.1 mm long; autumnal leaf blades flat, the larger to 9 cm by 2-4 mm ..... ***Dichanthelium angustifolium***
19 Longest vernal leaf blades to 6 cm (*D. aciculare*) or 12 cm (*D. arenicoloides*) long, 2-5 mm wide, not noticeably wrinkled; vernal spikelets 1.5-2.8 mm long, autumnal spikelets either 1.5-2.3 (*D. aciculare*) or 2.3-3.1 (*D. arenicoloides*); autumnal leaf blades involute, the larger to 6 cm by 1.5 mm.
20 Longest vernal leaf blades to 12 cm, widest vernal leaf blades 3-4 (-5) mm; vernal spikelets 2.1-2.8 mm long; autumnal spikelets 2.3-3.1 mm long, pointed, attenuate, the glumes attached 0.3-0.5 mm below sterile lemma; first glumes 0.7-1.5 mm long; larger autumnal leaf blades to 6 cm by 1.5 mm ..... ***Dichanthelium arenicoloides***
20 Longest vernal leaf blades to 6 (-8) cm, widest vernal leaf blades 2-5 mm; vernal and autumnal spikelets 1.7-2.3 mm long, blunt, not attenuate, the glumes attached < 0.2 mm below sterile lemma; first glumes 0.6-0.9 mm long; larger autumnal leaf blades to 3 cm by 1 mm ..... ***Dichanthelium aciculare***
14 Blades of mid-culm leaves lanceolate, thin or firm but not stiff, usually < 10× as long as wide, usually 7 mm or more wide when as much as 8 cm long.
21 Spikelet bases strongly attenuate, apices blunt to beaked; first glume (2/5-) ½-2/3 (-4/5) as long as spikelet, attached 0.3-0.5 (-0.7) mm belong expansion of second glume and sterile lemma ..... ***Dichanthelium malacon***
21 Spikelet bases not noticeably attenuate, apices rounded to acute; first glume < ½ as long as spikelet, attached < 0.3 mm below expansion of second glume and sterile lemma.
22 Spikelets 2.9-3.8 mm long, broadly elliptic, rounded at the summit, with broad and thick nerves ..... ***Dichanthelium scribnerianum***
22 Spikelets 2.1-2.9 mm long, elliptic or obovate, rounded or pointed at the summit, the nerves often raised, but not broad and thick.
23 Culm internodes and sheaths glabrous or, sparsely pilose, or villous.
24 Culms 50-150 cm long; at least lowest sheaths papillose-pilose. ..... ***Dichanthelium mundum***
24 Culms 18-100 cm long; sheaths glabrous or the lowest softly pubescent but not papillose-pilose. ..... ***Key to the Dichanthelium dichotomum group***
23 Culm internodes crisp-puberulent (sparsely so in *D. webberianum)*; sheaths puberulent or glabrous.
27 Spikelets elliptic, sub-acute to pointed, greenish or faintly purple-tinged basally ..... ***Dichanthelium commutatum ssp. ashei***

Key to Map Symbology:  ←rare ←uncommon ←common (see introduction for more)

* : waif EN : endemic H : historic
N : no P : planted ? : questionable
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27 Spikelets strongly plano-convex when viewed laterally, obpyriform when viewed dorsally, broadly rounded, usually markedly reddish-purple basally.
..... ***Dichanthelium portoricense ssp. patulum***

Key F - Spikelets 0.8-2.0 mm long, lower culm internodes variously hairy

1 Longer hairs of ligule 2-5 mm long.
2 Ligule with a distinct ring of short hairs in front of the long hairs.
..... ***Dichanthelium meridionale***
2 Ligule without a distinct ring of short hairs in front of the long hairs.
5 Blades of mid-culm leaves lanceolate, thin or firm but not stiff, length and width various, less than 15× as long as wide .....
..... ***Key to the Dichanthelium acuminatum group***
5 Blades of mid-culm leaves linear or narrowly lanceolate, stiff, acuminate, often involute, 4-10 cm long, 2-5 mm wide, about 15-20× as long as wide.....
..... ***Dichanthelium filiramum***
1 Longer hairs of ligule < 2 mm long.
6 Culm leaves basally crowded, ascending, usually matted or cushion-forming, larger than the mid and upper culm blades.
7 Sheaths conspicuously retrorsely long-pilose; longer blades 6-18 cm long and 7-12 mm wide; spikelets (1.4-) 1.9-2.3 (-2.5) mm long.....
..... ***Dichanthelium laxiflorum***
7 Sheaths variously pubescent or glabrous, but not conspicuously retrorsely long-pilose; longer blades 2-6 cm long and 1-8 mm wide; spikelets 0.9-2.1 mm long.
8 Leaf blades 1-4 mm wide, glabrous, the margins eciliate or basally ciliate; spikelets 0.9-1.5 mm long, glabrous; autumnal form branched from lower and mid nodes as well as from basal nodes.
..... ***Dichanthelium chamaelonche***
8 Leaf blades 2-10 mm wide, pubescent or glabrous, the margins coarsely papillose-ciliate throughout; spikelets 1.1-2.1 mm long, glabrous or pubescent; autumnal form branched from basal nodes only.
10 Spikelets pubescent, 1.5-2.1 mm long; blade surfaces glabrous ..... ***Dichanthelium strigosum var. leucoblepharis***
10 Spikelets glabrous, 1.1-1.8 mm long; blade surfaces pubescent or glabrous.
11 Leaf blades glabrous, or sparsely pilose only near the adaxial base; spikelets 1.4-2.1 mm long ..... ***Dichanthelium strigosum var. glabrescens***
11 Leaf blades pilose, at least abaxially; spikelets 1.1-1.6 mm long ..... ***Dichanthelium strigosum var. strigosum***
6 Culm leaves not basally crowded, the lowest leaves spreading and rosette-forming, usually smaller than the culm leaves.
13 Blades of mid-culm leaves linear or narrowly lanceolate, stiff, acuminate, often involute, 4-10 cm long, 2-5 mm wide, about 15-20× as long as wide.
14 Ligule less than 1 mm long; nodes glabrous to sparsely pubescent, not bearded; blades glabrous (lowest sometimes sparsely pilose); autumnal blades involute..... ***Dichanthelium aciculare***
14 Ligule (1-) 1.5-2 (-2.5) mm long; nodes bearded with spreading-ascending hairs; blades moderately hirsute; autumnal blades flat.....
..... ***Dichanthelium filiramum***
13 Blades of mid-culm leaves lanceolate to lance-elliptic, thin or firm but not stiff, length and width various, < 15× as long as wide.
15 Internodes crisp-puberulent.
17 Spikelets (1.8-) 1.9-2.2 (-2.5) mm long; first glume 0.8-1.2 mm long; lower culm blades 2-8 mm wide ..... ***Dichanthelium portoricense ssp. patulum***
17 Spikelets 1.5-1.8 mm long; first glume 0.5-0.8 mm long; lower culm blades 2-5 mm wide..... ***Dichanthelium portoricense ssp. portoricense***
15 Internodes variously hairy but not crisp-puberulent.
18 Culms (55-) 70-140 cm long; nodes retrorsely bearded; vernal cauline leaves 6-15; blades 6-15 cm long, 8-13 mm wide, glabrous.....
..... ***Dichanthelium mundum***
18 Culms < 60 cm long; nodes not retrorsely bearded; vernal cauline leaves 2-7; blades to 14 cm long and 17 mm wide, glabrous or pubescent.
19 Internodes (sparsely-) moderately to densely pubescent to pilose; ligule 1-5 mm long; blade margins either weakly ciliate, papillose-ciliate basally only, or eciliate, lacking a white-beige cartilaginous edge 0.2 mm wide.
20 Larger mid-culm blades 4-7 cm long, 4-7 mm wide, glabrous to sparsely pubescent adaxially; ligule 1-5 mm long; spikelets 1.1-1.5 mm long.....
..... ***Dichanthelium leucothrix***
20 Larger mid-culm blades 3-6 cm long, 3-5 mm wide, long-pilose adaxially; ligule often with a ring of hairs < 1 mm and scattered longer hairs to 4 mm; spikelets 1.3-1.7 mm long..... ***Dichanthelium meridionale***
19 Internodes sparsely pilose; ligule < 1 mm long; blade margins various.
22 Blades with white-beige cartilaginous margins 0.2 mm wide; spikelets 1.4-1.7 mm long; autumnal form branching from middle and upper nodes
..... ***Dichanthelium tenue***
22 Blade margins coarsely papillose-ciliate throughout; spikelets 1.1-2.1 mm long; autumnal form branching from the base.
23 Spikelets pubescent, 1.5-2.1 mm long; blade surfaces glabrous ..... ***Dichanthelium strigosum var. leucoblepharis***
23 Spikelets glabrous, 1.1-1.8 mm long; blade surfaces pubescent or glabrous.
24 Blades glabrous, or sparsely pilose only near the adaxial base; spikelets 1.4-1.8 mm long .....
..... ***Dichanthelium strigosum var. glabrescens***
24 Blades pilose; spikelets 1.1-1.6 mm long ..... ***Dichanthelium strigosum var. strigosum***

Key G - Spikelets 0.8-2.0 mm long, lower culm internodes glabrous

1 Ligule 1-5 mm long.
2 Ligule (1.5-) 2-5 mm long; sheaths glabrous to variously pubescent; internodes glabrous or pubescent; nodes glabrous, or bearded with ascending, spreading, or tangled hairs; leaves 3-10 cm long, 3-10 mm wide; spikelets 0.8-1.9 mm long..... ***Key to the Dichanthelium acuminatum group***
2 Ligule 1-2 mm long; sheaths sparsely to moderately spreading short-pilose; internodes glabrous; nodes retrorsely bearded; leaves 1-4 cm long, 2-5 mm wide; spikelets 1.2-1.4 mm long ..... ***Dichanthelium curtifolium***
1 Ligule < 1 mm long.
3 Basal leaves rosette-forming, usually much smaller than the culm leaves, not matted or cushion-forming; culms branching at the mid and upper nodes in age.
4 Blades of mid-culm leaves typically long and acuminate, linear or narrowly lanceolate, usually 10-20× as long as wide, only 2-5 mm wide when < 8 cm long.
6 Spikelets (glandular-) papillose-pubescent; blades 1-3 (-5) mm wide; first glume 0.8-1.0 mm long; culms to 4 dm tall..... ***Dichanthelium neuranthum***
6 Spikelets glabrous; blades 3-8 mm wide; first glume 0.3-1.1 mm long; culms to 10 dm tall.

Key to Map Symbology:

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X : extirpated

.....***Key to the Dichanthelium dichotomum group***

4 Blades of mid-culm leaves lanceolate, mostly 10× or less as long as wide, usually 7 mm or more wide when as much as 8 cm long.
8 Spikelets elliptic, oblong, or obovate; lower culm blades 3-12 (-15) mm wide, thin, tapered to the base; plants often freely branching in age, becoming top-heavy with a mass of fascicled, reduced leafy branches and inflorescences.....***Key to the Dichanthelium dichotomum group***
8 Spikelets broadly elliptic to suborbicular; lower culm blades 6-30 mm wide, broad and cordate to subcordate at the base; plants sparingly branched in age, not becoming top-heavy with fascicled, reduced leafy branches and inflorescences.
10 Spikelets 0.9-1.2 mm long; longer blades 6-8 cm long, erect to erect-ascending.....***Dichanthelium erectifolium***
10 Spikelets 1.2-1.9 mm long; longer blades 8-20 cm long, ascending or the uppermost erect.
11 Mid-culm blades to 25 cm long, 14-30 mm wide, the uppermost 10-15+ cm long; vernal panicles to 20 cm long, often less than half as wide as long; spikelets 1.3-1.6 (-1.7).....***Dichanthelium polyanthes***
11 Mid-culm blades to 10 cm long, 5-11 (-14) mm wide, the uppermost 3-9 cm long; vernal panicles to 14 cm long, usually more than half as wide as long; spikelets (1.4-) 1.5-1.8 mm long .....***Dichanthelium sphaerocarpon***

3 Basal leaves similar to or larger than the mid and upper culm leaves, often matted or cushion-forming; culms branching at the base (also at mid and upper nodes in *D. chamaelonche* vars. and *D. dichotomum* var. *glabrifolium*).
12 Longer blades > 6 cm; if only 6 cm, then sheaths retrorsely long-pilose (*D. laxiflorum*).
14 Longer blades 6-18 cm long by 7-12 mm wide; sheaths conspicuously retrorsely long-pilose; nodes bearded with retrorse or spreading hairs; spikelets (1.4-) 1.9-2.3 (-2.5) mm long .....***Dichanthelium laxiflorum***
14 Longer blades 10-35 cm long by 2-4 mm wide; sheaths glabrous to variously pilose, but not conspicuously retrorsely long-pilose; nodes variously pubescent to glabrate; spikelets 1.7-2.3 (-2.8) mm long.....***Dichanthelium linearifolium***
12 Longer blades 1.5-6 cm; sheaths glabrous or pubescent, but not retrorsely long-pilose.
15 Blades 1-3 mm wide, glabrous, eciliate or basally ciliate; spikelets 0.9-1.4 mm long.
.....***Dichanthelium chamaelonche***
15 Blades 3-8 mm wide; spikelets 1.1-2.1 mm long (if < 1.5 mm, then blades either pubescent on one or both surfaces or ciliate to the apex).
17 Spikelets pubescent, 1.5-2.1 mm long; blade surfaces glabrous .....***Dichanthelium strigosum var. leucoblepharis***
17 Spikelets glabrous, 1.1-1.8 mm long; blade surfaces pubescent or glabrous.
18 Blades glabrous, or sparsely pilose only near the adaxial base; spikelets 1.4-2.1 mm long..... ***Dichanthelium strigosum var. glabrescens***
18 Blades pilose, at least abaxially; spikelets 1.1-1.6 mm long..... ***Dichanthelium strigosum var. strigosum***

Key to the *Dichanthelium acuminatum* group -

1 Internodes glabrous (sometimes lowest internodes sparsely to moderately pubescent).
2 Ligule 1-2 mm long; sheaths sparsely to moderately spreading short-pilose; nodes retrorsely bearded; leaves 1-4 cm long, 2-5 mm wide; spikelets 1.2-1.4 mm long .....***Dichanthelium curtifolium***
2 Ligule (1.5-) 2-5 mm long; sheaths glabrous to variously pubescent, but not spreading short-pilose; nodes glabrous or pubescent, but not bearded; leaves 4-11 cm long, 4-8 mm wide.
3 Leaf blade basal cilia usually conspicuous; larger vernal blades 6-10 cm by 6-10 mm; internodes, especially lower, sometimes pilose; spikelets obovoid; plant often yellowish-green (orange-brown in age).....***Dichanthelium acuminatum var. lindheimeri***
3 Leaf blade basal cilia usually inconspicuous or absent; larger vernal blades 2.5-10 cm long, 2-9 mm wide; all internodes glabrous (rarely the lowest sparsely pilose); spikelets ellipsoid; plant often green to purplish.
4 Spikelets (0.9-) 1.1-1.5 mm long, moderately densely to densely puberulent, most hairs < 0.1 mm long; panicles 3-8 cm long, usually more than ½ as wide as long; larger blades 2.5-8 cm long .....***Dichanthelium longiligulatum***
4 Spikelets (1.3-) 1.4-1.9 mm long, (glabrous-) sparsely to moderately pubescent, most hairs > 0.1 mm long; panicles 4-12 cm long, usually less than ½ as wide as long; larger blades 7-10 cm long..... ***Dichanthelium spretum***

1 Internodes variously pubescent.
5 Peduncle, panicle axis, and/or sheaths of vernal culms puberulent with hairs 0.1 mm long, sometimes also pubescent with longer hairs, but never grayish-villous; larger leaf blades 2-7 cm long, 2-7 mm wide.
6 Spikelets 0.8-1.1 mm long; mid-culm leaf blades 2-4.5 cm long, 2-5 mm wide; sheaths sparsely puberulent to glabrous, lacking papillose-based longer hairs ...
.....***Dichanthelium wrightianum***
6 Spikelets 1.1-1.7 mm long; mid-culm leaf blades generally 3-7 cm long and 3-7 mm wide; sheaths with some papillose-based hairs 2 mm or more long.
7 Larger mid-culm leaf blades 4-7 cm long, 4-7 mm wide, glabrous to sparsely pubescent adaxially; ligule 1-5 mm long; spikelets 1.1-1.5 mm long.....
.....***Dichanthelium leucothrix***
7 Larger mid-culm leaf blades 3-6 cm long, 3-5 mm wide, long-pilose adaxially; ligule often with a ring of hairs < 1 mm and scattered longer hairs to 4 mm; spikelets 1.3-1.7 mm long.....***Dichanthelium meridionale***
5 Peduncle, panicle axis, and sheaths of vernal culms glabrous, or pilose, or grayish-villous with some shorter hairs 0.2-0.5 mm long, but not puberulent with hairs 0.1 mm long; larger blades 4-20 cm long, 4-12 mm wide.
9 Sheaths and internodes of vernal culms gray-villous with a dense, tangled, or matted mixture of slender hairs 2-4 mm long, variously ascending, spreading, and retrorse, papillose or non-papillose, often with shorter hairs beneath; leaf blades velvety-pubescent on abaxial surface, the margins ciliate for half or more their length..... ***Dichanthelium acuminatum var. acuminatum***
9 Sheaths and internodes of vernal culms puberulent, pubescent or papillose-pilose to hispid with ascending straight hairs, but never grayish-villous; leaf blades glabrous to variously pilose abaxially, but not velvety-pubescent, the margins eciliate or ciliate only below the middle.
10 Spikelets 0.8-1.1 mm long; blades 2-4.5 cm long, 2-5 mm wide .....***Dichanthelium wrightianum***
10 Spikelets 1.1-2.0 mm long; blades 3-12 cm long, 3-12 mm wide.
11 Peduncle, panicle axis, and often middle and upper internodes glabrous; sheaths lacking hairs or papillae, at least near mid-length .....
..... ***Dichanthelium acuminatum var. lindheimeri***
11 Peduncle, panicle axis, and internodes puberulent, pubescent, or pilose; sheaths papillose-pilose to hispid.
12 Leaf bades 5-12 cm long, 6-12 mm wide; spikelets 1.5-2.0 mm long; peduncle, panicle axis, and sheaths variously pilose, but lacking puberulent hairs 0.1 mm long.....***Dichanthelium acuminatum var. fasciculatum***
12 Leaf blades 3-7 cm long, 3-7 mm wide; spikelets 1.1-1.7 mm long; puberulent hairs 0.1 mm long often present on peduncle, panicle axis, or sheaths.
13 Larger mid-culm leaf blades 4-7 cm long, 4-7 mm wide, glabrous to sparsely pubescent adaxially; ligule 1-5 mm long, the hairs of one series; spikelets 1.1-1.5 mm long.....***Dichanthelium leucothrix***

Key to Map Symbology: □⊡■ └native┘ ◇◈◆ └maybe exotic┘ △◬▲ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated

13 Larger mid-culm leaf blades 3-6 cm long, 3-5 mm wide, long-pilose adaxially; ligule often with a short series of hairs <1 mm long in front of a series with hairs to 4 mm long; spikelets 1.3-1.7 mm long ..... ***Dichanthelium meridionale***

Key to the *Dichanthelium dichotomum* group -

1 Lower cauline nodes bearded, the hairs usually retrorse.
2 Spikelets glabrous.
3 Ligule an eciliate membrane; fertile lemma and palea densely papillose at 20×; leaves 3.5-7 cm long by 3-6 mm wide; culms weak, usually sprawling over other vegetation..... ***Dichanthelium lucidum***
3 Ligule ciliate; fertile lemma and palea smooth, with few or no papillae; leaves either 1.5-4 (-5) cm long by 1-5 mm wide, or 5-12 cm long by 3-15 mm wide.
4 Spikelets 0.9-1.4 mm long; vernal cauline blades 1.5-4 (-5) cm long and 1-5 mm wide; internodes or sheaths glabrous or pubescent.
5 Spikelets 0.9-1.2 (-1.4) mm long; sheaths glabrous; vernal cauline blades 1-2 (-3) mm wide; ligule < 1 mm long; node beard hairs erect and often only partially encircling the node; internodes glabrous or puberulent ..... ***Dichanthelium chamaelonche***
5 Spikelets 1.2-1.4 mm long; sheaths spreading-pilose; vernal cauline blades 2-5 mm wide; ligule 1-2 mm long; node beard hairs usually spreading or reflexed; internodes glabrous..... ***Dichanthelium curtifolium***
4 Spikelets 1.4-2.3 mm long; vernal cauline blades 5-12 cm long and 3-15 mm wide; internodes and sheaths glabrous.
6 Spikelets 1.8-2.3 mm long; first glume 0.6-1.1 mm long; fertile lemma 0.8–1.0 mm wide; widest vernal blades 3-8 (-10) mm wide; nodes, often only the lower, usually sparsely to moderately bearded with retrorse hairs ..... ***Dichanthelium dichotomum var. dichotomum***
6 Spikelets 1.4-1.9 mm long; first glume 0.3-0.6 (-0.7) mm long; fertile lemma 0.6-0.8 mm wide; widest vernal blades 7-15 mm wide; usually all nodes densely bearded with retrorse hairs..... ***Dichanthelium microcarpon***
2 Spikelets pubescent.
7 Spikelets 1.2-1.4 mm long; sheaths spreading-pilose; vernal cauline blades 1-4 cm long and 2-5 mm wide; ligule 1-2 mm long ..... ***Dichanthelium curtifolium***
7 Spikelets 1.4-2.8 mm long; sheaths glabrous to pilose; vernal cauline blades 5-15 cm long and 5-15 mm wide; ligule ≤ 1 mm long.
8 Culms(55-) 70-140 cm long; lowest internodes moderately to densely villous; vernal cauline leaves 6-15; blades glabrous except for basal cilia; spikelets 1.8-2.2 mm long, obovoid to broadly ellipsoid, rounded to blunt ..... ***Dichanthelium mundum***
8 Culms 30-110 cm long; lowest internodes glabrous to sparsely hairy; vernal cauline leaves 3-7; spikelets 1.4-2.8 mm long, elliptic to lance-ovate, blunt to acute.
9 Usually all culm nodes bearded; internodes glabrous, or middle and upper internodes and peduncle sparsely to moderately spreading short-hairy, sometimes also glandular; upper as well as lower vernal sheaths and both surfaces of cauline blades pubescent, often densely so; spikelets (1.5-) 1.8-2.2 mm long; [of dry rocky or sandy basic soil and barrens]..... ***Dichanthelium annulum***
9 Often only lower culm nodes bearded; internodes glabrous; at least middle and upper cauline blades glabrous; spikelets 1.4-2.8 mm long; [mostly of wet acid soils and mesic to dry woodlands].
11 Spikelets 1.7-2.2 mm long; first glume 0.6-0.9 mm long; fertile lemma 0.7-1.0 mm wide ..... ***Dichanthelium dichotomum var. nitidum***
11 Spikelets 1.4-1.9 mm long; first glume 0.3-0.6 (-0.8) mm long; fertile lemma 0.6-0.8 mm wide..... ***Dichanthelium microcarpon***
1 Lower cauline nodes glabrous or puberulent, but not bearded.
12 Spikelets pubescent.
13 Spikelets (1.5-) 1.7-2.7 mm long, if shorter than 1.8 mm then fertile lemma and palea densely papillose; culms soon sprawling. ..... ***Dichanthelium lucidum***
13 Spikelets 1.2-1.7 mm long; fertile lemma and palea smooth; culms erect.
16 Leaf blades (3-) 4-6 (-9) per culm, pliable, 1-3.5 (-5) cm long, 1.5-4 mm wide, the margins flat and sharp-edged, gray-green to white-beige, 0.1 mm wide or less; spikelets 1.2-1.5 mm long, pubescent or glabrous; culms to 40 cm long ..... ***Dichanthelium ensifolium***
16 Leaf blades 3-4 per culm, firm, 2-6 (-8) cm long, 2-6 (-8) mm wide, at least one margin cartilaginously thickened, the edge usually rounded, white-beige to green-stramineous, 0.1-0.2 mm wide; spikelets (1.1-) 1.3-1.7 mm long, pubescent; culms to 60 cm long..... ***Dichanthelium tenue***
12 Spikelets glabrous.
17 Cauline leaves mostly basally disposed, strongly ascending, much larger than the 2-3 remote middle and upper cauline leaves of fertile culms; spikelets 2.4-2.9 mm long; culms branch from basal and lower nodes, but are not known to produce autumnal inflorescences..... ***Dichanthelium nudicaule***
17 Cauline leaves well-distributed along the culm, > 3, gradually reduced upward and often spreading; spikelets 0.9-2.6 mm long; culms produce autumnal inflorescences from lower, middle, and/or upper nodes, if from lower only, then spikelets only 0.9-1.2 mm long.
18 Fertile lemma and palea densely papillose; ligule usually ciliate, rarely an eciliate membrane 0.1-0.3 mm long; culms weak, soon sprawling over vegetation ..... ***Dichanthelium lucidum***
18 Fertile lemma and palea smooth, with few or no papillae; ligule always ciliate.
19 Spikelets 0.9-1.5 mm long; vernal blades 1-4 mm wide; culms stiffer, erect to ascending.
20 Spikelets 0.9-1.2 (-1.4) mm long; blades 1.5-4 (-5) cm long, 1-2.5 (-3) mm wide, mostly 15-20 times as long as wide; autumnal plants cushion-forming ..... ***Dichanthelium chamaelonche***
20 Spikelets 1.2-1.5 mm long; blades 1-12 (-20) cm long; autumnal plants not cushion-forming. ..... ***Dichanthelium ensifolium***
19 Spikelets 1.4-2.6 mm long; vernal blades 3-15 mm wide (if spikelets < 1.6 mm long and vernal blades < 5 mm wide, then larger blades > 5 cm long in *D. caerulescens*).
22 Widest vernal cauline blades 7-15 mm wide; upper sheaths often glutinous-warty; spikelets 2.1-2.6 mm long, some or most acute to beaked, second glume and sterile lemma extending 0.3-0.5 mm beyond fertile lemma in at least some spikelets ..... ***Dichanthelium yadkinense***
22 Widest vernal cauline blades 3-10 mm wide; upper sheaths not glutinous-warty; spikelets 1.4-2.3 mm long, blunt to subacute, second glume and sterile lemma often equal to or shorter than fertile lemma, or extending < 0.3 mm beyond it.
23 Spikelets 1.4-1.8 mm long; first glume 0.3–0.8 mm long; fertile lemma 1.3-1.5 mm long; mature vernal panicles usually short-exserted with ascending branches; fresh foliage bluish-glaucous..... ***Dichanthelium caerulescens***
23 Spikelets 1.7-2.3 mm long; first glume 0.6-1.1 mm long; fertile lemma 1.6-1.9 mm long; mature vernal panicles exserted with spreading branches; fresh foliage not bluish-glaucous.
24 Vernal panicle smooth to weakly scabrous, the scabrousness usually confined to the pedicels; vernal cauline blades spreading to deflexed, flexuous; autumnal form densely bushy-fascicled, essentially forming one large mass of clustered leaves [of wet-mesic to dry woods and thickets]..... ***Dichanthelium dichotomum var. dichotomum***
24 Vernal panicle moderately to densely scabrous, increasingly so from rachis to branches to pedicels; vernal cauline blades stiffly erect; autumnal fascicles forming isolated clusters of leaves [of wet pine savannas and open swamps] ..... ***Dichanthelium roanokense***

Key to Map Symbology:

←rare ←uncommon ←common (see introduction for more)

* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable

X : extirpated

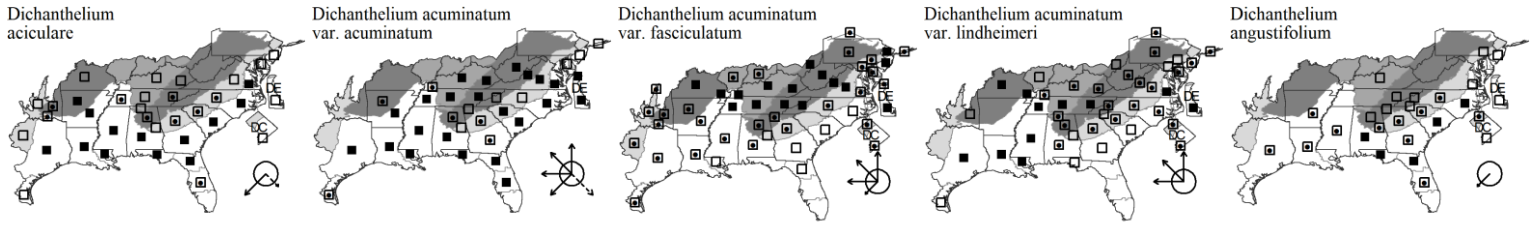
Dichanthelium aciculare (Desvaux ex Poiret) Gould & Clark. NEEDLE-LEAF WITCHGRASS. **Hab:** Sandy woods and fields. **Dist:** NJ south to n. FL, west to TX and OK, also in West Indies and n. South America. **Phen:** May-Oct. **Comm:** Blades typically are strongly involute, especially autumnal form. **Syn:** = Va, LeBlond (2017a) in Weakley et al (2017); = *Dichanthelium aciculare* ssp. *aciculare* – FNA25; = *Panicum aciculare* Desvaux ex Poiret – F, G, RAB; < *Dichanthelium aciculare* (Desvaux ex Poiret) Gould & Clark – FlGr, K1, K3, K4, Gould & Clark (1978); < *Panicum aciculare* Desvaux ex Poiret – C; > *Panicum aciculare* Desvaux ex Poiret – HC, S; < *Panicum aciculare* var. *aciculare* – NcTx; > *Panicum arenicolum* W.W. Ashe – HC, correctable orthographic error; > *Panicum bennettense* M.V. Brown – HC, S. NatureServe G5T4T5 (Apparently Secure).

Dichanthelium acuminatum (Swartz) Gould & C.A. Clark *var*. ***acuminatum***. WOOLLY WITCHGRASS. **Hab:** Dryish sandy or clayey soils of open woods and disturbed areas. **Dist:** MA south to FL, west to TX, also in West Indies, Mexico, Central America, and n. South America. **Phen:** May-Oct. **ID Notes:** Internodes and sheaths gray-villous with usually non-papillate hairs. Plants tend to be low and "bushy" with several spreading-ascending culms and dense autumnal branching. See also discussion under *Dichanthelium filiramum*. **Syn:** = Va, Freckmann (1981); < *Dichanthelium acuminatum* ssp. *acuminatum* – FNA25; < *Dichanthelium acuminatum* (Swartz) Gould & C.A. Clark var. *acuminatum* – K3, NcTx; >< *Dichanthelium acuminatum* (Swartz) Gould & C.A. Clark var. *acuminatum* – K1, Gould & Clark (1978); >< *Dichanthelium acuminatum* var. *implicatum* (Lamson-Scribner) Gould & Clark – K1, Gould & Clark (1978); < *Dichanthelium acuminatum* var. *thurowii* (Lamson-Scribner & J.G. Smith) Gould & C.A. Clark – K1, Freckmann (1981), Gould & Clark (1978); < *Panicum acuminatum* Swartz var. *acuminatum* – Lelong (1984); > *Panicum auburne* Ashe – F, G, HC, S, WV; < *Panicum lanuginosum* Elliott – RAB; > *Panicum lanuginosum* Elliott – HC, S, WV; > *Panicum lanuginosum* Elliott var. *lanuginosum* – C, F, G; < *Panicum leucothrix* Nash – C; < *Panicum thurowii* Lamson-Scribner & J.G. Smith – HC, S.

Dichanthelium acuminatum (Swartz) Gould & C.A. Clark *var*. ***fasciculatum*** (Torrey) Freckmann. SLENDER-STEMMED WITCHGRASS. **Hab:** Open or cut-over woods, thickets, fields, meadows, and shores, frequently on disturbed soils. **Dist:** NL (Newfoundland) south to FL, west to CA, north to s. BC. **Phen:** May-Aug. **ID Notes:** Typically much less pilose than var. *acuminatum*, the hairs usually papillate. Plants referable to *Panicum glutinoscabrum* Fernald may be a hybrid of var. *fasciculatum* with *D. scoparium*. Known only from se. VA, they are described as having culms 7-9 dm high; elongate internodes with cinereous puberulence and black, warty, viscid glands; villous nodes; glutinous-warty and scabrous sheaths and blades; ligule 4-5 mm long; minutely puberulent panicle axis; spikelets ellipsoid, subacute, 1.7-1.8 mm long, pubescent; first glume subacute, 0.6-0.7 mm long. **Syn:** = Va, Freckmann (1981); = *Dichanthelium acuminatum* ssp. *fasciculatum* (Torrey) Freckmann & Lelong – FNA25; < *Dichanthelium acuminatum* (Swartz) Gould & C.A. Clark var. *acuminatum* – K3; >< *Dichanthelium acuminatum* (Swartz) Gould & C.A. Clark var. *acuminatum* – K1, Gould & Clark (1978); >< *Dichanthelium acuminatum* var. *implicatum* (Lamson-Scribner) Gould & Clark – K1, Gould & Clark (1978); < *Panicum acuminatum* Swartz var. *acuminatum* – NcTx; > *Panicum acuminatum* Swartz var. *fasciculatum* (Torrey) Lelong – Lelong (1984); > *Panicum acuminatum* var. *unciphyllum* (Trinius) Lelong – Lelong (1984); > *Panicum huachucae* Ashe – WV; > *Panicum huachucae* var. *fasciculatum* (Torrey) Hubb. – HC; > *Panicum huachucae* Ashe var. *huachucae* – HC, S; > *Panicum huachucae* var. *silvicola* A.S. Hitchcock & Chase – S; > *Panicum implicatum* Swartz – HC, NY, WV; < *Panicum lanuginosum* Elliott – RAB; > *Panicum lanuginosum* var. *fasciculatum* (Torrey) Fernald – C, F, G; > *Panicum lanuginosum* var. *implicatum* (Lamson-Scribner) Fernald – C, F, G; > *Panicum lanuginosum* var. *tennesseense* (Ashe) Gleason – C, G; > *Panicum tennesseense* Ashe – HC, S.

Dichanthelium acuminatum (Swartz) Gould & C.A. Clark *var*. ***lindheimeri*** (Nash) Gould & C.A. Clark. LINDHEIMER'S WITCHGRASS. **Hab:** Open or cut-over woods, thickets, fields, meadows, and shores, often on wet soils. **Dist:** NS west to MB, south to FL and MO, west to s. CA. **Phen:** May-Sep. **ID Notes:** Internodes as well as sheaths often nearly glabrous. Panicle axis sometimes sparsely pilose at branch nodes, but otherwise glabrous. **Syn:** = Va, Freckmann (1981); = *Dichanthelium acuminatum* ssp. *lindheimeri* (Nash) Freckmann & Lelong – FNA25; = *Dichanthelium lindheimeri* (Nash) Gould – Mi, NY; < *Dichanthelium acuminatum* (Swartz) Gould & C.A. Clark var. *acuminatum* – K3, Gould & Clark (1978); > *Dichanthelium acuminatum* (Swartz) Gould & C.A. Clark var. *lindheimeri* (Nash) Gould & C.A. Clark – K1, Gould & Clark (1978); > *Panicum acuminatum* Swartz var. *lindheimeri* (Nash) Lelong – Lelong (1984); < *Panicum lanuginosum* Elliott – RAB; > *Panicum lanuginosum* var. *lindheimeri* (Nash) Fernald – F; >< *Panicum lanuginosum* var. *lindheimeri* (Nash) Fernald – C, G; > *Panicum lanuginosum* var. *septentrionale* Fernald – C, F, G; > *Panicum lindheimeri* Nash – HC, S, WV; < *Panicum spretum* J.A. Schultes – GW1.

Dichanthelium angustifolium (Elliott) Gould. NARROWLEAF WITCHGRASS. **Hab:** Sandy pinelands and fields. **Dist:** NJ south to FL, west to AR and e. TX. **Phen:** May-Oct. **Tax:** Autumnal form most readily distinguished from *D. aciculare* and *D. arenicoloides)* by flat blades 2-4 mm wide (vs. involute blades 1-2 mm wide). Can be confused with *D. consanguineum*, which has spreading-pilose nodes and blades 10-15× as long as wide; *D. angustifolium* blades typically are 20× or more as long as wide. **Syn:** = Va, LeBlond (2017a) in Weakley et al (2017); = *Dichanthelium aciculare* ssp. *angustifolium* (Elliott) Freckmann & Lelong – FNA25; = *Dichanthelium aciculare* var. *angustifolium* (Elliott) Wipff & S.D. Jones – NcTx; = *Panicum angustifolium* Elliott – F, G, HC, RAB, S; < *Dichanthelium aciculare* (Desvaux ex Poiret) Gould & Clark – K1, K3, K4, Gould & Clark (1978); < *Panicum aciculare* Desvaux ex Poiret – C; < *Panicum angustifolium* Elliott – Tx.



Dichanthelium annulum (Ashe) LeBlond. RINGED WITCHGRASS. **Hab:** Dry sandy or rocky soil of open woods, dry grasslands, and barrens, and glades over serpentine, limestone, calcareous shales, and other high pH dry soils. **Dist:** NY, NJ, IN, and MO south to AL and MS, primarily in the Appalachian Province with very few occurrences in the Coastal Plain. **Phen:** May-Oct. **Comm:** One of the more distinctive taxa within the *D. dichotomum* group by morphology, habitat, and range. Plants from se. MA with all leaves pubescent, glabrous internodes, and spikelets 2.2-2.5 mm long were described as *Panicum annulum* var. *glabrescens*, but belong to *D. mattamuskeetense*. Reported for Pulaski County, KY (Brock 2020). **Syn:** = NY, Pa, Va, LeBlond (2001a); = *Panicum annulum* Ashe – F, HC, S; = *Panicum annulum* var. *annulum* – G; < *Dichanthelium dichotomum* (Linnaeus) Gould – K1, Gould & Clark (1978); < *Dichanthelium dichotomum* ssp. *mattamuskeetense* (Ashe) Freckmann & Lelong – FNA25; < *Dichanthelium dichotomum* (Linnaeus) Gould var. *dichotomum* – K3, K4; < *Panicum dichotomum* Linnaeus – C, GW1, RAB; < *Panicum dichotomum* var. *mattamuskeetense* (Ashe) Lelong – Lelong (1984).

Dichanthelium arenicoloides (Ashe) LeBlond. SANDY WOODS WITCHGRASS. **Hab:** Open sandy soil of pinelands and dunes, primarily near the coast; probably occasional to frequent, but long overlooked. **Dist:** NC south to FL and west to TX and AR; also in West Indies, Central America, and n. South America. **Phen:** May-Nov. **Comm:** Vernal form intermediate between *D. aciculare* and *D. angustifolium*. Vernal cauline leaves are longer than those of *D. aciculare* but of similar width. Panicle branches often ascending. Autumnal form strongly resembling *D. aciculare* but with larger,

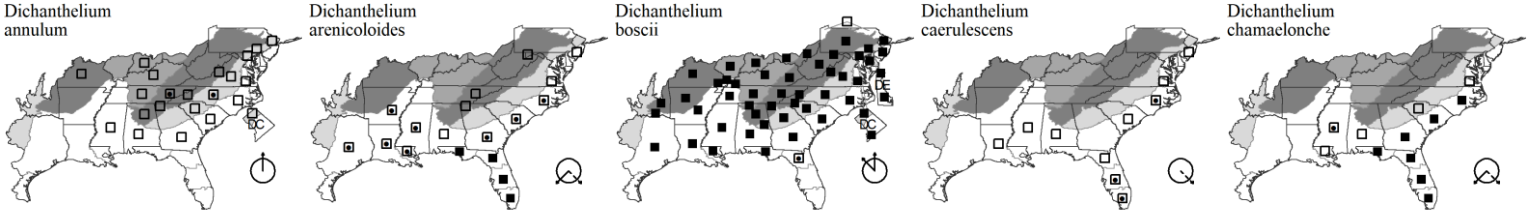
Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated

attenuate spikelets, longer first glumes, and both glumes attached 0.3-0.5 mm below expansion of fertile lemma. **Syn:** = LeBlond (2017a) in Weakley et al (2017); = *Panicum arenicoloides* Ashe – HC, S; < *Dichanthelium aciculare* (Desvaux ex Poiret) Gould & Clark – K1, K3, K4, Gould & Clark (1978); < *Dichanthelium aciculare* ssp. *angustifolium* (Elliott) Freckmann & Lelong – FNA25; < *Panicum angustifolium* Elliott – Tx.

Dichanthelium boscii (Poiret) Gould & C.A. Clark. BOSC'S WITCHGRASS. **Hab:** Shaded mesic to dry woodlands. **Dist:** MA and IL south to n. FL and e. TX. **Phen:** Apr-Sep. **Syn:** = FlGr, FNA25, K1, K3, K4, NY, Pa, Va, Gould & Clark (1978); = *Panicum boscii* Poiret – C, G, NcTx, RAB; > *Panicum boscii* var. *boscii* – F, HC, S, WV; > *Panicum boscii* var. *molle* (Vasey) A.S. Hitchcock & Chase – F, HC, S, WV. NatureServe G5 (Secure).

Dichanthelium caerulescens (Hackel ex A.S. Hitchcock) Correll. BLUE WITCHGRASS. **Hab:** Marshes, swamps, wet pinelands, maritime grasslands, damp sandy soil. **Dist:** NJ to NC, and from FL to w. LA; Bahamas and West Indies. **Phen:** Jun-Oct. **Tax:** Not treated by FNA, where it presumably would have been placed in synonymy with *D. dichotomum* ssp. *roanokense*. **Syn:** = Bah, Va, LeBlond (2001a); = *Panicum caerulescens* Hackel ex A.S. Hitchcock – F, HC, S; < *Dichanthelium dichotomum* ssp. *roanokense* (Ashe) Freckmann & Lelong – FNA25; < *Dichanthelium dichotomum* (Linnaeus) Gould var. *dichotomum* – K1, K3, K4, Gould & Clark (1978); < *Panicum dichotomum* Linnaeus – GW1, RAB; < *Panicum dichotomum* var. *roanokense* (Ashe) Lelong – Lelong (1984); < *Panicum roanokense* Ashe – G.

Dichanthelium chamaelonche (Trinius) Freckmann & Lelong. CARPET WITCHGRASS. **Hab:** Moist pine savannas and flatwoods, pineland pondshores. **Dist:** Se. VA south to FL, west to LA, also in Cuba and Belize. **Phen:** Apr-Sep. **Comm:** Internodes can be glabrous or puberulent, and nodes glabrous, pubescent, or bearded, but the glabrous spikelets 0.9-1.2 mm long are diagnostic. The concept of this taxon in FNA (as ssp. *chamaelonche*) appears to include *D. dichotomum* var. *glabrifolium* (see descriptions of Floridian *D. chamaelonche* ssp. *breve* and *D. dichotomum* var. *glabrifolium* in this treatment). **Syn:** = LeBlond (2018b) in Weakley et al (2018a); = *Panicum chamaelonche* Trinius – G, GW1, HC, RAB, S; = *Panicum chamaelonche* Trinius var. *chamaelonche* – Lelong (1984); < *Dichanthelium chamaelonche* (Trinius) Freckmann & Lelong ssp. *chamaelonche* – FNA25; < *Dichanthelium dichotomum* (Linnaeus) Gould var. *ensifolium* (Baldwin) Gould & Clark – K1, K3, K4, Gould & Clark (1978); < *Panicum ensifolium* Baldwin ex Elliott – C.



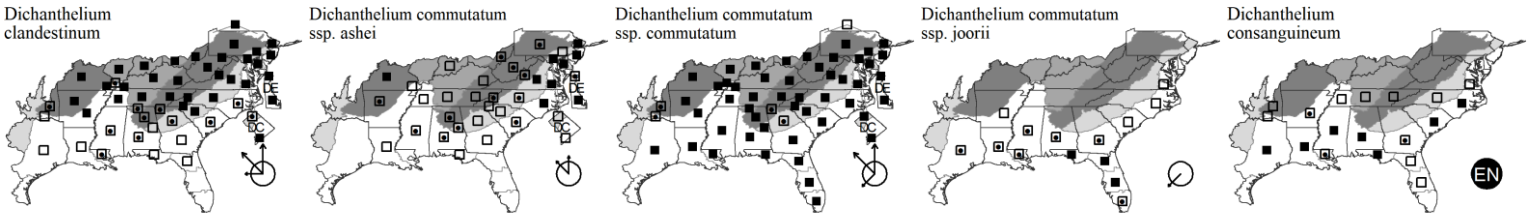
Dichanthelium clandestinum (Linnaeus) Gould. DEER-TONGUE WITCHGRASS. **Hab:** Shaded to filtered woodlands, ditches and low areas, and often in moist sandy soil. **Dist:** NS and QC south to n. FL, west to IA, KA, and TX. **Phen:** May-Oct. **Syn:** = FlGr, FNA25, K1, K3, K4, Mi, NY, Pa, Va, Gould & Clark (1978); = *Panicum clandestinum* Linnaeus – C, F, G, HC, NcTx, RAB, S, WV, Lelong (1984). NatureServe G5 (Secure).

Dichanthelium commutatum (J.A. Schultes) Gould *ssp.* ***ashei*** (T.G. Pearson ex Ashe) Freckmann & Lelong. ASHE'S WITCHGRASS. **Hab:** Dry rocky or sandy woods and openings. **Dist:** MA south to FL and MS, west to MI, MO, and OK. **Phen:** May-Oct. **Syn:** = FNA25, Mi, NY, Pa, Tn; = *Dichanthelium commutatum* (J.A. Schultes) Gould var. *ashei* (Pearson ex Ashe) Mohlenbrock – Mo1, Va; = *Panicum ashei* Pearson ex Ashe – HC, S, WV; = *Panicum commutatum* J.A. Schultes var. *ashei* (Pearson ex Ashe) Fernald – F, G; < *Dichanthelium commutatum* (J.A. Schultes) Gould – FlGr, K1, K3, K4, WH3; < *Panicum commutatum* J.A. Schultes – C, RAB, Tx. NatureServe G5TNRQ (Not Yet Ranked).

Dichanthelium commutatum (J.A. Schultes) Gould *ssp.* ***commutatum***. VARIABLE WITCHGRASS. **Hab:** Low, shaded, moist woodlands and woodland edges, and dry, thin, often rocky woods and thickets. **Dist:** ME south to FL, west to MI, MO, OK, and TX; Mexico. **Phen:** May-Oct. **Tax:** Also see commentary under *D. commutatum* ssp. *equilaterale* and ssp. *joori*. **Syn:** = FNA25, NY, Pa, Tn; = *Dichanthelium commutatum* (J.A. Schultes) Gould var. *commutatum* – Mo1, Va; < *Dichanthelium commutatum* (J.A. Schultes) Gould – K1, K3, K4; > *Dichanthelium mutabile* (Lamson-Scribner & J.G. Smith ex Nash) Wipff – Wipff (2020); < *Panicum commutatum* J.A. Schultes – C, RAB, Tx; > *Panicum commutatum* J.A. Schultes – HC, S, WV; > *Panicum commutatum* var. *commutatum* – F, G; < *Panicum divergens* Kunth – NcTx; > *Panicum mutabile* Lamson-Scribner & Smith ex Nash – F, G, HC, S.

Dichanthelium commutatum (J.A. Schultes) Gould *ssp.* ***joorii*** (Vasey) Freckmann & Lelong. SPRAWLING WITCHGRASS. **Hab:** Wet to swampy woodlands, sandy riparian areas. **Dist:** VA south to FL, west to TX; Mexico. **Phen:** May-Oct. **Tax:** Plants intermediate to ssp. *commutatum* are frequent, but recognition may be warranted in some areas. **Syn:** = FNA25; = *Panicum commutatum* J.A. Schultes var. *joorii* (Vasey) Fernald – F; = *Panicum joorii* Vasey – HC, S; < *Dichanthelium commutatum* (J.A. Schultes) Gould – FlGr, K1, K3, K4, WH3; < *Panicum commutatum* J.A. Schultes – C, RAB, Tx; < *Panicum commutatum* var. *commutatum* – G.

Dichanthelium consanguineum (Kunth) Gould & C.A. Clark. KUNTH'S WITCHGRASS. **Hab:** Moist or dry sandy soils of pinelands. **Dist:** Occasional from se. VA south to FL, west to TX and IN. **Phen:** Apr-Sep. **Comm:** Often not easily separated from *D. angustifolium* and *D. ovale*. It is distinguished from *D. angustifolium* by spreading-hirsute nodes and leaves 10-15× as long as wide (*D. angustifolium* has beardless nodes, or nodes bearded with erect-ascending soft hairs, and longer leaves 20× or more as long as wide). *D. consanguineum* is distinguished from *D. ovale* by having strongly pilose upper blade surfaces (*D. ovale* upper blade surfaces are glabrous or with a few long hairs basally). The hairs of *D. consanguineum* frequently are strongly papillate. **Syn:** = FNA25, K1, K3, K4, Va, Gould & Clark (1978), LeBlond (2017a) in Weakley et al (2017); = *Panicum consanguineum* Kunth – C, F, G, HC, RAB, S; < *Dichanthelium aciculare* (Desvaux ex Poiret) Gould & Clark – FlGr; < *Panicum angustifolium* Elliott – Tx.



Dichanthelium cryptanthum (Ashe) LeBlond. HIDDEN-FLOWERED WITCHGRASS. **Hab:** Wet meadows and ditches, streamside openings. **Dist:** DE (or NJ?) to MS (or TX?) (previous concepts of this taxon and its range are unclear). **Phen:** May-Sep. **Comm:** In the field, this taxon can be

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* : waif; EN : endemic; H : historic

N : no; P : planted; ? : questionable

X : extirpated

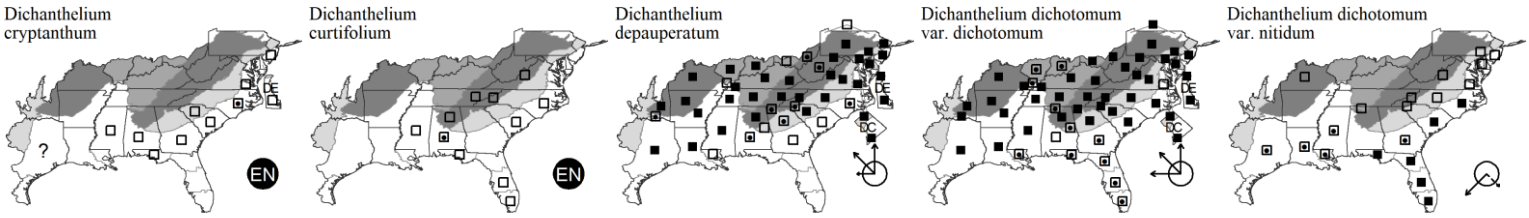
mistaken for *D. yadkinense*; it is readily distinguished by its scabrous peduncle and membranous ligules. Reported for DE (Longbottom, Naczi, & Knapp 2016). **Syn:** = Va, LeBlond (2011) in Weakley et al (2011), LeBlond (2019a) in Weakley et al (2019a); = *Panicum cryptanthum* Ashe – F, HC, S; = *Panicum scabriusculum* var. *cryptanthum* (Ashe) Gleason – G; < *Dichanthelium scabriusculum* (Elliott) Gould & C.A. Clark – FNA25, K1, K3, K4, Gould & Clark (1978); < *Panicum scabriusculum* Elliott – C, GW1, RAB.

Dichanthelium curtifolium (Nash) LeBlond. SHORT-LEAVED WITCHGRASS. **Hab:** Bogs, sphagnous streamhead swamps, mountain streams, marl meadows. **Dist:** Disjunctly distributed in w. VA, w. NC and e. TN, e. SC, FL, and MS. **Phen:** Apr-Sep. **Comm:** The combination of characters is quite distinctive for the genus in our region. **Syn:** = LeBlond (2011) in Weakley et al (2011), LeBlond (2018b) in Weakley et al (2018a); = *Dichanthelium ensifolium* (Baldwin ex Elliott) Gould ssp. *curtifolium* (Nash) Freckmann & Lelong – FNA25; = *Panicum curtifolium* Nash – HC, RAB, S; = *Panicum ensifolium* Baldwin ex Elliott var. *curtifolium* (Nash) Lelong – Lelong (1984); < *Dichanthelium acuminatum* var. *implicatum* (Lamson-Scribner) Gould & Clark – K1, Gould & Clark (1978); < *Dichanthelium dichotomum* (Linnaeus) Gould var. *ensifolium* (Baldwin) Gould & Clark – K3, K4.

Dichanthelium depauperatum (Muhlenberg) Gould. STARVED WITCHGRASS. **Hab:** Dry soils of grasslands and open woods, often on disturbed soils of roadsides and ditches. **Dist:** NL (Newfoundland) and MN south to GA and TX. **Phen:** Apr-Sep. **Syn:** = FNA25, K1, K3, K4, Mi, NY, Pa, Va, Gould & Clark (1978); = *Panicum depauperatum* Muhlenberg – C, HC, NcTx, RAB, S, Tx, WV; > *Panicum depauperatum* var. *depauperatum* – F, G; > *Panicum depauperatum* var. *psilophyllum* Fernald – F, G. NatureServe G5 (Secure).

Dichanthelium dichotomum (Linnaeus) Gould *var. **dichotomum***. FORKED WITCHGRASS. **Hab:** Wet-mesic to dry woods, thickets, and woodland openings. **Dist:** S. Canada and MI south to FL and TX. **Phen:** May-Oct. **Tax:** Plants with bearded nodes and larger leaves are referable to *Panicum dichotomum* var. *barbulatum* (here included) but intermediates abound. **Syn:** = Va, LeBlond (2001a), LeBlond (2017c) in Weakley et al (2017); = *Dichanthelium dichotomum* ssp. *dichotomum* – FNA25, NY; = *Panicum dichotomum* Linnaeus – G; = *Panicum dichotomum* var. *dichotomum* – Lelong (1984); < *Dichanthelium dichotomum* (Linnaeus) Gould – Pa; < *Dichanthelium dichotomum* (Linnaeus) Gould var. *dichotomum* – K1, K3, Gould & Clark (1978); > *Panicum barbulatum* Michaux – HC, S; < *Panicum dichotomum* Linnaeus – C, GW1, NcTx, RAB; > *Panicum dichotomum* Linnaeus – HC, S; > *Panicum dichotomum* var. *barbulatum* (Michaux) Wood – F, WV; > *Panicum dichotomum* var. *dichotomum* – F, WV.

Dichanthelium dichotomum (Linnaeus) Gould *var. **nitidum*** (Lamarck) LeBlond. SHINING WITCHGRASS. **Hab:** Moist sandy or peaty soil of wet pine savannas and pocosin ecotones, wet meadows near the coast, swamps, and marshes. **Dist:** PA and NJ south to FL, west to MO and TX; also the Bahamas (Sorrie & LeBlond 1997) and West Indies, and Mexico to Venezuela. **Syn:** = Va, LeBlond (2001a); = *Dichanthelium dichotomum* ssp. *nitidum* (Lamarck) Freckmann & Lelong – FNA25; = *Panicum dichotomum* var. *nitidum* (Lamarck) Wood – Lelong (1984); = *Panicum nitidum* Lamarck – F, HC, Mi, S; = *Panicum nitidum* var. *nitidum* – G; < *Dichanthelium dichotomum* (Linnaeus) Gould – Bah, Pa; < *Dichanthelium dichotomum* (Linnaeus) Gould var. *dichotomum* – K1, K3, Gould & Clark (1978); < *Panicum dichotomum* Linnaeus – C, GW1, RAB.



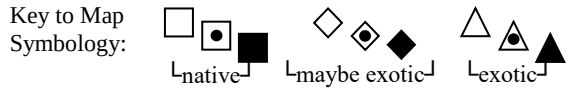
Dichanthelium ensifolium (Baldwin ex Elliott) Gould. SMALL-LEAVED WITCHGRASS. **Hab:** Wet to mesic peaty, sandy, or mucky soils, often in open pinelands or with *Sphagnum*. **Dist:** NJ south to FL, west to e. TX and AR. **Phen:** May-Oct. **Comm:** Plants with pubescent spikelets are frequent. **Syn:** = Va, LeBlond (2018b) in Weakley et al (2018a); = *Dichanthelium ensifolium* ssp. *ensifolium* – FNA25; = *Panicum ensifolium* Baldwin ex Elliott – F; < *Dichanthelium dichotomum* (Linnaeus) Gould var. *ensifolium* (Baldwin) Gould & Clark – K1, K3, K4, Gould & Clark (1978); > *Dichanthelium flavovirens* (Nash) Wipff – Wipff (2020); > *Dichanthelium vernale* (A.S. Hitchcock & Chase) Wipff – Wipff (2020); < *Panicum ensifolium* Baldwin ex Elliott – C, G, GW1, RAB; > *Panicum ensifolium* Baldwin ex Elliott – HC, S; < *Panicum ensifolium* var. *ensifolium* – Lelong (1984); > *Panicum flavovirens* Nash – HC, S; > *Panicum vernale* A.S. Hitchcock & Chase – HC, S.

Dichanthelium erectifolium (Nash) Gould & C.A. Clark. ERECT-LEAVED WITCHGRASS. **Hab:** Limesink ponds, depression meadows, cypress savannas, pine savannas. **Dist:** Se. NC to FL, west to LA; Cuba. **Phen:** May-Aug. **Syn:** = FNA25, K1, K3, K4, Gould & Clark (1978); = *Panicum erectifolium* Nash – GW1, HC, RAB, S. NatureServe G4 (Apparently Secure).

Dichanthelium filiramum (Ashe) LeBlond. HAIRY NEEDLE-LEAVED WITCH GRASS. **Hab:** Dry to moist sandy pinelands. **Dist:** DE south to FL, west to TX and AR; West Indies. **Phen:** May-Oct. **Comm:** This species has the longitudinally wrinkled leaves 15-20+ times as long as wide plus the strongly nerved spikelets associated with the *D. aciculare* group. The villous nodes and longer ligules lead it towards the *D. acuminatum* group. The Ashe type for *Panicum filiramum* was treated as a synonym of *P. aciculare* by Hitchcock & Chase (1910), but it is the same as Nash's *P. chrysopsidifolium* published three years later. Lower leaves of the Florida type of *P. chrysopsidifolium* are up to 10 mm wide, but no plants have been seen outside of Florida with leaves wider than 5 mm. The specific epithet *filiramum* was changed to *filirameum* by Hitchcock & Chase, but Ashe's original spelling has been determined to be legitimate. **Syn:** = LeBlond (2016), LeBlond (2017a) in Weakley et al (2017); = *Dichanthelium chrysopsidifolium* (Nash) J.R. Thomas & Wipff – Wipff (2020); = *Panicum chrysopsidifolium* Nash – G, HC, S; < *Dichanthelium acuminatum* (Swartz) Gould & C.A. Clark var. *acuminatum* – K1, K3, Gould & Clark (1978); < *Dichathelium acuminatum* – K4; < *Panicum aciculare* Desvaux ex Poiret – F; < *Panicum consanguineum* Kunth – RAB; < *Panicum lanuginosum* Elliott var. *lanuginosum* – C.

Dichanthelium fusiforme (A.S. Hitchcock) Harvill. SPINDLE-FRUITED WITCHGRASS. **Hab:** Dry to moist sand of open pine and pine-oak woods and clearings. **Dist:** Se. VA south to FL, west to MS and w. LA, also in West Indies, Mexico, Central America, and Venezuela; perhaps most abundant in FL. **Phen:** May-Nov. **Comm:** Autumnal blades often flat. The autumnal form of *D. oligosanthes* var. *oligosanthes* can be very similar to *D. fusiforme* if the vernal blades of the former are missing. They are best separated by ligule length (0.5-1 mm in *fusiforme*, 1.5-3 mm in *oligosanthes*) and the more attenuated ends of the *fusiforme* spikelet. **Syn:** = Va, LeBlond (2017a) in Weakley et al (2017); = *Dichanthelium aciculare* ssp. *fusiforme* (A.S. Hitchcock) Freckmann & Lelong – FNA25; = *Panicum fusiforme* A.S. Hitchcock – F, G, HC, RAB, S; < *Dichanthelium aciculare* (Desvaux ex Poiret) Gould & Clark – FlGr, K1, K3, K4, Gould & Clark (1978); < *Panicum aciculare* Desvaux ex Poiret – C.

Dichanthelium laxiflorum (Lamarck) Gould. OPEN-FLOWER WITCHGRASS. **Hab:** Open or shaded woodlands, often in moist soil. **Dist:** MD south to FL, west to TX, north to IN; Mexico, Central America; West Indies. **Phen:** Apr-Sep. **Tax:** Included in this concept of *D. laxiflorum* are plants formerly known as *Panicum xalapense* var. *strictirameum*. They have strict panicles, smaller leaves, shorter culms, and spikelets as short as 1.4 mm. The known range of these plants is SC to TX. A few *D. laxiflorum* populations in SC and FL have spikelets to 2.5 mm long. **Syn:** = FNA25,



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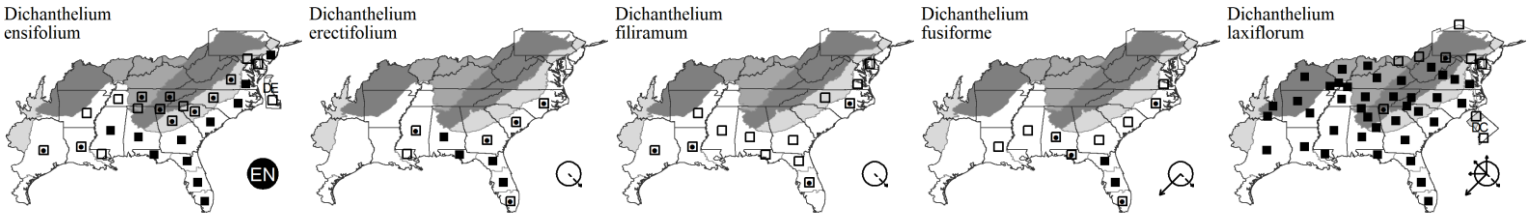
K1, K3, K4, Pa, Va, Gould & Clark (1978); = *Panicum laxiflorum* Lamarck – C, F, G, NcTx, RAB; > *Dichanthelium xalapense* (Kunth) Wipff var. *strictirameum* (A.S. Hitchcock & Chase) Wipff – Wipff (2020); > *Dichanthelium xalapense* (Kunth) Wipff var. *xalapense* – Wipff (2020); > *Panicum laxiflorum* Lamarck – HC, S; > *Panicum xalapense* – WV; > *Panicum xalapense* var. *strictirameum* A.S. Hitchcock & Chase – HC, S; > *Panicum xalapense* Kunth var. *xalapense* – HC, S. NatureServe G5 (Secure).



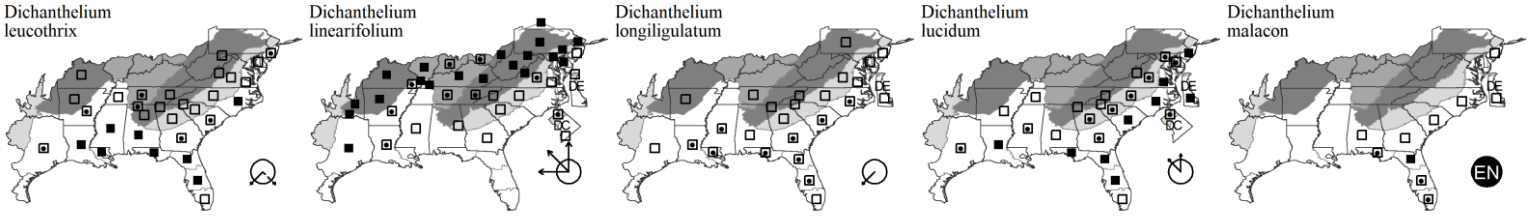
Dichanthelium leucothrix (Nash) Freckmann. ROUGHISH WITCHGRASS. **Hab:** Wet sandy, peaty, or mucky soil of pinelands and depression marshes. **Dist:** S. NJ south to FL, west to TX, also in TN; West Indies and n. South America. **Phen:** May-Oct. **Comm:** A micrometer is needed to measure the very short puberulence (0.1 mm) that distinguishes this taxon, *D. meridionale*, and *D. wrightianum* from other members of the *D. acuminatum* group. **Syn:** = K1, Freckmann (1981); = *Dichanthelium acuminatum* ssp. *leucothrix* (Nash) Freckmann & Lelong – FNA25; = *Panicum acuminatum* Swartz var. *leucothrix* (Nash) Lelong – Lelong (1984); = *Panicum leucothrix* Nash – F, G, HC, RAB, S; < *Dichanthelium acuminatum* var. *implicatum* (Lamson-Scribner) Gould & Clark – Gould & Clark (1978); < *Dichanthelium leucothrix* (Nash) Freckmann – K3, K4; < *Panicum leucothrix* Nash – C; < *Panicum spretum* J.A. Schultes – GW1.

Dichanthelium linearifolium (Lamson-Scribner) Gould. LOW WHITE-HAIRED WITCHGRASS. **Hab:** Dry open woods. **Dist:** Se. Canada and MN south to GA and TX. **Phen:** May-Oct. **Syn:** = FNA25, K1, K3, K4, NY, Pa, Va, Gould & Clark (1978); = *Panicum linearifolium* Lamson-Scribner – C, NcTx, RAB, S, Tx; > *Dichanthelium linearifolium* (Lamson-Scribner) Gould – Mi; > *Dichanthelium perlongum* (Nash) Freckmann – Mi; > *Panicum linearifolium* Lamson-Scribner – HC; > *Panicum linearifolium* var. *linearifolium* – F, G, WV; > *Panicum linearifolium* var. *werneri* (Lamson-Scribner) Fernald – F, G, WV; > *Panicum werneri* Lamson-Scribner – HC.

Dichanthelium longiligulatum (Nash) Freckmann. LONG-LIGULE WITCHGRASS. **Hab:** Limesink ponds, depression meadows, cypress savannas, pine savannas, bogs, swamps. **Dist:** NJ and PA south to FL, also in TN, e. TX, and Central America. **Phen:** May-Sep. **Comm:** Intermediate forms between this taxon and *D. spretum* occur. **Syn:** = K1, Va, Freckmann (1981); = *Dichanthelium acuminatum* ssp. *longiligulatum* (Nash) Freckmann & Lelong – FNA25; = *Dichanthelium acuminatum* (Swartz) Gould & Clark var. *longiligulatum* (Nash) Gould & Clark – Gould & Clark (1978); = *Panicum acuminatum* Swartz var. *longiligulatum* (Nash) Lelong – Lelong (1984); = *Panicum longiligulatum* Nash – HC, RAB, S; < *Dichanthelium leucothrix* (Nash) Freckmann – K3, K4; < *Panicum lanuginosum* var. *lindheimeri* (Nash) Fernald – C, G; < *Panicum spretum* J.A. Schultes – GW1.

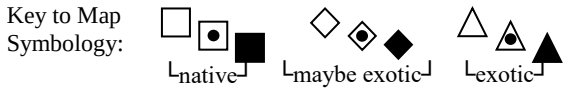
Dichanthelium lucidum (Ashe) LeBlond. BOG WITCHGRASS. **Hab:** Wet meadows, sphagnous swamps, bogs, wet woods, sphagnous streamhead pocosins, baygalls. **Dist:** MA and MI south to FL and TX. **Phen:** May-Oct. **Tax:** Vernal culms soon recline, producing a tangled mass. The papillose fertile lemma is diagnostic. Rarely, entire populations of *D. lucidum* can have eciliate ligules composed of a membrane 0.1-0.3 mm long. Even rarer are plants within these populations with retrorsely bearded nodes. Both conditions may reflect intergradation with another taxon, possibly within the *dichotomum* complex, or with *D. cryptanthum* in section *Clandestina*. Plants with spikelets 1.5-1.8 mm long, pubescent lower sheaths and internodes, and strigose-bullate blade surfaces of lower leaves were named *Panicum lucidum* var. *opacum* by Fernald. Plants with these characters were collected in Clarendon Co., SC, by John Nelson in 2019. These plants have incomplete ligules with few scattered short hairs, and fertile lemmas with scattered and irregular papillae at 40×. Gleason (1952) noted intermediates. More research is needed to determine the taxonomic validity of these plants. **Syn:** = NY, Pa, Va, LeBlond (2001a); = *Panicum lucidum* Ashe – G, S; < *Dichanthelium dichotomum* ssp. *lucidum* (Ashe) Freckmann & Lelong – FNA25; < *Dichanthelium dichotomum* (Linnaeus) Gould var. *dichotomum* – K1, K3, K4, Gould & Clark (1978); < *Panicum dichotomum* Linnaeus – C, GW1, NcTx, RAB; < *Panicum dichotomum* var. *lucidum* (Ashe) Lelong – Lelong (1984); > *Panicum lucidum* var. *lucidum* – F, HC; > *Panicum lucidum* var. *opacum* Fernald – F, HC.

Dichanthelium malacon (Nash) LeBlond. DEHISCENT WITCH GRASS. **Hab:** Dry pine/scrub oak woodlands. **Dist:** Disjunctly from NJ south to FL and AL; reported from TX. **Phen:** April-Dec. **Comm:** The basally attenuate spikelets, first glumes ½ or more as long as the spikelets, and dehiscent glumes and sterile lemmas distinguish this wide-ranging but local and uncommon species. RAB recognized the name *P. malacon*, but misapplied it to specimens referable to *D. oligosanthes* (Schultes) Gould and *D. fusiforme* (A.S. Hitchcock) Harvill. **Syn:** = FlGr, LeBlond (2016); = *Panicum malacon* Nash – HC, S; < *Dichanthelium ovale* – K4; < *Dichanthelium ovale* (Elliott) Gould & C.A. Clark var. *ovale* – FNA25, K1, K3, Gould & Clark (1978); < *Panicum malacon* Nash – RAB, misapplied; < *Panicum ovale* Elliott var. *ovale* – Lelong (1984).



Dichanthelium malacophyllum (Nash) Gould. SOFT-LEAF WITCHGRASS. **Hab:** Primarily a plant of cedar glades and dry calcareous soils. **Dist:** KY and TN west to KS and TX. **Comm:** Reported from SC by FNA, but source of record has not been identified. **Syn:** = FNA25, K1, K3, K4, Gould & Clark (1978); = *Panicum malacophyllum* Nash – F, G, HC, NcTx, S. NatureServe G4G5 (Apparently Secure).

Dichanthelium meridionale (Ashe) Freckmann. MATTING WITCHGRASS. **Hab:** Dry to damp sand of shores and woods. **Dist:** Sw. NS and MA to MN, south to e. NC, n. GA, and n. AL. **Phen:** May-Oct. **Comm:** A micrometer is needed to measure the very short puberulence (0.1 mm) that distinguishes this taxon, *D. leucothrix*, and *D. wrightianum* from other members of the *D. acuminatum* group. **Syn:** = K1, Mi, NY, Pa, Va, Freckmann (1981); = *Dichanthelium acuminatum* (Swartz) Gould & Clark ssp. *implicatum* (Lamson-Scribner ex Nash) Freckmann & Lelong – FNA25; = *Dichanthelium implicatum* (Lamson-Scribner ex Nash) Kerguélen – Mi; = *Panicum meridionale* Ashe – G; < *Dichanthelium acuminatum* – K4; < *Dichanthelium acuminatum* (Swartz) Gould & C.A. Clark var. *acuminatum* – K3; < *Dichanthelium acuminatum* var. *implicatum* (Lamson-Scribner) Gould & Clark – Gould & Clark (1978); >

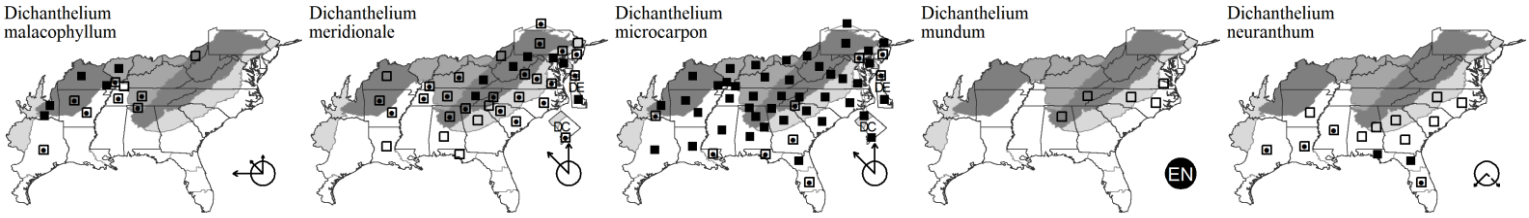


Dichanthelium albemarlense (Nash) Mohlenbrock – Il; < *Panicum acuminatum* var. *unciphyllum* (Trinius) Lelong – Lelong (1984); > *Panicum albemarlense* Ashe – HC, S, WV; > *Panicum columbianum* var. *thinium* A.S. Hitchcock & Chase – HC; < *Panicum lanuginosum* Elliott – RAB; < *Panicum leucothrix* Nash – C; > *Panicum meridionale* Ashe – HC, S, WV; > *Panicum meridionale* var. *albemarlense* (Ashe) Fernald – F; > *Panicum meridionale* var. *meridionale* – F; > *Panicum oricola* A.S. Hitchcock & Chase – HC.

Dichanthelium microcarpon (Muhlenberg ex Elliott) Mohlenbrock. SMALL-FRUITED WITCHGRASS. **Hab:** Floodplain forests, swamps, openings, and borders of streams and ponds, and occasionally in dry upland woods. **Dist:** MA and MI south to FL and TX. **Phen:** May-Oct. **Comm:** All nodes are typically densely retrorsely bearded. **Syn:** = Il, Mi, NY, Pa; = *Dichanthelium dichotomum* ssp. *microcarpon* (Muhlenberg ex Elliott) Freckmann & Lelong – FNA25; = *Dichanthelium dichotomum* (Linnaeus) Gould var. *ramulosum* (Torrey) LeBlond – Va, LeBlond (2001a); = *Panicum dichotomum* var. *ramulosum* (Torrey) Lelong – Lelong (1984); = *Panicum microcarpon* Muhlenberg ex Elliott – F, HC, S, WV; = *Panicum nitidum* Lamarck var. *ramulosum* Torrey – G; < *Dichanthelium dichotomum* (Linnaeus) Gould var. *dichotomum* – K1, K3, K4, Gould & Clark (1978); < *Panicum dichotomum* Linnaeus – C, GW1, NcTx, RAB.

Dichanthelium mundum (Fernald) LeBlond. ELEGANT WITCHGRASS. **Hab:** Sandy and peaty meadows, edge of swamps, low moist acid soil. **Dist:** Se. VA, north-central NC, e. TN. **Phen:** Probably spring to fall (known collections are Jul and Aug). **Tax:** The distribution suggests a periglacial influence. Appearing to be very rare, known from six collection sites, the most recent 1992. The spikelets resemble those of the *Dichanthelium ovale* group, but the vegetative characters are strongly aligned with the *D. scabriusculum* group. Not treated by RAB, and regarded as a putative hybrid by FNA. **Comm:** See LeBlond (2019a) for additional, detailed information. **Syn:** = LeBlond (2019a) in Weakley et al (2019a); = *Panicum mundum* Fernald – F, G, HC; < *Dichanthelium ovale* (Elliott) Gould & C.A. Clark var. *addisonii* (Nash) Gould & C.A. Clark – K1, K3, Gould & Clark (1978); < *Dichanthelium portoricense* – K4; < *Dichanthelium scoparium* (Lamarck) Gould – FNA25.

Dichanthelium neuranthum (Grisebach) LeBlond. NERVED WITCHGRASS. **Hab:** Maritime wet grasslands, Piedmont prairie-like barrens. **Dist:** Disjunct in se . and central NC, se. SC, GA, FL, MS, e. TX, AR; Bahamas, Cuba, and Belize. **Phen:** May-Nov. **Tax:** Can occur with the similar-appearing *D. caerulescens*, from which it differs by having spikelets that are longer (1.8-2.2 mm vs. 1.4-1.8), rounded summits vs. obtuse to sub-acute, and pubescent vs. glabrous; longer first glumes (0.8-1.0 mm vs. 0.3-0.8); leaves 15× or more as long as wide vs. 10-15×; and a nearly strict panicle. The plants from the Piedmont of NC match descriptions of *Panicum ovinum*, known from dry to moist open ground and prairies in e. TX, MS, and AR when last recognized (HC). It is treated here as a synonym of *D. neuranthum*. **Syn:** = FlGr, LeBlond (2017a) in Weakley et al (2017), LeBlond et al (2017); = *Dichanthelium aciculare* (Desvaux ex Poiret) Gould & C.A. Clark ssp. *neuranthum* (Grisebach) Freckmann & Lelong – FNA25; = *Panicum neuranthum* Grisebach – RAB; < *Dichanthelium aciculare* (Desvaux ex Poiret) Gould & Clark – K1, K3, K4, Gould & Clark (1978); > *Panicum neuranthum* Grisebach – HC, S, Tx; > *Panicum ovinum* Lamson-Scribner & J.G. Smith – HC, S. NatureServe G5T3 (Vulnerable).



Dichanthelium nudicaule (Vasey) B.F. Hansen & Wunderlin. NAKED WITCHGRASS. **Hab:** Bogs, wet pine savannas. **Dist:** W. FL Panhandle and s. AL west to MS. **Syn:** = FlGr, FNA21, WH3, LeBlond (2001a); = *Panicum nudicaule* Vasey – HC, S; < *Dichanthelium dichotomum* (Linnaeus) Gould var. *dichotomum* – K3, K4.

Dichanthelium oligosanthes (J.A. Schultes) Gould. FEW-FLOWERED WITCHGRASS. **Hab:** Longleaf pine sandhills, barrens over xeric alluvial deposits, other xeric sandy soils, sandy fields and open woods. **Dist:** MA and MN south to FL and TX. **Phen:** Apr-Oct. **Tax:** See note under *D. fusiforme*. **Syn:** = Thomas (2021); = *Dichanthelium oligosanthes* ssp. *oligosanthes* – FNA25; = *Dichanthelium oligosanthes* (J.A. Schultes) Gould var. *oligosanthes* – K1, Va, Gould & Clark (1978); = *Panicum oligosanthes* J.A. Schultes – HC, RAB, S; = *Panicum oligosanthes* var. *oligosanthes* – F, NcTx; < *Dichanthelium oligosanthes* (J.A. Schultes) Gould – K3, K4, Pa; < *Panicum oligosanthes* J.A. Schultes – C, G. NatureServe G5T5? (Secure).

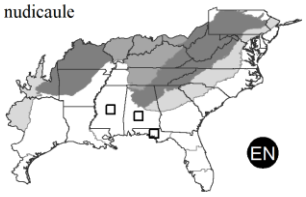
Dichanthelium ovale (Elliott) Gould & C.A. Clark *var. **addisonii*** (Nash) Gould & C.A. Clark. LOW STIFF WITCHGRASS. **Hab:** Dry to damp sandy woods and fields. **Dist:** MA and MN south to FL and TX, also in n. Mexico. **Phen:** May-Oct. **Comm:** See note under *D. ovale* var. *ovale* and *D. aciculare*. **Syn:** = K1, K3, Va, Gould & Clark (1978); = *Dichanthelium commonsianum* (Ashe) Freckmann – Mi, NY; = *Panicum commonsianum* W.W. Ashe – C, RAB; = *Panicum ovale* Elliott var. *pseudopubescens* (Nash) Lelong – Lelong (1984); < *Dichanthelium ovale* ssp. *pseudopubescens* (Nash) Freckmann & Lelong – FNA25; < *Dichanthelium portoricense* – K4; > *Dichanthelium wilmingtonense* (W.W. Ashe) Wipff – Wipff (2020); > *Panicum addisonii* Nash – HC, S; > *Panicum commonsianum* W.W. Ashe – HC, S; > *Panicum commonsianum* var. *addisonii* (Nash) Fernald – F, G; > *Panicum commonsianum* var. *commonsianum* – F, G, Pa; > *Panicum mundum* Fernald – F, G, HC; > *Panicum wilmingtonense* W.W. Ashe – HC, S.

Dichanthelium ovale (Elliott) Gould & C.A. Clark *var. **ovale***. OVAL-FLOWERED WITCHGRASS. **Hab:** Dry to damp sandy pinelands. **Dist:** NY to WI, south to FL and e. TX. **Phen:** May-Oct. **Comm:** Infrequent over most of its range except FL. In our region, the *D. ovale* double ligule character is more evident in var. *ovale*, with var. *addisonii* often having only a single ligule about 1 mm long. Also see note under *D. consanguineum* regarding *D. ovale*. **Syn:** = K1, K3, Va, Gould & Clark (1978); = *Dichanthelium ovale* ssp. *ovale* – FNA25; = *Panicum ovale* Elliott – RAB, Lelong (1984); = *Panicum ovale* Elliott var. *ovale* – Lelong (1984); < *Dichanthelium ovale* – K4; > *Panicum ovale* Elliott – HC, S.

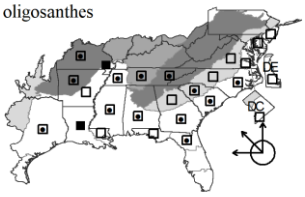
Dichanthelium polyanthes (J.A. Schultes) Mohlenbrock. SMALL-FRUITED WITCHGRASS. **Hab:** Damp to dry soil of open woods and ditches. **Dist:** VA to MI and s. IL, south to GA and e. TX. **Phen:** Jun-Oct. **Syn:** = FNA25, Mi, NY, Pa, Va; = *Dichanthelium sphaerocarpon* (Elliott) Gould var. *isophyllum* (Lamson-Scribner) Gould & Clark – K1, K3, K4, Gould & Clark (1978); = *Panicum polyanthes* J.A. Schultes – C, F, G, GW1, HC, RAB, S, WV.

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

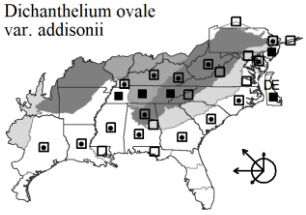
Dichanthelium nudicaule



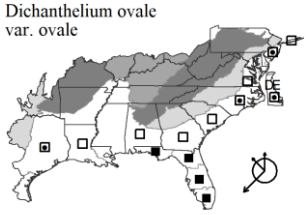
Dichanthelium oligosanthes



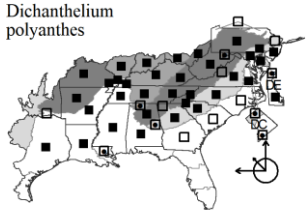
Dichanthelium ovale var. addisonii



Dichanthelium ovale var. ovale



Dichanthelium polyanthes



Dichanthelium portoricense (Desvaux ex Hamilton) B.F. Hansen & Wunderlin *ssp.* ***patulum*** (Lamson-Scribner & Merrill) Freckmann & Lelong. NASH'S WITCHGRASS. **Hab:** Moist pine savannas and flatwoods, moist to dry openings in maritime forests, dry pine and oak sandhills. **Dist:** Se. VA to FL, west to e. TX; West Indies and Central America. **Phen:** May-Sep. **Comm:** This and *D. portoricense* ssp. *portoricense* appear to intergrade in our region. **Syn:** = Va; = *Panicum lancearium* Trinius – C, G, RAB; > *Dichanthelium patentifolium* (Nash) Wipff – Wipff (2020); > *Dichanthelium patulum* (Lamson-Scribner & Merrill) Wipff – Wipff (2020); < *Dichanthelium portoricense* – K3, K4; < *Dichanthelium portoricense* (Desvaux ex Hamilton) B.F. Hansen & Wunderlin ssp. *patulum* (Lamson-Scribner & Merrill) Freckmann & Lelong – FNA25; < *Dichanthelium sabulorum* (Lamarck) Gould & Clark var. *patulum* (Lamson-Scribner & Merrill) Gould & Clark – K1, Gould & Clark (1978); > *Panicum lancearium* Trinius – HC, S; > *Panicum lancearium* var. *lancearium* – F; > *Panicum lancearium* var. *patulum* (Lamson-Scribner & Merrill) Fernald – F; > *Panicum patentifolium* Nash – HC, S; > *Panicum patulum* (Lamson-Scribner & Merrill) A.S. Hitchcock – HC, S; < *Panicum portoricense* Desvaux ex Hamilton var. *nashianum* (Lamson-Scribner) Lelong – Lelong (1984).

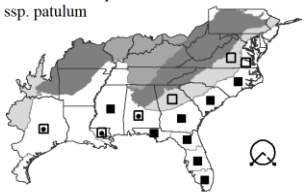
Dichanthelium portoricense (Desvaux ex Hamilton) B.F. Hansen & Wunderlin *ssp.* ***portoricense***. PUERTO RICAN WITCHGRASS. **Hab:** Moist pine savannas and flatwoods. **Dist:** NC south to FL, west to TX; West Indies. **Phen:** May-Sep. **Syn:** = FNA25; = *Panicum portoricense* Desvaux ex Hamilton – HC, RAB, S; = *Panicum portoricense* var. *portoricense* – Lelong (1984); < *Dichanthelium portoricense* – K3, K4; < *Dichanthelium sabulorum* (Lamarck) Gould & Clark var. *thinium* (A.S. Hitchcock & Chase) Gould & Clark – K1, Gould & Clark (1978).

Dichanthelium ravenelii (Lamson-Scribner & Merrill) Gould. RAVENEL'S WITCHGRASS. **Hab:** Dry sandy or rocky thin woods and openings, sometimes in moist soils. **Dist:** NJ south to FL, west to e. TX, north to IA. **Phen:** May-Oct. **Syn:** = FlGr, FNA25, K1, K3, K4, Va, Gould & Clark (1978); = *Panicum ravenelii* Lamson-Scribner & Merrill – C, F, G, HC, NcTx, RAB, S. NatureServe G5 (Secure).

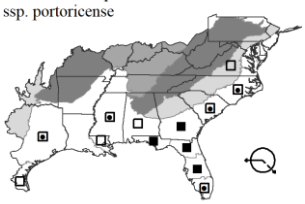
Dichanthelium roanokense (Ashe) LeBlond. ROANOKE WITCHGRASS. **Hab:** Wet pine savannas, swamp openings, and wet peaty meadows. **Dist:** DE south to FL, west to e. TX; disjunct in Coffee County, TN (Ciafre, in prep.); Jamaica. **Phen:** May-Sep. **Tax:** See note under *D. caerulescens* regarding FNA treatment. **Syn:** = LeBlond (2017a) in Weakley et al (2017), LeBlond (2017c) in Weakley et al (2017), LeBlond et al (2017); = *Dichanthelium dichotomum* (Linnaeus) Gould var. *roanokense* (Ashe) LeBlond – Va, LeBlond (2001a); = *Panicum roanokense* Ashe – F, HC, S; < *Dichanthelium dichotomum* ssp. *roanokense* (Ashe) Freckmann & Lelong – FNA25; < *Dichanthelium dichotomum* (Linnaeus) Gould var. *dichotomum* – K1, K3, K4, Gould & Clark (1978); < *Panicum dichotomum* Linnaeus – C, GW1, NcTx, RAB; < *Panicum dichotomum* var. *roanokense* (Ashe) Lelong – Lelong (1984); < *Panicum roanokense* Ashe – G.

Dichanthelium scabriusculum (Elliott) Gould & C.A. Clark. TALL SWAMP WITCHGRASS. **Hab:** Moist, low, open or shaded woodlands, often along streams or ditches. **Dist:** Se. MA south to FL, west to e. TX and AR. **Phen:** May-Oct. **Syn:** = Va, LeBlond (2019a) in Weakley et al (2019a); < *Dichanthelium scabriusculum* (Elliott) Gould & C.A. Clark – FNA25, K1, K3, Gould & Clark (1978); > *Panicum aculeatum* A.S. Hitchcock & Chase – F, G, HC, S; < *Panicum scabriusculum* Elliott – C, GW1, RAB; > *Panicum scabriusculum* Elliott – F, HC, S; > *Panicum scabriusculum* var. *scabriusculum* – G.

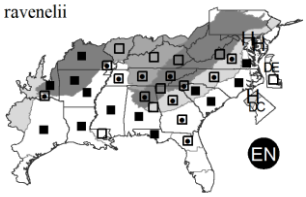
Dichanthelium portoricense ssp. patulum



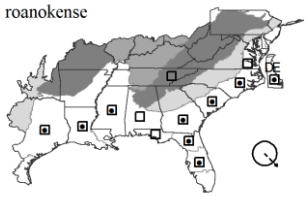
Dichanthelium portoricense ssp. portoricense



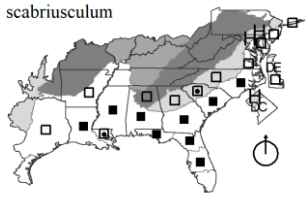
Dichanthelium ravenelii



Dichanthelium roanokense



Dichanthelium scabriusculum



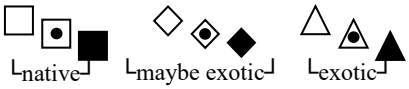
Dichanthelium scoparium (Lamarck) Gould. VELVET WITCHGRASS. **Hab:** Moist sandy soil of woodland openings and ditches. **Dist:** MA and MI south to FL and TX; also in Mexico and West Indies. **Phen:** May-Oct. **Tax:** See note under *D. acuminatum* var. *fasciculatum* regarding *Panicum glutinoscabrum*. **ID Notes:** The dense, velvety pubescence of the internodes, sheaths, and blades of this taxon, combined with the viscid band below the nodes, are diagnostic. **Syn:** = FNA25, K1, K3, K4, NY, Pa, Va, Gould & Clark (1978); = *Panicum scoparium* Lamarck – C, F, G, GW1, HC, NcTx, RAB, S.

Dichanthelium scribnerianum (Nash) J.R. Thomas. SCRIBNER'S WITCHGRASS. **Hab:** Black belt prairies, calcareous clay prairies, prairie-like grassland remnants over fragipan soils in the loess plains, calcareous maritime forests, dry thin woods and openings, dry prairies, usually in basic soil. **Dist:** Sw. ME to s. BC, south to se. NC, n. GA, and CA, also in n. Mexico. **Phen:** Apr-Nov. **Syn:** = *Dichanthelium oligosanthes* ssp. *scribnerianum* (Nash) Freckmann & Lelong – FNA25, Mi, NY; = *Dichanthelium oligosanthes* (J.A. Schultes) Gould var. *scribnerianum* (Nash) Gould – K1, Va, Gould & Clark (1978); = *Panicum oligosanthes* var. *scribnerianum* (Nash) Fernald – NcTx; = *Panicum scribnerianum* Nash – S; > *Dichanthelium helleri* (Nash) Mohlenbrock – Thomas (2021); < *Dichanthelium oligosanthes* (J.A. Schultes) Gould – K3, K4, Pa; > *Dichanthelium scribnerianum* (Nash) J.R. Thomas – Thomas (2021); > *Panicum helleri* – G, HC; < *Panicum oligosanthes* J.A. Schultes – C, RAB; > *Panicum oligosanthes* J.A. Schultes – G; > *Panicum oligosanthes* J.A. Schultes var. *helleri* (Nash) Fernald – F; > *Panicum oligosanthes* var. *scribnerianum* (Nash) Fernald – F; > *Panicum scribnerianum* Nash – HC. NatureServe G5T5 (Secure).

Dichanthelium sphaerocarpon (Elliott) Gould. ROUND-FRUITED WITCHGRASS. **Hab:** Moist or dry thin woods, meadows, and ditches, often in dry sandy soil. **Dist:** MA, VT, OH, and KA south to FL and TX; also in Mexico. **Phen:** May-Oct. **Comm:** Nodes are infrequently bearded, but internodes remain glabrous. **Syn:** = FNA25, K1, K3, Mi, NY, Pa, Va, Gould & Clark (1978); = *Dichanthelium sphaerocarpon* var. *sphaerocarpon* – K4; = *Panicum sphaerocarpon* Elliott – C, NcTx, RAB, WV; > *Panicum sphaerocarpon* var. *inflatum* (Lamson-Scribner & J.G. Smith) A.S. Hitchcock & Chase – F, G, HC, S; > *Panicum sphaerocarpon* var. *sphaerocarpon* – F, G, HC, S. NatureServe G5T5 (Secure).

Dichanthelium spretum (J.A. Schultes) Freckmann. EATON'S WITCHGRASS. **Hab:** Wet sands and peats of bogs, savannas, meadows, and shores. **Dist:** ME south to n. FL, LA and e. TX. **Phen:** May-Sep. **Comm:** Intermediate forms between this taxon and *D. longiligulatum* occur. **Syn:** = K1, Mi, NY, Pa, Va, Freckmann (1981); = *Dichanthelium acuminatum* (Swartz) Gould & Clark ssp. *spretum* (J.A. Schultes) Freckmann & Lelong – FNA25; = *Dichanthelium acuminatum* var. *densiflorum* (Rand & Redfield) Gould & Clark – Gould & Clark (1978); = *Panicum acuminatum* Swartz var. *densiflorum* (Rand & Redfield) Lelong –

Key to Map Symbology:



←rare ←uncommon ←common (see introduction for more)

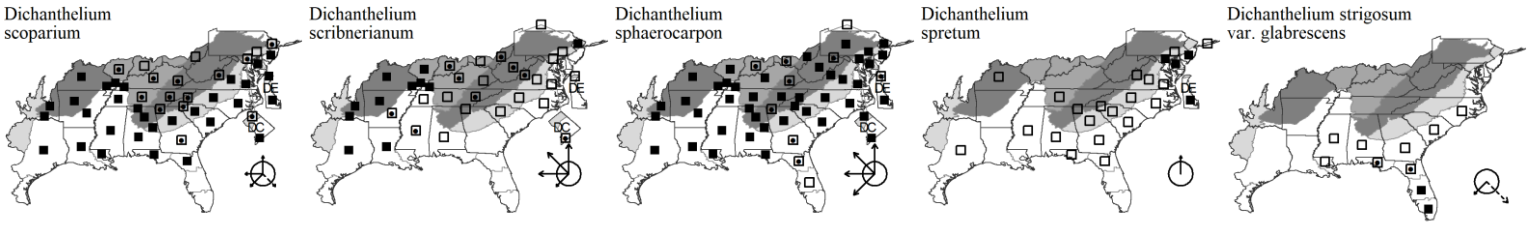
* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable

X : extirpated

Lelong (1984); = *Panicum spretum* J.A. Schultes – C, F, G, HC, RAB, S; < *Dichanthelium leucothrix* (Nash) Freckmann – K3, K4; < *Panicum spretum* J.A. Schultes – GW1.

Dichanthelium strigosum (Muhlenberg ex Elliott) Freckmann *var*. ***glabrescens*** (Grisebach) Freckmann. HAIRLESS WITCHGRASS. **Hab:** Low, open sandy pinelands and hammocks, bogs. **Dist:** GA and FL west to LA; disjunct in se. NC, ne. SC, and se. SC (Bradley et al. [in prep.]; West Indies, Belize. **Phen:** May-Oct. **Comm:** Included in synonymy with *Panicum strigosum* by RAB, but no specimen from the Carolinas had been found prior to discovery of a population in Onslow County in 2009. **Syn:** = K1; = *Dichanthelium leucoblepharis* (Trinius) Gould & Clark var. *glabrescens* (Grisebach) Gould & Clark – Gould & Clark (1978); = *Dichanthelium strigosum* ssp. *glabrescens* (Grisebach) Freckmann & Lelong – FNA25; = *Panicum polycaulon* Nash – HC, S; > *Dichanthelium polycaulon* (Nash) Wipff – Wipff (2020); < *Dichanthelium strigosum* (Muhlenberg ex Elliott) Freckmann – K3, K4; < *Panicum strigosum* Muhlenberg ex Elliott – GW1, RAB. NatureServe G5T4T5 (Apparently Secure).



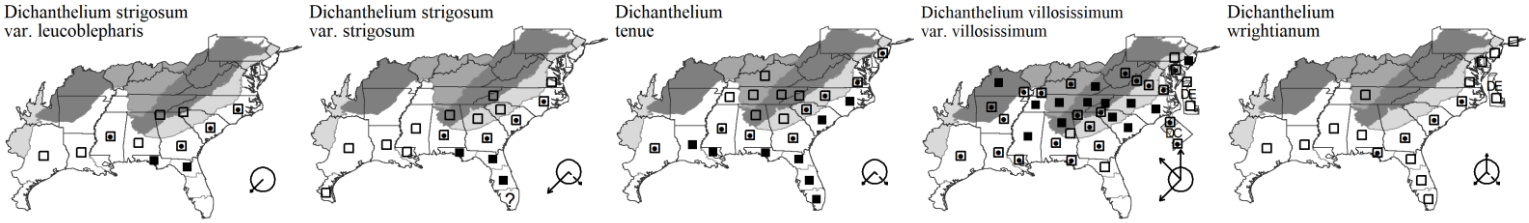
Dichanthelium strigosum (Muhlenberg ex Elliott) Freckmann *var*. ***leucoblepharis*** (Trinius) Freckmann. DWARF WITCHGRASS. **Hab:** Sandy, acidic soils of pinelands. **Dist:** NC south to FL, west to TX; also in Mexico. **Phen:** May-Oct. **Syn:** = K1; = *Dichanthelium leucoblepharis* (Trinius) Gould & Clark var. *leucoblepharis* – Gould & Clark (1978); = *Dichanthelium strigosum* ssp. *leucoblepharis* (Trinius) Freckmann & Lelong – FNA25; = *Panicum ciliatum* Elliott – HC, RAB, S; = *Panicum strigosum* Muhlenberg var. *leucoblepharis* (Trinius) Lelong – Lelong (1984); < *Dichanthelium strigosum* (Muhlenberg ex Elliott) Freckmann – K3, K4. NatureServe G5T3T5 (Apparently Secure).

Dichanthelium strigosum (Muhlenberg ex Elliott) Freckmann *var*. ***strigosum***. ROUGH-HAIRY WITCHGRASS. **Hab:** Moist soils of pine flatwoods, savannas, and pocosins, also in boggy situations. **Dist:** Se. VA south to FL, west to TX, also in TN, e. Mexico, Mesoamerica, n. South America, and West Indies. **Phen:** May-Sep. **Syn:** = K1, Va; = *Dichanthelium leucoblepharis* (Trinius) Gould & Clark var. *pubescens* (Vasey) Gould & Clark – Gould & Clark (1978); = *Dichanthelium strigosum* ssp. *strigosum* – FNA25; = *Panicum strigosum* Muhlenberg ex Elliott – C, F, G, HC, S; = *Panicum strigosum* var. *strigosum* – Lelong (1984); < *Dichanthelium strigosum* (Muhlenberg ex Elliott) Freckmann – K3, K4; < *Panicum strigosum* Muhlenberg ex Elliott – GW1, RAB. NatureServe G5T5 (Secure).

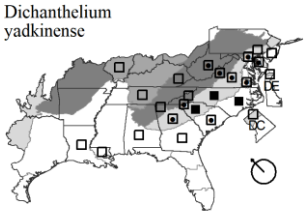
Dichanthelium tenue (Muhlenberg) Freckmann & Lelong. WHITE-EDGED WITCHGRASS. **Hab:** Wet peaty or sandy soil of pineland savannas, flatwoods, bogs, and meadows. **Dist:** NJ south to FL, west to TX; Central America and West Indies (Cuba). **Phen:** May-Oct. **Comm:** This treatment of *D. tenue* includes plants from n. Alabama formerly recognized as *Panicum concinnius*, with spikelets 1.2-1.4 mm long but otherwise possessing the characters of *D. tenue*. **Syn:** = FNA25, Va, LeBlond (2018b) in Weakley et al (2018a); = *Panicum tenue* Muhlenberg – C, RAB; > *Dichanthelium albomarginatum* (Nash) Wipff – Wipff (2020); > *Dichanthelium concinnius* (A.S. Hitchcock & Chase) Wipff – Wipff (2020); < *Dichanthelium dichotomum* (Linnaeus) Gould var. *tenue* (Muhlenberg) Gould & Clark – K1, K3, K4, Gould & Clark (1978); < *Dichanthelium ensifolium* var. *unciphyllum* – WH3; > *Dichanthelium trifolium* (Nash) Wipff – Wipff (2020); > *Panicum albomarginatum* Nash – F, HC, S; > *Panicum concinnius* A.S. Hitchcock & Chase – HC, S; < *Panicum ensifolium* Baldwin ex Elliott – G; > *Panicum tenue* Muhlenberg – F, HC, S; > *Panicum trifolium* Nash – F, G, HC, S.

Dichanthelium villosissimum (Nash) Freckmann *var*. ***villosissimum***. WHITE-HAIRED WITCHGRASS. **Hab:** Dry sandy soil of open woods and prairies. **Dist:** MA south to FL, west to TX, also in Mexico and Mesoamerica. **Phen:** Apr-Sep. **Comm:** Appearing to be related to *D. ovale* based on such characters as the double ligule. **Syn:** = K1, Va, Freckmann (1981); = *Panicum ovale* Elliott var. *villosum* (A. Gray) Lelong – Lelong (1984); = *Panicum villosissimum* Nash – C, HC, RAB, S, WV; < *Dichanthelium acuminatum* – K4; < *Dichanthelium acuminatum* (Swartz) Gould & C.A. Clark var. *acuminatum* – K3; < *Dichanthelium acuminatum* (Swartz) Gould & Clark var. *villosum* (A. Gray) Gould & Clark – Gould & Clark (1978); > *Dichanthelium ovale* (Elliott) Gould & Clark ssp. *villosissimum* (Nash) Freckmann & Lelong – FNA25; < *Dichanthelium villosissimum* – NY, Pa; > *Panicum pseudopubescens* Nash – HC, S; > *Panicum villosissimum* Nash – HC, S; > *Panicum villosissimum* var. *pseudopubescens* (Nash) Fernald – F, G; > *Panicum villosissimum* var. *villosissimum* – F, G.

Dichanthelium wrightianum (Lamson-Scribner) Freckmann. WRIGHT'S WITCHGRASS. **Hab:** Limesink ponds and meadows, cypress savannas, pine savannas, bogs. **Dist:** MA south to FL, west to TX; disjunct inland in Coffee County, TN (Ciafre in prep.), ; Cuba and Mesoamerica. **Phen:** May-Sep. **Comm:** A micrometer is needed to measure the very short puberulence (0.1 mm long) that distinguishes this taxon, D. *meridionale*, and *D. leucothrix* from other members of the *D. acuminatum* group. **Syn:** = FNA25, K1, K3, K4, Va, Freckmann (1981); = *Dichanthelium acuminatum* (Swartz) Gould & Clark var. *wrightianum* (Lamson-Scribner) Gould & Clark – Gould & Clark (1978); = *Panicum wrightianum* Lamson-Scribner – C, F, G, HC, RAB, S; < *Panicum spretum* J.A. Schultes – GW1. NatureServe G4 (Apparently Secure).



Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



Dichanthelium yadkinense (Ashe) Mohlenbrock. SPOTTED-SHEATH WITCHGRASS. **Hab:** Floodplain forests, thickets, bottomlands, and swamps, often on alluvial deposits. **Dist:** NJ and MI south to GA and TX; Mexico. **Phen:** May-Oct. **Comm:** Sheaths often with wart-like glands. This taxon resembles *D. species 9 (=cryptanthum)*, from which it differs most readily by its hairy ligule (vs. membranous) and smooth peduncle (vs. antrorsely scabrous). **Syn:** = Pa, Va, LeBlond (2001a); = *Dichanthelium dichotomum* ssp. *yadkinense* (Ashe) Freckmann & Lelong – FNA25; = *Panicum dichotomum* var. *yadkinense* (Ashe) Lelong – Lelong (1984); = *Panicum yadkinense* Ashe – C, F, G, HC, S, WV; < *Dichanthelium dichotomum* (Linnaeus) Gould var. *dichotomum* – K1, K3, K4, Gould & Clark (1978); < *Panicum dichotomum* Linnaeus – GW1, NcTx, RAB.

Digitaria Haller 1768 (CRAB GRASS)

A genus of about 200 species, primarily in the tropics and subtropics. Most of our species occur primarily in disturbed situations; their original distributions and habitats are now obscure. References: Bridges & Orzell (2018b) in Weakley et al (2018a); Lo Medico et al (2017); Vega et al (2009); Webster (1980); Webster (1987); Wipff & Hatch (1994); Wipff & Shaw (2018b); Wipff (1996b); Wipff (2003e) in FNA25 (2003a).

Unkeyed taxa: *Digitaria horizontalis*

1 Inflorescences an open panicle (as long as wide); spikelets solitary (or paired or in 3's) on long or short pedicels; pedicels mostly > 2× as long as the spikelets, mostly spreading (sometimes distally appressed on branches); the entire panicle usually detaching at maturity ..... ***Leptoloma***
1 Inflorescences of digitate or sub-digitate primary branches, or primary branches alternately arranged along a central axis; with (1) 2-3 (or more) spikelets per node on primary branches, arranged in two rows along one side of the branch; spikelets appressed on branches; the entire inflorescence not detaching at maturity.
  2 Inflorescences of primary branches alternately arranged along a central axis; all the rachilla internodes more or less conspicuously elongated, hence upper florets stipitate; upper lemmas dark brown at maturity; spikelets 3.0-6.6 mm long, densely short to long pubescent, hairs generally exceeding the length of the spikelet and hairs spreading at maturity; hairs smooth-walled, with acute apices ..... ***Trichachne***
  2 Inflorescences of digitate or sub-digitate primary branches, or primary branches alternately arranged along a central axis; no conspicuous elongated rachilla internodes, upper floret not stipitate; upper lemmas pale yellow, tan, gray, purple-tinged, purple, brown or dark brown; spikelets 1.3-4.1 mm long, glabrous to variously pubescent; hairs various, smooth or verrucose walled, with acute or dilated apices.
    3 Rachis of each raceme narrow, trigonous, only slightly (if at all) winged.
      5 Spikelets 1.7-2.2 mm long; plants 3-10 dm tall; racemes to 10 cm long; upper sheaths glabrous, lower sheaths glabrous to sparsely pilose ..... ***Digitaria filiformis var. filiformis***
      5 Spikelets 2.0-2.8 mm long; plants 8-15 dm tall; racemes to 25 cm long; upper sheaths glabrous or pilose, lower sheaths densely pilose ..... ***Digitaria villosa***
    3 Rachis of each raceme broad (0.5-1 mm wide), winged, the wings as wide as or wider than the rachis proper.
      6 Lower sheaths glabrous; second glume 0.75-1× as long as the first glume (which may be ; fertile lemma dark brown or black at maturity (or pale brown or gray in *D. longiflora*).
        7 Hairs of the spikelet minutely capitate; second glume ca. 1× as long as the first glume; spikelets 1.7-2.3 mm long ..... ***Digitaria ischaemum***
        7 Hairs of the spikelet not minutely capitate; second glume ca. 0.75× as long as the first glume; spikelets 1.2-1.7 mm long ..... ***Digitaria violascens***
      6 Lower sheaths pilose; second glume 0.3-0.6× as long (to 0.8× as long in *D. ciliaris*) as the first glume; fertile lemma white, tan, or grayish-brown at maturity.
        8 Spikelets 1.5-1.8 mm long, villous with crinkled hairs; pedicels glabrous, terete in cross-section ..... ***Digitaria serotina***
        8 Spikelets (1.7-) 2.4-4.1 mm long, glabrous, scabrous, or pubescent with straight hairs; pedicels scabrous, 3-angled in cross-section; [section *Digitaria*].
          9 Spikelets (1.7-) 2.5-3.4 mm long, averaging 3.0 mm long or shorter; leaf blades pilose over the upper surface ..... ***Digitaria sanguinalis***
          9 Spikelets 2.6-4.1 mm long, averaging 3.1 mm long or longer; leaf blades glabrous except for a few hairs on the upper surface at the base.
            10 Lower lemma of the sessile spikelet with 5 equidistant nerves; lowermost inflorescence node glabrous or pubescent with hairs < 0.4 mm long; apex of the first glume rounded to truncate ..... ***Digitaria bicornis***
            10 Lower lemma of sessile spikelet with the lateral nerves crowded to the margins; lowermost inflorescence node pubescent with hairs > 0.4 mm long; apex of the first glume acute ..... ***Digitaria ciliaris***

* ***Digitaria bicornis*** (Lamarck) Roemer & J.A. Schultes. **Hab:** Sandy fields, lawns, roadsides, disturbed places. **Dist:** Webster (1980) believed that this species is likely to occur in VA and MD, as well. **Phen:** Jan-Dec. **Comm:** Whether or not it is introduced is unclear; it is now widely distributed in the tropics and subtropics worldwide. **Syn:** = Bah, ETx1, FlGr, FNA25, K1, K3, K4, WH3, Webster (1987); > *Digitaria diversiflora* Swallen – Tx. NatureServe G5 (Secure).

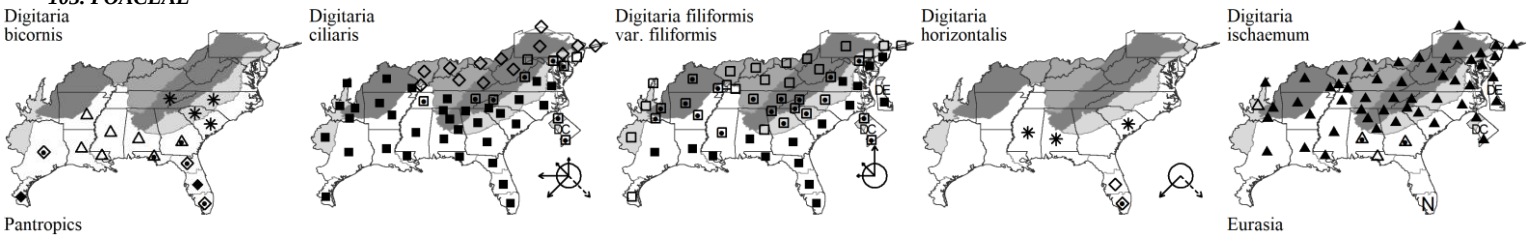
Digitaria ciliaris (Retzius) Koeler. SOUTHERN CRAB GRASS. **Hab:** Sandy fields, roadsides, and disturbed areas. **Phen:** Aug-Oct (-Jul). **Syn:** = Ar, Bah, C, ETx1, FlGr, FNA25, K1, K3, K4, Mo1, NcTx, NY, Pa, Tn, Va, WH3, Webster (1987); = *Digitaria sanguinalis* var. *ciliaris* (Retzius) Parlatore – F, HC; ? *Digitaria adscendens* (Kunth) Henrard – Tx. NatureServe G5 (Secure).

Digitaria filiformis (Linnaeus) Koeler *var. **filiformis***. SLENDER CRABGRASS. **Hab:** Pine flatwoods, longleaf pine sandhills, fields, roadsides, disturbed areas. **Dist:** Widespread in e. North America. **Phen:** Mar-Dec. **Tax:** Var. *laeviglumis* (Fernald) J. Wipff, with glabrous spikelets, is a narrow endemic in NH. **Syn:** = Ar, C, ETx1, F, G, Mo1, NY, RAB, Va, WH3, Wipff (1996b); = *Digitaria filiformis* – HC, K1; = *Syntherisma filiformis* (Linnaeus) Nash – S; < *Digitaria filiformis* – Mi, NcTx, Pa, Tn, Tx, W, WV; < *Digitaria filiformis* (Linnaeus) Koeler var. *filiformis* – FNA25, K3, K4.

* ***Digitaria horizontalis*** Willdenow. JAMAICAN CRABGRASS. **Hab:** Roadsides, sandy areas, other disturbed areas. **Dist:** Uncertain if native in c. and s. peninsular FL; West Indies, Mexico south to South America. **Phen:** Jun-Nov. **Syn:** = Bah, FlGr, FNA25, K1, K3, K4, WH3. NatureServe G5 (Secure).

* ***Digitaria ischaemum*** (Schreber) Muhlenberg. SMOOTH CRAB GRASS. **Hab:** Fields, lawns, disturbed areas. **Dist:** Native of Eurasia. **Phen:** Jul-Nov. **Tax:** Two varieties have sometimes been recognized. Var. *ischaemum* has racemes (1-) 2-6, 1-9 (-10) cm long, mostly curved and plants mostly to 4 dm tall. Var. *mississippiensis* (Gattinger) Fernald has racemes 5-7, 6-15 cm long, mostly stiff and straight and plants to 10 dm tall. **Syn:** = Ar, C, ETx1, FlGr, FNA25, K1, K3, K4, Mi, Mo1, NE, NY, Pa, Tn, Va, W, WH3, WV; = *Digitaria ischaemum* var. *ischaemum* – RAB; = *Syntherisma ischaemum* (Schreber) Nash – S; > *Digitaria ischaemum* var. *ischaemum* – F, G, HC; > *Digitaria ischaemum* (Schreber) Muhlenberg var. *mississippiensis* (Gattinger) Fernald – F, G, HC.

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

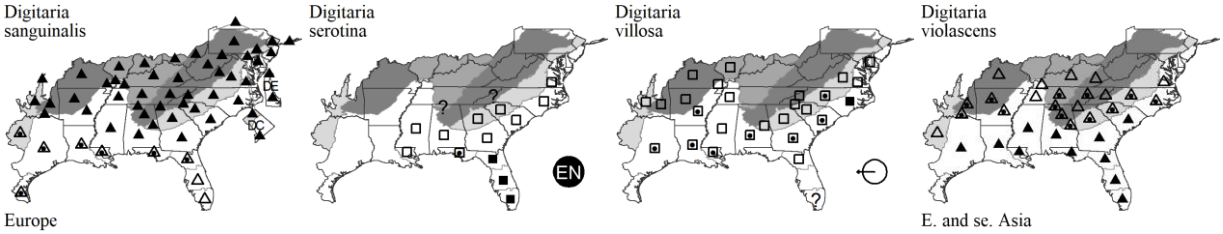


* ***Digitaria sanguinalis*** (Linnaeus) Scopoli. NORTHERN CRAB GRASS. **Hab:** Fields, roadsides, disturbed areas. **Dist:** Native of Eurasia. **Phen:** Jul-Oct. **Syn:** = Ar, C, ETx1, FlGr, FNA25, G, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, W, WV, Webster (1987); = *Digitaria sanguinalis* var. *sanguinalis* – F, HC; = *Syntherisma sanguinalis* (Linnaeus) Dulac – S. NatureServe G5 (Secure).

Digitaria serotina (Walter) Michaux. DWARF CRAB GRASS. **Hab:** Pine flatwoods, hammocks, disturbed areas. **Dist:** Se. VA south to s. FL, west to s. MS. **Phen:** Apr-Dec. **Syn:** = C, F, FlGr, FNA25, G, GW1, HC, K1, K3, K4, Pa, RAB, Va, WH3; = *Syntherisma serotina* Walter – S. NatureServe G5? (Secure).

Digitaria villosa (Walter) Persoon. SHAGGY CRABGRASS. **Hab:** Longleaf pine sandhills, dry pine flatwoods, glades, dry prairies, dry hammocks, dunes, sandy fields, roadsides, other disturbed habitats. **Dist:** VA, TN, IL, and MO south to s. FL and TX; West Indies. **Phen:** Sep-Oct. **Syn:** = Bah, HC, K1, K3, K4, NcTx, Va; = *Digitaria filiformis* var. *villosa* (Walter) Fernald – Ar, C, ETx1, F, FlGr, FNA25, G, Mo1, RAB, Wipff (1996b); = *Syntherisma villosa* Walter – S; < *Digitaria filiformis* – Tn, Tx.

* ***Digitaria violascens*** Link. **Hab:** Sandy fields, roadsides, and woodland borders. **Dist:** Native of Asia. **Phen:** Sep-Oct. **Syn:** = Ar, Bah, C, ETx1, FlGr, FNA25, G, HC, K1, K3, K4, NE, Tn, Tx, WH3; = *Digitaria ischaemum* var. *violascens* (Link) Radford – RAB. NatureServe GNR (Not Yet Ranked).



Dinebra Jacquin 1809 (VIPER GRASS)

A genus of ca. 25 species, annuals, of the tropics and subtropics. The circumscription of *Dinebra* here follows the greatly expanded course of Peterson et al. (2012). References: Barkworth (2003c) in FNA25 (2003a); Peterson et al (2012); Snow & Peterson (2012); Snow (2003a) in FNA25 (2003a); Snow et al (2018).

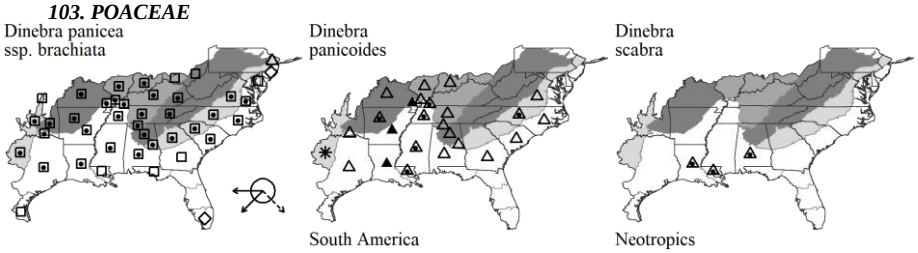
2 Sheaths sparsely to densely hairy with papillose-based hairs.
.....***Dinebra panicea ssp. brachiata***
2 Sheaths glabrous, or pubescent with non-papillose-based hairs.
4 Panicles with 25-150 branches.
5 Lemmas 2.4-3 mm long; anthers 0.6-0.8 mm long; spikelets 4-5 mm long..... ***Dinebra panicoides***
5 Lemmas 1.2-2.4 mm long; anthers 0.2-0.6 mm long; spikelets 2.5-4.5 mm long.
.....***Dinebra scabra***
4 Panicles with 2-25 branches.

Dinebra panicea (Retzius) P.M. Peterson & N. Snow *ssp.* ***brachiata*** (Steudel) P.M. Peterson & N. Snow. RED SPRANGLETOP. **Hab:** Sandy fields, disturbed bottomlands, agricultural fields, other disturbed areas. **Dist:** Widespread in the Western Hemisphere. **Phen:** Jun-Oct. **Tax:** The more familiar epithet, *Leptochloa filiformis*, must be replaced for reasons of nomenclatural priority. **Syn:** = K3, K4, Va, Peterson et al (2012), Snow & Peterson (2012); = *Leptochloa panicea* (Retzius) Ohwi ssp. *brachiata* (Steudel) N. Snow – Ar, FNA25, Il, Mo1, Pa, Tn; < *Dinebra panicea* – ETx1; < *Leptochloa filiformis* (Lamarck) Palisot de Beauvois – C, F, G, GW1, HC, RAB, S, Tx, W. NatureServe GNRT5 (Secure).

* ***Dinebra panicoides*** (J. Presl) P.M. Peterson & N. Snow. AMAZON SPRANGLETOP. **Hab:** Swamps, wet areas, drawdown habitats on lake margins and in river channels. **Dist:** Native of South America. Belden et al. (2004) discuss the VA occurrences along the banks of the Roanoke (Staunton) River at Kerr Reservoir. Also reported for e. GA in the Coastal Plain (Sorrie, pers. comm.) and SC (Richland County) (Bradley et al. [in prep.]). **Phen:** May-Nov. **Syn:** = FlGr, K3, K4, Peterson et al (2012); = *Leptochloa panicoides* (J. Presl) A.S. Hitchcock & Chase – Ar, C, ETx1, FNA25, G, GW1, HC, Il, K1, Meso6, Mo1, Tn, Tx, Va; ? *Diplachne halei* Nash – F; ? *Leptochloa floribunda* Doell – S. NatureServe G5 (Secure).

* ***Dinebra scabra*** (Nees) P.M. Peterson & N. Snow. **Hab:** Disturbed areas. **Dist:** Native of the Neotropics. **Syn:** = K3, K4, Peterson et al (2012); = *Leptochloa scabra* Nees – FNA25, K1, Meso6. NatureServe G5 (Secure).

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more)
* : waif
EN : endemic
H : historic
N : no
P : planted
? : questionable
X : extirpated



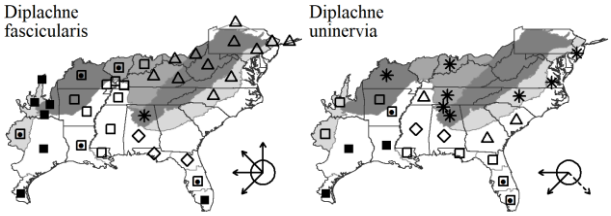
Diplachne Palisot de Beauvois 1812

A genus of 2 or more species (depending on species concepts), widely distributed worldwide. Snow prefers to recognize 2 species, one with a number of subspecies. References: C; Peterson et al (2012); Peterson, Romaschenko, & Herrera Arrieta (2015); Snow & Peterson (2012); Snow (1998); Snow (2003a) in FNA25 (2003a); Snow et al (2018); Weakley et al (2011).

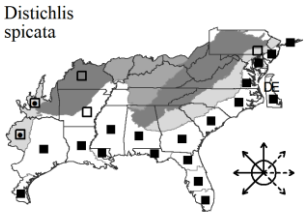
1 Lemmas 2-3 mm long, the apex obtuse to truncate, with the midrib often extended as a mucro..... ***Diplachne uninervia***
1 Lemmas 3-5 mm long, the apex acuminate or awned.
..... ***Diplachne fascicularis***

Diplachne fascicularis (Lamarck) Palisot de Beauvois. BEARDED SPRANGLETOP. **Hab:** Freshwater marshes (in s. FL), beds of artificial impoundments, brackish habitats, disturbed areas. **Dist:** Widespread in e. North America, primarily west of the Appalachians (adventive farther east), and extending into South America. **Phen:** Jan-Dec. **Comm:** Reported (as *L. fascicularis*) for SC by Nelson & Kelly (1997). **Syn:** = F, FlGr; = *Leptochloa fascicularis* – Il, Tx; = *Leptochloa fascicularis* (Lamarck) A. Gray var. *fascicularis* – C, G; < *Diplachne fusca* (Linnaeus) Palisot de Beauvois ex Roemer & J.A. Schultes ssp. *fascicularis* (Lamarck) P.M. Peterson & N. Snow – K3, K4, Snow et al (2018); < *Diplachne fusca* (Linnaeus) Palisot de Beauvois ex Roemer & J.A. Schultes var. *fascicularis* (Lamarck) P.M. Peterson & N. Snow – Peterson et al (2012), Snow & Peterson (2012); < *Leptochloa fascicularis* – Bah, GW1, HC, Meso6, NcTx, RAB, S; < *Leptochloa fusca* (Linnaeus) Kunth ssp. *fascicularis* (Lamarck) N. Snow – Ar, FNA25, K1, Mi, Mo1, NE, NY, Pa, Tn, WH3.

Diplachne uninervia (J. Presl) Parodi. MEXICAN SPRANGLETOP. **Hab:** Wet, muddy areas, especially alkaline or saline; adventive eastwards and northwards. **Dist:** Widespread in the Western Hemisphere. Reported for SC by Nelson & Kelly (1997). **Phen:** Jan-Dec. **Syn:** = FlGr; = *Diplachne fusca* ssp. *uninervia* – K3, K4, Snow et al (2018); = *Diplachne fusca* (Linnaeus) Palisot de Beauvois ex Roemer & J.A. Schultes var. *uninervia* (J. Presl) P.M. Peterson & N. Snow – Peterson et al (2012), Snow & Peterson (2012); = *Leptochloa fusca* (Linnaeus) Kunth ssp. *uninervia* (J. Presl) N. Snow – FNA25, K1, Mo1, NE, Tn, WH3; = *Leptochloa uninervia* (J. Presl) A.S. Hitchcock & Chase – Bah, C, G, GW1, HC, Il, Meso6, NcTx, RAB, S, Tx. NatureServe G5T5 (Secure).



Distichlis Rafinesque 1819 (SALTGRASS)



A genus of about 10 species, of North, Central, and South America, and Australia. Bell & Columbus (2008) recircumscribed *Distichlis* to include *Monanthochloe* Engelmann and *Reederochloa* Soderstrom & H.F. Decker. References: Barkworth (2003b) in FNA25 (2003a); Bell & Columbus (2008); Thieret (2003a) in FNA25 (2003a).

Identification Notes: When sterile, *Distichlis spicata* is easily confused with *Sporobolus virginicus*, with which it sometimes occurs. *Distichlis spicata* is generally a coarser plant, and lacks long hairs around the collar of the sheath; *Sporobolus virginicus* is more delicate, and typically has long hairs on either side of the collar.

Distichlis spicata (Linnaeus) Greene. SALTGRASS, SPIKE GRASS. **Hab:** Coastal marshes and shores, especially common in hypersaline flats (where infrequent tidal inundation is followed by evaporation). **Dist:** Widespread in the Americas. **Phen:** Jun-Oct. **Tax:** Two varieties (or subspecies or species) have often been recognized: var. *spicata* ranging along the Atlantic coast from NS and PE south to tropical America, and on the Pacific coast of North America, and var. *stricta* (Torrey) Lamson-Scribner widespread in saline situations in western North America. These do not appear to warrant taxonomic recognition (Barkworth in FNA 2003a). **Syn:** = Ar, Bah, ETx1, FlGr, FNA25, GW1, Il, K1, K3, K4, Meso6, NcTx, NE, NY, Pa, RAB, S, Va, WH3; > *Distichlis spicata* (Linnaeus) Greene – F, G, HC; > *Distichlis spicata* var. *spicata* – C, Mo1, Tx; > *Distichlis spicata* var. *stricta* (Torrey) Lamson-Scribner – C, Mo1, Tx; > *Distichlis stricta* – F, G, HC.

Echinochloa Palisot de Beauvois 1812 (BARNYARD-GRASS, JUNGLE-RICE)

A genus of 6-7 species of the tropics and warm temperate regions. References: Michael (2003) in FNA25 (2003a).

Unkeyed waifs: *Echinochloa esculenta*

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

103. POACEAE

1 Panicle elongate, the branches few, distant, unbranched, and short, to 2 (-3) cm long; spikelets awnless; leaves 3-6 (-9) mm wide..... ***Echinochloa colonum***
1 Panicle broader, the branches numerous, approximate, often further branched, short to long, some (at least) exceeding 2 cm long; spikelets awnless or awned; leaves 5-30 mm wide.
2 Lower sheaths usually papillate-pubescent; fertile lemma 2.5-4× as long as wide ..... ***Echinochloa walteri***
2 Lower sheaths glabrous; fertile lemma 1.5-2.5× as long as wide.
3 Inflorescence nodding; awns 4-29 mm long..... ***Echinochloa cruspavonis var. cruspavonis***
3 Inflorescence erect, stiff; awns 0-25 mm long.
4 Second glume and sterile lemma hairy or scabrous to nearly glabrous, the hairs usually not papillose-based; fertile lemma obtuse or broadly acute, with a thin, membranous (later withering) tip set off from the body by a line of minute hairs.
5 Panicle fairly open, the branches erect, appressed, or spreading; spikelets green or purple-tinged, awnless or with a well-developed awn (to 25 mm long); leaves 5-15 mm wide; plants mostly 3-7 dm tall..... ***Echinochloa crusgalli var. crusgalli***
5 Panicle very crowded, the branches appressed to slightly spreading, the tips often incurved; spikelets purplish-brown, awnless (or with awn to 2 mm long); leaves mostly 15-30 mm wide; plants mostly 7-15 dm tall..... ***Echinochloa frumentacea***
4 Second glume and sterile lemma usually with stout, papillose-based hairs on the veins; fertile lemma acuminate, abruptly narrowed to a firm, persistent tip.
6 Spikelets < 3.5 mm long, not including the awn (if present); sterile lemma awnless or with an awn to 6 (-10) mm long..... ***Echinochloa muricata var. microstachya***
6 Spikelets > 3.5 mm long, not including the awn (if present); sterile lemma usually awned (rarely awnless), the awn 6-25 mm long ..... ***Echinochloa muricata var. muricata***

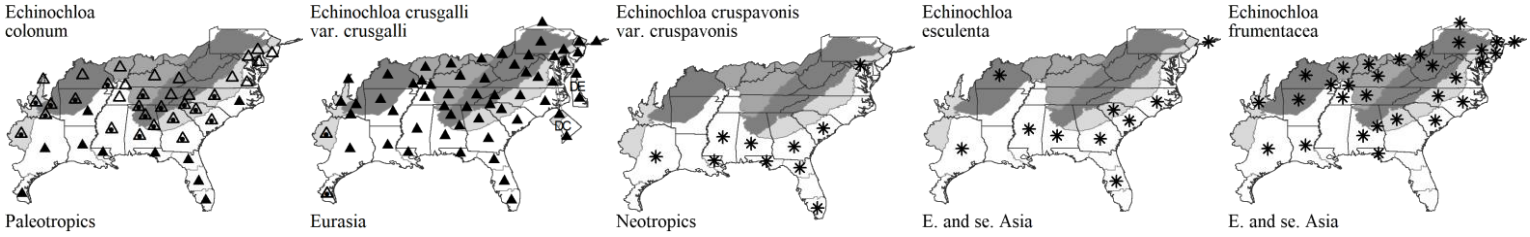
* ***Echinochloa colonum*** (Linnaeus) Link. JUNGLE-RICE. **Hab:** Fields, ditches, disturbed wet areas. **Dist:** Native of the Old World tropics. **Phen:** Jul-Oct (-Jun). **Tax:** The debate over the appropriate grammatical treatment and therefore spelling of the epithet is discussed in detail in Ward (2005b). **Syn:** = Bah, C, F, FlGr, G, GW1, HC, Il, Mo1, RAB, Tx, Va; = *Echinochloa colona* – Ar, ETx1, FNA25, K1, K3, K4, Meso6, NcTx, NE, Pa, S, Tn, WH3, orthographic variant. NatureServe GNR (Not Yet Ranked).

* ***Echinochloa crusgalli*** (Linnaeus) Palisot de Beauvois *var*. ***crusgalli***. BARNYARD-GRASS. **Hab:** Disturbed areas. **Dist:** Native of Eurasia. **Phen:** Jul-Nov (-Jun). **Syn:** = C, G, Pa, Tx, Va; = *Echinochloa crus-galli* – FlGr, Il, K1, K3, K4, NY, WH3, orthographic variant; < *Echinochloa crusgalli* – Ar, Bah, ETx1, F, FNA25, GW1, Mi, Mo1, NcTx, NE, RAB, Tn, WV; < *Echinochloa crus-galli* ssp. *crus-galli* – S. NatureServe GNR (Not Yet Ranked).

* ***Echinochloa cruspavonis*** (Kunth) J.A. Schultes *var*. ***cruspavonis***. **Hab:** Disturbed areas. **Phen:** Jul-Oct. **Syn:** = *Echinochloa cruspavonis* – Tx; = *Echinochloa crus-pavonis* var. *crus-pavonis* – FlGr, FNA25, K1, K3, K4, orthographic variant; < *Echinochloa crus-pavonis* – HC, Meso6, WH3. NatureServe G5TNR (Not Yet Ranked).

* ***Echinochloa esculenta*** (A. Braun) H. Scholtz. JAPANESE MILLET. **Hab:** Cultivated for grain, fodder, and birdseed, rarely persistent; of garden origin from *E. crusgalli*, and arguably better regarded as a cultivated form. **Comm:** {not yet keyed; add to synonymy}. **Syn:** = FNA25, K3, K4, Mi, NY, Va.

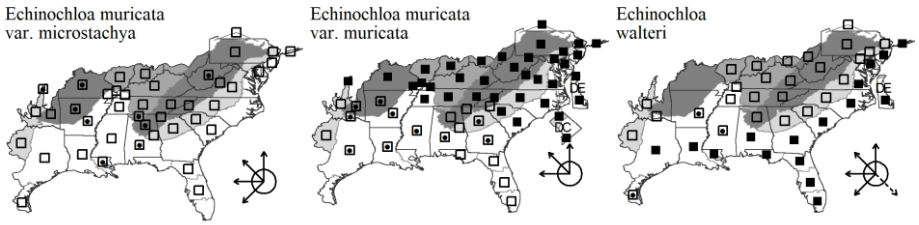
* ***Echinochloa frumentacea*** Link. JAPANESE MILLET, BILLION-DOLLAR GRASS, WHITE PANIC, SIBERIAN MILLET. **Hab:** Disturbed areas. **Dist:** Native of Asia. **Phen:** May-Oct. **Syn:** = F, FlGr, FNA25, Il, K1, K3, K4, NE, WV; = *Echinochloa crus-galli* ssp. *edulis* A.S. Hitchcock – S; = *Echinochloa crusgalli* (Linnaeus) Palisot de Beauvois var. *frumentacea* (Link) W. Wight – C, G, Pa, Tx; < *Echinochloa crusgalli* – GW1, RAB. NatureServe GNR (Not Yet Ranked).



Echinochloa muricata (Palisot de Beauvois) Fernald *var*. ***microstachya*** Wiegand. ROUGH BARNYARD-GRASS. **Hab:** Alluvial swamps, river shores and bars, depression ponds, impoundments, interdune swales, low fields, beaver impoundments, other moist to wet disturbed habitats. **Phen:** Jul-Oct. **Syn:** = Ar, C, ETx1, FNA25, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Tn, Va, WH3; = *Echinochloa microstachya* (Wiegand) Rydberg – G; = *Echinochloa pungens* (Poiret) Rydberg var. *microstachya* (Wiegand) Fernald & Griscom – F; < *Echinochloa crusgalli* – GW1, RAB, WV; < *Echinochloa crus-galli* ssp. *crus-galli* – S; > *Echinochloa muricata* (Palisot de Beauvois) Fernald var. *microstachya* Wiegand – Il; > *Echinochloa muricata* var. *wiegandii* Fassett – Il.

Echinochloa muricata (Palisot de Beauvois) Fernald *var*. ***muricata***. ROUGH BARNYARD-GRASS. **Hab:** Interdune wetlands, various other wet to damp habitats. **Dist:** Widespread in North America. **Phen:** Jul-Oct. **Syn:** = Ar, C, ETx1, FlGr, FNA25, Il, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Tn, Va; = *Echinochloa muricata* – G, Pa; < *Echinochloa crusgalli* – GW1, RAB, WV; < *Echinochloa crus-galli* ssp. *crus-galli* – S; > *Echinochloa pungens* var. *coarctata* Fernald & Griscom – F; > *Echinochloa pungens* var. *ludoviciana* (Wiegand) Fernald & Griscom – F; > *Echinochloa pungens* (Poiret) Rydberg var. *pungens* – F. NatureServe G5T5 (Secure).

Echinochloa walteri (Pursh) A. Heller. SWAMP BARNYARD-GRASS. **Hab:** Marshes of many kinds. **Dist:** MA south to FL, west to TX on the outer Coastal Plain; also inland from OH west to WI, south to w. WV, MO, and AR; Mexico to Central America; West Indies. **Phen:** Jul-Oct. **Syn:** = Ar, C, ETx1, F, FlGr, FNA25, GW1, HC, Il, K1, K3, K4, Meso6, Mi, Mo1, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3. NatureServe G5 (Secure).



Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

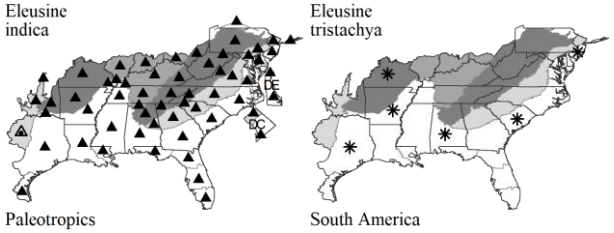
Eleusine Gaertner 1788 (YARD GRASS)

A genus of about 9 species, native to Africa and South America. References: Hilu (2003) in FNA25 (2003a); Peterson, Romaschenko, & Herrera Arrieta (2015).

1 Panicles with 1-3 branches, attached in a single digitate cluster ..... ***Eleusine tristachya***
1 Panicles with 4-20 branches, 1-2 of these attached below the terminal digitate cluster. ..... ***Eleusine indica***

* ***Eleusine indica*** (Linnaeus) Gaertner. YARD GRASS, GOOSE GRASS. **Hab:** Lawns, roadsides, gardens, disturbed areas. **Dist:** Native of Old World. **Phen:** Jun-Oct. **Syn:** = Ar, Bah, C, ETx1, F, FlGr, FNA25, G, HC, K1, K3, K4, Meso6, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV; = *Eleusine indica* ssp. *indica* – Mo1. NatureServe GNR (Not Yet Ranked).

* ***Eleusine tristachya*** (Lamarck) Lamarck. THREE-SPIKE GOOSE-GRASS. **Hab:** Waste areas of wool-combing mills, other disturbed areas, perhaps only a waif. **Dist:** Native of South America. Reported as introduced in additional, scattered states in e. United States, including VA (Kartesz 1999, but apparently in error), NJ (Hilu 1980) and AL (Small 1933). **Syn:** = Ar, ETx1, FNA25, K1, K3, K4, Mo1, S. NatureServe GNR (Not Yet Ranked).



Elymus Linnaeus 1753 (WILD-RYE, RYE GRASS)

A genus of about 150 species, semicosmopolitan in temperate regions. The genus, as now circumscribed, includes all allopolyploid taxa with at least one chromosome complement contributed from *Pseudoroegneria*. North American *Elymus* species are all allopolyploids of *Pseudoroegneria* and *Hordeum* (Helfgott & Mason-Gamer 2004). Reference: Barkworth, Campbell, & Salomon in FNA (2007a); Campbell (2000); Church (1967); Tucker (1996)=Z; Barkworth (1997)=X. This treatment largely follows Barkworth, Campbell, & Salomon in FNA (2007a). References: Barkworth (1997); Barkworth, Campbell, & Salomon (2007) in FNA24 (2007a); Bush (1926); Campbell (2000); Church (1967); Haines (2020c); Poindexter & Weakley (2017); Tucker (1996).

Identification Notes: Measurements of the spike include the awns, but measurements of spikelets and its components do not. Rachis internodes should be measured near the middle of the spike. Glume widths are measured at the widest point, or if the widest point is not apparent, at about 5 mm above the glume base.

1 Spikelets solitary at each node (occasionally paired at the lowest nodes); glumes and lemmas awned or unawned; plants cespitose to strongly rhizomatous. ..... ***Elymus repens***
1 Spikelets 2-3 (-5) at each node; glumes and lemmas usually awned; plants usually cespitose, occasionally short-rhizomatous.
  6 Both glumes (including their awn) either 0-3 mm long and subulate or 1-25 (-27) mm long and often differing in length by > 5 mm, 0.1-0.6 mm wide, tapering from the base, with 0-1 distinct veins, persistent; rachis internodes 4-12 mm long, ca. 0.5 mm thick at the narrowest section.
    7 Spikelets appressed; lemma awns straight or curving; glumes sometimes absent, but usually 1-20 mm long, 0.1-0.6 mm wide, with a distinct vein; spikes erect or nodding ..... ***Elymus churchii***
    7 Spikelets widely spreading to horizontal; lemma awns straight (rarely slightly curving); glumes 0-3 or (13-) 15-25 (-27) mm long, with no distinct veins, < 0.2 mm wide); spikes usually erect.
      10 Glumes (13-) 15-25 (-27) mm long at nearly all nodes of the inflorescence, subequal ..... ***Elymus hystrix var. piedmontanus***
      10 Glumes absent or inconsistent, 0-10 (-20) mm long, unequal ..... ***Elymus hystrix var. hystrix***
  6 Both glumes (including the awns) 10-40 mm long, usually differing in length by < 5 mm, 0.2-2.3 mm wide, lanceolate to setaceous, usually widest above the base, with 2-8 veins, persistent or disarticulating; rachis internodes slender (as above) or stout (2-5 mm long and ca. 1 mm thick at the narrowest section).
    11 Glume bases flat, thin, and evidently veined, or indurate for < 1 mm, the bodies not exceeding the adjacent (usually 8-15 mm long) lemmas; lemma awns usually curving outward; spikes usually nodding to pendent; rachis internodes (2-) 4-12 mm long. ..... ***Elymus canadensis var. canadensis***
    11 Glume bases terete, indurate, and lacking evident veins for 0.5-4 mm, the bodies (unless indistinct from the awns) exceeding the adjacent (usually 6-12 mm long) lemmas; lemma awns straight; spikes erect or nodding; rachis internodes 2-5 mm long (to 7 mm in *E. sp. 1*).
      15 Glumes persistent on the rachis, 0.2-1 mm wide, with 2-4 veins, the basal 0.5-2 mm essentially straight; lemmas rarely glabrous; spikelets with 1-3 (-4) florets; spikes nodding, exserted. ..... ***Elymus villosus var. villosus***
      15 Glumes disarticulating with the lowest floret, 0.7-2.3 mm wide, with (2-) 3-5 (-8) veins, the basal 1-4 mm clearly bowed-out; lemmas often glabrous; spikelets with (2-) 3-5 (-6) florets; [*Elymus virginicus* complex].
        18 Spikes (including the awns) 2.5-6 cm wide, exserted; lemma awns 15-40 mm long; blades glabrous, scabrous, or villous.
          19 Spikes with 9-18 nodes; internodes 4-7 mm long; blades usually lax, dark glossy green under the glaucous bloom; auricles 2-3 mm long, blackish at maturity; flowering usually in mid-May to mid-Jun. ..... ***Elymus macgregorii var. macgregorii***
          19 Spikes with 15-30 nodes; internodes 3-5 mm long; blades lax, or often ascending and involute, pale dull green; auricles 0-2 mm long, brownish at maturity; flowering usually in mid-Jun to late Jul.

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

21 Spikelets (and usually also the foliage) pubescent; spikes usually 6-12 cm long; lemmas 6-10 mm long..... ***Elymus glabriflorus var. australis***

21 Spikelets (and usually also the foliage) glabrous to scabrous; spikes usually 9-16 cm long; lemmas 7-13 mm long..... ***Elymus glabriflorus var. glabriflorus***

18 Spikes (including the awns) 0.7-2 cm wide, exserted or sheathed; lemma awns 1-15 (-20) mm long; spikelets appressed to slightly spreading; blades usually glabrous to scabridulous. ***Elymus virginicus***

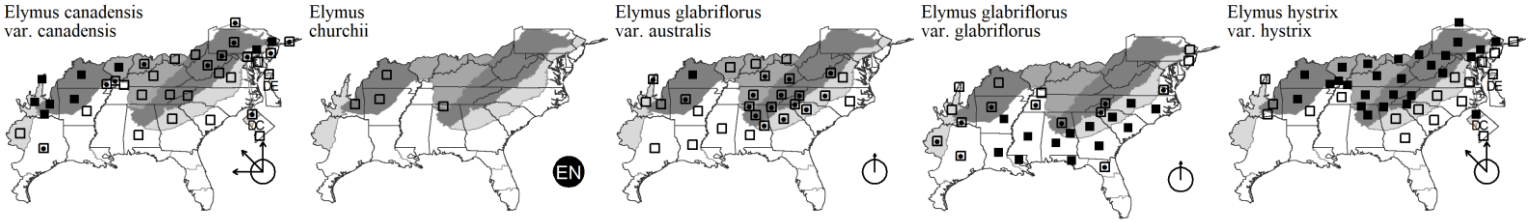
Elymus canadensis Linnaeus *var*. ***canadensis***. GREAT PLAINS WILD-RYE, NODDING WILD-RYE. **Hab:** Moist forests. **Dist:** NS, QC, and YT south to NC, SC (?), OK, NM, and AZ. **Phen:** Jul-Aug. **Syn:** = FNA24, Il, Mo1, NY, Pa, Va; < *Elymus canadensis* – Ar, C, ETx1, F, G, GW1, K1, K3, K4, Mi, NcTx, NE, RAB, Tn, W, WV.

Elymus churchii J.J.N. Campbell. CHURCH'S WILD-RYE. **Hab:** Calcareous bluffs and slopes. **Dist:** Interior Highlands of sw. MO, nw. AR and e. OK; disjunct in n. AL (Schotz & Dattilo 2012). **Phen:** Jun. **Syn:** = Ar, FNA24, K3, K4. NatureServe G3 (Vulnerable).

Elymus glabriflorus (Vasey) Lamson-Scribner & C.R. Ball *var*. ***australis*** (Lamson-Scribner & C.R. Ball) J.J.N. Campbell. SOUTHEASTERN WILD-RYE. **Syn:** = NE, NY; = *Elymus virginicus* var. *australis* – S; < *Elymus glabriflorus* – FNA24, Il, K3, K4, Tn, Va; < *Elymus virginicus* Linnaeus – C, ETx1, GW1, Pa, RAB, Tx, W, WH3, WV; < *Elymus virginicus* var. *glabriflorus* (Vasey) Bush – F, Mo1; < *Elymus virginicus* Linnaeus var. *virginicus* – G, K1.

Elymus glabriflorus (Vasey) Lamson-Scribner & C.R. Ball *var*. ***glabriflorus***. SOUTHEASTERN WILD-RYE. **Syn:** = NE; = *Elymus virginicus* var. *glabriflorus* (Vasey) Bush – S; < *Elymus glabriflorus* – FNA24, Il, K3, K4, Tn, Va; < *Elymus virginicus* Linnaeus – C, GW1, Pa, RAB, Tx, W, WV; < *Elymus virginicus* var. *glabriflorus* (Vasey) Bush – F, Mo1; < *Elymus virginicus* Linnaeus var. *virginicus* – FlGr, G, K1.

Elymus hystrix Linnaeus *var*. ***hystrix***. COMMON BOTTLEBRUSH GRASS. **Hab:** Moist forests, dry forests especially over more fertile soils. **Dist:** ME and QC west to SK, south to SC, GA, AL, AR, and OK. **Phen:** May-Jul. **Syn:** = Poindexter & Weakley (2017); < *Elymus hystrix* – Ar, C, FNA24, Mi, Mo1, NY, Pa, Tn, Va; < *Elymus hystrix* Linnaeus var. *hystrix* – Il, K1, K3, K4, NE; < *Hystrix hystrix* (Linnaeus) Millspaugh – S; < *Hystrix patula* Moench – G, RAB, WV; < *Hystrix patula* var. *patula* – F.



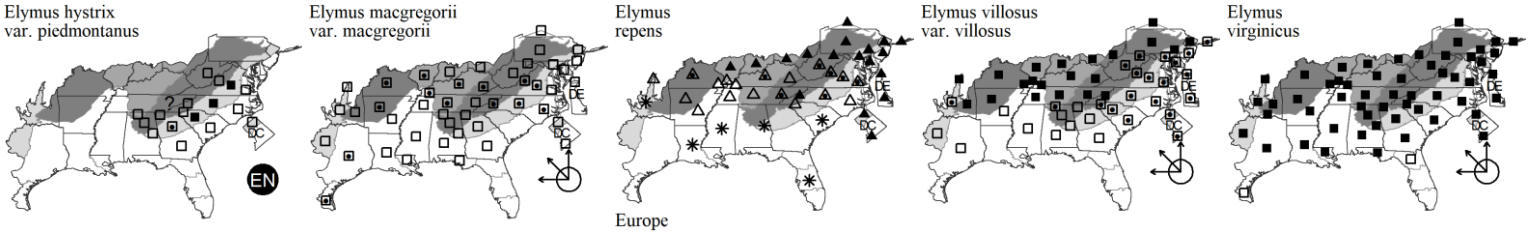
Elymus hystrix Linnaeus *var*. ***piedmontanus*** D.B. Poindexter & Weakley. PIEDMONT BOTTLEBRUSH GRASS. **Hab:** Moist to dry forests. **Dist:** VA to GA, especially in the Piedmont, but also extending into adjacent provinces. **Phen:** May-Jul. **Tax:** See Poindexter & Weakley (2017) for discussion. **Syn:** = Poindexter & Weakley (2017); < *Elymus hystrix* – C, FNA24, Pa, Va; < *Elymus hystrix* Linnaeus var. *hystrix* – K1, K3, K4, Blomquist (1948); < *Hystrix hystrix* (Linnaeus) Millspaugh – S; < *Hystrix patula* Moench – G, RAB; < *Hystrix patula* var. *patula* – F.

Elymus macgregorii R.E. Brooks & J.J.N. Campbell *var*. ***macgregorii***. EARLY WILD-RYE. **Hab:** Rich mesic forests, especially bottomlands. **Dist:** ME west to SD, south to Panhandle FL and s. TX. **Comm:** See Campbell (2000). **Syn:** = Haines (2020c); < *Elymus macgregorii* R. Brooks & J.J.N. Campbell – Ar, FNA24, Il, K3, K4, Mi, NE, Tn, Va; < *Elymus virginicus* Linnaeus – C, ETx1, GW1, Pa, RAB, W, WV; < *Elymus virginicus* Linnaeus var. *virginicus* – F, G, K1, S.

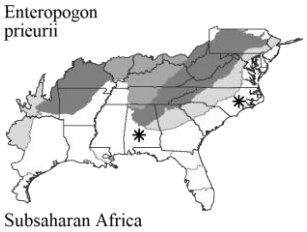
* ***Elymus repens*** (Linnaeus) Gould. QUACKGRASS, DOG-GRASS, WITCHGRASS. **Hab:** Roadsides, disturbed areas, pastures; probably introduced from Europe (sometimes considered to be partially native along the coast). **Phen:** Jun-Aug. **Syn:** = Ar, ETx1, FNA24, K1, K3, K4, Mi, Mo1, NE, NY, Pa, Tn, Va; = *Agropyron repens* (Linnaeus) Palisot de Beauvois – G, HC, RAB, S, W, WV; = *Elytrigia repens* (Linnaeus) Nevski – C, Il; > *Agropyron repens* var. *repens* – F; > *Agropyron repens* var. *subulatum* (Schreber) Roemer & J.A. Schultes – F. NatureServe GNR (Not Yet Ranked).

Elymus villosus Muhlenberg ex Willdenow *var*. ***villosus***. DOWNY WILD-RYE. **Hab:** Moist forests, dry calcareous forests. **Dist:** QC, ON, MN, ND, AND WY south to GA, AL, MS, and TX. **Phen:** Early Jun-early Jul. **Syn:** = NE, NY; = *Elymus striatus* Willdenow var. *striatus* – S; < *Elymus canadensis* – ETx1, NcTx, Tx; < *Elymus villosus* – Ar, C, F, FNA24, G, GW1, HC, Il, K1, K3, K4, Mi, Mo1, Pa, RAB, Va, W, WV.

Elymus virginicus Linnaeus. COMMON EASTERN WILD-RYE, TERRELL GRASS. **Hab:** Moist forests. **Syn:** = Il, Mi; = *Elymus virginicus* Linnaeus var. *virginicus* – Ar, FNA24, Mo1, NE, NY, Tn; ? *Elymus striatus* Willdenow – S; < *Elymus virginicus* Linnaeus – C, ETx1, GW1, RAB, Tx, Va, W, WV; < *Elymus virginicus* Linnaeus var. *virginicus* – F, FlGr, G, K1, K3, S.



Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



Enteropogon Nees 1836

A genus of about 17 species, tropical. References: Barkworth (2003g) in FNA25 (2003a); Peterson, Romaschenko, & Herrera Arrieta (2015); Wipff & Shaw (2018c).

* ***Enteropogon prieurii*** (Kunth) W.D. Clayton. **Hab:** On ballast at Wilmington, New Hanover County, NC and Mobile, AL, probably only a waif. **Dist:** Native of Africa. Reported from Mobile, Baldwin County, AL (Hitchcock & Chase 1950). **Syn:** = FNA25, K3; = *Chloris prieurii* Kunth – S. NatureServe GNR (Not Yet Ranked).

Eragrostis Wolf 1776 (LOVEGRASS)

A genus of about 350 species of temperate and tropical areas. References: Franck (2018c) in Weakley et al (2018b); Kelley (2019); Koch (1978); Peterson (2003a) in FNA25 (2003a).

Unkeyed taxa: *Eragrostis atrovirens*
Unkeyed waifs: *Eragrostis elongata*

1 Plants cespitose or rhizomatous perennials, with innovations near the base, and with or without buds in the basal sheaths.
  3 Plants with short, knotty, thick rhizomes; florets articulating whole ..... ***Eragrostis spectabilis***
  3 Plants without short or thick rhizomes; florets usually disarticulating.
    4 Caryopsis with a deep to shallow groove along the adaxial surface.
      5 Caryopsis dorsoventrally compressed, flattened parallel to the side of the embryo, translucent, light brownish ..... ***Eragrostis curvula***
      5 Caryopsis laterally compressed, flattened on the side perpendicular to the embryo, or cylindric, opaque (rarely translucent), usually reddish brown.
        6 Lateral veins of the lemmas conspicuous, often greenish, the lemmas strongly keeled ..... ***Eragrostis trichodes***
        6 Lateral veins of the lemmas inconspicuous and hardly evident, the lemmas sometimes weakly keeled.
          7 Lemmas 1.2-1.8 mm long; culms 30-70 cm tall ..... ***Eragrostis lugens***
          7 Lemmas 1.6-3.0 mm long; culms (30-) 40-110 (-120) cm tall.
            8 Spikelets 2-6-flowered, greenish with purple tinges; leaf blades 3-8 (-11) mm wide, 25-60 cm long; sheaths often densely papillose-hirsute ..... ***Eragrostis hirsuta***
            8 Spikelets (3-) 5-12-flowered, olive green to lead gray; leaf blades 1-3.8 mm wide, (4-) 10-35 cm long; sheaths never papillose-hirsute ..... ***Eragrostis intermedia***
    4 Caryopsis not grooved on the adaxial surface.
      9 Stamens 3.
        10 Spikelets 4-8.2 (-10) mm long ..... ***Eragrostis curvula***
        10 Spikelets 2-4.5 (-5) mm long.
          11 Leaf blades 25-60 cm long, 3-8 (-11) mm wide; lemmas 1.6-2.4 mm long; spikelets 1.0-1.7 mm wide ..... ***Eragrostis hirsuta***
          11 Leaf blades (4-) 8-22 cm long, 1-3.5 mm wide; lemmas 1.2-1.8 mm long; spikelets 0.5-1.0 (-1.3) mm wide ..... ***Eragrostis lugens***
      9 Stamens 2.
        12 Panicle 15-45 cm wide, open, diffuse, broadly ovate to obovate in outline, the panicle branches capillary; pedicels 0.5-35 (-50) mm long, longer than or shorter than the spikelets.
          13 Spikelets with widely spreading pedicels, the lower pedicels all generally longer than the spikelets; disarticulation of the lemmas only, the paleas persistent ..... ***Eragrostis elliottii***
          13 Spikelets with appressed pedicels, lower pedicels of each branch shorter than the spikelets; disarticulation usually of the whole floret ..... ***Eragrostis refracta***
        12 Panicle (1-) 2-17 (-20) cm wide, contracted to open, narrowly ovate to oblong in outline, the panicle branches stiffly spreading; pedicels (0-) 0.3-6 mm long, always shorter than the spikelets.
          14 Spikelets 0.7-2.4 mm wide; glumes 0.3-2.2 mm long; lemma 1.5-2.5 mm long, the apex acute (sometimes acuminate) ..... ***Eragrostis bahiensis***
          14 Spikelets 2.4-5 mm wide; glumes 1.4-4 mm long; lemma 2-6 mm long, the apex acuminate to attenuate ..... ***Eragrostis oxylepis***

1 Plants cespitose, geniculate or mat-forming annuals, lacking innovations or buds in the lower sheaths.
  15 Paleas prominently ciliate-pectinate on the keels, the hairs 0.1-0.8 mm long. ..... ***Eragrostis amabilis***
  15 Paleas smooth to scaberulous on the keels, the hairs (if present) <0.1 mm long.
    18 Plants extensively stoloniferous, creeping and forming flat mats; inflorescences 1-3.5 cm long; culms (2-) 5-12 (-20) cm tall on the erect portions.
      19 Hermaphroditic; spikelets bisexual; anthers 2, each 0.2-0.3 mm long ..... ***Eragrostis hypnoides***
      19 Dioecious; spikelets unisexual; anthers 3, each 1.4-2.2 mm long ..... ***Eragrostis reptans***
    18 Plants not stoloniferous (sometimes creeping and forming flat mats); inflorescences 3-55 cm long; culms (2-) 6-130 cm tall.
      20 Ligules membranous, glabrous ..... ***Eragrostis japonica***
      20 Ligules ciliate, with a row of tiny white hairs.
        21 Caryopsis with a deep to shallow groove along the adaxial surface.
          24 Panicle 10-45 (-55) cm long, 2/3 or more the height of the plant; pedicels (4-) 5-25 mm long; glandular pits absent below the nodes, branches, and rachis ..... ***Eragrostis capillaris***
          24 Panicle 4-20 cm long, < ½ the height of the plant; pedicels 1.5-5 mm long; glandular pits often present below the nodes, branches, and rachis ..... ***Eragrostis frankii***
        21 Caryopsis not grooved on the adaxial surface.
          25 Plants with glandular pits or bands on the culm below the nodes, on the veins of the sheath, on the margins and veins of the blade, on the rachis, on the inflorescence branches and pedicels, and/or on the midveins of the lemma and palea.
            26 Spikelets (1.7-) 2-4 mm long, 3-6-flowered ..... ***Eragrostis frankii***
            26 Spikelets (2-) 3.5-20 mm long, (3-) 5-40-flowered.
              27 Spikelets 0.6-1.3 mm wide; pedicels 1-10 mm long, flexuous and delicate, appressed or spreading ..... ***Eragrostis pilosa var. pilosa***
              27 Spikelets 1.1-4 mm wide; pedicels 0.2-4 mm long, straight and rigid, mostly spreading.

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

28 Spikelets 6-20 mm long, 2-4 mm wide, 10-40-flowered; lemmas 2-2.8 mm long, with 1-3 crateriform glands along the keel; disarticulation of the entire florets from the persistent rachilla; anthers yellow ..... ***Eragrostis cilianensis***

28 Spikelets 4-7 (-11) mm long, 1.1-2.2 mm wide, 7-12 (-20)-flowered; lemmas 1.4-1.8 mm long, rarely with 1-2 crateriform glands along the keel; disarticulation of the lemmas only, the palea and rachilla usually persistent; anthers reddish-brown. ..... ***Eragrostis minor***

25 Plants lacking glandular pits or bands on the culm below the nodes, on the veins of the sheath, on the margins and veins of the blade, on the rachis, on the inflorescence branches and pedicels, and/or on the midveins of the lemma and palea.

31 Spikelets 3-6-flowered ..... ***Eragrostis frankii***

31 Spikelets (3-) 5-42-flowered.

32 Lemmas with conspicuous lateral veins, these usually greenish; grains 0.3-0.6 mm long, ovoid, subglobose, or obovoid. ..... ***Eragrostis gangetica***

32 Lemmas with inconspicuous or moderately conspicuous lateral veins, these usually not greenish; grains 0.5-1.1 mm long, pear-shaped, obovoid, or prism-shaped.

34 First glume 0.3-0.6 (-0.8) mm long, <0.5× as long as the lowest lemma; spikelets 0.6-1.3 mm wide; panicle branches usually whorled at the lowest 2 nodes ..... ***Eragrostis pilosa var. pilosa***

34 First glume 0.5-1.5 mm long, >0.5× as long as the lowest lemma; spikelets 1.2-2.5 mm wide; panicle branches solitary or paired at the 2 lowest nodes.

36 Pedicels widely spreading ..... ***Eragrostis pectinacea var. miserrima***

36 Pedicels appressed or rarely diverging up to 20 degrees from the branches ..... ***Eragrostis pectinacea var. pectinacea***

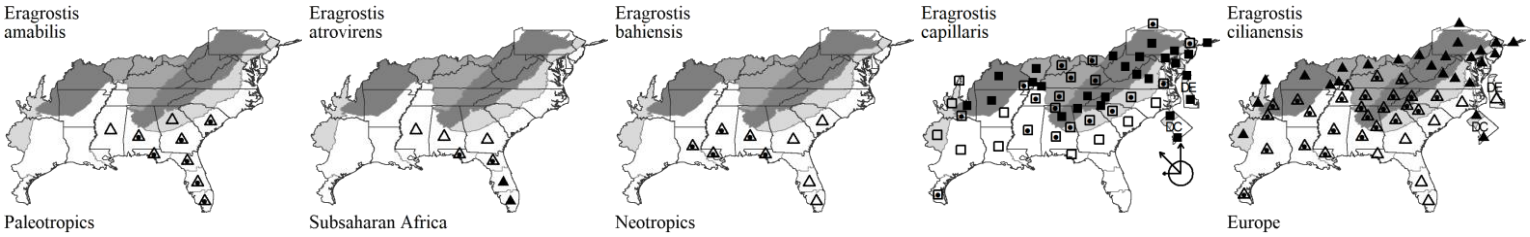
* ***Eragrostis amabilis*** (Linnaeus) Wright & Arnott ex Nees. JAPANESE LOVEGRASS, FEATHER LOVEGRASS. **Hab:** Disturbed areas. **Dist:** Native of Old World. **Phen:** Jun. **Syn:** = ETx1, FlGr, FNA25, HC, K3, K4, Meso6, RAB, S, Tx, WH3; ? *Eragrostis tenella* (Linnaeus) Palisot de Beauvois ex Roemer & J.A. Schultes – Bah, K1.

* ***Eragrostis atrovirens*** (Desvaux) Trinius ex Steudel. THALIA LOVEGRASS. **Hab:** Disturbed areas. **Dist:** Native of Africa. **Phen:** Jan-Dec. **Comm:** {add to key; add to synonymy}. **Syn:** = FlGr, FNA25, K1, K3, K4, Meso6, WH3. NatureServe GNR (Not Yet Ranked).

* ***Eragrostis bahiensis*** (Schrader ex J.A. Schultes) J.A. Schultes. BAHIA LOVEGRASS. **Hab:** Disturbed areas. **Dist:** Native of tropical America. Reported for SC (Kartesz 1999) and sw. GA (Jones & Coile 1988, GW, Kartesz 1999). **Phen:** Jan-Dec. **Syn:** = FlGr, FNA25, GW1, HC, K1, K3, K4, Meso6, S, WH3. NatureServe GNR (Not Yet Ranked).

Eragrostis capillaris (Linnaeus) Nees. LACE LOVEGRASS, LACEGRASS. **Hab:** Fields, roadsides, disturbed areas. **Dist:** ME and WI south to GA, FL Panhandle, and TX. **Phen:** Jul-Oct. **Syn:** = Ar, C, ETx1, F, FlGr, FNA25, G, HC, Il, K1, K3, K4, Mi, Mo1, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WV. NatureServe G5 (Secure).

* ***Eragrostis cilianensis*** (Allioni) Vignolo ex Janchen. STINKGRASS. **Hab:** Fields, disturbed areas. **Dist:** Native of Europe. **Phen:** Jul-Oct. **Syn:** = Ar, C, ETx1, FNA25, G, HC, Il, K1, K3, K4, Meso6, Mi, Mo1, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3; ? *Eragrostis megastachya* (Koeler) Link – F, WV. NatureServe GNR (Not Yet Ranked).



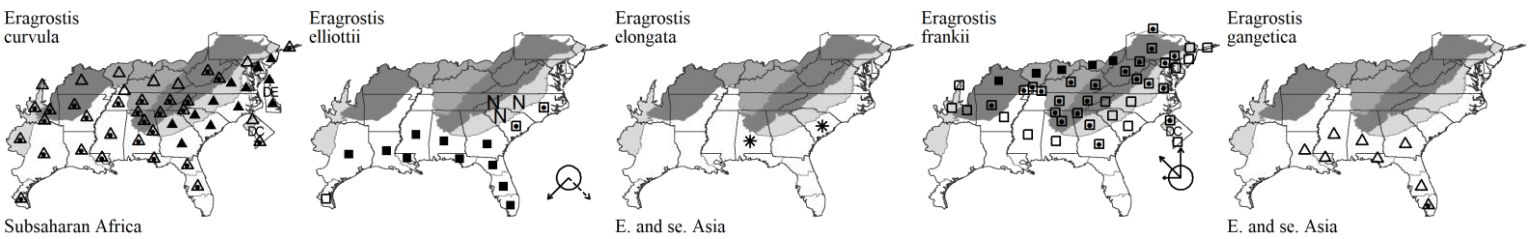
* ***Eragrostis curvula*** (Schrader) Nees. WEEPING LOVEGRASS. **Hab:** Roadsides. **Dist:** Native of s. Africa. Very commonly planted as a roadbank stabilizer, *E. curvula* is fire resistant and shows some capability to spread into adjacent natural habitats. **Phen:** Apr-Jul. . **Syn:** = Ar, C, ETx1, FlGr, FNA25, HC, Il, K1, K3, K4, Meso6, Mi, Mo1, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, WH3, WV. NatureServe GNRTNR (Not Yet Ranked).

Eragrostis elliottii S. Watson. ELLIOTT'S LOVEGRASS. **Hab:** Ultisol wet pine savannas, maritime wet grasslands, inland edges of brackish marshes, inland edges of freshwater tidal marshes, calcareously-influenced wet pine savannas. **Dist:** NC south to s. FL, west to e. TX; West Indies; s. Mexico and Belize. **Phen:** Jun-Dec. **Syn:** = Bah, ETx1, FlGr, FNA25, GW1, HC, K1, K3, K4, Meso6, Mo1, RAB, S, Tx, WH3, Franck (2018c) in Weakley et al (2018b).

* ***Eragrostis elongata*** (Willdenow) J. Jacquin. LONG LOVEGRASS. **Hab:** Waste areas near wool-combing mills or old sea-ports. **Dist:** Native of se. Asia and Australia. **Comm:** {not yet keyed}. **Syn:** = FNA25, K1, K3, K4, Meso6, WH3. NatureServe GNR (Not Yet Ranked).

Eragrostis frankii C.A. Meyer ex Steudel. LACEGRASS, SANDBAR LOVEGRASS. **Hab:** Rocky river shores, sand bars, floodplains of rivers in clearings. **Dist:** MA and MN south to GA and AR. **Phen:** Sep. **Syn:** = Ar, C, FNA25, G, GW1, K1, K3, K4, Mi, Mo1, NE, NY, Pa, RAB, S, Tn, Va, W, WV; > *Eragrostis frankii* var. *frankii* – F, HC, Il. NatureServe G5 (Secure).

* ***Eragrostis gangetica*** (Roxburgh) Steudel. SLIMFLOWER LOVEGRASS. **Hab:** Ditches, roadsides, pond margins. **Dist:** Native of s. Asia. **Comm:** {add to synonymy}. **Syn:** = FlGr, FNA25, K3, K4, Meso6, WH3. NatureServe GNR (Not Yet Ranked).



Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more)

* : waif EN : endemic H : historic

N : no P : planted ? : questionable X : extirpated

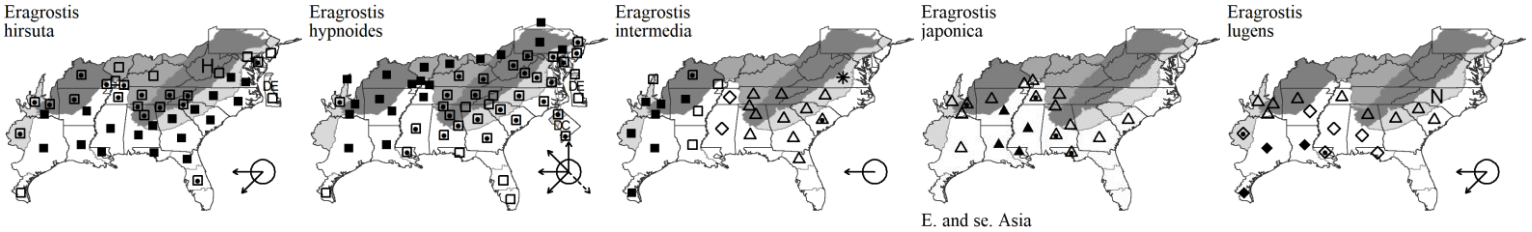
Eragrostis hirsuta (Michaux) Nees. BIGTOP LOVEGRASS. **Hab:** Fields, roadsides, clearings, disturbed areas. **Dist:** MD south to FL, west to TX, north in the interior to TN, AR, and MO; Central America. **Phen:** Jul-Dec. **Syn:** = Ar, C, ETx1, FlGr, FNA25, Il, K1, K3, K4, Mo1, NcTx, RAB, S, Tn, Tx, Va, W, WH3, WV, Franck (2018c) in Weakley et al (2018b); > *Eragrostis hirsuta* var. *hirsuta* – F, G, HC; > *Eragrostis hirsuta* var. *laevivaginata* Fernald – F, G, HC. NatureServe G5 (Secure).

Eragrostis hypnoides (Lamarck) Britton, Sterns, & Poggenburg. CREEPING LOVEGRASS, TEAL LOVEGRASS. **Hab:** Marshes, shores, riverbanks, shores, impoundments. **Dist:** ME and QC west to SK, south to s. FL, TX, and CA; West Indies; south to South America. **Phen:** May-Sep. **Syn:** = Ar, C, ETx1, F, FlGr, FNA25, G, GW1, HC, Il, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV. NatureServe G5 (Secure).

Eragrostis intermedia A.S. Hitchcock. PLAINS LOVEGRASS. **Hab:** Sandy woodlands, prairies, disturbed areas. **Dist:** MO, KS, NM, and AZ south to AR, TX, Mexico, and Central America. Reported for scattered locations as far east as NC and SC (Kartesz 1999), e. GA (Jones & Coile 1988), e. TN (Chester et al. 1993). **Phen:** Apr-May. Apr-May. **Syn:** = C, ETx1, F, FlGr, FNA25, G, HC, K1, K3, K4, Meso6, NcTx, NE, Tn, Va, WH3; > *Eragrostis intermedia* var. *intermedia* – Mo1. NatureServe G5 (Secure).

* ***Eragrostis japonica*** (Thunberg) Trinius. POND LOVEGRASS. **Hab:** Riverbanks, other moist or wet sandy areas. **Dist:** SC and TN south to Central America, South America, and West Indies; Old World tropics. Probably introduced from the Old World. Reported for SC by HC, G, and Small (1933) and corroborated by recent collections (K. Bradley, pers.comm., 2020), sw. GA by Jones & Coile (1988), and for w. TN by Chester et al. (1993). **Phen:** Aug-Nov. **Syn:** = Ar, ETx1, FlGr, FNA25, Il, K1, K3, K4, Tn, WH3; ? *Eragrostis glomerata* (Walter) L.H. Dewey – G, GW1, HC, Mo1, S, Tx. NatureServe G3G5 (Apparently Secure).

* ***Eragrostis lugens*** Nees. MOURNING LOVEGRASS. **Hab:** Marshes, roadsides, low fields. **Dist:** Sw. and sc. United States south to Mexico; the native distribution is uncertain. **Phen:** Jun-Jan. **Syn:** = ETx1, FlGr, FNA25, HC, K1, K3, K4, Meso6, RAB, S, Tn, W, WH3. NatureServe G5 (Secure).



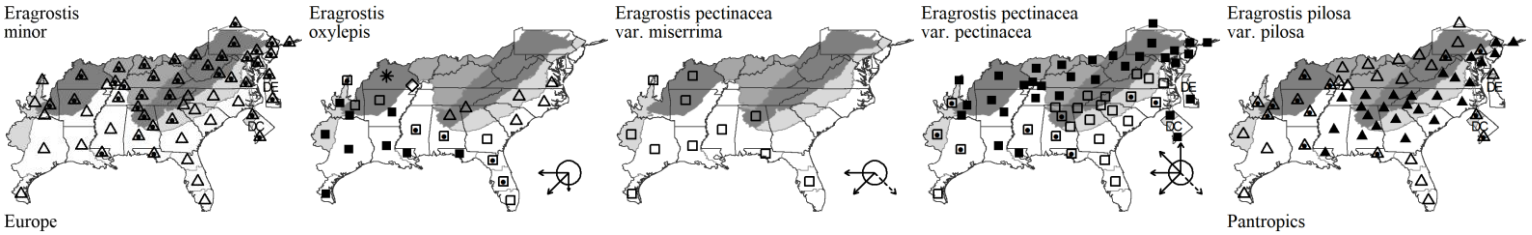
* ***Eragrostis minor*** Host. LITTLE LOVEGRASS, BLUEGRASS LOVEGRASS. **Hab:** Disturbed areas, compacted soils of pastures and fields, other disturbed areas, as in cinders along railroads. **Dist:** Native of Europe. **Phen:** Late Jun-Sep. **Syn:** = Ar, C, FlGr, FNA25, Il, K1, K3, K4, Mi, Mo1, NE, NY, Pa, Tn, Va, WH3; ? *Eragrostis eragrostis* (Linnaeus) Palisot de Beauvois – S; ? *Eragrostis poaeoides* Palisot de Beauvois ex Roemer & J.A. Schultes – F, G, HC, RAB, Tx, W, WV.

Eragrostis oxylepis (Torrey) Torrey. RED LOVEGRASS. **Hab:** Sandy roadsides, coastal dunes, and disturbed areas. **Dist:** NE and CO south to FL, TX, NM, and Mexico. Scattered eastwards and of uncertain nativity. First reported for SC by Nelson & Kelly (1997). **Phen:** May-Dec. **Syn:** = GW1, HC, Tx; = *Eragrostis secundiflora* J. Presl ssp. *oxylepis* (Torrey) S.D. Koch – Ar, ETx1, FlGr, FNA25, K1, K3, K4, Mo1, NcTx, WH3; < *Eragrostis secundiflora* – S. NatureServe G5TNR (Not Yet Ranked).

Eragrostis pectinacea (Michaux) Nees ex Steudel *var*. ***miserrima*** (E. Fournier) J. Reeder. **Hab:** Disturbed habitats. **Dist:** From FL and westward and southward. **Phen:** Mar-Nov. **Syn:** = ETx1, FlGr, FNA25, K1, K3, K4, Meso6, Mi, Mo1, NcTx, WH3; = *Eragrostis tephrosanthos* J.A. Schultes – HC, S; > *Eragrostis arida* A.S. Hitchcock – Tx; < *Eragrostis pectinacea* – GW1, Il; >< *Eragrostis pectinacea* – Tx; > *Eragrostis tephrosanthos* J.A. Schultes – Tx.

Eragrostis pectinacea (Michaux) Nees ex Steudel *var*. ***pectinacea***. CAROLINA LOVEGRASS. **Hab:** Fields, roadsides, disturbed areas. **Dist:** ME and WA south to Central America; West Indies. **Phen:** May-Nov. **Syn:** = Ar, ETx1, FlGr, FNA25, K1, K3, K4, Meso6, Mi, Mo1, NcTx, NE, NY, Va, WH3; = *Eragrostis pectinacea* – F, HC, S, WV; > *Eragrostis diffusa* Buckley – G, Il; < *Eragrostis pectinacea* – Bah, C, GW1, Pa, Tn, Tx, W; > *Eragrostis pectinacea* – G; >< *Eragrostis pectinacea* – Il; < *Eragrostis pilosa* (Linnaeus) Palisot de Beauvois – RAB.

* ***Eragrostis pilosa*** (Linnaeus) Palisot de Beauvois *var*. ***pilosa***. INDIA LOVEGRASS. **Hab:** Fields, roadsides, disturbed areas. **Dist:** Native of tropical regions of the Old and New World. **Phen:** Jul-Oct. **Syn:** = Ar, FNA25, K3, K4, Mo1, NE, NY, Va; = *Eragrostis pilosa* (Linnaeus) Palisot de Beauvois – S; > *Eragrostis multicaulis* Steudel – F, G, HC; < *Eragrostis pilosa* (Linnaeus) Palisot de Beauvois – Bah, ETx1, FlGr, Il, K1, Meso6, Mi, NcTx, Pa, RAB, Tn, Tx, W, WH3; > *Eragrostis pilosa* (Linnaeus) Palisot de Beauvois – F, G, HC.



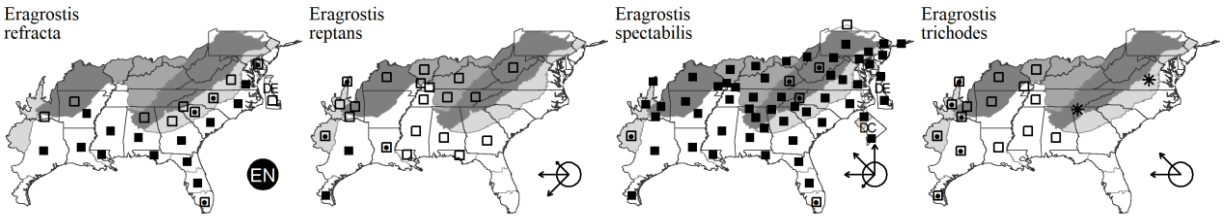
Eragrostis refracta (Muhlenberg) Lamson-Scribner. COASTAL LOVEGRASS. **Hab:** Pinelands, pine savannas, woodlands, bogs and seeps, marshes, maritime grasslands. **Dist:** DE south to s. FL, west to TX. **Phen:** Jul-Oct. **Tax:** Some authors (see synonymy) have taken up the older name *E. virginica* for this, but its application is uncertain. **Syn:** = Ar, C, ETx1, F, FlGr, FNA25, G, GW1, HC, K1, K3, K4, RAB, S, Tx, Va, Franck (2018c) in Weakley et al (2018b); ? *Eragrostis virginica* (Zuccagni) Steudel – K2, WH3, misapplied. NatureServe G5 (Secure).

Eragrostis reptans (Michaux) Nees. CREEPING LOVEGRASS. **Hab:** Shores and wet flats along rivers, streams, and reservoirs. **Dist:** WV, IL, IA, and SD south to sw. GA, Panhandle FL, AL, MS, LA, TX and n. Mexico. **Phen:** Apr-Nov. **Syn:** = C, ETx1, F, FlGr, FNA25, G, GW1, HC, Il, K3, Mo1, NcTx, Tn, Tx; = *Neeragrostis reptans* (Michaux) Nicora – K1, K4. NatureServe G5 (Secure).

Eragrostis spectabilis (Pursh) Steudel. PURPLE LOVEGRASS, TUMBLEGRASS. **Hab:** Longleaf pine sandhills, pine flatwoods, other dry woodlands, sandy fields, roadsides. **Dist:** ME west to ND, south to s. FL and TX. **Phen:** Aug-Nov. **Syn:** = Ar, C, ETx1, FlGr, FNA25, G, GW1, HC, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV, Franck (2018c) in Weakley et al (2018b); > *Eragrostis spectabilis* var. *sparsihirsuta* Farwell – F; > *Eragrostis spectabilis* var. *spectabilis* – F.

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

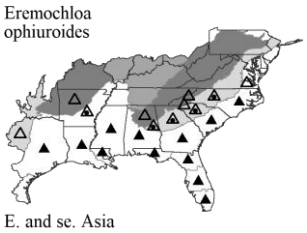
Eragrostis trichodes (Nuttall) Alph. Wood. SAND LOVEGRASS. **Hab:** Sandy prairies, disturbed areas. **Dist:** IL, MN, SD, and se. WY south to MS, LA, TX, NM, AZ, and Mexico. **Phen:** Jul-Dec. **Syn:** = C, ETx1, FNA25, K1, K3, Mi, Mo1, NcTx, NY, Tn, Tx; > *Eragrostis trichodes* var. *pilifera* (Scheele) Fernald – Il; > *Eragrostis trichodes* var. *trichodes* – F, HC, Il.



Eremochloa Buse 1852 (CENTIPEDE GRASS)

A genus of about 11 species, native of Asia and Australia. References: Sorrie (2020a); Thieret (2003e) in FNA25 (2003a).

Identification Notes: In the autumn, the inflorescences make this grass readily recognizable at a distance: a short, tight lawn grass with a reddish aspect.



* ***Eremochloa ophiuroides*** (Munro) Hackel. CENTIPEDE GRASS. **Hab:** Lawns, roadsides, weedy in open, more natural sites. **Dist:** Native of se. Asia. Now very commonly planted as a lawn and roadside grass (especially in the Coastal Plain from se. NC southward). **Phen:** Jun-Oct. **Comm:** Stalter & Lamont (1996) report the VA occurrence of this species. Sorrie (2020) discusses the spread in distribution of this species. **Syn:** = Ar, ETx1, FlGr, FNA25, HC, K1, K3, K4, NE, RAB, Va, WH3, Sorrie (2020a). NatureServe GNR (Not Yet Ranked).

Erianthus Michaux 1803 (PLUMEGRASS)

A genus of XX species, perennials, of the New World. While Clayton & Renvoize (1986) stated that the "traditional division [of *Saccharum*] into awned (*Erianthus*) and awnless species seems wholly artificial", Hodkinson et al. (2002) and others have developed molecular evidence which suggests that our species are not congeneric with *Saccharum*. It seems best to retain our species in *Erianthus*, following Soreng et al. (2015) and Lloyd Evans, Joshi, & Wang (2019). References: Gandhi & Dutton (1993); Hodkinson et al (2002); Soreng et al (2015); Ward (2001); Webster & Shaw (1995); Webster (2003) in FNA25 (2003a).

1 Lowermost inflorescence node densely hairy; callus hairs (ring of hairs beneath the spikelet) (7-) 9-25 mm long, equal to or longer than the spikelet; stem appressed-pubescent below the inflorescence, on the internodes as well as the nodes.
  2 Lemma awn flattened and spirally twisted at base; callus hairs 9-14 mm long, silvery or tinged with purple; leaves usually glabrous on the upper surface at maturity; [of moist to dry sites, rarely in wetlands] ..... ***Erianthus alopecuroides***
  2 Lemma awn nearly terete, straight or slightly flexuous; callus hairs (7-) 15-20 (-25) mm long, tawny or brown; leaves usually pilose on the upper surface at maturity; [of moist to wet sites, rarely in uplands] ..... ***Erianthus giganteus***
1 Lowermost inflorescence node glabrous; callus hairs (ring of hairs beneath the spikelet) 0-6.5 mm long, shorter than or equal to the spikelet (or absent in *E. brevibarbis*); stem glabrous below the inflorescence, except sometimes on the nodes.
  3 Callus hairs (ring of hairs beneath the spikelet) absent, or of few hairs 0-2 mm long (much shorter than the spikelet); panicle branches closely appressed, the panicle usually 1-3 cm broad; panicle branches glabrous ..... ***Erianthus strictus***
  3 Callus hairs (ring of hairs beneath the spikelet) present, dense, 3-6.5 mm long (from about half as long to nearly as long as the spikelet); panicle branches ascending, the panicle usually 4-10 cm broad; panicle branches pubescent.
    4 Awn of the lemma of the upper floret terete at the base, and not spiraled; spikelets dark brown; spikelet pair dissimilar in size, the lemma of the upper floret 0.7-0.8× as long as the lemma of the lower floret; lemma of the lower floret typically 3-nerved ..... ***Erianthus coarctatus***
    4 Awn of the lemma of the upper floret flattened at the base, either spiraled or not; spikelets straw-colored or purplish; spikelet pair homomorphic, the upper lemma 0.9-1.0× as long as the lower lemma; lemma of the lower floret not distinctly nerved.
      5 Awn of the lemma of the upper floret not basally spiraled, 10-18 mm long; lemma of the upper floret entire ..... ***Erianthus brevibarbis***
      5 Awn of the lemma of the upper floret basally spiraled, 15-22 mm long; lemma of the upper floret bifid, the tooth on either side of the lemma 2.0-2.5 mm long ..... ***Erianthus contortus***

Erianthus alopecuroides (Linnaeus) Elliott. SILVER PLUME GRASS. **Hab:** Dry to moist fields, roadsides, woodlands, and woodland borders. **Dist:** NJ west to IN, IL, MO, and OK, south to FL and TX. **Phen:** Sep-Nov. **Syn:** = C, F, G, GW1, HC, Il, Mo1, RAB, Tx, W, WV; = *Erianthus divaricatus* (Linnaeus) A.S. Hitchcock – S; = *Saccharum alopecuroides* (Linnaeus) Nuttall – Ar, ETx1, FlGr, FNA25, K3, K4, Tn, Va, WH3; = *Saccharum alopecuroideum* (Linnaeus) Nuttall – Webster & Shaw (1995), orthographic variant; = *Saccharum alopecuroidum* – K1, orthographic variant. NatureServe G5 (Secure).

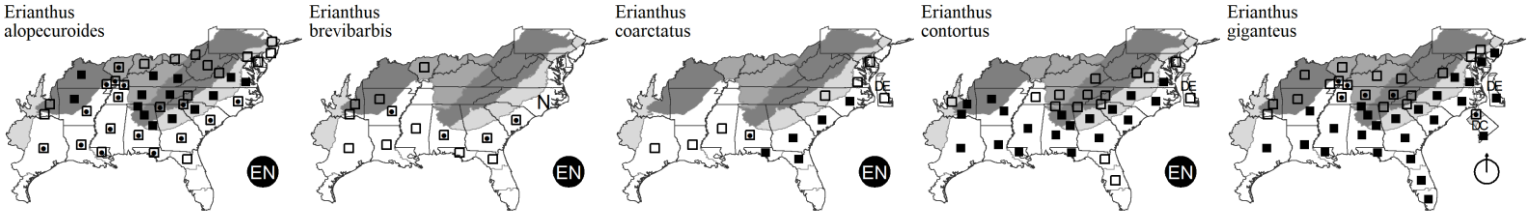
Erianthus brevibarbis Michaux. SHORT-BEARDED PLUME GRASS. **Hab:** Marshes, ditches. **Dist:** Sc and AL west to n. FL, west to AR, e. OK, and e. TX; disjunct in s. IL. Reports from NC appear to be in error. **Phen:** Sep-Oct. **Syn:** = F, Il; = *Erianthus brevibarbis* var. *brevibarbis* – Ward (2001); = *Saccharum brevibarbe* (Michaux) Persoon var. *brevibarbe* – ETx1, FNA25, K3, K4, Webster & Shaw (1995); < *Erianthus brevibarbis* Michaux – C, G, GW1, RAB, S; >< *Erianthus coarctatus* Fernald var. *coarctatus* – HC; >< *Erianthus coarctatus* var. *elliottianus* Fernald – HC. NatureServe G3G5 (Apparently Secure).

Erianthus coarctatus Fernald. BROWN PLUME GRASS. **Hab:** Marshes, ditches, clay-based Carolina bays, swamps, peaty powerline rights-of-way. **Dist:** DE and MD south to FL, west to TX (Brown & Marcus 1998). **Phen:** Sep-Nov. **Syn:** = F; = *Saccharum coarctatum* (Fernald) R.D. Webster – ETx1, FlGr, FNA25, K3, Va, WH3, Webster & Shaw (1995); < *Erianthus brevibarbis* Michaux – C, G, GW1, RAB, S; >< *Erianthus coarctatus* Fernald var. *coarctatus* – HC; >< *Erianthus coarctatus* var. *elliottianus* Fernald – HC. NatureServe G5? (Secure).

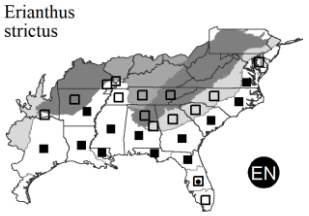
Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Erianthus contortus Elliott. BENT-AWN PLUME GRASS. **Hab:** Moist to wet clearings, open woodlands and forests, woodland borders. **Dist:** DE and MD south to Panhandle FL, west to TX and AR, with scattered occurrences north to TN. **Phen:** Late Jul-Oct. **Syn:** = C, F, G, GW1, HC, RAB, S, Tx, W; = *Erianthus brevibarbis* Michaux var. *contortus* (Elliott) D.B. Ward – Ward (2001); = *Saccharum brevibarbe* (Michaux) Persoon var. *contortum* (Elliott) R. Webster – Ar, ETx1, FlGr, FNA25, K3, NcTx, Tn, Va, WH3, Webster & Shaw (1995). NatureServe G5 (Secure).

Erianthus giganteus (Walter) Palisot de Beauvois. SUGARCANE PLUME GRASS, GIANT PLUME GRASS. **Hab:** Marshes, roadbanks, lake and pond margins, cypress ponds, wet pine flatwoods, ditches. **Dist:** NY south to FL, west to se. TX and AR, mainly Coastal Plain, but with an extensive distribution inland as well. **Phen:** Sep-Dec. **Syn:** = C, G, GW1, HC, Il, Mo1, NcTx, RAB, Tx, W; = *Erianthus saccharoides* Michaux – S; = *Saccharum giganteum* (Walter) Persoon – Ar, ETx1, FlGr, FlGr, FNA25, K3, K4, Pa, Tn, Va, WH3, Webster & Shaw (1995); > *Erianthus giganteus* var. *compactus* (Nash) Fernald – F; > *Erianthus giganteus* var. *giganteus* – F. NatureServe G5 (Secure).



Erianthus strictus Elliott. NARROW PLUME GRASS. **Hab:** Marshes, clay-based Carolina bays, depression ponds, ditches. **Dist:** E. VA south to FL, west to TX, AR, scattered northward inland to TN and MO. **Phen:** Jul-Nov. **Syn:** = C, F, G, GW1, HC, Il, Mo1, RAB, S, Tx; = *Saccharum baldwinii* Sprengel – Ar, ETx1, FlGr, FNA25, K3, K4, Tn, Va, WH3, Webster & Shaw (1995).



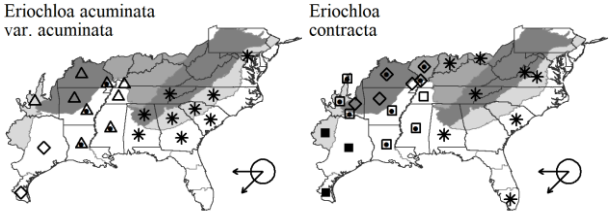
Eriochloa Kunth 1816 (CUP GRASS)

A genus of 320-30 species, of the tropical, subtropical, and warm temperate Old World and New World. References: Crins (1991); Shaw & Webster (1987); Shaw, Webster, & Bern (2003) in FNA25 (2003a).

1 Lemma of fertile floret with an awn > 0.2 mm long; second glume awned; panicle compact, the raceme-like lateral branches close together and ascending-appressed, of irregular lengths; spikelets 8-16 on a typical, primary branch ..... ***Eriochloa contracta***
1 Lemma of fertile floret lacking an awn; second glume not awned; panicle open, the raceme-like lateral branches remote and divergent, the lowermost longest, the upper gradually reduced in length to the apex (*E. acuminata* var. *acuminata*, *E. michauxii* var. *michauxii*) or the panicle compact (*E. villosa*); spikelets 12-40 on a typical, primary branch.
..... ***Eriochloa acuminata var. acuminata***

* ***Eriochloa acuminata*** (J. Presl) Kunth *var.* ***acuminata***. **Hab:** Disturbed areas, urban waste areas, waste areas near wool-combing mills. **Dist:** Presumably native of farther south and west. Reported for scattered locations in GA (Jones & Coile 1988, as *E. gracilis*). **Phen:** Jun-Oct. **Comm:** Reported for NC (Kartesz 1999), but the specimen basis is of cultivated material. Reported as well-established in Laurens County, SC (Bradley et al. [in prep.]). **Syn:** = Ar, FlGr, FNA25, K3, K4, Mo1, NY, Crins (1991), Shaw & Webster (1987); = *Eriochloa gracilis* (Fournier) A.S. Hitchcock var. *gracilis* – HC; < *Eriochloa acuminata* – C, Il, Tn, WH3; < *Eriochloa gracilis* (Fournier) A.S. Hitchcock – Tx.

Eriochloa contracta A.S. Hitchcock. PRAIRIE CUPGRASS. **Hab:** Prairies, roadsides, wet or moist disturbed areas, waste areas around wool-combing mills. **Dist:** IL, NE, CO, and NM south to MS, LA, TX, NM, and Mexico. **Phen:** (Apr-) Jul-Sep. **Syn:** = Ar, ETx1, F, FlGr, FNA25, G, GW1, HC, Il, K3, K4, Mo1, NcTx, Tx, WH3, Crins (1991), Shaw & Webster (1987). NatureServe G5 (Secure).



Eustachys Desvaux 1810 (FINGER-GRASS)

A genus of ca. 12 species, of tropical and warm temperate regions. References: Aulbach (2003) in FNA25 (2003a).

1 Lateral nerves of the fertile lemma glabrous; culms stout, 7-15 dm tall; spikes 8-16 (-20), 7-12 cm long..... ***Eustachys glauca***
1 Lateral nerves of the fertile lemma pubescent; culms slender, 3-10 dm tall; spikes 1-20, 2.5-9 cm long.
2 Keel of the fertile lemma glabrous; [aliens, in disturbed situations].
..... ***Eustachys distichophylla***
2 Keel of the fertile lemma pubescent; [natives and aliens].
4 Spikelets 1.5-2.5 mm long; lowest lemma in each spikelet mucronate.
5 Lowest lemma in each spikelet tawny to reddish-brown; lateral veins of the lowest lemma in each spikelet with spreading hairs > 0.5 mm long; [rare introduction]..... ***Eustachys caribaea***

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

5 Lowest lemma in each spikelet dark brown; lateral veins of the lowest lemma in each spikelet with appressed hairs < 0.5 mm long; [common native from NC south to s. FL, west to LA and beyond our area] ..... ***Eustachys petraea***

4 Spikelets 2.6-3.7 mm long; lowest lemma in each spikelet awned, the awns 0.4-1.2 mm long.

6 Panicle branches 1-3; awns of the lowest lemma in each spikelet 0.4-0.6 mm long; spikelets 3.0-3.7 mm long ..... ***Eustachys floridana***

6 Panicle branches (3-) 4-9; awns of the lowest lemma in each spikelet 0.7-1.2 mm long; spikelets 2.6-3.0 mm long ..... ***Eustachys neglecta***

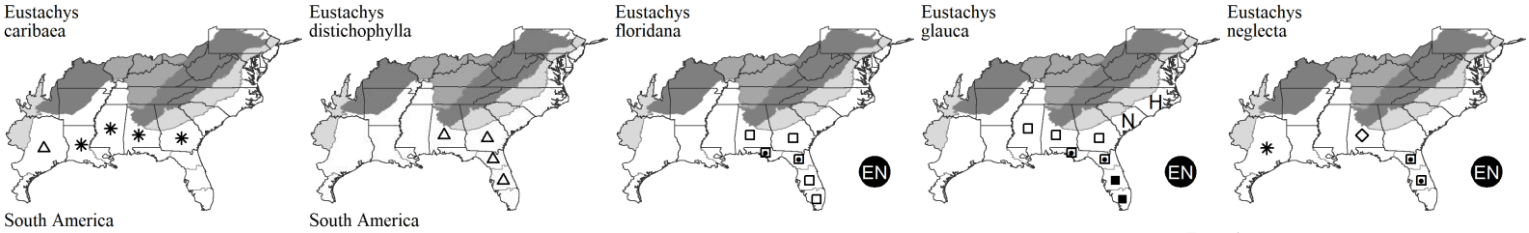
* ***Eustachys caribaea*** (Sprengel) Herter. CHICKENFOOT GRASS, CARIBBEAN FINGER-GRASS. **Hab:** Roadsides, other disturbed areas. **Dist:** Native of South America. Reported for AL (Henry and Houston counties) by Diamond (2013b). **Syn:** = ETx1, FNA25, K1, K4; = *Chloris capensis* Sprengel – HC, misapplied; = *Eustachys paspaloides* ssp. *caribaea* – K3. NatureServe GNR (Not Yet Ranked).

* ***Eustachys distichophylla*** (Lagasca y Segura) Nees. WEEPING FINGER-GRASS. **Hab:** Open, sandy fields, other dry, disturbed areas. **Dist:** Native of South America. Reported for AL (Pike County) by Diamond (2013b). **Phen:** Jun-Sep. **Syn:** = FlGr, FNA25, FNA25, K1, K3, K4, WH3; = *Chloris distichophylla* Lagasca y Segura – HC, Tx. NatureServe GNR (Not Yet Ranked).

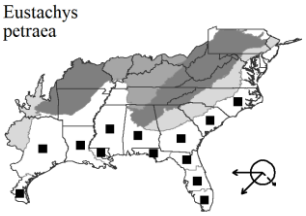
Eustachys floridana Chapman. FLORIDA FINGER-GRASS. **Hab:** Longleaf pine sandhills, pine flatwoods. **Dist:** E. GA south to c. peninsular FL, west to w. Panhandle FL and s. AL. **Phen:** May-Oct. **Syn:** = FlGr, FNA25, FNA25, K1, K3, K4, WH3; = *Chloris floridana* (Chapman) Wood – HC, S. NatureServe G2? (Imperiled).

Eustachys glauca Chapman. SALTMARSH FINGER-GRASS. **Hab:** Marshes and marsh edges, wet hammocks, coastal wetlands, swamps. **Dist:** Se. NC south to FL and west to s. AL. The reported record for SC (Charleston County) is incorrect, based on a misidentification. **Phen:** Jun-Oct (-May). **Syn:** = FlGr, FNA25, FNA25, K1, K3, K4, WH3; = *Chloris glauca* (Chapman) Wood – GW1, HC, RAB, S. NatureServe G4 (Apparently Secure).

Eustachys neglecta (Nash) Nash. FOUR-SPIKE FINGER-GRASS. **Hab:** Pinelands, sandy fields. **Dist:** N. and peninsular FL, se. AL, and e. TX (where perhaps introduced). **Phen:** Apr-Sep. **Syn:** = FlGr, FNA25, K1, K3, K4, WH3; = *Chloris neglecta* Nash – HC, S. NatureServe G3 (Vulnerable).



Eustachys petraea (Swartz) Desvaux. DUNE FINGER-GRASS. **Hab:** Dune slacks and sand flats, also in disturbed areas (especially southward). **Dist:** NC (Dare County) south to FL and west to TX; Mexico to Panama; West Indies. **Phen:** (Sep-) Jun-Oct. **Syn:** = Bah, ETx1, FlGr, FNA25, K1, K3, K4, Meso6, WH3; = *Chloris petraea* Swartz – GW1, HC, RAB, S, Tx. NatureServe G5 (Secure).



Festuca Linnaeus 1753 (FESCUE)

A genus of about 530 species, nearly cosmopolitan in temperate regions. Likely, given the complex phylogenetic relationships between several *Vulpia* clades and the "narrow-leaved *Festuca* clade" (= *Festuca* s.s.) it is best to include *Vulpia* in *Festuca*, even if *Festuca* is treated narrowly to consist only of the "narrow-leaved clade". References: Aiken & Darbyshire (1990); Darbyshire & Pavlick (2007) in FNA24 (2007a); Darbyshire (1993); Lonard (2007) in FNA24 (2007a); Soreng & Terrell (1998); Tucker (1996).

1 Plant annual; stamen 1.

2 First glume < ½ as long as the second glume ..... ***Festuca myuros***

2 First glume > ½ as long as the second glume.

3 Lemma pubescent; lowest lemma 2.5-3.5 mm long; grains 1.5-2 mm long ..... ***Festuca sciurea***

3 Lemma glabrous or scabrous; lowest lemma 2.7-7 mm long; grains 1.7-3.3 mm long.

4 First glume 1.7-4.5 mm long; lemma awns 3-12 mm long; spikelets with 4-7 loosely imbricate florets; rachilla internodes mostly 0.9-1.1 mm long ..... ***Festuca bromoides***

4 First glume 3.5-5 mm long; lemma awns 0.3-6 (-9) mm long; spikelets with 5-11 (-more) closely imbricate florets; rachilla internodes mostly 0.5-0.7 mm long.

5 Spikelets 5.5-10 (-13) mm long; awn of the lowest lemma 3-9 mm long ..... ***Festuca octoflora var. octoflora***

5 Spikelets 4-5.5 (-6.5) mm long; awn of the lowest lemma 0.3-3 mm long ..... ***Festuca octoflora var. tenella***

1 Plant perennial; stamens 3.

6 Leaves 0.2-3 mm wide, often involute. ..... ***Festuca rubra***

6 Leaves 3-12 mm wide, flat.

9 Larger lemmas 5.5-10 mm long; leaf blades auriculate at the base; anthers 2-4 mm long

10 Auricles ciliate (sometimes only very sparsely so – check several at 10-20× magnification); spikelets with 3-6 (-9) florets; old sheaths pale straw-colored, often remaining intact; internodes of the rachilla antrorsely scabrous ..... ***Lolium arundinaceum***

10 Auricles glabrous; spikelets with (2-) 4-10 (-12) florets; old sheaths brown, decaying to fibers; internodes of the rachilla glabrous (smooth) or nearly so ..... ***Lolium pratense***

9 Larger lemmas 3.3-5.2 mm long; leaf blades not auriculate at the base; anthers 0.8-1.5 mm long; [subgenus *Subulatae*, section *Obtusae*].

12 Principal lowermost panicle branches with 8-20 spikelets clustered at the end; spikelets broadly ovate, 4-6 mm wide ..... ***Festuca paradoxa***

12 Principal lowermost panicle branches with 2-7 spikelets scattered along the outer half; spikelets narrowly ovate, 2-4 mm wide ..... ***Festuca subverticillata***

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

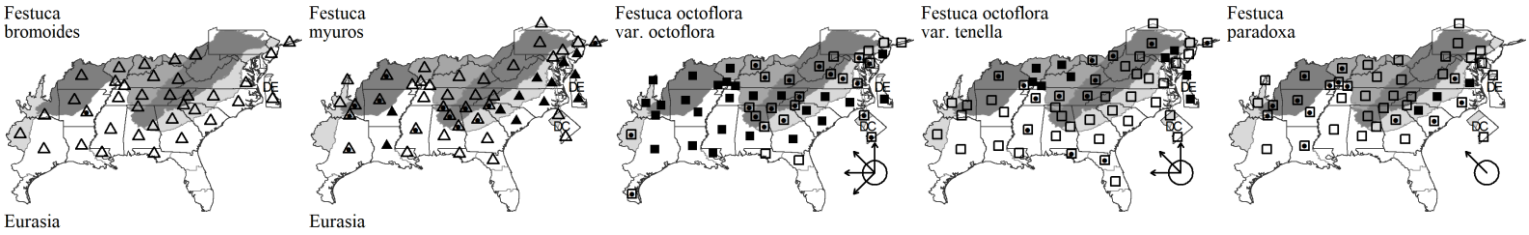
* ***Festuca bromoides*** Linnaeus. EUROPEAN SQUIRREL-TAIL FESCUE, BROME FESCUE. **Hab:** Sandy disturbed areas. **Dist:** Native of Eurasia. **Phen:** Mar-Apr. **Syn:** = FlGr, K4; = *Festuca dertonensis* (Allioni) Ascherson & Graebner – G, HC, Tx; = *Vulpia bromoides* (Linnaeus) S.F. Gray – Ar, Bah, C, ETx1, FNA24, Il, K1, K3, Meso6, Mo1, NcTx, NE, WH3, Tucker (1996).

* ***Festuca myuros*** Linnaeus. RAT-TAIL FESCUE. **Hab:** Roadsides, fields, disturbed areas. **Dist:** Native of Eurasia. **Phen:** Mar-Jun. **Syn:** = FlGr, G, HC, K4, NY, RAB, S, W, WV; = *Vulpia myuros* (Linnaeus) C.C. Gmelin – Ar, C, ETx1, F, FNA24, Il, K1, K3, Mi, Mo1, NcTx, NE, Pa, Tn, Va, WH3, Tucker (1996); > *Vulpia megalura* (Nuttall) Rydberg – Tx; > *Vulpia myuros* (Linnaeus) C.C. Gmelin – Tx; > *Vulpia myuros* var. *hirsuta* Hackel – Meso6. NatureServe G5 (Secure).

Festuca octoflora Walter *var*. ***octoflora***. SOUTHERN SIX-WEEKS FESCUE. **Hab:** Fields, roadsides, disturbed areas. **Dist:** S. NJ south to FL, west to TX, north in the interior to MO and OK. **Phen:** Apr-Jun. **Syn:** = FlGr, HC, K4, NE; = *Vulpia octoflora* (Walter) Rydberg var. *octoflora* – Ar, C, ETx1, F, FNA24, Il, K1, K3, Mo1, NcTx, Tn; < *Festuca octoflora* Walter – GW1, RAB, S, W, WV; > *Festuca octoflora* var. *aristulata* Torrey ex L.H. Dewey – G; < *Vulpia octoflora* – Tx, Va, WH3, Tucker (1996). NatureServe G5T5 (Secure).

Festuca octoflora Walter *var*. ***tenella*** (Willdenow) Fernald. NORTHERN SIX-WEEKS FESCUE. **Hab:** Fields, roadsides, disturbed areas. **Dist:** S. ME west to BC, south to GA, AR, TX, and CA. **Phen:** Apr-Jun. **Syn:** = G, HC, K4, NE, NY; = *Vulpia octoflora* (Walter) Rydberg var. *glauca* (Nuttall) Fernald – Ar, C, ETx1, FNA24, K1, Mo1, NcTx, Pa; = *Vulpia octoflora* (Walter) Rydberg var. *tenella* (Willdenow) Fernald – F, K3, Tn; < *Festuca octoflora* Walter – GW1, RAB, S, W, WV; < *Vulpia octoflora* – Mi, Tx, Va, Tucker (1996); > *Vulpia octoflora* (Walter) Rydberg var. *glauca* (Nuttall) Fernald – Il; > *Vulpia octoflora* (Walter) Rydberg var. *tenella* (Willdenow) Fernald – Il.

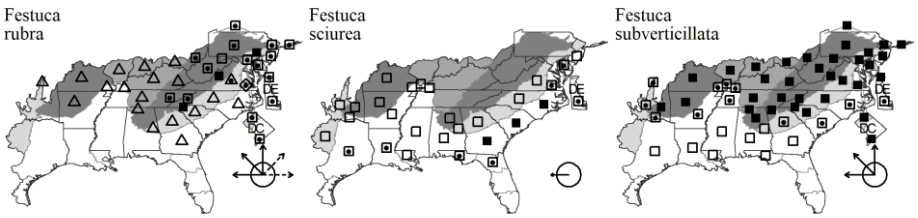
Festuca paradoxa Desvaux. CLUSTER FESCUE. **Hab:** Bottomlands, uplands over mafic or calcareous rock. **Dist:** PA west to WI and IA, south to SC, c. GA, and e. TX. **Phen:** May-Jul. **Syn:** = Ar, C, ETx1, F, FNA24, G, GW1, HC, Il, K1, K3, K4, Mo1, Pa, RAB, Tn, Tx, Va, W, Tucker (1996); ? *Festuca shortii* Kunth ex Wood – S, misapplied. NatureServe G5 (Secure).



Festuca rubra Linnaeus. RED FESCUE. **Hab:** Dune grasslands, salt scrub, and borders of oligohaline to mesohaline marshes in the Coastal Plain (where presumably native), in middle- to high-elevation forests, rocky woodlands, barrens, grassy balds, and bogs in the Mountains (where also presumably native), and in fields, pastures, weedy clearings, and other open, disturbed habitats (where presumably introduced from Eurasia, adventive from native populations, or some complex mix of situations). **Dist:** In our area, this species is considered to be partly native and partly introduced. **Phen:** Apr-Jul. **Tax:** This species is circumboreal, extending south (as a native) in North America to GA and MO. Many varieties or subspecies have been described in the *F. rubra* complex. It is not clear how our material should be subdivided (or whether it can be). **Syn:** = Ar, C, G, HC, Il, Meso6, Mi, Mo1, Pa, RAB, S, Tn, Va, WV, Aiken & Darbyshire (1990), Tucker (1996); > *Festuca rubra* ssp. *arctica* – K3, K4, NE; > *Festuca rubra* ssp. *commutata* – K3, K4, NE, NY; > *Festuca rubra* ssp. *fallax* – K3, K4, NE; > *Festuca rubra* ssp. *pruinosa* – K3, NE; > *Festuca rubra* ssp. *rubra* – FNA24, K1, K3, K4, NE, NY; > *Festuca rubra* var. *arenaria* (Osbeck) Fries – F; > *Festuca rubra* var. *commutata* Gaudin – F; > *Festuca rubra* var. *multiflora* (Hoffmann) Ascherson & Graebner – F; > *Festuca rubra* var. *mutica* Hartman – F; > *Festuca rubra* var. *rubra* – F.

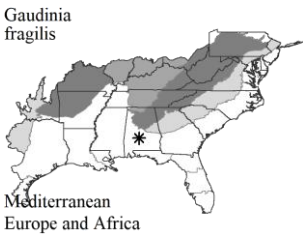
Festuca sciurea Nuttall. SQUIRREL-TAIL FESCUE. **Hab:** Sandy roadsides, fields, disturbed areas. **Dist:** S. NJ south to n. peninsular FL, west to TX, and north in the interior to MO. **Phen:** Mar-May. **Comm:** There may be question whether the Rafinesquian epithet applies here; moreover, when transferred into *Festuca* it may be blocked by the very similar *Festuca elliottii*. **Syn:** = FlGr, G, HC, K4, RAB, S; = *Vulpia elliotea* (Rafinesque) Fernald – C, F, Il, K1, K3, Mo1, Tx, WH3; = *Vulpia sciurea* (Nuttall) Henrard – Ar, ETx1, FNA24, NcTx, Va, Tucker (1996). NatureServe G5 (Secure).

Festuca subverticillata (Persoon) E.B. Alexeev. NODDING FESCUE. **Hab:** Moist to wet forests, dry woodlands, and disturbed areas. **Dist:** ME, QC, and MB south to FL and e. TX. **Phen:** May-Jul. **Syn:** = Ar, C, ETx1, FlGr, FNA24, Il, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Tn, Va, WH3, Aiken & Darbyshire (1990), Tucker (1996); ? *Festuca obtusa* Biehler – F, G, GW1, HC, Pa, RAB, S, Tx, W, WV. NatureServe G5 (Secure).



Gaudinia Palisot de Beauvois 1812

A genus of about 4 species, annuals or perennials, native of the Mediterranean region. References: Daniel (2007b) in FNA24 (2007a).



* ***Gaudinia fragilis*** (Linnaeus) Palisot de Beauvois. OATGRASS. **Hab:** Ballast, probably only a waif. **Dist:** Native of Mediterranean Europe. Reported from Mobile, AL. **Syn:** = FNA24, K1, K2, K4.

Glyceria R. Brown 1810 (MANNAGRASS)

A genus of about 40 species, nearly cosmopolitan. References: Barkworth & Anderton (2007) in FNA24 (2007a); Tucker (1996).

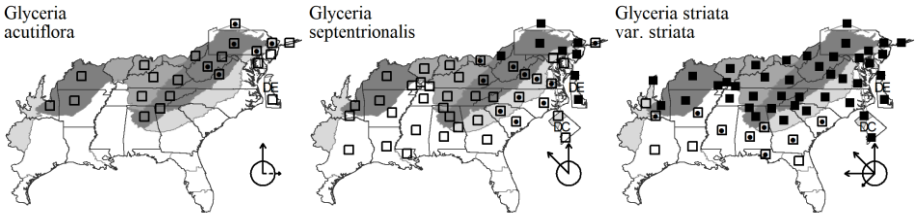
Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

1 Spikelets 10-40 mm long, linear, 5-15× as long as wide, terete or nearly so in cross-section; [section *Glyceria*].
  2 Lemma (6-) 7-8.5 (-10) mm long, acute to acuminate; palea longer than the lemma, extending 1.5-3 mm beyond the lemma apex..... ***Glyceria acutiflora***
  2 Lemma 2.4-6.0 mm long, obtuse to notched; palea about as long as the lemma (ranging from shorter than the lemma and included, to projecting up to 1.5 mm beyond the lemma apex).
  ..... ***Glyceria septentrionalis***
1 Spikelets 2.5-8 mm long, ovate to oblong, 1.5-3× as long as wide, laterally compressed in cross-section.
  .....***Glyceria striata var. striata***

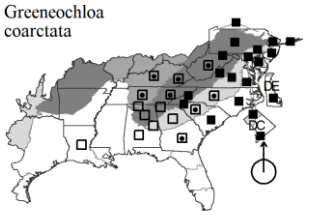
Glyceria acutiflora Torrey. **Hab:** Shallow water and wet mucky soils in mountain ponds, sinkhole ponds, acid seeps, and wet pastures. **Dist:** ME west to MI, south to DE, VA, nw. GA (Jones & Coile 1988), e. TN, and MO; e. Asia. **Phen:** Jun-Jul. **Syn:** = Ar, C, F, FNA24, G, GW1, HC, K1, K3, K4, Mi, Mo1, NE, NY, Pa, Tn, Va, W, WV, Tucker (1996); = *Panicularia acutiflora* (Torrey) Kuntze – S. NatureServe G5 (Secure).

Glyceria septentrionalis A.S. Hitchcock. FLOATING MANNAGRASS, EASTERN MANNAGRASS. **Hab:** Shallow water, wet mucky soils, floodplain sloughs, cypress ponds. **Dist:** MA west to MN, south to SC, ne. GA, and TX. **Phen:** May-Jun. **Syn:** = ETx1, F, FlGr, GW1, HC, Il, K1, K3, K4, Mi, Pa, RAB, Tx, Va, W, WH3, WV, Tucker (1996); = *Glyceria septentrionalis* var. *septentrionalis* – Ar, FNA24, Mo1, NE, NY, Tn; = *Panicularia septentrionalis* (A.S. Hitchcock) E.P. Bicknell – S; < *Glyceria septentrionalis* A.S. Hitchcock – C, G. NatureServe G5 (Secure).

Glyceria striata (Lamarck) A.S. Hitchcock *var*. ***striata***. FOWL MANNAGRASS. **Hab:** Wet meadows, seepages, bogs, marshes, swamp forests, freshwater tidal marshes, bottomland forests in mesic soils. **Dist:** NL (Newfoundland) west to BC, south to FL and CA. **Phen:** Apr-Jun. **Comm:** Var. *stricta* (Lamson-Scribner) Fernald is more northern. **Syn:** = C, F, G, HC, Il, Va, Tucker (1996); = *Panicularia striata* (Lamarck) A.S. Hitchcock – S; < *Glyceria striata* – Ar, ETx1, FlGr, FNA24, GW1, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, RAB, Tn, Tx, W, WH3, WV. NatureServe G5T5 (Secure).



Greeneochloa P.M. Peterson, Soreng, Romaschenko, & Barberá 2019 (REEDGRASS)



A genus of 2 species, perennial herbs, of e. and w. North America. "The two species of *Greeneochloa* form a clade within subtribe Echinopogoninae which is sister to subtribe Calothecinae plus *Calamagrostis* s.s. (subtribe Agrostidinae Fr.) all in supersubtrib. Agrostidodinae Soreng" (Peterson et al. 2019b). References: Peterson et al (2019b).

Greeneochloa coarctata (Eaton) P.M. Peterson, Soreng, Romaschenko, & Barberá. NUTTALL'S REEDGRASS. **Hab:** Savannas, bogs, and other wet sites. **Dist:** ME and NY south to n. GA (Jones & Coile 1988), AL, and LA, primarily on the Coastal Plain. **Phen:** Jul-Oct. **Comm:** The replacement of the familiar epithet *cinnoides* is necessary for nomenclatural reasons (Kartesz 1999); the type of *Calamagrostis cinnoides* is actually *Calamagrostis canadensis*. **Syn:** = K4, Peterson et al (2019b); = *Calamagrostis cinnoides* (Muhlenberg) W.P.C. Barton – C, F, FNA24, G, GW1, HC, NE, NY, Pa, RAB, S, Tn, Va, W, WV, Tucker (1996); = *Calamagrostis coarctata* Eaton – K1, K3.

Gymnopogon Palisot de Beauvois 1812 (SKELETON GRASS, BEARD GRASS)

A genus of about 15 species, in temperate and tropical areas of the Americas. References: Cialdella & Zuloaga (2011); Peterson, Romaschenko, & Herrera Arrieta (2020); Smith (1971); Smith (2003) in FNA25 (2003a).

Identification Notes: When sterile, *Gymnopogon* is sometimes confused with *Dichanthelium*. *Gymnopogon* differs in having the sheaths conspicuously overlapping (vs. not overlapping in *Dichanthelium*) and leaves that are definitely cordate-clasping and of stiff texture (only a few *Dichanthelium* have this combination).

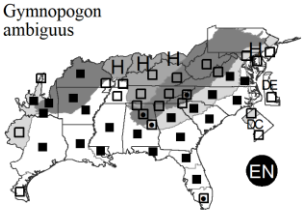
1 Awn of the lemma (4.5-) 7.4-12 mm long; inflorescence branches with spikelets distributed from the tip nearly to the base; leaves 5-15 mm wide; [widespread in our area, including the inland provinces] ..... ***Gymnopogon ambiguus***
1 Awn of the lemma (0.3-) 0.8-2.2 (-3.5) mm long; inflorescence branches with spikelets distributed either from the tip nearly to the base (*G. chapmanianus*) or to roughly the midpoint, the basal portion naked (or some branches rarely with a few spikelets) (*G. brevifolius*); leaves 2-8 mm wide; [Coastal Plain and only rarely the inland provinces].
  ..... ***Gymnopogon brevifolius***

Gymnopogon ambiguus (Michaux) Britton, Sterns, & Poggenburg. EASTERN SKELETON GRASS, EASTERN BEARD GRASS. **Hab:** Prairies, glades, barrens, dry pinelands and woodlands, dry fields. **Dist:** S. NJ west to KY, OH, and MO, south to s. FL and c. TX. **Phen:** Aug-Nov. **Syn:** = Ar, C, ETx1, F, FlGr, FNA25, G, HC, Il, K1, K3, K4, Mo1, NcTx, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV, Cialdella & Zuloaga (2011), Smith (1971). NatureServe G4 (Apparently Secure).

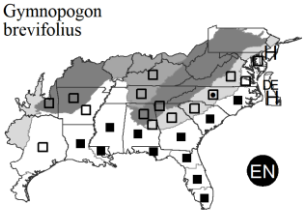
Gymnopogon brevifolius Trinius. PINELAND SKELETON GRASS, PINELAND BEARD GRASS. **Hab:** Pine savannas, sandhills, dry woodlands, prairies, calcareous glades, typically in dry sandy or clay hardpan soils. **Dist:** S. NJ south to s. FL, west to LA, AR, and e. TX; disjunct inland in the Highland Rim of KY and TN and w. SC in the uppermost Piedmont in the Blue Ridge Escarpment region. **Phen:** Jul-Dec. **Syn:** = Ar, C, ETx1, F, FlGr, FNA25, G, HC, K1, K3, K4, RAB, S, Tn, Tx, Va, WH3, Cialdella & Zuloaga (2011), Smith (1971). NatureServe G5 (Secure).

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Gymnopogon ambiguus



Gymnopogon brevifolius



Heteropogon Persoon 1806 (TANGLEHEAD)

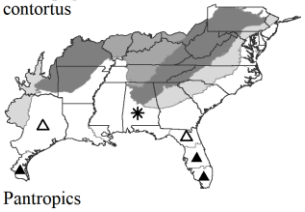
A genus of about 10 species, pantropical and extending into subtropical and warm temperate areas. References: Barkworth (2003w) in FNA25 (2003a).

1 Glume eglandular, with long stiff hairs ..... ***Heteropogon contortus***
1 Glume glabrous, with a row of glandular depressions ..... ***Heteropogon melanocarpus***

* ***Heteropogon contortus*** (Linnaeus) Palisot de Beauvois ex Roemer. TANGLEHEAD. **Hab:** Pine flatwoods, disturbed areas. **Dist:** Native of the Old World tropics and subtropics. Sometimes considered to be native of the New World as well as the Old World. **Phen:** (Mar-) Jun-Feb. **Syn:** = ETx1, FlGr, FNA25, HC, K3, K4, Tx, WH3. NatureServe G5 (Secure).

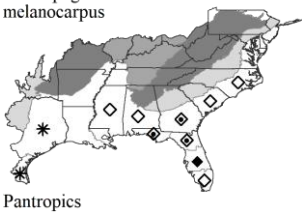
* ***Heteropogon melanocarpus*** (Elliott) Bentham. SWEET TANGLEHEAD, BUZZARD GRASS. **Hab:** Sandy roadsides, disturbed areas; possibly naturalized from the Old World. **Dist:** The species is widespread in the Old World and New World tropics, north in North America to se. NC. Named by Elliott in the early 1800s from material between the Altamaha and Satilla rivers in e. GA, but quite possibly already naturalized at that time from the Old World. **Phen:** Sep-Oct. **Syn:** = FlGr, FNA25, HC, K3, K4, RAB, S, Tx, WH3. NatureServe G4? (Apparently Secure).

Heteropogon contortus



Pantropics

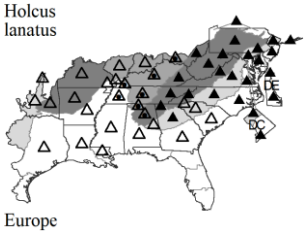
Heteropogon melanocarpus



Pantropics

Holcus Linnaeus 1753 (VELVET GRASS, SOFT GRASS)

Holcus lanatus



Europe

A genus of 8 species, usually perennial, native of Europe, n. Africa, and w. Asia. References: Standley (2007a) in FNA24 (2007a); Tucker (1996).

* ***Holcus lanatus*** Linnaeus. VELVET GRASS, SOFT GRASS, YORKSHIRE-FOG. **Hab:** Moist to wet meadows, pastures, disturbed areas, roadsides, hedge-rows, sometimes invasive in bogs, fens, and other natural wetlands. **Dist:** Native of Europe. **Phen:** May-Oct. **Syn:** = Ar, C, ETx1, F, FNA24, G, HC, Il, K1, K3, K4, Meso6, Mi, Mo1, NE, NY, Pa, RAB, Tn, Va, W, WV, Tucker (1996); = *Notholcus lanatus* (Linnaeus) Nash – S. NatureServe GNR (Not Yet Ranked).

Hordeum Linnaeus 1753 (BARLEY)

A genus of about 40 species, north temperate and in South America. Many recent authors place most of our species (other than *H. vulgare)* in *Critesion* Rafinesque. References: Blattner (2004); Carmona et al (2016); Petersen & Seberg (2003); Tucker (1996); von Bothmer, Baden, & Jacobsen (2007) in FNA24 (2007a).

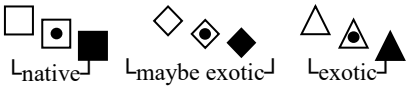
1 Rachis remaining intact at maturity; leaves 5-12 mm wide, with well-developed auricles; [section *Hordeum*] ..... ***Hordeum vulgare***
1 Rachis disarticulating at maturity; leaves 1-5 mm wide, not auriculate (except in *H. murinum* ssp. *leporinum*).
  3 Leaves auriculate; glumes of the central spikelet (in the triad) with ciliate margins; [section *Hordeum*] ..... ***Hordeum murinum ssp. leporinum***
  3 Leaves not auriculate; glumes of the central spikelet (in the triad) with scabrous margins; [section *Critesion*] ..... ***Hordeum pusillum***

* ***Hordeum murinum*** Linnaeus *ssp.* ***leporinum*** (Link) Arcangeli. MOUSE BARLEY. **Hab:** Disturbed areas. **Dist:** Native of Mediterranean Europe. **Phen:** Apr-May. **Comm:** A tetraploid taxon. **Syn:** = ETx1, FNA24, K1, K3, K4, NcTx, NE, NY, Tucker (1996); = *Hordeum leporinum* Link – C, HC, RAB; < *Hordeum murinum* Linnaeus – G, Pa, S. NatureServe GNRTNR (Not Yet Ranked).

Hordeum pusillum Nuttall. LITTLE BARLEY. **Hab:** Roadsides, fields, pastures, ditches, disturbed areas. **Dist:** Probably restricted to west of the Mississippi River a few centuries ago, but now present (and in many areas common) throughout a broad portion of the United States, from ME west to WA south to n. FL, s. TX, CA, and Mexico. **Phen:** Apr-Jun. **Comm:** A diploid taxon. **Syn:** = Ar, C, ETx1, F, FNA24, G, HC, Il, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, Tucker (1996); = *Hordeum pussilum* – FlGr, orthographic error. NatureServe G5 (Secure).

* ***Hordeum vulgare*** Linnaeus. BARLEY. **Hab:** Cultivated fields, commonly cultivated, rare as a waif. **Dist:** Native of Eurasia. **Phen:** Apr-Jul. **Tax:** A diploid taxon. The original wild form is often treated as *H. vulgare* ssp. *spontaneum* and the cultivated, non-shattering derivative as ssp. *vulgare* (Hancock 2004). The wild form was used as a food source since at least 19,000 years ago, and "ssp. *vulgare*" developed by 8,500 years ago. **Syn:** =

Key to Map Symbology:



←rare ←uncommon ←common (see introduction for more)

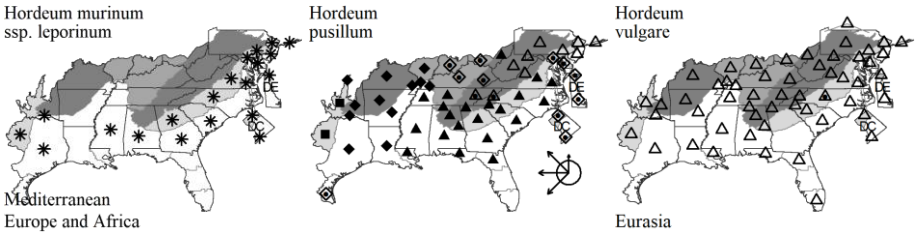
* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable

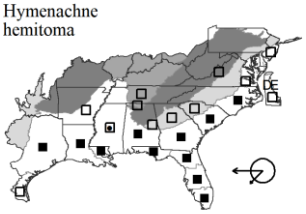
X : extirpated

103. POACEAE

Ar, C, F, FlGr, K1, K3, K4, Meso6, Mi, Mo1, NcTx, NE, NY, Pa, RAB, Tn, Tx, WH3, Tucker (1996); > *Hordeum aegiceras* Nees ex Royle – G; > *Hordeum vulgare* ssp. *vulgare* – FNA24; > *Hordeum vulgare* var. *trifurcatum* (Schlechtendal) Alefeld – G, HC, Il; > *Hordeum vulgare* var. *vulgare* – G, HC, Il.



Hymenachne Palisot de Beauvois 1812 (MARSH-GRASS, MAIDENCANE)



A genus of 5-10 species, perennials, of the Neotropics and Paleotropics. Acosta et al. (2014) show 2 clades of *Hymenachne*, rendering it non-monophyletic, and suggest that it may need to be split in the future. If it is split, it appears that our two species would be in separate genera, with *Hymenachne hemitomon* (the former *Panicum hemitomon*) moving to yet another new genus. *Hymenachne* has a C3 photosynthetic pathway. References: Acosta et al (2014); Barkworth (2003m) in FNA25 (2003a); Freckmann & Lelong (2003c) in FNA25 (2003a); Grande Allende (2014); Hsu (1965); Lelong (1986).

Hymenachne hemitoma (J.A. Schultes) C.C. Hsu. MAIDENCANE. **Hab:** Lake, pond, and river shores, swamp borders, marshes, ditches, often in shallow water, often forming dense colonies in the low margin and shallow waters of Coastal Plain ponds. Occasionally in surprisingly xeric habitats, spreading vegetatively. **Dist:** Coastal Plain from s. NJ south to s. FL, west to TX; also TN; South America. **Phen:** Mar-Nov. **Syn:** = FlGr; = *Hymenachne hemitomon* (J.A. Schultes) C.C. Hsu – K3, K4, Grande Allende (2014), orthographic variant; = *Panicum hemitomon* J.A. Schultes – C, ETx1, F, FNA25, G, GW1, HC, K1, RAB, S, Tn, Tx, Va, W, WH3, Lelong (1986). NatureServe G5? (Secure).

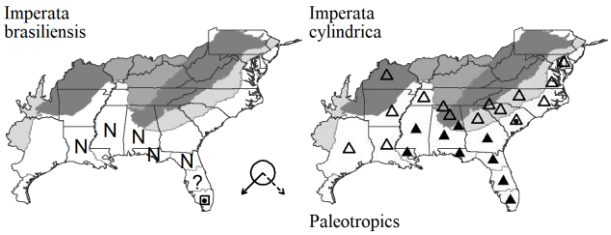
Imperata Cirillo 1792 (COGONGRASS, SATINTAIL)

A genus of about 8-9 species, of tropical, subtropical, and warm temperate areas of both hemispheres. References: Burrell et al (2015); Cordobés et al (2021); Gabel (2003) in FNA25 (2003a); Hall (1998); Ward (2004c).

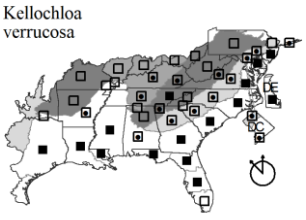
1 Anther 1; filaments dilated at base; lower lemma often absent ..... ***Imperata brasiliensis***
1 Anthers 2; filaments not dilated at base; lower lemma rarely absent ..... ***Imperata cylindrica***

Imperata brasiliensis Trinius. BRAZILIAN SATINTAIL. **Hab:** Pine rocklands, mesic flatwoods. **Dist:** S. FL; West Indies and other parts of the Neotropics. **Phen:** Feb-May. **Tax:** In our area, Burrell et al. (2015) found evidence of this taxon only in s. FL. **Comm:** Native and relatively conservative in its s. FL habitat. **Syn:** = Bah, FNA25, HC, K1, K3, K4, S; = *Imperata cylindrica* var. *mexicana* (Ruprecht) D.B. Ward – Ward (2004c); < *Imperata cylindrica* (Linnaeus) Palisot de Beauvois – FlGr, Hall (1998).

* ***Imperata cylindrica*** (Linnaeus) Palisot de Beauvois. COGONGRASS. **Hab:** Pinelands, grassy roadsides, pastures. **Dist:** Native of se. Asia, s. Asia, and possibly e. Africa. See Nelson (1993) for first report from SC. **Phen:** Feb-May (-Nov). **Tax:** Hall (1998) argues that *I. cylindrica* and *I. brasiliensis* are not distinct. Ward (2004c) treats the 2 taxa at varietal level. **Comm:** An extremely aggressive and dangerous weed, now well-established and rapidly invading fire-maintained Coastal Plain areas (such as longleaf pine and slash pine flatwoods and longleaf pine clayhills) on the Gulf Coastal Plain of FL, AL, and MS. **Syn:** = FNA25, HC, K1, K3, K4; = *Imperata cylindrica* var. *cylindrica* – Ward (2004c); < *Imperata cylindrica* (Linnaeus) Palisot de Beauvois – FlGr, Hall (1998).



Kellochloa Lizarazu, M.V. Nicola, & Scataglini 2015 (WARTY PANIC GRASS)

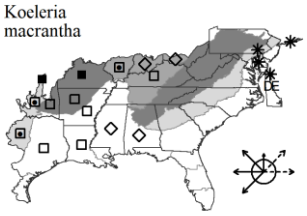


A genus of 2 species, annual herbs, of eastern North America. References: Freckmann & Lelong (2003c) in FNA25 (2003a); Lelong (1986); Nicola, Lizarazu, & Scataglini (2015).

Kellochloa verrucosa (Muhlenberg) Lizarazu, M.V. Nicola, & Scataglini. WARTY PANIC GRASS. **Hab:** Seasonally flooded depression meadows, wet pinelands, marshes, shores, ditches. **Dist:** MA and PA west to MI

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

and IN, south to FL and se. TX. **Phen:** Apr-Nov. **ID Notes:** Spikelets deep green, the warty surface separating this species and *K. brachyantha* from *Panicum (sensu lato)* in our region. **Syn:** = FlGr, K4, NY, Nicola, Lizarazu, & Scataglini (2015); = *Panicum verrucosum* Muhlenberg – Ar, C, ETx1, F, FNA25, G, GW1, HC, Il, K1, K3, Mi, Pa, RAB, S, Tn, Tx, Va, W, WH3, Lelong (1986). NatureServe G4 (Apparently Secure).



Koeleria Persoon 1805 (JUNEGRASS, KOELERIA)

A genus of about 60 species, north and south temperate. References: Arnow (1994); Barberá et al (2019); Finot et al (2005); Rumely (2007) in FNA24 (2007a); Standley (2007b) in FNA24 (2007a).

Koeleria macrantha (Ledebour) J.A. Schultes. PRAIRIE JUNEGRASS. **Hab:** Upland prairies, glades, other habitats. **Dist:** NL west to AK, south to DE, MD, PA, KY, MS, LA, TX, CA, and Mexico; n. Eurasia. **Phen:** May-Jul. **Syn:** = Ar, ETx1, FNA24, Il, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, Arnow (1994); < *Koeleria cristata* – F; < *Koeleria pyramidata* (Lamarck) Palisot de Beavois – C, Tx. NatureServe G5 (Secure).

Leersia Swartz 1788 (CUTGRASS)

A genus of about 17-18 species, perennial (less typically annual) herbs, tropical and warm temperate. References: Pyrah (1969); Pyrah (2007) in FNA24 (2007a); Tucker (1988).

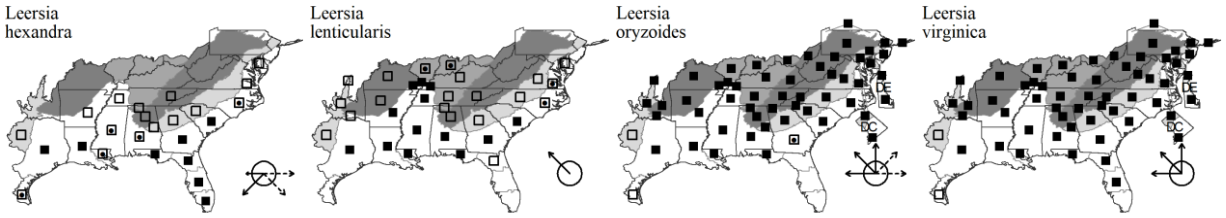
2 Lower panicle branches whorled or closely approximate; spikelets 4.0-5.5 mm long, 1.5-2.0 mm broad; stamens 3 ..... ***Leersia oryzoides***
2 Lower panicle branches alternate (rarely opposite); spikelets 2.2-5.0 mm long, 0.8-4.0 mm broad; stamens 2 or 6.
  3 Spikelets suborbicular-falcate, 3.0-4.0 mm broad, < 2× as long as broad; principal leaf-blades 10-15 mm wide; stamens 2 ..... ***Leersia lenticularis***
  3 Spikelets narrowly elliptic-falcate, 0.8-2.0 mm broad, > 2× as long as wide; principal leaf-blades usually < 7 mm wide; stamens 2 or 6.
    4 Spikelets 3.8-4.7 mm long, 1.5-2.0 mm broad; panicle branches short, bearing spikelets nearly to their bases; stamens 6 ..... ***Leersia hexandra***
    4 Spikelets 2.2-3.5 mm long, 0.8-1.2 mm broad; panicle branches long, filiform, the longer ones bearing spikelets only in their upper half; stamens 2 ..... ***Leersia virginica***

Leersia hexandra Swartz. SOUTHERN CUTGRASS. **Hab:** Clay-based Carolina bays, limesink ponds, Florida wet prairies, lakes, pools, canals, marshes, usually in places where periodically or seasonally inundated. **Dist:** Pantropical, ranging north in North America to MD, TN, and TX. **Phen:** Apr-Nov. **Comm:** This species is considered a serious weed in the Old World and New World tropics; in parts of our area, however, it is uncommon and not weedy. **Syn:** = Ar, C, ETx1, F, FlGr, FNA24, G, GW1, HC, K1, K3, K4, Meso6, RAB, Tn, Tx, Va, WH3, Pyrah (1969), Tucker (1988); = *Homalocenchrus hexandrus* (Swartz) Kuntze – S. NatureServe G5 (Secure).

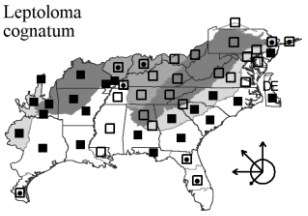
Leersia lenticularis Michaux. CATCHFLY CUTGRASS, OATMEAL GRASS. **Hab:** Floodplain forests and swamps, rarely in depression swamps and ponds. **Dist:** Se. VA south to ne. FL and Panhandle FL, west to e. TX, north in the interior to IN and MN. **Phen:** Jul-Nov. **Syn:** = Ar, C, ETx1, F, FlGr, FNA24, G, GW1, HC, Il, K1, K3, K4, Mo1, NcTx, RAB, Tn, Tx, Va, WH3, Pyrah (1969), Tucker (1988); = *Homalocenchrus lenticularis* (Michaux) Kuntze – S. NatureServe G5 (Secure).

Leersia oryzoides (Linnaeus) Swartz. RICE CUTGRASS. **Hab:** Marshes, riverbanks, pond-shores, and a wide diversity of other wetlands. **Dist:** NS west to BC, south to Panhandle FL and CA; also in Europe and e. Asia (where probably introduced). **Phen:** Aug-Nov. **Syn:** = Ar, C, ETx1, F, FlGr, FNA24, G, GW1, HC, Il, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, WH3, WV, Tucker (1988); = *Homalocenchrus oryzoides* (Linnaeus) Pollich – S; > *Leersia oryzoides* var. *oryzoides* – Pyrah (1969). NatureServe G5 (Secure).

Leersia virginica Willdenow. WHITE GRASS, WHITE CUTGRASS, VIRGINIA CUTGRASS. **Hab:** Floodplain forests, swamps, streambanks, less typically in mesic to even dry-mesic upland forests. **Dist:** QC west to MN and SD, south to c. peninsular FL and TX. **Phen:** May-Nov. **Syn:** = Ar, C, ETx1, FlGr, FNA24, G, GW1, HC, Il, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, WH3, WV, Pyrah (1969), Tucker (1988); = *Homalocenchrus virginicus* (Willdenow) Britton – S; > *Leersia virginica* var. *ovata* (Poiret) Fernald – F; > *Leersia virginica* var. *virginica* – F. NatureServe G5 (Secure).



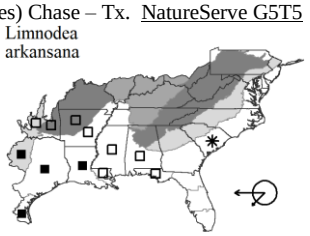
Key to Map Symbology: □⊡■ └native┘ ◇◈◆ └maybe exotic┘ △◬▲ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated



Leptoloma Chase 1906 (WITCHGRASS)

A genus of 4-10 species, perennial herbs, of North Americ, Central America, and South America. References: Lo Medico et al (2017); Vega et al (2009); Webster (1980); Webster (1987); Wipff & Hatch (1994); Wipff & Shaw (2018b); Wipff (1996b); Wipff (2003e) in FNA25 (2003a).

Leptoloma cognatum (J.A. Schultes) Chase. FALL WITCHGRASS. **Hab:** Sandy fields and roadsides. **Dist:** NH and MN south to FL, TX, and n. Mexico. **Phen:** Jun-Nov. **Syn:** = C, F, G, HC, Il, K4, RAB, Wipff & Hatch (1994), Wipff & Shaw (2018b); = *Digitaria cognata* (J.A. Schultes) Pilger – Ar, FlGr, FNA25, K3, Mi, NE, NY, Tn, Va, WH3; = *Digitaria cognata* ssp. *cognata* – ETx1, Mo1, NcTx; = *Digitaria cognata* var. *cognata* – K1; = *Digitaria cognatum* – Pa, orthographic variant; < *Leptoloma cognatum* (J.A. Schultes) Chase – Tx. NatureServe G5T5 (Secure).



Limnodea L.H. Dewey 1894

A monotypic genus, and annual, of sc. United States and adjacent Mexico. References: Brandenburg & Thieret (2000); Snow (2007b) in FNA24 (2007a); Tucker (1996).

Limnodea arkansana (Nuttall) L.H. Dewey. LIMNODEA. **Hab:** Calcareous prairies, hammocks, moist forests, loamy and sandy prairies, disturbed areas (Panhandle FL westward), waste at wool-combing mill, probably not established (SC). **Dist:** W. FL, c. and s. AL, west through MS, LA, and AR to OK, TX, and adjacent Mexico. **Phen:** Mar-Jun. **Syn:** = Ar, ETx1, FlGr, FNA24, HC, K1, K3, K4, NcTx, S, Tx, WH3, Brandenburg & Thieret (2000); = *Cinna arkansana* (Nuttall) G. Tucker – Tucker (1996). NatureServe G4? (Apparently Secure).

Lolium Linnaeus 1753 (RYE-GRASS, DARNEL, FESCUE)

A genus of about 8-10 species, annuals and perennials, native to Europe, n. Africa, and temperate Asia. Here interpreted to include *Schedonorus*, following Soreng et al. (2015); perhaps the two together are best included in an even-more expanded *Festuca*. The best generic placement of *Schedonorus arundinaceus* (= *Festuca elatior; = Festuca arundinacea; = Lolium arundinaceum*) and *S. pratense* has been much disputed. Articles and floras continue to place them variously in three genera: *Festuca* (Aiken et al. 1997; Baldwin et al. 2012, Mohlenbrock 2014), *Lolium* (Darbyshire 1993; Soreng et al. 2015), and *Schedonorus* (Soreng & Terrell 1998). References: Aiken & Darbyshire (1990); Darbyshire (1993); Darbyshire (2007) in FNA24 (2007a); Inda et al (2008); Smith & Aikin (2012); Soreng & Terrell (1998); Terrell (2007d) in FNA24 (2007a); Tucker (1996).

1 Inflorescence paniculate (spikelets borne on branches off the central axis, not 2-ranked).
  2 Auricles ciliate (sometimes only very sparsely so – check several at 10-20× magnification); spikelets with 3-6 (-9) florets; old sheaths pale straw-colored, often remaining intact; internodes of the rachilla antrorsely scabrous ..... ***Lolium arundinaceum***
  2 Auricles glabrous; spikelets with (2-) 4-10 (-12) florets; old sheaths brown, decaying to fibers; internodes of the rachilla glabrous (smooth) or nearly so ..... ***Lolium pratense***
1 Inflorescence spikelike (spikelets sessile on the central axis, 2-ranked).
  3 Glumes (12-) 15-25 mm long, subcoriaceous, equaling or surpassing the uppermost lemma (therefore the length of the spikelet); florets 4-9 per spikelet; annual ... ***Lolium temulentum ssp. temulentum***
  3 Glumes 4-12 mm long, herbaceous, shorter than the lemmas (therefore shorter than the spikelet); florets (2-) 5-22 per spikelet; annual or perennial.
    4 Lemmas (at least the upper) awned, the awns to 15 mm long; florets 11-22 per spikelet; annual or perennial ..... ***Lolium multiflorum***
    4 Lemmas awnless; florets (2-) 5-10 per spikelet; perennial ..... ***Lolium perenne***

* ***Lolium arundinaceum*** (Schreber) Darbyshire. TALL FESCUE, ALTA FESCUE. **Hab:** Fields, roadsides, pastures, disturbed areas. **Dist:** Native of Eurasia. **Phen:** May-Jul. **Syn:** = FlGr, K1, K4, WH3, Darbyshire (1993), Tucker (1996); = *Festuca arundinacea* Schreber – ETx1, HC, Il, K2, Meso6, Mo1, NcTx, Aiken & Darbyshire (1990); = *Festuca elatior* Linnaeus – C, nom. utique rej.; = *Festuca elatior* var. *arundinacea* (Schreber) Wimmer – G; = *Schedonorus arundinaceus* (Schreber) Dumortier – Ar, FNA24, K3, Mi, NE, NY, Pa, Tn, Va, Soreng & Terrell (1998); < *Festuca elatior* Linnaeus – F, RAB, S, Tx, W, WV, nom. utique rej.; < *Festuca pratensis* Hudson – GW1.

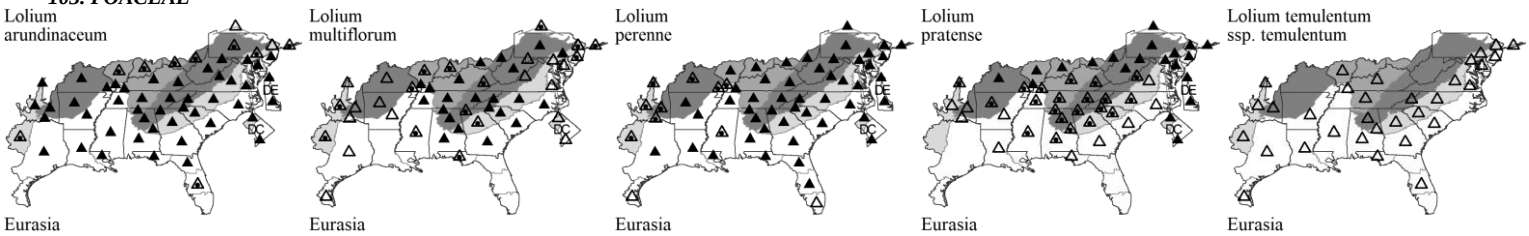
* ***Lolium multiflorum*** Lamarck. ITALIAN RYE-GRASS, ANNUAL RYE-GRASS. **Hab:** Fields, roadsides, pastures, disturbed areas. **Dist:** Native of Eurasia. **Phen:** Apr-Jul. **Syn:** = F, FlGr, FNA24, G, HC, Il, K4, Meso6, NE, Pa, RAB, S, Tn, WV; = *Lolium perenne* ssp. *multiflorum* (Lamarck) Husnot – K1, K3, NcTx, NY; = *Lolium perenne* Linnaeus var. *aristatum* Willdenow – Ar, C, ETx1, Mi, Mo1, Va, Tucker (1996); < *Festuca perennis* (Linnaeus) Columbus & J.P. Smith, Jr. – Smith & Aikin (2012); < *Lolium perenne* Linnaeus – W.

* ***Lolium perenne*** Linnaeus. ENGLISH RYE-GRASS, PERENNIAL RYE-GRASS. **Hab:** Fields, roadsides, pastures, disturbed areas. **Dist:** Native of Eurasia. **Phen:** Apr-Jul. **Syn:** = F, FNA24, G, HC, Il, K4, Meso6, NE, Pa, RAB, S, Tn, Tx, WH3, WV; = *Lolium perenne* Linnaeus ssp. *perenne* – K1, K3, NcTx, NY; = *Lolium perenne* Linnaeus var. *perenne* – Ar, C, ETx1, Mi, Mo1, Va, Tucker (1996); < *Festuca perennis* (Linnaeus) Columbus & J.P. Smith, Jr. – Smith & Aikin (2012); < *Lolium perenne* Linnaeus – W. NatureServe GNRTNR (Not Yet Ranked).

* ***Lolium pratense*** (Hudson) Darbyshire. MEADOW FESCUE. **Hab:** Fields, roadsides, pastures, disturbed areas. **Dist:** Native of Eurasia. **Phen:** May-Jul. **Syn:** = K1, K4, Darbyshire (1993), Tucker (1996); = *Festuca elatior* Linnaeus – HC, misapplied; = *Festuca elatior* var. *pratensis* (Hudson) A. Gray – G; = *Festuca pratensis* Hudson – C, ETx1, Il, K2, Mo1, Aiken & Darbyshire (1990); = *Schedonorus pratensis* (Hudson) Palisot de Beauvois – FNA24, K3, Mi, NY, Pa, Tn, Soreng & Terrell (1998); < *Festuca elatior* Linnaeus – F, S, W, WV, misapplied; < *Festuca pratensis* Hudson – GW1.

* ***Lolium temulentum*** Linnaeus *ssp.* ***temulentum***. DARNEL. **Hab:** Fields, roadsides, pastures, disturbed areas. **Dist:** Native of Eurasia. **Phen:** May-Jun. **Syn:** = Ar, FNA24, K4, NY; = *Festuca temulentum* (Linnaeus) Columbus & J.P. Smith, Jr. – Smith & Aikin (2012); = *Lolium temulentum* Linnaeus var. *temulentum* – FlGr; < *Lolium temulentum* – C, ETx1, F, HC, Il, Meso6, Mi, Mo1, NcTx, Pa, RAB, S, Tx, Va, WH3, Tucker (1996); > *Lolium temulentum* Linnaeus ssp. *temulentum* – K1, K3, NE; > *Lolium temulentum* var. *leptochaetum* A. Braun – G; > *Lolium temulentum* var. *macrochaeton* A. Braun – G.

Key to Map Symbology: □⊡■ └native┘ ◇◈◆ └maybe exotic┘ △◬▲ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated



Luziola A.L. de Jussieu 1789 (SOUTHERN WATER GRASS)

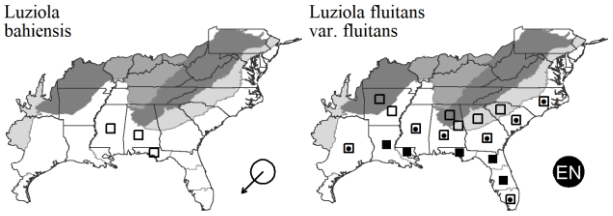
A genus of about 12 species, from s. North America south to tropical South America. References: Judziewicz et al (2000); Martínez-y-Pérez, Mejía-Saulés, & Sosa (2008); Terrell (2007c) in FNA24 (2007a); Tucker (1988).

2 Culms prostrate; leaves conspicuously clustered toward the apex of the culms, floating, 1-5 (-8) cm long; pistillate inflorescence an inconspicuous axillary raceme, 1.1-3.5 cm long, with 2-5 florets ..... ***Luziola fluitans var. fluitans***

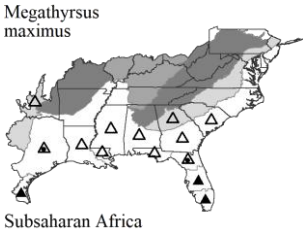
2 Culms suberect to erect; leaves scattered along the culm, not floating, > 6 cm long; pistillate inflorescence an axillary panicle, 2-21.5 (-58) cm long, with 18-250 (-350) florets.
..... ***Luziola bahiensis***

Luziola bahiensis (Steudel) A.S. Hitchcock. BRAZILIAN WATER GRASS. **Hab:** Streams and riverbanks. **Dist:** Apparently native (Anderson & Hall 1993), but considered native of South America by some authors. **Phen:** Jun-Oct (-May). **Syn:** = FlGr, FNA24, HC, K1, K3, K4, S, WH3, Martínez-y-Pérez, Mejía-Saulés, & Sosa (2008). NatureServe G4G5 (Apparently Secure).

Luziola fluitans (Michaux) Terrell & H. Robinson *var*. ***fluitans***. SOUTHERN WATER GRASS. **Hab:** Aquatic in water of natural lakes, slow-moving blackwater rivers, swamps, ponds, and other stagnant waters. **Dist:** Var. *fluitans* ranges from ne. NC to c. FL and west to e. TX. **Phen:** Aug-Oct. **Tax:** Var. *oconneri* (Guzman M.) G. Tucker occurs in the highlands of w. Mexico (Tucker 1988). **Comm:** A very unusual grass, truly aquatic, with flexuous stems and unwettable, floating leaves. In addition to floating leaves (helpful in the field but not in the herbarium!), other useful characters include two secondary blade nerves on either side of the midnerve and virtually as prominent as the midnerve, and which extend onto the sheath where they occur with another 5 or so strong nerves; often with cilia 0.5-1 mm long at the summit of the ventral face of the sheath (an unusual place); and a hyaline ligule about 1 mm long on the same plane as the sheath (i.e., free from the base of diverging blades). **Syn:** = FNA24, WH3, Judziewicz et al (2000), Tucker (1988); < *Hydrochloa carolinensis* Palisot de Beauvois – GW1, HC, RAB, S; < *Luziola fluitans* – Ar, ETx1, FlGr, K1, K3, K4, Meso6, Tx, Martínez-y-Pérez, Mejía-Saulés, & Sosa (2008). NatureServe G4G5TNR (Not Yet Ranked).



Megathyrsus (Pilger) B.K. Simon & S.W.L. Jacobs 2003 (GUINEA GRASS)



A genus of 3 species. References: Wipff & Thompson (2003b) in FNA25 (2003a).

* ***Megathyrsus maximus*** (Jacquin) B.K. Simon & S.W.L. Jacobs. GUINEA GRASS. **Hab:** A wide variety of dry to moist disturbed areas, pine plantations, fruit groves. **Dist:** Native of Africa. Introduced in the Gulf states (GA, AL, FL) (FNA; Carter, Baker, & Morris 2009) and se. SC (Bradley et al. [in prep.]). **Phen:** Jan-Dec. **Syn:** = FNA24, K3, K4; = *Panicum maximum* Jacquin – Bah, HC, S, Tx, WH3; = *Urochloa maxima* (Jacquin) R. Webster – FlGr, FNA25, K1; > *Panicum maximum* var. *maximum* – Meso6; > *Panicum maximum* var. *pubiglume* Schumann ex Peter – Meso6. NatureServe G5 (Secure).

Melica Linnaeus 1753 (MELIC)

A genus of about 80 species, north temperate, s. Africa and s. South America. References: Barkworth (2007c) in FNA24 (2007a); Tucker (1996).

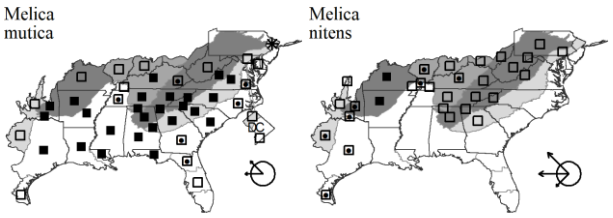
1 First glume oblong, 6.5-10 mm long, 2-4× as long as wide, acute to obtuse at the apex, about the same length and width as the second glume; inflorescence with (0-) 1-5 branches from the lower nodes only; fertile lemmas 2; leaves 1-6 mm wide; [common, widespread in our area] ..... ***Melica mutica***

1 First glume broadly ovate, 5-8 mm long, 1.5-2× as long as wide, obtuse to rounded at the apex, shorter and broader than the second glume; inflorescence with 2-10 (or more) branches from most nodes; fertile lemmas (2-) 3; leaves 3-12 mm wide; [rare, Mountains of NC and VA, northward and westward] ..... ***Melica nitens***

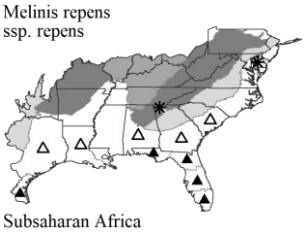
Melica mutica Walter. TWO-FLOWER MELIC. **Hab:** Dry to mesic forests and woodlands, including coastal fringe and maritime forests. **Dist:** MD west to IN and IL, south to n. peninsular FL and TX. **Phen:** Apr-Jun. **Syn:** = Ar, C, ETx1, F, FlGr, FNA24, G, HC, Il, K1, K3, K4, NcTx, RAB, S, Tn, Tx, Va, W, WH3, WV, Tucker (1996). NatureServe G5 (Secure).

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Melica nitens (Lamson-Scribner) Nuttall ex Piper. THREE-FLOWER MELIC. **Hab:** Rocky upland woodlands, barrens, cliffs, and glades, over calcareous rocks (such as limestone, dolomite, and calcareous shale) and more unusually over mafic rocks. **Dist:** PA west to s. MN and NE, south to nw. GA and TX. **Phen:** Apr-Jun. **Syn:** = Ar, C, ETx1, F, FNA24, G, HC, Il, K1, K3, K4, NcTx, Pa, RAB, Tn, Tx, Va, W, WV, Tucker (1996). NatureServe G5 (Secure).



Melinis Palisot de Beauvois 1812 (NATALGRASS)

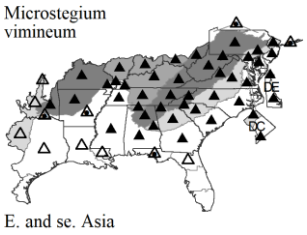


A genus of ca. 22 species, native to Africa and w. Asia. References: Wipff (2003j) in FNA25 (2003a).

* ***Melinis repens*** (Willdenow) Zizka *ssp.* ***repens***. ROSE NATALGRASS, CREEPING MOLASSES-GRASS. **Hab:** Disturbed areas, roadsides, railroad embankments, other disturbed areas. **Dist:** Native of Africa. Reported for several s. GA counties (Carter, Baker, & Morris 2009). Reported for Beaufort and Jasper counties, SC (Bradley et al. [in prep.]). The report for NC by Kartesz (1999) is an error and was dropped by Kartesz (2015, 2020). **Phen:** Jan-Dec. **Syn:** = FNA25; < *Melinis repens* – FlGr, K1, K3, K4, WH3; < *Rhynchelytrum repens* (Willdenow) C.E. Hubbard – Bah, Meso6, Tx; ? *Rhynchelytrum roseum* (Nees) Stapf & C.E. Hubbard ex Bews – HC; ? *Tricholaena rosea* Nees – S.

Microstegium Nees in Lindley 1836 (SASA-GRASS, JAPANESE-GRASS)

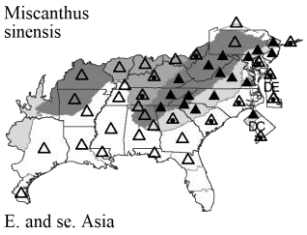
A genus of about 16 species, of subtropical Asia and Africa. References: Barden (1987); Chen, Veldkamp, & Kuoh (2012); Fairbrothers & Gray (1972); Koyama (1987); Thieret (2003c) in FNA25 (2003a); Winter, Schmitt, & Edwards (1982).



* ***Microstegium vimineum*** (Trinius) A. Camus. JAPANESE STILT-GRASS, FLEXIBLE SASA-GRASS, JAPANESE-GRASS. **Hab:** Disturbed areas, colonizing moist, rich soil, especially in floodplains, though sometimes patchily in even dry or dry-mesic uplands. **Dist:** Native of tropical se. Asia. **Phen:** Sep-Nov. **Comm:** The following chronological synopsis of flora accounts of *Microstegium* is instructive: not treated by Small (1933), "local" (Fernald 1950), "rarely introduced and possibly not established" (Gleason & Cronquist 1952), "sporadically naturalized" (Godfrey & Wooten 1979), "a rapidly spreading pernicious invader on moist ground, too common" (Wofford 1989). Radford, Ahles, & Bell (1968) reported it from fewer than 1/3 of the counties of the Carolinas (in 1968); it is now undoubtedly in every county, an abundant weed in most of them. This species has become a very serious pest, now ranking as one of the most destructive introduced plants in our area, forming extensive and dense patches, sprawling over and eliminating nearly all other herbaceous plants. Eradication is very difficult, and considering its obvious colonizing abilities, only temporary. Hunt & Zaremba (1992) documented the continuing northern expansion of *Microstegium* into NY and CT. Redman (1995) discussed its habitat preferences in MD and DC. Koyama (1987) reported it as "common as undergrowth of forests" in Japan, part of its native distribution. **Syn:** = Ar, C, ETx1, FlGr, FNA25, GW1, Il, K1, K3, K4, Mi, Mo1, NE, NY, Pa, RAB, Tn, Va, W, WH3, Chen, Veldkamp, & Kuoh (2012); = *Eulalia viminea* (Trinius) Kuntze – G; > *Eulalia viminea* var. *variabilis* Kuntze – F; > *Eulalia viminea* var. *viminea* – F; > *Microstegium vimineum* var. *imberbe* (Nees) Honda – HC; > *Microstegium vimineum* var. *vimineum* – HC. NatureServe GNR (Not Yet Ranked).

Miscanthus Andersson 1855 (EULALIA)

A genus of ca. 14 species, perennials, of Eurasia and s. Africa. References: Barkworth (2003p) in FNA25 (2003a).



* ***Miscanthus sinensis*** Andersson. EULALIA, CHINESE SILVER GRASS. **Hab:** Roadsides, powerline rights-of-way, other disturbed habitats, increasingly moving into a wide variety of natural habitats, including those with prescribed fire. **Dist:** Native of e. Asia. **Phen:** Apr-Nov. **Comm:** This species is becoming aggressively invasive. Forms with leaves cross-variegated or linear-variegated with yellow are cultivated and sometimes escape or persist (in addition to the much more common green-leaved form). **Syn:** = C, ETx1, FlGr, FNA25, G, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV; > *Miscanthus sinensis* var. *gracillimus* A.S. Hitchcock – Il; > *Miscanthus sinensis* var. *sinensis* – Il; > *Miscanthus sinensis* var. *variegatus* Beal – F, HC; > *Miscanthus sinensis* var. *zebrinus* Beal – F, HC.

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Mnesithea Kunth 1829 (JOINTGRASS)

A genus of about 30 species, perennial and annual herbs, widespread in the tropics and subtropics of the Old and New World. Here circumscribed to include *Coelorachis* and *Hackelochloa*, based on Veldkamp, Koning, & Sosef (1986) and Soreng et al. (2015). References: Allen (2003c) in FNA25 (2003a); Soreng et al (2015); Thieret (2003f) in FNA25 (2003a); Veldkamp, de Koning, & Sosef (1986).

1 Annual; sessile spikelets hemispheric; lower glumes of the sessile spikelet alveolate; [alien weed] ..... ***Mnesithea granularis***
1 Perennial (cespitose or rhizomatous); sessile spikelets ovate; lower glumes of the sessile spikelet rugose or pitted; [native].
  2 Culms round in cross-section ..... ***Mnesithea cylindrica***
  2 Culms compressed-keeled in cross-section.
    3 Lower glume with rectangular pits ..... ***Mnesithea tessellata***
    3 Lower glume smooth or with transverse ridges.
      4 Lower glume with transverse ridges ..... ***Mnesithea rugosa***
      4 Lower glume smooth ..... ***Mnesithea tuberculosa***

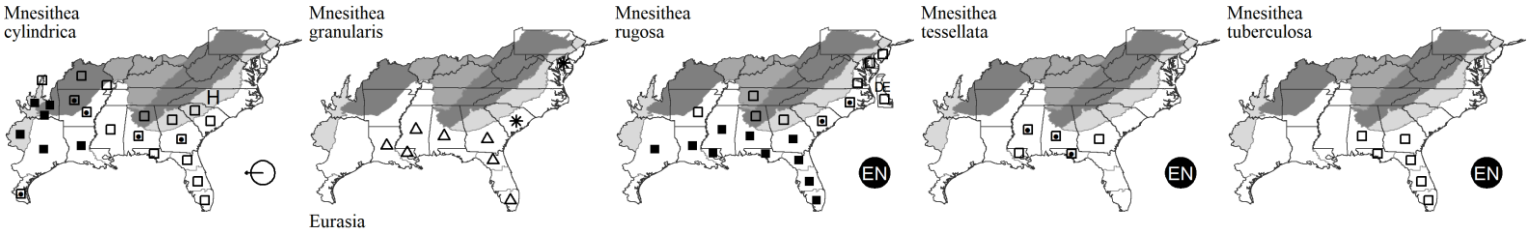
Mnesithea cylindrica (Michaux) de Koning & Sosef. CAROLINA JOINTGRASS. **Hab:** Prairies, oak woodlands, roadsides and other disturbed ground in areas formerly prairie-like and fire-maintained, perhaps now extirpated in portions of our area (including NC). **Dist:** Fairly widespread in se. North America, north to NC and SC (at least formerly), MS, MO, and TX. **Phen:** Apr-Aug. **Syn:** = FlGr, Veldkamp, de Koning, & Sosef (1986); = *Coelorachis cylindrica* (Michaux) Nash – Ar, C, ETx1, FNA25, K1, K3, K4, Mi, Mo1, NcTx, WH3; = *Manisuris campestris* (Nuttall) A.S. Hitchcock – S; = *Manisuris cylindrica* (Michaux) Kuntze – F, G, GW1, HC, RAB, Tx. NatureServe G4G5 (Apparently Secure).

* ***Mnesithea granularis*** (Linnaeus) de Koning & Sosef. PITSCALE GRASS. **Hab:** Hammocks, pinelands, disturbed areas. **Dist:** Native of the Old World. Reported for sw. GA and other Gulf Coast states (Thieret in FNA 2003a, Jones & Coile 1988, Kartesz 1999). **Phen:** Sep-Oct. **Syn:** = *Hackelochloa granularis* (Linnaeus) Kuntze – FlGr, FNA25, HC, K1, K3, K4, WH3; = *Rytilix granularis* (Linnaeus) Skeels – S. NatureServe GNR (Not Yet Ranked).

Mnesithea rugosa (Nuttall) de Koning & Sosef. WRINKLED JOINTGRASS. **Hab:** Limesink ponds (dolines), depression meadows, clay-based Carolina bays, wet pine savannas, wet pine flatwoods, marl prairies, disturbed areas (such as seeps in powerline rights-of-way), always in places with a seasonally high water-table. **Dist:** A Southeastern Coastal Plain endemic: s. NJ south to FL and west to TX. **Phen:** May-Oct. **Syn:** = FlGr, Veldkamp, de Koning, & Sosef (1986); = *Coelorachis rugosa* (Nuttall) Nash – Ar, C, ETx1, FNA25, K1, K3, K4, Va, WH3; = *Manisuris rugosa* (Nuttall) Kuntze – F, G, GW1, HC, RAB, S, Tx. NatureServe G5 (Secure).

Mnesithea tessellata (Steudel) de Koning & Sosef. PITTED JOINTGRASS. **Hab:** Wet pine savannas and bogs. **Dist:** Sw. GA and FL Panhandle west to e. LA, an East Gulf Coastal Plain endemic. **Phen:** Sep-Oct. **Syn:** = FlGr, Veldkamp, de Koning, & Sosef (1986); = *Coelorachis tessellata* (Steudel) Nash – FNA25, K1, K3, K4, WH3; = *Manisuris tessellata* (Steudel) Lamson-Scribner – GW1, HC, S. NatureServe G5? (Secure).

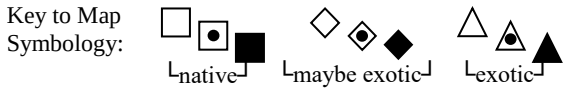
Mnesithea tuberculosa (Nash) de Koning & Sosef. SMOOTH JOINTGRASS. **Hab:** Pond margins. **Dist:** Southeastern Coastal Plain endemic: sw. GA (Mitchell County) (Sorrie 1998b) west to s. AL, and in the FL peninsula. **Phen:** Jun-Oct. **Syn:** = FlGr, Veldkamp, de Koning, & Sosef (1986); = *Coelorachis tuberculosa* (Nash) Nash – FNA25, K1, K3, K4, WH3; = *Manisuris tuberculosa* Nash – GW1, HC, S. NatureServe G3 (Vulnerable).



Muhlenbergia Schreber 1789 (MUHLY)

A genus of about 176 species, perennials and annuals, of North America south to Andean South America, and e. and se. Asia. *Muhlenbergia* is a large and diverse genus, recently reclassified by Peterson, Romaschenko, & Johnson (2010b); the subgenera used here follow that classification. References: Columbus & Smith (2010); Gustafson & Peterson (2007); Morden & Hatch (1989); Peterson (2003b) in FNA25 (2003a); Peterson, Romaschenko, & Johnson (2010b); Pohl (1969); Reeder (2003b) in FNA25 (2003a); Snow (2003b) in FNA25 (2003a).

1 Panicle open and diffuse, > 4 cm broad, the spikelets borne on slender or capillary pedicels longer than the lemmas.
  4 Lemma awn 0-1.5 (-4) mm long; glume bodies (1.1-) 2.0-3.3 (-3.6) mm long, < ½ as long as the lemma bodies, acuminate, not awned (rarely the second with a short awn < 0.6 mm long); spikelets usually brown or bronze (when fresh); basal sheaths usually very fibrous ..... ***Muhlenbergia expansa***
  4 Lemma awn (2-) 3-35 mm long; glume bodies (0.3-) 0.7-1.7 (-2.4) mm long, > ½ as long as the lemma body, one or both glumes sometimes awned; spikelets usually purple (when fresh); basal sheaths rarely strongly fibrous.
    5 Lemma awn (2-) 3-13 (-18) mm long, first glume awnless (or rarely with an awn to 3.2 mm long), second glume awnless (or rarely with an awn up to 5.0 mm long), palea awnless; lemma lacking setaceous teeth flanking the awn; flowering late Aug-Oct; [widespread in our area, particularly in rocky, clayey, or sandy glades, barrens, and woodlands with prairie affinities] ..... ***Muhlenbergia capillaris***
    5 Lemma awn (8-) 12-26 (-35) mm long, first glume awn (0.5-) 1-7 (-10) mm long, second glume awn (1-) 5-19 (-25) mm long, palea awn-tipped; lemma with two setaceous teeth flanking the awn, the teeth 0.5-2.5 (-4.7) mm long; flowering Oct-Nov; [sandy maritime situations on barrier islands of the outer Coastal Plain] ..... ***Muhlenbergia sericea***
1 Panicle slender, dense, < 2.5 cm broad, the spikelets sessile or on non-capillary pedicels shorter than the lemmas; [subgenus *Muhlenbergia*].
  6 Glumes minute, 0-0.5 mm long; plant lacking rhizomes; culms weak, decumbent and cespitosely branching in their lower portions, rooting at the nodes, the upper portions erect and sparsely branched ..... ***Muhlenbergia schreberi***
  6 Glumes well-developed, 1-7 mm long; plant with scaly rhizomes (except for *M. cuspidata*); culms firm (rarely sprawling), few or solitary (rarely forming dense colonies).



9 Panicle linear, loosely flowered, much exceeding the leaves; culm erect, simple or sparingly branched; glumes relatively broad, the body ovate, 1.2-2.5 mm long, abruptly narrowed to the acuminate tip; ligule obsolete or shorter than the elongate cartilaginous summit of the leaf sheath.
10 Lemmas awnless or awn < 0.5 mm long; spikelets 1.5-2.5 mm long; leaf blades usually (1-) 2-6 mm wide ..... ***Muhlenbergia sobolifera***
10 Lemma awn 1-11 mm long (rarely awnless); spikelets 3-5 mm long; leaf blades (2) 6-10 (-13) mm wide (often > 8 mm wide) ..... ***Muhlenbergia tenuiflora***
9 Panicle lanceolate, densely (rarely loosely) flowered, leaves often extending conspicuously into the inflorescence; culm geniculate, freely branched; glumes relatively narrow, the body lanceolate, 2-3 mm long, tapering from base to apex; ligule usually obvious above the short cartilaginous summit of the leaf sheath.
11 Culm glabrous throughout (including below the nodes).
..... ***Muhlenbergia frondosa***
11 Culm pubescent, at least below the nodes.
13 Lemma awn 7-12 mm long; spikelets loosely clustered, on pedicels 2-4 mm long ..... ***Muhlenbergia sylvatica***
13 Lemma awnless or with a short awn tip (rarely to 9 mm long); spikelets densely clustered, on pedicels < 1 mm long.
..... ***Muhlenbergia glabrifloris***

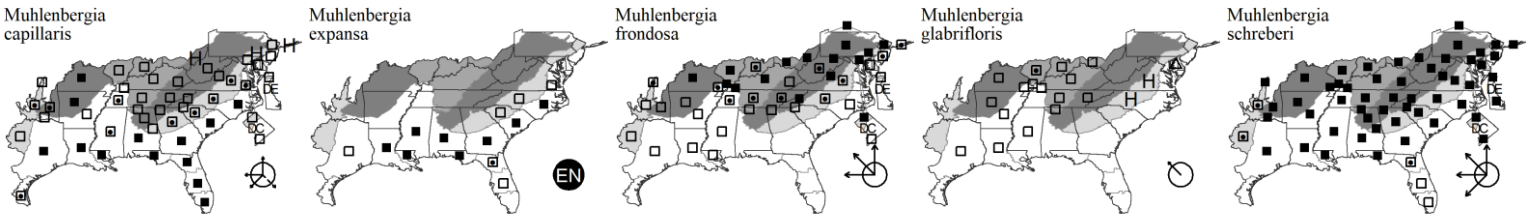
Muhlenbergia capillaris (Lamarck) Trinius. HAIRGRASS, HAIR-AWN MUHLY. **Hab:** In the Piedmont and Interior Low Plateau primarily in clayey or thin rocky soils (especially in areas which formerly burned and were prairie-like) and in open woodlands, in the Coastal Plain in pine savannas, sandhills, dry woodlands, and coastal grasslands (where sometimes in close proximity with *M. sericea*), in the Mountains around calcareous rock outcrops, sandy prairies westwards. **Dist:** MA, NY, s. OH, s. IN, s. IL, MO, and e. KS south to s. FL, LA, and c. and s. TX. **Phen:** Aug-Dec. **Tax:** *M. capillaris* and its relatives, *M. expansa* and *M. sericea*, were the subject of an herbarium morphological study by Morden & Hatch (1989), who concluded that the three taxa are not sharply separable and should be recognized only at the varietal level. If one considers behavior in the field, ecology, and geography in conjunction with morphologic characters, however, there is little doubt that the three taxa are biological species. Distribution and typical habitat are different for the three species, but *M. capillaris* can be found growing with or in proximity to each of the other two (I have not seen *M. sericea* and *M. expansa* together). In such situations, the two taxa present are readily distinguishable at a glance, and there is no evidence of intermediates or hybrids. Gustafson & Peterson (2007) also concluded that the three taxa are separable as species. **Syn:** = Ar, ETx1, F, FlGr, FNA25, G, Il, K3, K4, NcTx, NE, NY, Pa, Tn, Va, W, Gustafson & Peterson (2007); = *Muhlenbergia capillaris* var. *capillaris* – C, HC, K1, Mo1, S, WH3, Morden & Hatch (1989); < *Muhlenbergia capillaris* (Lamarck) Trinius – GW1, RAB, Tx. NatureServe G5T5? (Secure).

Muhlenbergia expansa (Poiret) Trinius. SAVANNA HAIRGRASS. **Hab:** Pine savannas, pine flatwoods, mesic areas in sandhill-pocosin ecotones. **Dist:** Se. VA south to FL, west to e. TX (nearly exactly the range of *Pinus palustris*). **Phen:** Sep-Oct. **Tax:** See *M. capillaris* for a discussion of recent studies on the *M. capillaris* complex. **Comm:** An important part of the grassy component of many longleaf pine savannas, *M. expansa*'s flowering is stimulated by fire, and, lacking fire, it may be found in large populations in solely vegetative condition. **ID Notes:** *Muhlenbergia expansa* can be distinguished in sterile condition from other savanna bunchgrasses (*Sporobolus teretifolius, S. pinetorum, S. floridanus, S. curtissii, Aristida stricta*, and *A. beyrichiana*) by the following characteristics: old leaf bases fibrous and curly (rather than hardened and cartilaginous) and ligules 1-3 mm long (rather than 0.2 to 0.5 mm long). The open panicle somewhat resembles that of several species of similar habitat which often co-occur with *M. expansa* – *Sporobolus teretifolius, S. pinetorum, S. curtissii, S. floridanus*, and *S. brevipilis*, but the panicle of *M. expansa* is capillary, flexuous, and fragile, tending to break up over the winter (vs. fine-textured but not capillary, the branches rigid and ascending, more likely to persist over the winter in relatively intact condition). The vegetative characters listed above and under *Sporobolus brevipilis* are also useful. **Syn:** = ETx1, F, FNA25, GW1, HC, K3, K4, RAB, S, Va, Gustafson & Peterson (2007); = *Muhlenbergia capillaris* var. *trichopodes* (Elliott) Vasey – C, K1, WH3, Morden & Hatch (1989); < *Muhlenbergia capillaris* (Lamarck) Trinius – Tx; < *Muhlenbergia sericea* (Michaux) P.M. Peterson – FlGr. NatureServe G5T5 (Secure).

Muhlenbergia frondosa (Poiret) Fernald. SMOOTH WIRESTEM MUHLY, SATIN GRASS. **Hab:** Barrens, prairies, floodplain forests, riverbanks, scour prairies, and moist disturbed areas. **Dist:** NC, ON, and ND south to e. NC, nw. SC, ne. GA, n. AL, n. MS, ne. LA, and ne. TX. **Phen:** Late Aug-Oct. **Syn:** = Ar, C, ETx1, F, FNA25, G, GW1, HC, Il, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, W, WV; = *Muhlenbergia mexicana* (Linnaeus) Trinius – S, misapplied.

Muhlenbergia glabrifloris Lamson-Scribner. CLAY-PAN MUHLY, SMOOTH MUHLY. **Hab:** Barrens, open oak flatwoods, other open habitats, in clayey soils. **Dist:** VA and NC west to IA, MO, AL, and TX, local and apparently rare in all of that range. **Phen:** Aug-Nov. **Comm:** In NC, only known from one collection, that from Durham County in 1936, with vague habitat data. F describes the habitat as "dry exsiccated or baked soils, prairies, gravels or rocky slopes," Pohl (1969) as "mostly on low ground, in shade on heavy clay soils." **Syn:** = Ar, FNA25, Il, K3, K4, Mo1, NcTx, Tn; = *Muhlenbergia glabriflora* – C, ETx1, F, G, HC, K1, Tx, Va, orthographic variant. NatureServe G4? (Apparently Secure).

Muhlenbergia schreberi J.F. Gmelin. NIMBLE-WILL. **Hab:** Bottomland and other moist forests, dry forests, fields, dirt roads, disturbed areas. **Dist:** ME, NY, ON, MI, WI, MN, and SD, south to c. peninsular FL, LA, and c. TX. **Phen:** Aug-Jan. **Syn:** = Ar, C, ETx1, F, FlGr, FNA25, GW1, HC, Il, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV; > *Muhlenbergia schreberi* var. *palustris* (Lamson-Scribner) Lamson-Scribner – G, Il; > *Muhlenbergia schreberi* var. *schreberi* – G, Il. NatureServe G5 (Secure).



Muhlenbergia sericea (Michaux) P.M. Peterson. DUNE HAIRGRASS, SWEET GRASS. **Hab:** Maritime dry grasslands, maritime wet grasslands, interdune swales, low dunes, sometimes edges of freshwater or brackish marshes, northwards in its distribution (in NC and SC) apparently limited to the barrier islands (sometimes in close proximity with *M. capillaris*), sometimes locally abundant. **Dist:** NC (slightly north of Oregon Inlet, Dare County, south of Nags Head) south to s. FL and west to s. TX, primarily on barrier islands (some portions of the distribution on the Gulf Coast may be by introduction only). **Phen:** Aug-Dec. **Comm:** This species is a very conspicuous part of the Outer Banks flora in the autumn, especially showy and abundant between Rodanthe (Chicamacomico) and Avon (Kinnakeet), Dare County, NC, and also abundant on Ocracoke Island, Hyde County,

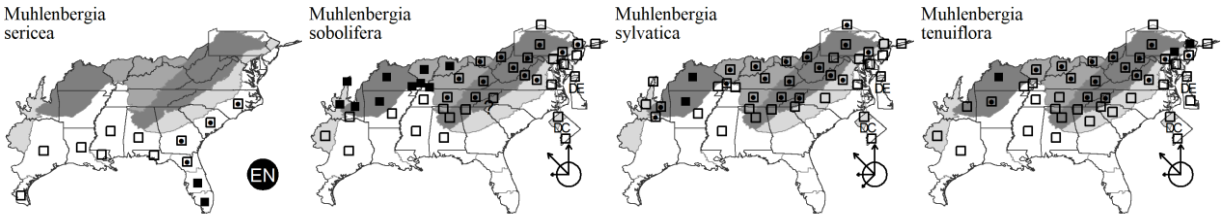
Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

NC. The capillary pedicels and awns of its purple inflorescences are so light as to be moved by the slightest breeze. By December or January they fade to tan, but remain showy. This grass is a major component of baskets made in the Low Country of SC by the Gullah, who call it "sweet grass." I agree with Curtis (1843), Blomquist (1948), Pinson & Batson (1971), Gould (1975), and others who consider *M. sericea* (as *M. filipes*) a species distinct from *M. capillaris*. In addition to a discussion of its relationship to *M. capillaris*, Pinson and Batson (1971) and Morden & Hatch (1989) provide descriptions, not elsewhere available. See *M. capillaris* for a discussion of recent studies on this complex. **Syn:** = FNA25, K3, K4, Gustafson & Peterson (2007); = *Muhlenbergia capillaris* var. *filipes* (M.A. Curtis) Chapman ex Beal – HC, K1, S, WH3, Morden & Hatch (1989); < *Muhlenbergia capillaris* (Lamarck) Trinius – GW1, RAB, Tx; < *Muhlenbergia sericea* (Michaux) P.M. Peterson – FlGr. NatureServe G5T5? (Secure).

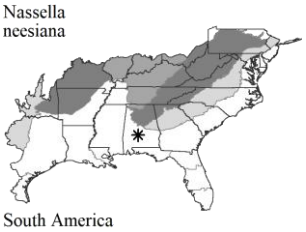
Muhlenbergia sobolifera (Muhlenberg ex Willdenow) Trinius. ROCK MUHLY. **Hab:** Dry wooded limestone slopes, rock outcrops, and rocky calcareous woodlands and forests. **Dist:** ME, WI, and KS south to n. GA, n. AL, n. MS, and c. TX. **Phen:** Jul-Oct. **Syn:** = Ar, C, ETx1, F, FNA25, G, HC, Il, K1, K3, K4, Mo1, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WV. NatureServe G5 (Secure).

Muhlenbergia sylvatica Torrey ex A. Gray. WOODLAND MUHLY. **Hab:** Bottomland and other moist forests, calcareous or mafic streambanks, prairies. **Dist:** ME and MN south to SC, ne. GA, AL, and TX. **Phen:** Jul-Oct. **Syn:** = Ar, C, FNA25, Il, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, W, WV; = *Muhlenbergia umbrosa* Lamson-Scribner – S; > *Muhlenbergia sylvatica* var. *sylvatica* – F, G, GW1, HC. NatureServe G5T3T5 (Apparently Secure).

Muhlenbergia tenuiflora (Willdenow) Britton, Sterns, & Poggenburg. SLENDER MUHLY. **Hab:** Moist forests and disturbed areas, up to at least 1400 meters, especially in base-rich soils. **Dist:** NH, WI, and NE south to GA, AL, MS, and OK. **Phen:** Aug-Oct. **Tax:** Two varieties are sometimes recognized: var. *tenuiflora*, with lemma awn 4-11 mm long and the sheaths and stems retrorsely hirsute, especially around the nodes, and var. *variabilis* (endemic to the Southern Appalachians), with lemma awn 1-4 mm long or absent, and the sheaths and stems glabrous or nearly so. The validity of the varieties needs further assessment. **Syn:** = Ar, F, FNA25, G, HC, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Va, W, WV; > *Muhlenbergia tenuiflora* var. *tenuiflora* – C, Mo1; > *Muhlenbergia tenuiflora* var. *variabilis* (Lamson-Scribner) Pohl – C.



Nassella (Trinius) Desvaux 1846



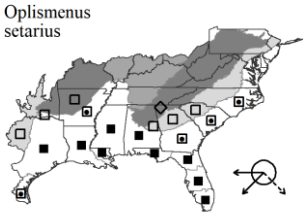
A genus of ca. 116 species, mainly perennials, mainly of South America. References: Barkworth (2007i) in FNA24 (2007a); Cialdella et al (2014).

* ***Nassella neesiana*** (Trinius & Ruprecht) Barkworth. URUGUAYAN TUSSOCKGRASS. **Hab:** Waif on ballast. **Dist:** Native of South America. Known only from old collections on ballast from Mobile, AL. **Syn:** = FNA24, K3, K4. NatureServe GNR (Not Yet Ranked).

Oplismenus Palisot de Beauvois 1807 (WOODS-GRASS, BASKET-GRASS)

A genus of 5 or more species, widespread in the New World and Old World tropics, subtropics, and warm temperate areas. References: Crins (1991); Peterson et al (1999); Scholz (1981); Wipff (2003h) in FNA25 (2003a).

Identification Notes: Superficially, *Oplismenus* somewhat resembles *Arthraxon*, but has the leaves only slightly cordate at the base (vs. strongly cordate-clasping).



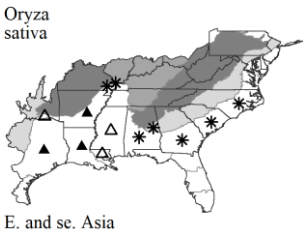
Oplismenus setarius (Lamarck) Roemer & J.A. Schultes. WOODS-GRASS. **Hab:** Hammocks, maritime forests, shell middens, moist forests. **Dist:** *O. hirtellus* is widespread in tropical and subtropical areas of the New and Old World; the "*setarius* entity" (variously treated at subspecies or species rank) ranges from e. NC south to FL, west to AR and TX, and south through the Caribbean and Central America to central South America. **Phen:** Aug-Oct. **Tax:** Scholz (1981) recognizes many other subspecies. The "*setarius* entity" is undoubtedly native in our area, often occurring in undisturbed habitats in natural communities entirely devoid of alien species (though it can also act somewhat aggressively in disturbed sites); the basis of Gould's (1975) assertion that *Oplismenus* is "introduced or adventive in the United States" is unknown. Crins (1991) favors treating *O. setarius* as a taxonomically unrecognized component within a polymorphic *O. hirtellus*. **Syn:** = HC, RAB, S; = *Oplismenus hirtellus* (Linnaeus) Palisot de Beauvois ssp. *setarius* (Lamarck) Mez ex Ekman – ETx1, FNA25, K3, Meso6, Scholz (1981); < *Oplismenus compositus* (Linnaeus) Palisot de Beauvois – K4; < *Oplismenus hirtellus* (Linnaeus) Palisot de Beauvois – Ar, NcTx, Tx, Crins (1991).

Oryza Linnaeus 1753 (RICE)

A genus of about 20 species, native of tropical and warm temperate portions of the Old World. References: Barkworth & Terrell (2007) in FNA24 (2007a); Judziewicz et al (2000); Nanda & Sharma (2003); Tucker (1988).

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

* ***Oryza sativa*** Linnaeus. RICE. **Hab:** Marshes, impoundments, of only sporadic occurrence outside of cultivation. **Dist:** Native of Asia. Perhaps the single most important food crop in the world, developed as a crop in Asia and cultivated at least since 10,000 years BP (Hancock 2004). **Phen:** Jun-Nov. **Comm:** Rice was an important crop before the Civil War in SC, GA, and extreme se. NC. It is planted as a crop in AR, LA, TX, and MS, and planted elsewhere in waterfowl impoundments. **Syn:** = Ar, C, FlGr, FNA24, G, GW1, HC, Il, K1, K3, K4, Meso6, Mo1, RAB, S, Tx, Judziewicz et al (2000), Nanda & Sharma (2003), Tucker (1988). NatureServe GNR (Not Yet Ranked).



Panicum Linnaeus 1753 (PANIC GRASS)

Contributed by Richard J. LeBlond

There has been considerable controversy over the generic limits of *Panicum*. In its broader past conceptions, it has been considered to include (in our area) taxa sometimes and variously segregated as *Brachiaria, Dichanthelium, Eriochloa, Paspalidium, Phanopyrum, Steinchisma*, and *Urochloa*. All were originally recognized based on morphological characteristics, to which have recently been added anatomical, chemical, and other evidence. Crins (1991) recognizes *Eriochloa*, *Urochloa* (including *Brachiaria*), *Paspalidium*, and *Panicum* as genera, with *Panicum* subdivided into subgenera *Panicum*, *Agrostoides*, *Dichanthelium*, *Phanopyrum*, and *Steinchisma*. We prefer to recognize most of the segregates as genera, pending further analyses, since there is little evidence that these groups are more closely related to one another than they are to other genera recognized in the Paniceae. *Phanopyrum* and *Dichanthelium* are the only segregate groups with C3 photosynthesis. *Eriochloa* and *Urochloa* (including *Brachiaria*) have C4 photosynthesis, with PEP-ck decarboxylation. *Panicum* and *Paspalidium* have C4 photosynthesis, with NAD-me or NADP-me decarboxylation. *Steinchisma*, in addition to its unusual expansion of the palea, apparently has a peculiar photosynthetic pathway, described by Crins (1991) as "intermediate between" C3 and C4 photosynthesis; "the leaves have Kranz anatomy, but there are fewer organelles than usual in the outer sheath."

We agree with Hansen & Wunderlin (1988) that "*Dichanthelium* is as 'good' a grass genus as many others (e.g. *Brachiaria*, *Sacciolepis*, and many more in other tribes)". Despite arguments to the contrary, there is little doubt that *Dichanthelium* is a natural group. Zuloaga, Ellis, and Morrone (1993) argue against the recognition of *Dichanthelium* as a genus, preferring to treat it as a subgenus under *Panicum*. They state, however, "within *Panicum*, *Dichanthelium* can be distinguished at the subgeneric level by the following set of characters: lax inflorescences; ellipsoid to obovoid spikelets; upper glume and lower lemma usually 7-11 nerved; upper anthecium apiculate or shortly crested, and simple papillae on the lemma and palea. Anatomically, all species are non-Kranz or C3, with the outer parenchymatous sheath lacking specialized chloroplasts", etc. The argument that *Phanopyrum* also has C3 photosynthesis does not materially affect the issue of the taxonomic rank at which to recognize the groups.

We also agree with Hansen & Wunderlin (1988) that "the acceptance of *Dichanthelium* provides a more consistent generic classification". It offers conveniences, as well, in our area, where *Dichanthelium* and *Panicum* are readily distinguishable from each other, and the combined genus would be very large, indeed. References: Darbyshire & Cayouette (1995); Freckmann & Lelong (2003c) in FNA25 (2003a); Haines (2010); LeBlond (2020); Lelong (1986); Sorrie (2018b) in Weakley et al (2018a); Zuloaga & Morrone (1996).

Identification Notes: {INTRODUCTION: Describe differences between *Panicum*, *Dichanthelium*, *Urochloa* (=*Brachiaria*), and *Paspalidium*, all of which are treated as *Panicum* in RAB. Describe collection methods and character analysis.}

1 Spikelets tuberculate..... ***Kellochloa***
1 Spikelets smooth, not tuberculate.
  2 Panicle < 2 cm wide at maturity.
    3 Spikelets > 4.5 mm long; first glume > 2.4 mm long; ligule 4-6 mm long; [of coastal dunes]; [*Panicum* section *Hiantes*]..... ***Panicum amarum***
    3 Spikelets < 4 mm long; first glume < 2.1 mm long; ligule < 2 mm long; [not of coastal dunes].
      4 Blades involute, 1.5-4 mm wide; culms wiry..... ***Coleataenia***
      4 Blades flat, the larger 6-20 mm wide; culms stout.
        5 Panicles constricted, 0.3-1.6 cm wide; spikelets subsessile to short-pediceled; summit of fertile palea not enclosed by fertile lemma..... ***Hymenachne hemitoma***
        5 Panicles > 1 cm wide; spikelets short to long-pediceled; summit of fertile palea enclosed by fertile lemma..... ***Coleataenia***
  2 Panicle > 2 cm wide at maturity.
    6 Lower primary panicle branches in whorls of 4-7 at the nodes, stiffly spreading, naked on the proximal ½, the axils strongly pilose; lower culm internodes appressed papillose-pubescent; first glume acuminate, ½ as long as spikelet; fertile lemma chestnut brown at maturity; [*Panicum* section *Panicum*]..... ***Panicum bergii***
    6 Plants without the above combination of characters.
      7 Plants from a cluster of fibrous roots, without rhizomes or hard knotty crowns, annuals or perennials.
        8 First glume 1/5 to 1/3 length of spikelet, blunt to broadly rounded to truncate; sheaths usually glabrous (papillose-hispid in *P. dichotomiflorum* var. *bartowense*); nodes glabrous; [*Panicum* section *Dichotomiflora*]. ..... ***Panicum dichotomiflorum var. dichotomiflorum***
        8 First glume 1/3 to 1/2 length of spikelet, acute to subacute; sheaths villous or hispid (except in the locally introduced *P. bisulcatum*); nodes often bearded.
          12 Spikelets 4.5-6 mm long; panicle branches often nodding or drooping at maturity; [*Panicum* section *Panicum*]..... ***Panicum miliaceum ssp. miliaceum***
          12 Spikelets 1.8-3.6 mm long; panicle branches ascending-spreading at maturity.
            13 Spikelets long-acuminate, (2.6-) 3.0-3.6 mm long; mature panicle slender, usually 2-3× as long as wide; [*Panicum* section *Panicum*]..... ***Panicum flexile***
            13 Spikelets short-pointed to acuminate, 1.8-2.5 (-2.8) mm long; mature panicle usually 0.7-2× as long as wide.

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

15 Panicle usually equal to or longer than portion of culm below panicle, often basally included at maturity; panicle rachis, branches, and pedicels usually scabrous with barbs > 0.05 mm; pulvini usually pilose to villous, especially at lower primary branches (sometimes glabrous); culm usually not obviously zig-zag; larger blades usually more than 10 mm wide; spikelets 1.6-2.9 (-4) mm long, short- to long-acuminate, lanceolate, lance-ovoid, or lance-ellipsoid; first glume 0.6-1.5 (-2) mm long..... ***Panicum capillare***

15 Panicle usually not as long as portion of culm below panicle, usually exerted at maturity; panicle rachis and branches usually smooth, the pedicels often scabrous with barbs < 0.05 mm; pulvini glabrous to sparsely (-moderately) pilose; culm often zig-zag at least proximally; larger blades usually no more than 4-12 mm wide; spikelets 1.4-2.4 mm long, pointed to short-acuminate, lance-ellipsoid, ellipsoid, ovoid, or obovoid; first glume 0.4-0.9 (-1.2) mm long.

16 Herbage usually purple-tinged (-yellowish-green); internodes glabrous to sparsely hispid; blades 2-6 mm wide, ascending; pulvini glabrous to sparsely pilose; spikelets 1.8-2.2 mm long, twice or more as long as wide; mature fertile lemma blackish (rarely stramineous); [plants of granite outcrops of NC, SC, and GA]..... ***Panicum philadelphicum ssp. lithophilum***

16 Herbage yellow-green to green or purple-tinged; internodes glabrate to densely hispid; blades 2-12 mm wide, spreading to ascending; pulvini glabrous to pilose; spikelets 1.4-2.4 mm long, < 2 to 2 × as long as wide; mature fertile lemma stramineous to blackish; [plants of a variety of open or wooded, dry or wet, and often disturbed sites].

17 Culms to 1 m long; internodes sparsely to densely hispid; blades to 12 mm wide; blade of flag (inflorescence bract) usually > ½ as long as panicle; panicle ellipsoid to obovoid, moderately to densely flowered; pulvini glabrous to sparsely pilose; spikelets 1.7-2.4 mm long..... ***Panicum philadelphicum ssp. gattingeri***

17 Culms to 0.5 m long; internodes glabrate to hispid; blades to 6 mm wide; blade of flag (inflorescence bract) usually < ½ as long as panicle; panicle ovoid to deltoid, sparingly to moderately flowered; pulvini sparsely to moderately pilose; spikelets 1.4-2.2 (-2.4) mm long..... ***Panicum philadelphicum ssp. philadelphicum***

7 Plants with rhizomes or hard knotty crowns, perennial.

18 Plants with hard crowns, lacking rhizomes; fertile lemma 1.2-2.4 mm long.
..... ***Coleataenia***

18 Plants with rhizomes; fertile lemma 1.6-4 mm long.

20 Rhizomes about 1 cm thick with pubescent scale-like leaves; lower portion of culm hard, nearly woody; [section *Antidotale* {not *Panicum*}] .....
..... ***Panicum antidotale***

20 Rhizomes less than 1 cm thick with glabrous scale-like leaves; culms not woody.

21 First glume truncate apically; [*Panicum* section *Repentia*]..... ***Panicum repens***

21 First glume acute to obtuse.

22 Culms slightly compressed below; ligules 0.5 mm long or less; spikelets subsessile and subsecund, usually some obliquely bent above the first glume; fertile lemma 1.8-2.2 mm long..... ***Coleataenia***

22 Culms terete; ligules 1-6 mm long; spikelets pediceled and not at all secund, essentially straight; fertile lemma 2-4 mm long; [*Panicum* section *Hiantes*].

23 Panicle narrow, the branches erect; sheaths longer than internodes; spikelets 4.3-7.7 mm long; fertile lemma 3-4 mm long.

24 First glumes 2.5-5.5 mm long, ⅔-¾ as long as the spikelet, 7-9 nerved, the nerves thickened and raised; rhizomes usually elongate; culms solitary to loosely tufted, 0.2-1.5 m tall; leaves 0.7-3.6 dm long; panicles 2-6 cm wide, the primary branches usually 1-2 per node, loosely flowered; spikelets 4.7-7.7 mm long; fertile lemma 1.3-1.8 mm wide..... ***Panicum amarum***

24 First glumes 2-3.5 mm long, ½-⅔ as long as the spikelet, 3-5 (-7) nerved, the nerves thin and wiry; rhizomes usually short; culms usually tufted, 1-2 (-3) m tall; leaves 2-5 dm long; panicles 3-10 cm wide, the primary branches usually 2 or more per node, densely flowered; spikelets 4.0-5.9 mm long; fertile lemma 1.0-1.5 mm wide..... ***Panicum amarulum***

23 Panicle with divergent to spreading-ascending branches; upper sheaths shorter than internodes; spikelets 2.8-5 mm long; fertile lemma 2-2.6 mm long.

25 Spikelets 2.8-3.5 mm long; beak of sterile lemma exceeding fertile lemma by 0.2-0.5 mm; first glume (blunt-) acute, ½-2/3× as long as spikelet..... ***Panicum virgatum var. cubense***

25 Spikelets 3.2-5 mm long; beak of sterile lemma exceeding fertile lemma by 0.6-1.3 mm; first glume acuminate, 3/5-3/4× as long as spikelet.
..... ***Panicum virgatum var. virgatum***

Panicum amarulum A.S. Hitchcock & Chase. SOUTHERN SEABEACH GRASS. **Hab:** Coastal dunes and shores, sand-flats, and longleaf pine sandhills. **Dist:** NJ s. to FL, west to TX and Mexico; West Indies; restricted to the Coastal Plain except for WV (where apparently introduced). **Phen:** Jul-Nov. **Tax:** Palmer (1975) reduced *P. amarum* and *P. amarulum* to infraspecific rank, but their broadly overlapping distributions and suite of characters suggests that they are separate lineages. Ultimately, this species is not part of *Panicum* sensu stricto. **Comm:** Primarily a coastal plant, *P. amarulum* has been planted extensively in the Sandhills of NC. Blomquist 1948 says this taxon "does not seem to grow naturally in North Carolina." **Syn:** = Bah, C, F, G, HC, RAB, S, Tx, WV; = *Panicum amarum* ssp. *amarulum* (A.S. Hitchcock & Chase) Freckmann & Lelong – FlGr, FNA25, NE, NY; = *Panicum amarum* Elliott var. *amarulum* (A.S. Hitchcock & Chase) P.G. Palmer – K1, K3, K4, Meso6, Pa, Va, Lelong (1986); < *Panicum amarum* Elliott – WH3. NatureServe G5T3T5 (Apparently Secure).

Panicum amarum Elliott. BITTER SEABEACH GRASS. **Hab:** Coastal dunes and shores. **Dist:** CT s. to FL, w. to TX and TAB; restricted to the coast. **Phen:** Aug-Nov (-Jul). **Comm:** See note under *P. amarulum*. **Syn:** = C, F, G, HC, RAB, S; = *Panicum amarum* ssp. *amarum* – FlGr, FNA25, NE, NY; = *Panicum amarum* Elliott var. *amarum* – K1, K3, K4, Meso6, Pa, Va, Lelong (1986); < *Panicum amarum* Elliott – WH3. NatureServe G5T5? (Secure).

* ***Panicum antidotale*** Retzius. BLUE PANIC GRASS. **Hab:** Open, disturbed areas and fields. **Dist:** Native of India and c. Asia. **Phen:** Apr-Sep. **Comm:** Not a *Panicum*. **Syn:** = ETx1, FNA25, HC, K1, K3, K4, Meso6, NcTx, Tx. NatureServe GNR (Not Yet Ranked).

* ***Panicum bergii*** Arechavaleta. BERG'S PANIC GRASS. **Hab:** Ditches and shallow, sporadically flooded depressions in grasslands. **Dist:** Native of e. South America. Reported for sc. GA (HC), AL (Kartesz 1999), and se. TX. **Phen:** Late Apr-May. **Comm:** *Panicum* sensu stricto. **Syn:** = ETx1, FNA25, HC, K1, K3, K4, NcTx, S; > *Panicum pilcomayense* Hackel – Tx.

Panicum capillare Linnaeus. OLD-WITCH GRASS, TUMBLEWEED, TICKLE GRASS. **Hab:** Open sandy or stony soil, fields, roadsides, waste places, often weedy in cultivated soil. **Dist:** E. to c. Canada, s. to FL and TX; Bermuda. **Phen:** Aug-Nov. **Tax:** Plants formerly known as *P. capillare* var. *occidentale* Rydberg, ranging from Canada south to NJ, WV, KY, TX, and CA, are distinguished by long-acuminate spikelets 2.5-4 mm long that are mostly subsessile or short-pedicelled. In our region, *P. capillare* has short-acuminate spikelets 1.8-2.9 mm long, mostly on longer pedicels. **Syn:** = FlGr, K1, K4, Mi, NcTx, Pa, RAB, S, Tn, Tx, Va, WH3, WV, Darbyshire & Cayouette (1995), Lelong (1986); = *Panicum capillare* ssp. *capillare* – Ar, FNA25, NE,

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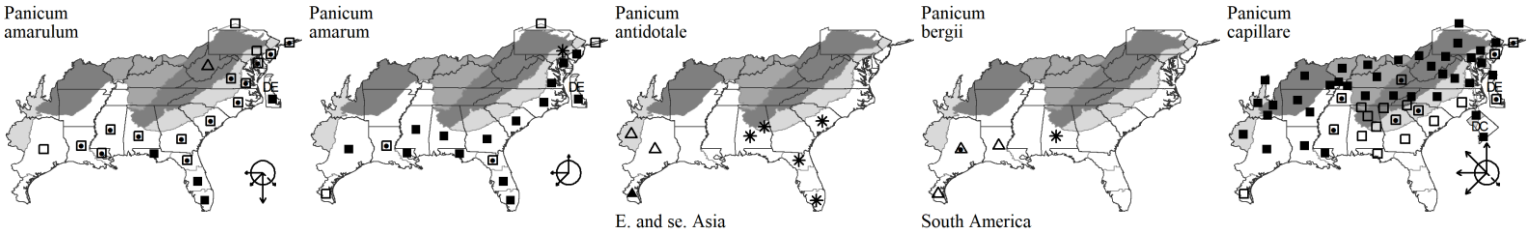
NY; = *Panicum capillare* var. *agreste* Gattinger – G; < *Panicum capillare* Linnaeus – C, Zuloaga & Morrone (1996); > *Panicum capillare* var. *capillare* – ETx1, F, HC, W.



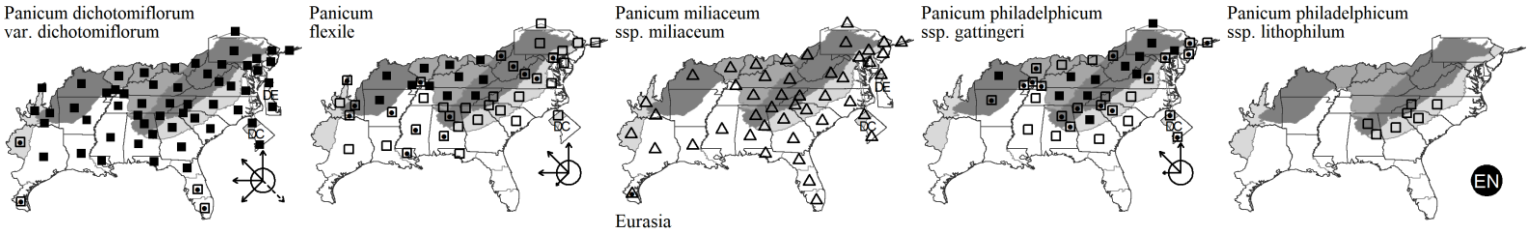
Panicum dichotomiflorum Michaux *var*. ***dichotomiflorum***. SPREADING PANIC GRASS, FALL PANIC GRASS. **Hab:** Marshy shores, exposed wet soils, alluvial deposits in floodplain forests, spoil banks, ditches. **Dist:** E. Canada west to BC, south to FL and TX; also in the Bahamas (Sorrie & LeBlond 1997). **Phen:** Mar-Nov. **Tax:** Plants with geniculate bases, enlarged lower nodes and sheaths, and panicles with included peduncles and divergent branches have been recognized as var. *geniculatum* (Alph. Wood) Fernald. **Syn:** = FlGr, K4, NE; = *Panicum dichotomiflorum* ssp. *dichotomiflorum* – Ar, NY; < *Panicum dichotomiflorum* – C, ETx1, GW1, Mi, NcTx, Pa, RAB, S, Tn, Tx, WV, Lelong (1986); > *Panicum dichotomiflorum* ssp. *dichotomiflorum* – FNA25; < *Panicum dichotomiflorum* Michaux var. *dichotomiflorum* – Va; > *Panicum dichotomiflorum* Michaux var. *dichotomiflorum* – F, G, Il, K1, K3, W; >< *Panicum dichotomiflorum* Michaux var. *dichotomiflorum* – HC; > *Panicum dichotomiflorum* var. *geniculatum* (Wood) Fernald – F, G, Il, W; > *Panicum lacustre* A.S. Hitchcock & Ekman – FNA25, HC, K1, K3.

Panicum flexile (Gattinger) Lamson-Scribner. WIRY PANIC GRASS. **Hab:** Glades and openings over mafic or calcareous rocks, damp sandy meadows, open woodlands. **Dist:** NY, sw. QC, S. ON, and ND south to n. FL and TX. First reported for SC by Nelson & Kelly (1997). **Phen:** Jul-Oct. **Syn:** = Ar, C, ETx1, F, FlGr, FNA25, G, HC, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV, Darbyshire & Cayouette (1995), Lelong (1986), Zuloaga & Morrone (1996). NatureServe G5 (Secure).

* ***Panicum miliaceum*** Linnaeus *ssp*. ***miliaceum***. BROOMCORN MILLET, PROSO MILLET, HOG MILLET. **Hab:** Planted in wildlife food plots, sometimes persistent or self-sowing nearby, also in fields and along railroads and roads. **Dist:** Native of Eurasia. **Phen:** Jul-Oct. **Tax:** *Panicum* sensu stricto. **Syn:** = C, FlGr, FNA25, K1, K3, K4, Mi, NE, NY; < *Panicum miliaceum* – ETx1, F, G, HC, Il, NcTx, Pa, S, Tn, Tx, WH3, Zuloaga & Morrone (1996). NatureServe GNRTNR (Not Yet Ranked).

Panicum philadelphicum Bernhardi ex Trinius *ssp*. ***gattingeri*** (Nash) Freckmann & Lelong. GATTINGER'S PANIC GRASS. **Hab:** Damp or dry, usually calcareous sandy soils of fields, roadsides, shores, and cultivated ground. **Dist:** NY, sw. QC, and MN south to NC, TN, GA, AL, and AR. **Phen:** Aug-Oct. **Tax:** Panicum sensu stricto. **Syn:** = FNA25, NY, Tn; = *Panicum capillare* var. *campestre* Gattinger – G, W; = *Panicum gattingeri* Nash – F, HC, Il, K1, Mi, Pa, RAB, S, Va, WV, Darbyshire & Cayouette (1995); = *Panicum philadelphicum* var. *campestre* (Gattinger) A. Haines – NE, Haines (2010); < *Panicum capillare* Linnaeus – C, Zuloaga & Morrone (1996); < *Panicum philadelphicum* Bernhardi ex Trinius – K3, K4.

Panicum philadelphicum Bernhardi ex Trinius *ssp*. ***lithophilum*** (Swallen) Freckmann & Lelong. FLATROCK PANIC GRASS. **Hab:** Soil islands on granitic flatrocks and domes. **Dist:** Restricted to granite outcrops in NC, SC, and ec. GA. **Phen:** Aug-Oct. **Comm:** Zuloaga & Morrone (1996) did not consider ssp. *lithophilum* separable from ssp. *philadelphicum*. **Syn:** = FNA25, Tn; = *Panicum lithophilum* Swallen – HC, K1, K3, K4, RAB; < *Panicum capillare* Linneaus var. *sylvaticum* Torrey – W; < *Panicum philadelphicum* Bernhardi ex Trinius – Zuloaga & Morrone (1996).



Panicum philadelphicum Bernhardi ex Trinius *ssp*. ***philadelphicum***. WOODLAND PANIC GRASS. **Hab:** Glades, barrens, desiccated pondshores, riversides, and other rocky or dry sandy soil of open woods and roadsides. **Dist:** NS west to WI, south to GA and e. TX. **Tax:** Plants formerly known as *P. tuckermanii* Fernald, ranging from se. Canada south to n. VA and OH, are distinguished by included or short-exserted peduncles less than one-third as long as the panicles (the peduncle measured from the summit of the flag sheath). **Comm:** *Panicum* sensu stricto. **Syn:** = Ar, FNA25; = *Panicum philadelphicum* Bernhardi ex Trinius – C, G, Il, K1, K3, NcTx, RAB, S, Tx, Va, WV; = *Panicum philadelphicum* var. *philadelphicum* – NE, Haines (2010); < *Panicum capillare* Linneaus var. *sylvaticum* Torrey – ETx1, W; < *Panicum philadelphicum* Bernhardi ex Trinius – K3, Zuloaga & Morrone (1996); > *Panicum philadelphicum* Bernhardi ex Trinius – F, HC, Mi, Pa, Darbyshire & Cayouette (1995); > *Panicum philadelphicum* Bernhardi ex Trinius ssp. *philadelphicum* – NY; > *Panicum tuckermanii* Fernald – F, HC, Mi, NY, Pa, Darbyshire & Cayouette (1995); > *Panicum tuckermannii* – NE, orthographic variant.

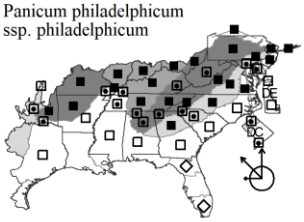
* ***Panicum repens*** Linnaeus. TORPEDO GRASS. **Hab:** Ditches, roadbanks, disturbed coastal sands, in areas where ship's ballast was deposited. **Dist:** Probably native of Europe. First reported for NC by Leonard (1971b); reported for numerous counties in the GA Coastal Plain (Carter, Baker, & Morris 2009). **Phen:** May-Oct. **Tax:** *Panicum* sensu stricto. **Syn:** = Ar, Bah, ETx1, FlGr, FNA25, GW1, K1, K3, K4, Tx, WH3; > *Panicum gouinii* Fournier – HC, S; > *Panicum repens* Linnaeus – HC, S. NatureServe GNR (Not Yet Ranked).

Panicum virgatum Linnaeus *var*. ***cubense*** Grisebach. BLUNT PANIC GRASS. **Hab:** Wet to dry sandy pinelands. **Dist:** Coastal Plain from MA to FL, west to MS; also in MI; West Indies. **Phen:** Jun-Oct. **Tax:** Not in *Panicum* sensu stricto. **Syn:** = F, HC, S, Va, Sorrie (2018b) in Weakley et al (2018a); < *Panicum virgatum* – C, FlGr, FNA25, G, GW1, NY, Pa, RAB, Tn, W, WH3, Lelong (1986); < *Panicum virgatum* Linnaeus var. *virgatum* – K1, K3, K4.

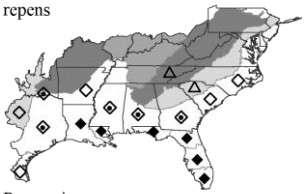
Panicum virgatum Linnaeus *var*. ***virgatum***. SWITCHGRASS. **Hab:** Dry or wet sandy soils of pinelands, fresh and brackish marshes, tidal swamps, interdune swales and ponds, riverside scour prairies, mafic fens, calcareous fens and spring marshes, rocky river shores and bars, and also frequently planted. **Dist:** Sw. QC and ND south to FL and TX, west to NV; Bermuda; Central and South America. **Phen:** Jun-Oct. **Tax:** Not in *Panicum* sensu stricto. **Syn:** = F, HC, S, Va, Sorrie (2018b) in Weakley et al (2018a); < *Panicum virgatum* – Ar, C, ETx1, FlGr, FNA25, G, GW1, Il, Mi, NcTx, NY, Pa, RAB, Tn, Tx, Tx, W, WH3, WV, Lelong (1986); < *Panicum virgatum* Linnaeus var. *virgatum* – K1, K3, K4. NatureServe G5T5 (Secure).

Key to Map Symbology: □ native; ◇ maybe exotic; △ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Panicum philadelphicum ssp. philadelphicum

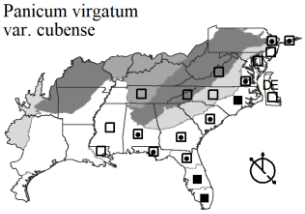


Panicum repens

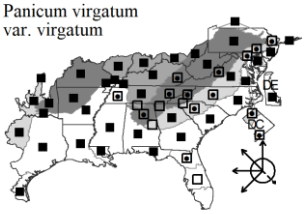


Pantropics

Panicum virgatum var. cubense



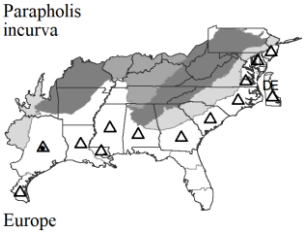
Panicum virgatum var. virgatum



Parapholis C.E. Hubbard 1946 (SICKLE GRASS)

A genus of 6 species, annuals, of Eurasia. References: Tucker (1996); Worley (2007) in FNA24 (2007a).

Parapholis incurva



Europe

* ***Parapholis incurva*** (Linnaeus) C.E. Hubbard. SICKLE GRASS, HARD GRASS, THIN-TAIL. **Hab:** Sandy and muddy flats, brackish or salt marshes. **Dist:** Native of Europe. **Phen:** Mar-Jun. **Syn:** = C, FlGr, FNA24, HC, K1, K3, K4, RAB, Tx, Tucker (1996); = *Pholiurus incurvus* (Linnaeus) Schinzius & Thellung – F, G.

Paspalum Linnaeus 1759 (PASPALUM, CROWN GRASS, BEADGRASS)

Contributed by Alan S. Weakley & Richard J. LeBlond

A genus of 300-400 species, of tropical and warm temperate regions. References: Allen & Hall (2003) in FNA25 (2003a); Banks (1966); Franck & Lange (2019) in Weakley et al (2019a); Silveus (1942); Wipff & Jones (1994).

Unkeyed taxa: *Paspalum denticulatum*, *Paspalum eglume*

1 Spikelets solitary, not associated with rudimentary spikelets or naked pedicels.
  2 Panicles usually composed of a terminal pair of branches, sometimes with 1 (-5) additional branches below the terminal pair.
    3 Upper glumes pubescent on the back or margins.
      4 Spikelets 1.3-1.9 mm long; upper glumes pilose along the margins ..... ***Paspalum conjugatum***
      4 Spikelets 2.4-3.2 mm long; upper glumes sparsely pubescent on the back ..... ***Paspalum distichum***
    3 Upper glumes glabrous.
      5 Spikelets elliptic, acute or acuminate at the tip ..... ***Paspalum vaginatum***
      5 Spikelets ovate to broadly elliptic, obtuse to broadly acute at the tip.
        6 Spikelets 1.9-2.3 mm long; leaf blades flat ..... ***Paspalum minus***
        6 Spikelets 2.5-4.0 mm long; leaf blades flat or longitudinally folded ..... ***Paspalum notatum***
  2 Panicles with 1-70 branches, if > 1, the branches arranged racemosely.
    7 Panicle branches 7-70, the axes extending beyond the outermost spikelets; panicle branches disarticulating at maturity ..... ***Paspalum fluitans***
    7 Panicle branches 1-6, terminating in a spikelet; panicle branches persistent.
      8 Upper florets olive to dark brown ..... ***Paspalum scrobiculatum***
      8 Upper florets pale to tan.
        9 Axes of panicle branches not broadly winged, 0.6-1.3 mm wide.
          10 Spikelets orbicular, 2.8-3.2 mm wide ..... ***Paspalum laeve var. circulare***
          10 Spikelets slightly longer than broad, 2.0-2.5 mm wide ..... ***Paspalum laeve var. laeve***
        9 Axes of panicle branches broadly winged, 1.8-3.3 mm wide.
          ..... ***Paspalum dissectum***

1 Spikelets paired, or at least the second nonfunctional spikelet represented by a naked pedicel.
  13 Margins of upper glumes and lower lemmas pilose.
    14 Panicle branches 2-7; spikelets 2.3-4.0 mm long ..... ***Paspalum dilatatum ssp. dilatatum***
    14 Panicle branches (4-) 10-30; spikelets 1.8-2.8 mm long ..... ***Paspalum urvillei***
  13 Margins of upper glumes and lower lemmas glabrous or pubescent (if pubescent, the hairs not pilose), but neither ciliate-lacerate, winged, nor pilose.
    15 Upper florets olive to dark brown.
      16 Panicle branches 10-28 (or more).
        ..... ***Paspalum boscianum***
      16 Panicle branches 1-10 (or to 28 in *P. boscianum*, keyed under both leads).
        19 Plants annual.
          ..... ***Paspalum boscianum***
        19 Plants perennial.
          21 Plants cespitose, rhizomes poorly developed; culms 10-20 dm tall; panicle branches ascending, divaricate, or reflexed.
            ..... ***Paspalum plicatulum***
          21 Plants not cespitose, rhizomatous; culms 1-15 dm tall; panicle branches ascending.
            23 Rhizomes long, evident ..... ***Paspalum nicorae***
            23 Rhizomes short, indistinct ..... ***Paspalum plicatulum***
    15 Upper florets white, stramineous, or golden brown.
      29 Spikelets 1.3-2.5 mm long.
        30 Upper glumes (and usually also the lower lemmas) shortly pubescent.
          32 Panicles both terminal and axillary, the axillary panicles partially or completely enclosed by the subtending leaf sheath ..... ***Key A***
          32 Panicles all terminal ..... ***Paspalum caespitosum***
        30 Upper glumes and lower lemmas glabrous.

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

33 Panicles both terminal and axillary, the axillary panicles partially or completely enclosed by the subtending leaf sheath ..... ***Key A***
33 Panicles all terminal.
35 Upper glumes and lower lemmas 5-veined ..... ***Paspalum caespitosum***
35 Upper glumes and lower lemmas 3-veined.
36 Lower sheaths villous or hirsute; spikelets 2.6-3.5 mm long ..... ***Paspalum praecox var. curtisianum***
36 Lower sheaths glabrous or sparsely papillose pubescent; spikelets 2.2-2.8 mm long ..... ***Paspalum praecox var. praecox***
29 Spikelets 2.5-4.1 mm long.
37 Spikelet pairs barely if at all imbricate; lower glumes usually present ..... ***Paspalum bifidum***
37 Spikelet pairs imbricate; lower glumes absent or present.
38 Upper glumes pubescent; lower lemmas usually pubescent.
..... ***Paspalum pubiflorum var. glabrum***
38 Upper glumes glabrous; lower lemmas usually glabrous.
40 Upper florets golden brown ..... ***Paspalum floridanum***
40 Upper florets pale to tan.
42 Plants decumbent, rooting at the lower nodes; spikelets obovate to elliptic ..... ***Paspalum pubiflorum var. glabrum***
42 Plants rhizomatous; spikelets orbicular to elliptic.
43 Spikelets 2.9-4.1 mm long; 1.9-3.1 mm wide, suborbicular to elliptic; upper glumes 5-veined; leaf blades flat .....
..... ***Paspalum floridanum***
43 Spikelets 2.1-3.1 mm long, 2.0-2.8 mm wide, orbicular or nearly so; upper glumes 3-veined; leaf blades laterally folded.
44 Lower sheaths villous or hirsute ..... ***Paspalum praecox var. curtisianum***
44 Lower sheaths glabrous or sparsely papillose pubescent ..... ***Paspalum praecox var. praecox***

Key A - *Paspalum setaceum* complex
(by Richard J. LeBlond)

1 Blades glabrous to pubescent or sparsely pilose (the margins often ciliate and/or scabrous).
2 Blades glabrous, crowded toward the base, often recurved, 3-10 mm wide; rachis of panicle branches 0.2-0.6 mm wide; spikelets 1.4-1.8 mm long, 0.9-1.3 mm wide, glabrous (-few glandular hairs); sterile lemma without a midvein ..... ***Paspalum setaceum var. longepedunculatum***
2 Blades glabrous, sometimes pubescent or sparsely pilose, more strongly cauline, not recurved (though sometimes spreading), 3-18 mm wide; rachis of panicle branches 0.6-1.2 mm wide; spikelets 1.7-2.6 mm long, 1.2-2.1 mm wide, pubescent to glabrous; sterile lemma with or without a midvein.
4 Sterile lemma with a midvein; blades dark green to purple; spikelets elliptic to obovate, 1.7-2.0 mm long, 1.2-1.5 mm wide .....
..... ***Paspalum setaceum var. ciliatifolium***
4 Sterile lemma without a midvein; blades yellow-green to dark green; spikelets obovate to suborbicular, 1.7-2.4 mm long, 1.5-2.1 mm wide .....
..... ***Paspalum setaceum var. stramineum***
1 Blades densely pubescent, hirsute, or long pilose.
6 Plants prostrate to widely spreading; rachis of panicle branches 0.6-1.5 mm wide.
..... ***Paspalum setaceum var. supinum***
6 Plants erect to spreading; rachis of panicle branches 0.3-1.0 mm wide.
8 Spikelets 1.4-1.9 mm long, 1.1-1.6 mm wide; sterile lemma without a midvein; blades grayish green, 1.5-7 mm wide ..... ***Paspalum setaceum var. setaceum***
8 Spikelets 1.7-2.5 mm long, 1.5-2.1 mm wide; sterile lemma with or without a midvein; blades light green or yellow-green to dark green, 2-16 mm wide.
9 Sterile lemma usually with a midvein; blades 2-10 mm wide, hirsute with hairs to 5.5 mm long, light to dark green; spikelets glabrous to sparsely pubescent ..... ***Paspalum setaceum var. muhlenbergii***
9 Sterile lemma without a midvein; blades 2-16 mm wide, pubescent with hairs < 1.5 mm long to glabrous, yellow-green to dark green; spikelets pubescent to glabrous ..... ***Paspalum setaceum var. stramineum***

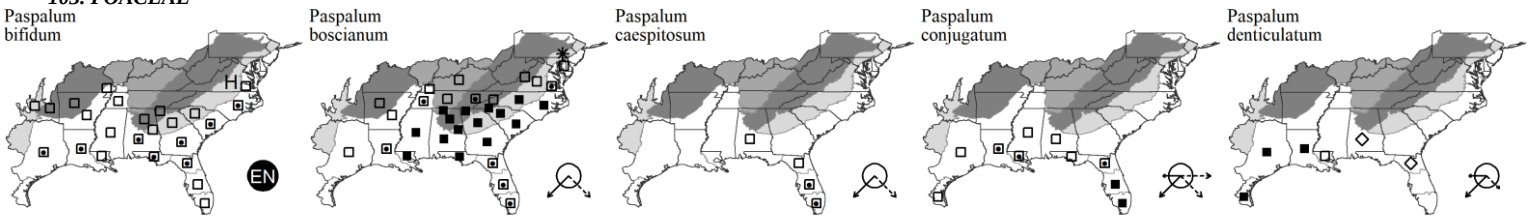
Paspalum bifidum (Bertoloni) Nash. PITCHFORK PASPALUM, PITCHFORK CROWN GRASS. **Hab:** Mesic to wet longleaf pine savannas and mesic swales in longleaf pine sandhills, inland sand savannas, other sandy woodlands and fields. **Dist:** Se. VA south to s. FL, west to se. MO, se. OK, and e. TX. **Phen:** (Jun-) Aug-Nov. **Syn:** = Ar, C, ETx1, FlGr, GW1, HC, K1, K3, K4, Mo1, RAB, S, Tn, Tx, Va, WH3, Silveus (1942); > *Paspalum bifidum* var. *bifidum* – F, G; > *Paspalum bifidum* var. *projectum* Fernald – F, G. NatureServe G5 (Secure).

Paspalum boscianum Flüggé. BULL PASPALUM. **Hab:** Marshes, cypress domes, low fields, ditches. **Dist:** MD, KY, AR, and e. TX south through tropical America. **Phen:** Jul-Oct (-Jun). **Syn:** = Ar, C, ETx1, F, FlGr, FNA25, G, GW1, HC, K1, K3, K4, RAB, S, Tn, Tx, Va, W, WH3, Silveus (1942). NatureServe G5 (Secure).

Paspalum caespitosum Flüggé. BLUE PASPALUM. **Hab:** Pine rocklands, rockland hammocks, coastal strands, dry pine savannas, marl prairies, disturbed areas over limestone (probably etc.). **Dist:** S. AL and n. FL south to s. FL; West Indies; Mexico and Central America; West Indies. **Syn:** = Bah, FlGr, FNA25, GW1, HC, K1, K3, K4, Meso6, S, WH3; < *Paspalum caespitosum* Flüggé – GW1.

Paspalum conjugatum Bergius. SOUR PASPALUM. **Hab:** Disturbed areas, forest edges. **Dist:** Ne. FL, FL Panhandle, and s. AL west to e. and s. TX, south in the New World tropics; Old World tropics. **Phen:** Jul-Nov (-Jun). **Syn:** = Bah, ETx1, FlGr, FNA25, HC, K1, K3, K4, Meso6, S, WH3. NatureServe G5 (Secure).

Paspalum denticulatum Trinius. PULL-AND-BE-DAMNED, LONG-TOM. **Hab:** Coastal marshes, ditches, wet disturbed areas. **Dist:** FL, AL, LA, and TX south through Mexico to Central America; Cuba. **Phen:** May-Nov. **Syn:** = FNA25, K3, K4; ? *Paspalum lividum* Trinius – ETx1, Tx. NatureServe G4G5 (Apparently Secure).



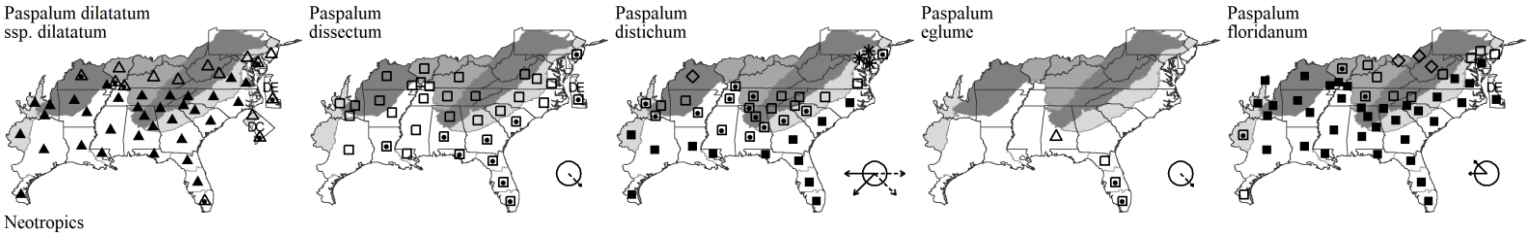
* ***Paspalum dilatatum*** Poiret *ssp. **dilatatum***. DALLIS GRASS. **Hab:** Roadsides, fields, disturbed areas. **Dist:** Native of tropical America. **Phen:** May-Nov. **Tax:** Other subspecies occur in the native range in South America. **Syn:** < *Paspalum dilatatum* – Ar, Bah, C, ETx1, F, FlGr, FNA25, G, GW1, HC, Il, K1, K3, K4, Meso6, Mo1, NcTx, RAB, S, Tn, Tx, Va, W, WH3, Silveus (1942). NatureServe GNR (Not Yet Ranked).

Paspalum dissectum (Linnaeus) Linnaeus. MUDBANK CROWN-GRASS, WALTER'S PASPALUM. **Hab:** Mud flats, drawdown zones of ponds and reservoirs. **Dist:** NJ, IL, and KS south to c. FL and e. TX; Cuba. **Phen:** Jul-Nov (-Jun). **Syn:** = Ar, C, ETx1, F, FNA25, G, GW1, HC, Il, K1, K3, K4, Mo1, RAB, S, Tn, Tx, Va, WH3, Silveus (1942). NatureServe G4? (Apparently Secure).

Paspalum distichum Linnaeus. JOINT PASPALUM, KNOTGRASS. **Hab:** Brackish (especially oligohaline) and freshwater marshes, interdune swales and marshes, waterfowl impoundments. **Dist:** NJ, KS, and WA south to s. FL, s. TX, s. CA, and through the New World and Old World tropics. **Phen:** May-Nov. **Syn:** = Ar, C, ETx1, F, FlGr, FNA25, G, HC, K1, K3, K4, Meso6, NcTx, Pa, RAB, S, Tn, Tx, Va, W, WH3, Silveus (1942); < *Paspalum distichum* Linnaeus – Bah, GW1; > *Paspalum distichum* var. *distichum* – Mo1.

Paspalum eglume Morrone & Zuloaga. REIMAR GRASS. **Hab:** Moist hammocks, marshes, riverside drawdown zones, depression marshes, wet disturbed areas, marshy floodplains. **Dist:** Ne. FL (Duval County) and s. AL south to s. FL; Cuba. **Syn:** = FlGr; = *Reimarochloa oligostachya* (Munro ex Bentham) A.S. Hitchcock – FNA25, HC, K1, K3, K4, WH3. NatureServe G3G4 (Vulnerable).

Paspalum floridanum Michaux. FLORIDA PASPALUM, BIG PASPALUM. **Hab:** Longleaf pine sandhills, pine savannas, hammock edges, moist forests, ditches, barrens, prairies, fields, roadsides. **Dist:** NJ, IL, and KS south to s. FL and e. TX. **Phen:** Mar-Dec. **Syn:** = Ar, C, ETx1, FlGr, FNA25, GW1, Il, K1, K3, K4, NcTx, Pa, RAB, Tn, Tx, Va, W, WH3; > *Paspalum difforme* Le Conte – G, HC, S, Silveus (1942); > *Paspalum floridanum* Michaux – G; > *Paspalum floridanum* var. *floridanum* – F, HC, Mo1, Pa, S, Silveus (1942); > *Paspalum floridanum* var. *glabratum* Engelmann ex Vasey – F, HC, Mo1, S, Silveus (1942); > *Paspalum giganteum* Baldwin ex Vasey – HC, S, Silveus (1942).



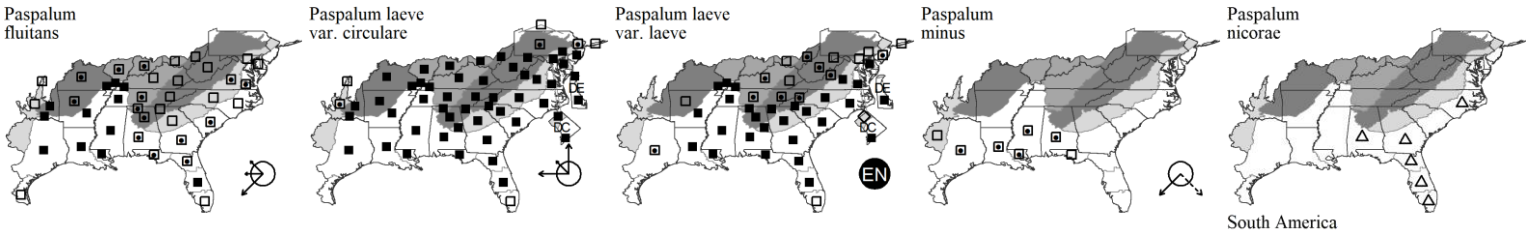
Paspalum fluitans (Elliott) Kunth. WATER PASPALUM, HORSETAIL CROWN GRASS. **Hab:** Mucky soils in swamp forests, moist riverbanks and bars, sloughs, sometimes forming floating mats. **Dist:** MD, IL, and KS south to s. FL and s. TX, and south through tropical America to c. South America. **Phen:** May-Nov. **Syn:** = C, F, G, HC, Il, K1, RAB, Tx, Va; = *Paspalum repens* P.J. Bergius var. *fluitans* (Elliott) J. Wipff & S.D. Jones – K3, K4, Wipff & Jones (1994); < *Paspalum repens* P.J. Bergius – Ar, ETx1, FlGr, FNA25, GW1, Meso6, Mo1, S, Tn, WH3, Silveus (1942).

Paspalum laeve Michaux *var. **circulare*** (Nash) W. Stone. **Hab:** {need additional herbarium work to fully determine range and abundance of varieties}. **Phen:** May-Dec. **Syn:** = ETx1, F, Il, Mo1, NcTx; = *Paspalum circulare* Nash – HC, S, WV, Silveus (1942); < *Paspalum laeve* – Ar, C, FlGr, FNA25, G, GW1, K1, K3, K4, NE, NY, Pa, RAB, Tn, Tx, Va, W, WH3. NatureServe G4G5T4T5 (Apparently Secure).

Paspalum laeve Michaux *var. **laeve***. **Hab:** Forest edges and disturbed areas. {need additional herbarium work to fully determine range and abundance of varieties}. **Dist:** Overall distribution of *P. laeve* s.l.: MA, NY, MI, and KS south to s. FL and e. TX. **Phen:** May-Dec. **Syn:** = NcTx; < *Paspalum laeve* – Ar, C, FlGr, FNA25, G, GW1, K1, K3, K4, Mi, NE, Pa, RAB, Tn, Tx, Va, W, WH3; > *Paspalum laeve* – HC, S, WV, Silveus (1942); > *Paspalum laeve* Michaux var. *laeve* – ETx1, F, Il, Mo1; > *Paspalum laeve* var. *pilosum* Lamson-Scribner – ETx1, F, Mo1; > *Paspalum longipilum* Nash – HC, S, WV, Silveus (1942).

Paspalum minus E. Fournier. MATTED PASPALUM. **Hab:** Disturbed areas, forest edges. **Dist:** FL Panhandle (Escambia County) and s. AL west to e. and c. TX; s. Mexico to South America; West Indies. **Phen:** May-Nov. **Syn:** = ETx1, FlGr, FNA25, K1, K3, K4, Meso6, Tx, WH3. NatureServe G4G5 (Apparently Secure).

* ***Paspalum nicorae*** Parodi. BRUNSWICK GRASS. **Hab:** Roadsides, pastures, lawns, sometimes cultivated. **Dist:** Native of Brazil. Also reported for peninsular FL (Wunderlin & Hansen 2006) and Baldwin County, AL (Barger et al. 2012). **Phen:** May-Oct. **Syn:** = FlGr, FNA25, HC, K1, K3, K4, WH3. NatureServe GNR (Not Yet Ranked).



* ***Paspalum notatum*** Flüggé. BAHIA GRASS. **Hab:** Roadsides and disturbed areas, often (especially in FL) planted as a coarse turfgrass or a pasture grass. **Dist:** Native of tropical America (e. Mexico to Argentina; West Indies). **Phen:** Jun-Oct. **Syn:** = Ar, ETx1, FNA25, G, GW1, K3, K4,

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

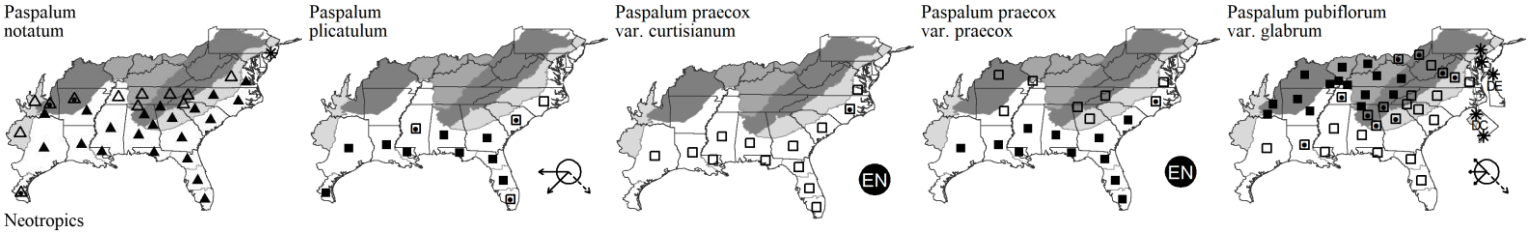
Meso6, Va, Silveus (1942); > *Paspalum notatum* var. *latiflorum* Döll – NcTx; > *Paspalum notatum* var. *notatum* – FlGr, HC, K1, Tx, WH3; > *Paspalum notatum* Flüggé var. *saurae* Parodi – Bah, FlGr, HC, K1, NcTx, RAB, Tn, Tx, WH3.

Paspalum plicatulum Michaux. BROWNSEED PASPALUM. **Hab:** Pine savannas, sandy loam prairies, sandy woodlands, fields (used for pasture, hay, and silage). **Dist:** Se. SC south to s. FL, west to s. TX, and south through tropical America to s. South America (Argentina); West Indies. **Phen:** Apr-Sep. **Syn:** = ETx1, FlGr, FNA25, GW1, HC, K1, K3, K4, Meso6, NcTx, RAB, S, Tx, WH3, Silveus (1942). NatureServe G5 (Secure).

Paspalum praecox Walter *var*. ***curtisianum*** (Steudel) Vasey. CURTIS'S CROWN GRASS. **Hab:** Pine savannas. **Dist:** NC south to s. FL, west to e. TX. **Phen:** Jun-Oct. **Comm:** The variety was named for the Rev. Moses Ashley Curtis (of Hillsborough, NC), not Allen Hiram Curtiss (of Jacksonville, FL); the correct spelling of the epithet is therefore '*curtisianum*'. **Syn:** = F, G, RAB; = *Paspalum lentiferum* Lamarck – HC, S, Silveus (1942); = *Paspalum praecox* var. *curtissianum* – C, orthographic error; < *Paspalum praecox* – ETx1, FlGr, FNA25, GW1, K1, K3, K4, Tx, Va, WH3.

Paspalum praecox Walter *var*. ***praecox***. EARLY CROWN GRASS. **Hab:** Pine savannas. **Phen:** May-Jul. **Syn:** = C, F, G, RAB; = *Paspalum praecox* – HC, S, Silveus (1942); < *Paspalum praecox* – Ar, ETx1, FlGr, FNA25, GW1, Il, K1, K3, K4, Tx, Va, WH3.

Paspalum pubiflorum Ruprecht *var*. ***glabrum*** Vasey. HAIRYSEED CROWN-GRASS. **Hab:** Roadsides, fields, and other disturbed areas. **Dist:** PA west to KS and CO, south to FL and s. TX and Mexico; Cuba. **Phen:** Aug-Nov. **Syn:** = C, ETx1, F, G, HC, Il, Mo1, NcTx, S, Silveus (1942); < *Paspalum pubiflorum* – Ar, FlGr, FNA25, GW1, K1, K3, K4, Meso6, RAB, Tn, Tx, Va, W, WH3. NatureServe G5T5 (Secure).



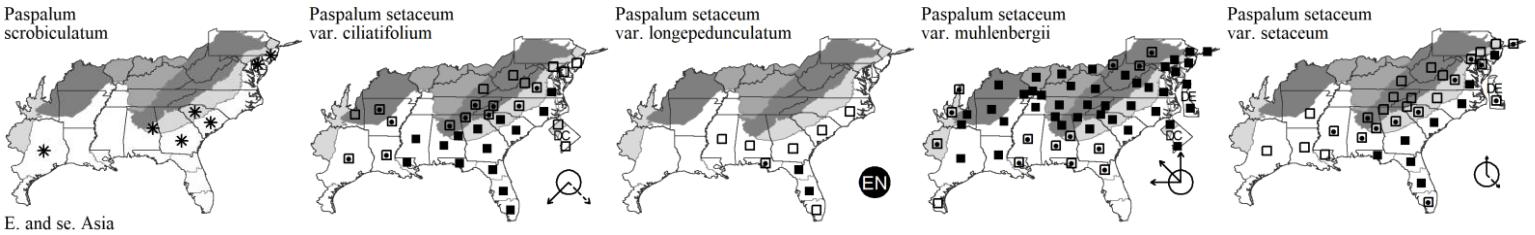
* ***Paspalum scrobiculatum*** Linnaeus. INDIAN PASPALUM. **Hab:** Disturbed areas. **Dist:** Native of India. **Syn:** = FNA25, HC, K1, K3, K4. NatureServe GNR (Not Yet Ranked).

Paspalum setaceum Michaux *var*. ***ciliatifolium*** (Michaux) Vasey. FRINGELEAF PASPALUM. **Hab:** Dry open areas and woodlands, disturbed areas. **Dist:** S. NJ south to s. FL, west to e. TX, interior to s. WV, se. KY, e. TN, n. AL, n. MS, c. AR, and e. OK; Bahamas; Central America. **Phen:** Jun-Sep (-May). **Syn:** = Ar, Bah, FlGr, FNA25, Il, Mo1, Tn, Banks (1966); = *Paspalum ciliatifolium* Michaux – WV, Silveus (1942); = *Paspalum ciliatifolium* Michaux var. *ciliatifolium* – F, G; > *Paspalum ciliatifolium* Michaux – HC, S; > *Paspalum propinquum* – HC, S; < *Paspalum setaceum* – ETx1, GW1, K1, K3, K4, Mi, NcTx, RAB, Va, W, WH3; < *Paspalum setaceum* Michaux var. *ciliatifolium* (Michaux) Vasey – C.

Paspalum setaceum Michaux *var*. ***longepedunculatum*** (LeConte) Alph. Wood. **Hab:** Pine flatwoods and pine savannas. **Dist:** Se. NC south to s. FL, west to s. MS; Bahamas. **Phen:** Mar-Nov. **Syn:** = Bah, F, FlGr, FNA25, Tn, Banks (1966); = *Paspalum longepedunculatum* LeConte – G, HC, S, Silveus (1942); < *Paspalum setaceum* – GW1, K1, K3, K4, RAB, W, WH3; < *Paspalum setaceum* Michaux var. *ciliatifolium* (Michaux) Vasey – C.

Paspalum setaceum Michaux *var*. ***muhlenbergii*** (Nash) Fernald. **Hab:** Dry or moist soils. **Dist:** NH west to MI, c. IL, s. IA, and c. KS, south to n. FL, s.AL, s. MS, s. LA, and c. TX. **Phen:** Apr-Sep. **Syn:** = Ar, C, FlGr, FNA25, Il, Mo1, NE, NY, Pa, Tx, Banks (1966); = *Paspalum ciliatifolium* Michaux var. *muhlenbergii* (Nash) Fernald – G; = *Paspalum pubescens* Muhlenberg ex Willdenow – HC, S, WV, Silveus (1942); = *Paspalum setaceum* var. *muehlenbergii* – Tn, orthographic variant; > *Paspalum ciliatifolium* Michaux var. *muhlenbergii* (Nash) Fernald – F; < *Paspalum setaceum* – ETx1, GW1, K1, K3, K4, NcTx, RAB, Va, W, WH3; > *Paspalum setaceum* var. *calvescens* Fernald – F.

Paspalum setaceum Michaux *var*. ***setaceum***. THIN PASPALUM. **Hab:** Longleaf pine sandhills, pine savannas, pine flatwoods, dry to moist disturbed areas. **Dist:** MA and CT south to s. FL, west to e. TX, inland to w. VA, s. WV, s. MO and AR; Cuba. **Phen:** Jun-Nov. **Syn:** = Ar, Bah, C, FlGr, FNA25, Il, Mo1, NE, NY, Pa, Tn, Banks (1966); > *Paspalum debile* Michaux – F, HC, S, Silveus (1942); < *Paspalum setaceum* – ETx1, GW1, K1, K3, K4, RAB, Va, W, WH3; > *Paspalum setaceum* – G, HC, S, WV, Silveus (1942); > *Paspalum setaceum* Michaux var. *setaceum* – F.



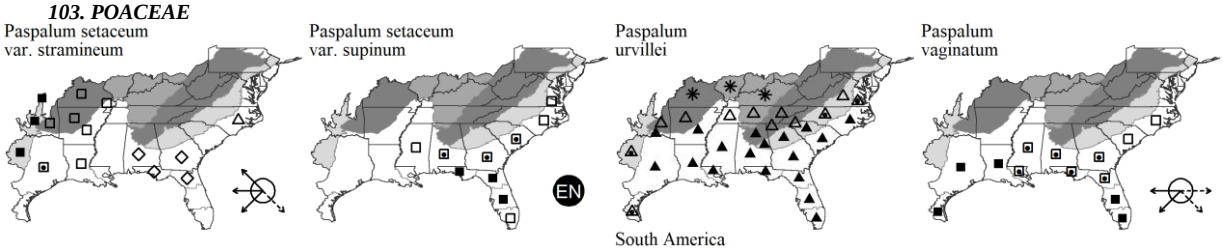
Paspalum setaceum Michaux *var*. ***stramineum*** (Nash) D.J. Banks. YELLOW SAND PASPALUM. **Hab:** Dry sandy soils. **Dist:** MI west to MT, south to LA, and NM; scattered eastward, especially near the coast, perhaps at least in part as introductions. **Phen:** Jun-Sep. **Syn:** = Ar, C, FlGr, FNA25, Mo1, Tn, Tx, Banks (1966); = *Paspalum ciliatifolium* Michaux var. *stramineum* (Nash) Fernald – F, G; = *Paspalum stramineum* Nash – HC, Silveus (1942); < *Paspalum setaceum* – ETx1, GW1, K1, K3, K4, NcTx, RAB, W, WH3; > *Paspalum setaceum* Michaux var. *stramineum* (Nash) D.J. Banks – Il.

Paspalum setaceum Michaux *var*. ***supinum*** (Bosc ex Poiret) Trinius. **Hab:** Longleaf pine sandhills, dunes, beaches, other sandy soils, old fields. **Dist:** E. NC (e. VA?) south to s. FL, west to s. MS. Also reported for the Coastal Plain of Virginia by Tatnall (1946); needing confirmation of the specimen identification. **Phen:** May-Dec. **Syn:** = F, FlGr, FNA25, Pa, Banks (1966); = *Paspalum supinum* Bosc ex Poiret – HC, S; < *Paspalum setaceum* – GW1, K1, K3, K4, RAB, Va, W, WH3.

* ***Paspalum urvillei*** Steudel. VASEY GRASS. **Hab:** Roadsides, fields, and other disturbed areas. **Dist:** Native of South America (Brazil and Argentina). **Phen:** Mar-Dec. **Syn:** = Ar, Bah, C, ETx1, F, FlGr, FNA25, G, GW1, HC, Il, K1, K3, K4, Meso6, Mo1, NcTx, RAB, S, Tn, Tx, Va, WH3, Silveus (1942). NatureServe GNR (Not Yet Ranked).

Paspalum vaginatum Swartz. SAND KNOTGRASS, SEASHORE CROWN GRASS. **Hab:** Brackish marshes, rarely inland in disturbed places. **Dist:** NC south to s. FL, west to s. TX, southward through the New World tropics; Old World tropics. **Phen:** Apr-Nov. **Syn:** = ETx1, FlGr, FNA25, HC, K1, K3, K4, Meso6, RAB, S, Tx, WH3, Silveus (1942); < *Paspalum distichum* Linnaeus – Bah, GW1, misapplied.

Key to Map Symbology: □ native; ◇ maybe exotic; △ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



Phalaris Linnaeus 1753 (CANARY-GRASS)

A genus of about 16-22 species, north temperate and South American. References: Barkworth (2007q) in FNA24 (2007a); Tucker (1996); Voshell, Baldini, & Hilu (2016).

1 Perennial, with scaly rhizomes; inflorescence either obviously paniculate, 7-25 cm long, with ascending to appressed branches, the main branches of the inflorescence apparent, the inflorescence outline thus appearing lobed, or densely spikelike, 1.5-15 cm long.
  2 Glumes broadly winged; fertile lemmas ovate-lanceolate, densely pubescent; [section *Bulbophalaris*] ..... ***Phalaris aquatica***
  2 Glumes not winged; fertile lemmas narrowly lanceolate, glabrous to sparsely pubescent; [section *Phalaroides*] ..... ***Phalaris arundinacea***
1 Annual, without rhizomes; inflorescence densely spikelike or almost capitate, 1-9 cm long, the branches not apparent, the inflorescence outline a single ovoid, ellipsoid, or lanceolate form.
  4 Keels of the glumes broadly winged (the wing ca. 1 mm wide); sterile florets 2.0-4.5 mm long; [section *Phalaris*] ..... ***Phalaris canariensis***
  4 Keels of the glume narrowly winged (the wing < 0.5 mm wide); sterile florets 0.5-2.5 mm long.
    5 Sterile floret 1; [section *Bulbophalaris*] ..... ***Phalaris minor***
    5 Sterile florets 2; [section *Caroliniana*].
      6 Nerves of the glumes scabrous; panicle cylindric in outline, 6-18 cm long; glumes 3.5-4.0 mm long; sterile florets 0.5-1.5 mm long ..... ***Phalaris angusta***
      6 Nerves of the glumes not scabrous; panicle narrowly ovate in outline, usually 2-6 cm long; glumes 5-6 mm long; sterile florets 1.5-2.5 mm long ..... ***Phalaris caroliniana***

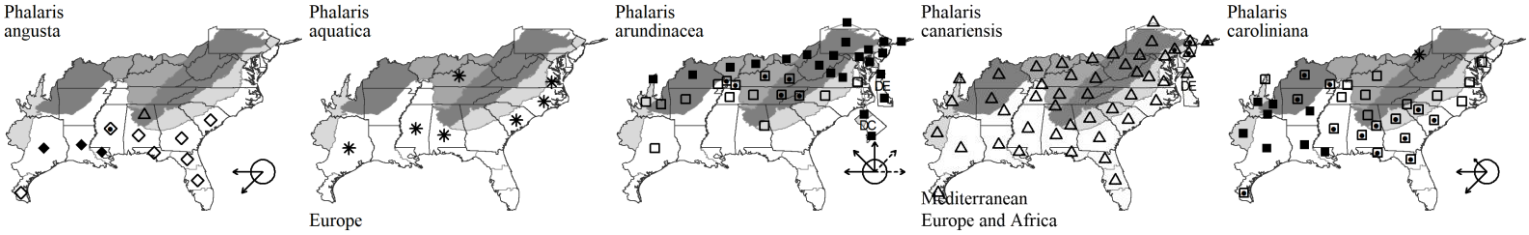
* ***Phalaris angusta*** Nees ex Trinius. TIMOTHY CANARY GRASS. **Hab:** Freshwater marshes, bayous, ditches, waterfowl impoundments. **Dist:** Native of tropical America, perhaps native in LA and TX. **Phen:** Mar-Jun. **Syn:** = ETx1, FlGr, FNA24, GW1, HC, K1, K3, K4, Tx, WH3, Tucker (1996), Voshell, Baldini, & Hilu (2016). NatureServe G5 (Secure).

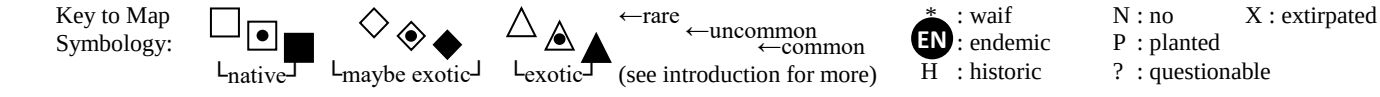
* ***Phalaris aquatica*** Linnaeus. BULBOUS CANARY-GRASS. **Hab:** Disturbed areas. **Dist:** Native of Europe. **Syn:** = K1, K3, K4, Tucker (1996); ? *Phalaris tuberosa* Linnaeus var. *stenoptera* (Hackel) A.S. Hitchcock – HC. NatureServe GNR (Not Yet Ranked).

Phalaris arundinacea Linnaeus. REED CANARY-GRASS, RIBBON GRASS. **Hab:** Fens, calcareous spring marshes, wet meadows, wet fields, moist forests, moist disturbed areas, bogs. **Dist:** NL (Newfoundland) west to AK, south to NC, TN, AR, NM, CA; Mexico; Eurasia. **Phen:** May-Jul. **Comm:** A variegated form, *P. arundinacea* forma *variegata* (Parnell) Druce, is cultivated for ornament, as Ribbon Grass. **Syn:** = Ar, C, F, FNA24, GW1, Il, K1, K3, K4, Mi, Mo1, NE, NY, Pa, RAB, S, Tn, Va, W, WV, Tucker (1996), Voshell, Baldini, & Hilu (2016); > *Phalaris arundinacea* var. *arundinacea* – G, HC; > *Phalaris arundinacea* var. *picta* Linnaeus – G, HC.

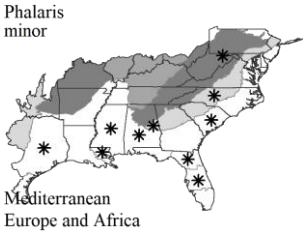
* ***Phalaris canariensis*** Linnaeus. BIRDSEED GRASS, CANARY-GRASS. **Hab:** Roadsides, gardens, yards (under bird feeders), other disturbed areas. **Dist:** Native of Mediterranean Europe. **Phen:** Apr-Oct. **Syn:** = Ar, C, ETx1, F, FlGr, FNA24, G, GW1, HC, Il, K1, K3, K4, Meso6, Mo1, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, WH3, WV, Tucker (1996), Voshell, Baldini, & Hilu (2016). NatureServe GNR (Not Yet Ranked).

Phalaris caroliniana Walter. MAYGRASS, CAROLINA CANARY-GRASS. **Hab:** Borders of oligohaline tidal marshes, bottomland forests, ditches, roadsides, pastures, fallow fields, disturbed areas. **Dist:** NC west to OR, south into Mexico, the original distribution now obscured. **Phen:** Apr-Jun. **Syn:** = Ar, C, ETx1, F, FlGr, FNA24, G, GW1, HC, K1, K3, K4, Mo1, NcTx, RAB, S, Tn, WH3, Tucker (1996), Voshell, Baldini, & Hilu (2016). NatureServe G5? (Secure).





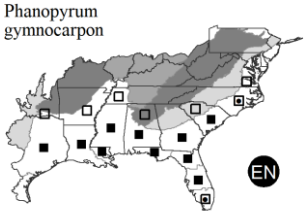
* ***Phalaris minor*** Retzius. LESSER CANARY GRASS. **Hab:** Waste areas near wool-combing mills, other disturbed sites. **Dist:** Native of Mediterranean Europe. Also reported for other scattered states in e. North America, including peninsular FL (Kartesz 1999). **Phen:** Mar. **Syn:** = FlGr, FNA24, HC, K1, K3, K4, Meso6, WH3, Voshell, Baldini, & Hilu (2016). NatureServe GNR (Not Yet Ranked).



Phanopyrum (Rafinesque) Nash 1903 (PHANOPYRUM)

Circumscription of this genus is currently in flux. *Phanopyrum* is variously treated as a distinct genus or as a subgenus of *Panicum*. References: Crins (1991); Freckmann & Lelong (2003c) in FNA25 (2003a); Webster (1988).

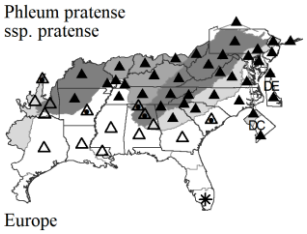
Phanopyrum gymnocarpon (Elliott) Nash. SWAMP PHANOPYRUM. **Hab:** Swamps, seasonally flooded soils of cypress-gum sloughs, tidal (freshwater) cypress-gum swamps, disturbed wet soils, low woods, ditches, muddy banks of streams and lakes, sinks, floodplains, and marshes. **Dist:** Se. VA south to FL, west to TX and AR. **Phen:** Aug-Oct. **Syn:** = Ar, FlGr, K1, K3, Tn, Va, WH3, Webster (1988); = *Panicum gymnocarpon* Elliott – ETx1, FNA25, GW1, HC, RAB, S, Tx, Crins (1991). NatureServe G5 (Secure).



Phleum Linnaeus 1753 (TIMOTHY)

A genus of about 15 species, annuals and perennials, mainly native to Eurasia. References: Barkworth (2007p) in FNA24 (2007a); Stace (2010); Tucker (1996).

* ***Phleum pratense*** Linnaeus *ssp. **pratense***. TIMOTHY, CAT'S-TAIL. **Hab:** Meadows, pastures, roadsides, disturbed areas. **Dist:** Native of Europe. **Phen:** Jun-Oct. **Comm:** The American common name comes from the name of the man (Timothy Hanson) who is believed to have introduced it into the United States in 1720; in England, *Phleum* is called "cat's-tail". **Syn:** = FNA24; = *Phleum pratense* – Stace (2010); = *Phleum pratense* var. *pratense* – F; < *Phleum pratense* – C, FlGr, G, HC, Il, K1, K3, K4, Mi, Mo1, NcTx, NE, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV, Tucker (1996).



Phragmites Adanson 1763 (COMMON REED)

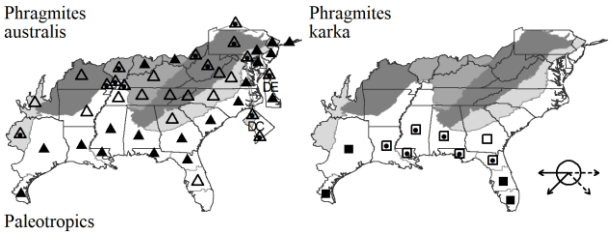
A genus with 3-5 species, nearly worldwide in distribution. References: Allred (2003a) in FNA25 (2003a); Haines (2010); Saltonstall & Hauber (2007); Saltonstall (2002); Saltonstall, Peterson, & Soreng (2004); Ward & Jacono (2009); Ward (2010).

1 Panicle diffuse and partially drooping, with lower lateral branches naked for 1-4 cm; leaf blades of lower stem leaves abscising from the sheaths by mid-season; leaves lightly scabrous on lower surface; culms stout, to 20 mm in diameter, smooth and glossy; [native on the Gulf Coast, from FL and GA westward, and southward into the tropics] ..... ***Phragmites karka***

1 Panicle erect and relatively compact, with lower lateral branches spikelet-bearing to base; {}. ..... ***Phragmites australis***

* ***Phragmites australis*** (Cavanilles) Trinius ex Steudel. COMMON REED, OLD WORLD REED. **Hab:** Brackish and freshwater marshes, dredge-spoil deposit islands, ditches. **Dist:** Native of Eurasia. **Phen:** Aug-Oct. **Comm:** Fox, Godfrey, & Blomquist (1950) report its first collection in NC (in 1948). In most of our area, reed is of relatively recent introduction, reported from only nine counties in Radford, Ahles, & Bell (1968), but now becoming a serious weed in coastal areas, where it aggressively colonizes freshwater and brackish marshes, excluding the native species. **Syn:** = K4, NY, Haines (2010); = *Phragmites australis* ssp. *australis* – Ar, FlGr, Il, K3, Mi, Pa, Va, Saltonstall & Hauber (2007), Ward (2010); = *Phragmites australis* (Cavanilles) Trinius ex Steudel var. *australis* – FNA25, NE, Saltonstall, Peterson, & Soreng (2004); = *Phragmites communis* var. *communis* – F; < *Phragmites australis* (Cavanilles) Trinius ex Steudel – C, ETx1, GW1, K1, Mo1, NcTx, Tn; < *Phragmites communis* Trinius – G, HC, RAB, WV; < *Phragmites phragmites* (Linnaeus) Karsten – S. NatureServe G5T5 (Secure).

Phragmites karka (Retzius) Trinius ex Steudel. TROPICAL REED, ROSEAU-CANE. **Hab:** Marshes. **Dist:** Ne. FL south to s. FL, west across the Gulf Coast to sw. United States, south into tropical America. Reported for Seminole County, GA (Carter, Baker, & Morris 2009). **Phen:** Sep-Dec. **Syn:** = K3, K4, Ward (2010); = *Phragmites australis* (Cavanilles) Trinius ex Steudel ssp. *berlandieri* (E. Fournier) C.F. Reed – FlGr, Saltonstall & Hauber (2007); = *Phragmites australis* (Cavanilles) Trinius ex Steudel var. *berlandieri* (E. Fournier) C.F. Reed – FNA25, Saltonstall, Peterson, & Soreng (2004); < *Phragmites australis* (Cavanilles) Trinius ex Steudel – Bah, C, ETx1, GW1, K1, Meso6, WH3; < *Phragmites communis* Trinius – G, HC, RAB, Tx; < *Phragmites communis* var. *berlandieri* (Fournier) Fernald – F; < *Phragmites phragmites* (Linnaeus) Karsten – S.



Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Phyllostachys Siebold & Zuccarini 1843 (BAMBOO)

A genus of about 50 (or more) species, native of mainly temperate e. Asia. References: Duncan & Duncan [(in prep); Judziewicz et al (2000); Stapleton & Barkworth (2007) in FNA24 (2007a).

Identification Notes: In addition to the species keyed below, a number of other species are sometimes cultivated in our area, and may be encountered. Bamboos are seriously under-represented in herbaria, since they rarely flower and are impractical to press. All of the species should be anticipated in other physiographic provinces and states than those listed.

Unkeyed waifs: *Phyllostachys meyeri, Phyllostachys sulphurea var. viridis*

1 Internodes at the base of principal culms dissimilar in length, the lowermost internode 1-12 cm long, the next 3 internodes distinctly longer, with nodal junctions mostly straight across ..... ***Phyllostachys aurea***
1 Internodes at the base of principal culms all similar in length, mostly 4-8 cm, with nodal junctions oblique.
2 Groove on internode (above the branch) yellowish-green, the rest of the culm dull greenish..... ***Phyllostachys aureosulcata***
2 Groove on internode (above the branch) the same color as the rest of the culm.
4 Largest culms to 15 cm in diameter and 25 m tall; upper culm sheaths with auricles; outer surface of culm sheaths usually with a green streak down the middle, flanked by streaks of purple and buff; culms medium to dark glossy green at first (some cultivars golden yellow or yellow streaked), remaining so in age..... ***Phyllostachys bambusoides***
4 Largest culms to 3.2 (-4) cm in diameter and 10 m tall (rarely taller); upper culm sheaths with or without auricles; outer surface of culm sheaths variously streaked, spotted, or mottled with brown or red (but not as above); culms pale green to green at first, usually becoming purple spotted, gray, or yellow in age. ..... ***Phyllostachys nigra***

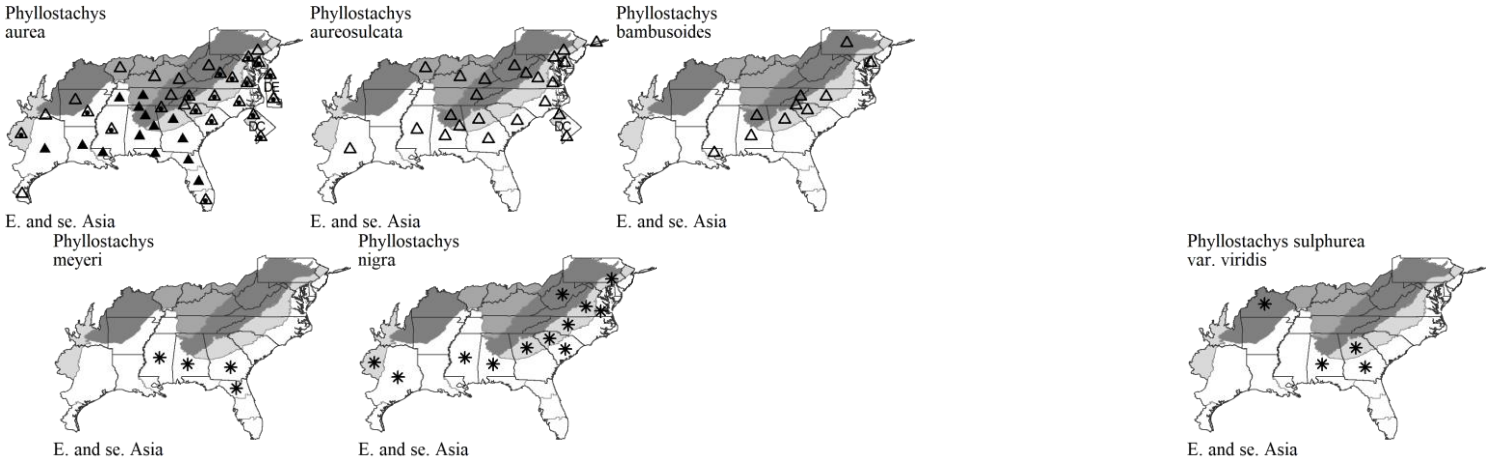
* ***Phyllostachys aurea*** Carrière ex Rivière & C. Rivière. GOLDEN BAMBOO, FISHPOLE BAMBOO. **Hab:** Suburban woodlands, upland forests and woodlands, riparian forests, stream banks, roadsides, pastures, old fields, persisting and spreading from plantings. **Dist:** Native of China and Japan. **Phen:** Mar. **Comm:** This is the usual large bamboo cultivated and naturalizing in most of our region, forming dense stands, up to at least 15 m tall. Very rarely flowering in our region. **Syn:** = Ar, ETx1, FlGr, FNA24, HC, Il, K1, K3, K4, Meso6, NcTx, RAB, Va, WH3, Duncan & Duncan [(in prep), Judziewicz et al (2000). NatureServe GNR (Not Yet Ranked).

* ***Phyllostachys aureosulcata*** McClure. YELLOWGROOVE BAMBOO. **Hab:** Cultivated as an ornamental, persistent or spreading from plantings. **Dist:** Native of China. Reported as persisting and spreading in n. VA (Arlington County and City of Alexandria) by Simmons et al. (2020). **Syn:** = K1, K3, K4, WV, Duncan & Duncan [(in prep), Judziewicz et al (2000). NatureServe GNR (Not Yet Ranked).

* ***Phyllostachys bambusoides*** Siebold & Zuccarini. GIANT TIMBER BAMBOO. **Hab:** Cultivated as an ornamental, persistent or spreading from plantings. **Dist:** Native of China. **Syn:** = FNA24, HC, K1, K3, K4, Duncan & Duncan [(in prep), Judziewicz et al (2000). NatureServe GNR (Not Yet Ranked).

* ***Phyllostachys meyeri*** McClure. **Hab:** Cultivated as an ornamental, persistent or spreading from plantings. **Dist:** Native of e. Asia. Reported as introduced in FL, NC, and SC (Kartesz 2015). **Phen:** Apr-Jun. **Syn:** = FlGr, K1, K3, K4. NatureServe GNR (Not Yet Ranked).

* ***Phyllostachys nigra*** (Loddiges ex Lindley) Munro. BLACK BAMBOO. **Hab:** Cultivated as an ornamental, persistent or spreading from plantings. **Dist:** Native of China and Japan. **Syn:** = K1, K3, K4, WV, Duncan & Duncan [(in prep), Judziewicz et al (2000); > *Phyllostachys nigra* var. *henonis* (Mitford) Makino – WV. NatureServe GNR (Not Yet Ranked).



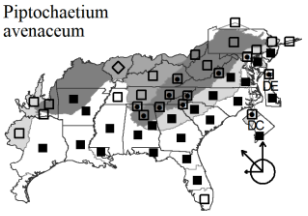
* ***Phyllostachys sulphurea*** (Carrière) Rivière & C. Rivière *var.* ***viridis*** R.A. Young. **Hab:** Suburban woodlands and areas near experimental plantations. **Comm:** See Diamond (2013b) for additional information. **Syn:** = K4; < *Phyllostachys sulphurea* – K3.

Piptochaetium J. Presl 1830 (NEEDLEGRASS)

A genus of about 27 species, of temperate North and South America, and montane tropical South America (Cialdella & Giussani 2002). References: Barkworth (2007g) in FNA24 (2007a); Cialdella & Giussani (2002).

Piptochaetium avenaceum (Linnaeus) Parodi. EASTERN NEEDLEGRASS, BLACK OATGRASS, BLACKSEED SPEARGRASS. **Hab:** Upland woodlands and forests, sometimes abundant or even dominant in xeric woodlands over granitic or mafic rocks in the Piedmont. **Dist:** MA, KY, s. IL, and c. OK,

south to c. peninsular FL and s. TX; disjunct near the Great Lakes in n. IN and w. MI. **Phen:** Mar-Jun. **Syn:** = Ar, C, ETx1, FlGr, FNA24, K1, K3, K4, Mi, NE, NY, Pa, Tn, Va, WH3; = *Stipa avenacea* Linnaeus – F, G, HC, RAB, S, Tx, W, WV. NatureServe G5 (Secure).



Poa Linnaeus 1753 (BLUEGRASS)

A genus of about 500 species, annuals and perennials, cosmopolitan. References: Haines (2004); Soreng & Simmons (2018); Soreng (1998); Soreng (2007) in FNA24 (2007a); Tucker (1996).

1 Plants with well-developed rhizomes; perennial.
  2 Upper stems strongly flattened; [section *Tichopoa*] ..... ***Poa compressa***
  2 Upper stems terete or nearly so.
    3 Lower nodes of the panicle with 1-3 branches; [section *Madropoa*] ..... ***Poa cuspidata***
    3 Lower nodes of the panicle with 4 or more branches; [section *Poa*]
      ..... ***Poa pratensis ssp. pratensis***
1 Plants lacking rhizomes; perennial or annual.
  5 Plants dioecious, the florets unisexual; lemmas and glumes scarious and silvery; [rare introduction in our area]; [section *Dioicopoa*] ..... ***Poa arachnifera***
  5 Plants not dioecious, the florets bisexual; lemmas and glumes not notably scarious and silvery; [collectively common and widespread in our area].
    6 Lemmas not webbed at the base.
      7 Annual; culms decumbent to ascending and 1-3 dm long; inflorescence 2-8 cm long, the ascending branches bearing crowded spikelets above the middle; lemmas 2.4-3.4 mm long; [section *Micrantherae*] ..... ***Poa annua***
      7 Perennial; culms erect, 3-6 dm long; inflorescence 6-15 cm long, the widely spreading branches bearing a few spikelets near the end; lemmas 3.2-4.4 mm long; [section *Sylvestres*] ..... ***Poa autumnalis***
    6 Lemmas webbed at the base.
      11 Annual; [section *Homalopoa*] ..... ***Poa chapmaniana***
      11 Perennial.
        12 Marginal veins of the lemma glabrous.
          ..... ***Poa trivialis ssp. trivialis***
        12 Marginal veins of the lemma pubescent, at least basally.
          ..... ***Poa sylvestris***

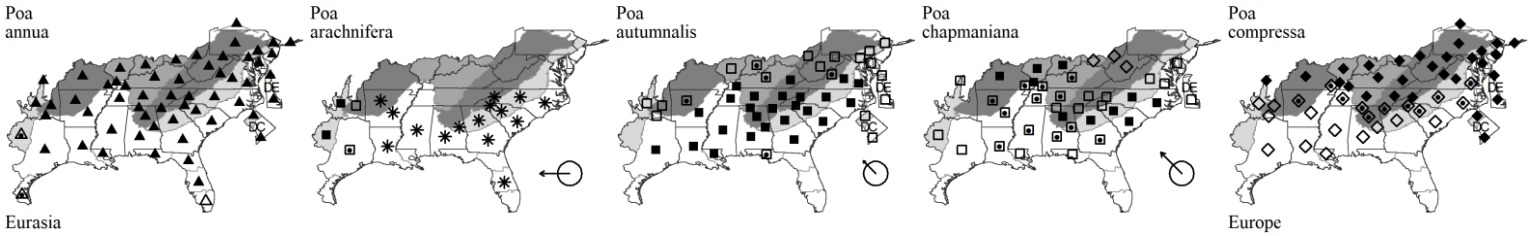
* ***Poa annua*** Linnaeus. SPEARGRASS, SIX-WEEKS GRASS, ANNUAL BLUEGRASS. **Hab:** Fields, roadsides, gardens, lawns, disturbed areas. **Dist:** Native of Eurasia. **Phen:** Dec-May (-Nov). **Syn:** = Ar, C, ETx1, F, FlGr, FNA24, G, GW1, HC, Il, K1, K3, K4, Meso6, Mi, Mo1, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV, Tucker (1996). NatureServe GNR (Not Yet Ranked).

Poa arachnifera Torrey. TEXAS BLUEGRASS. **Hab:** Prairies and woodlands, eastwards in disturbed areas. Prairies, woodlands, eastwards in disturbed areas. **Dist:** Sc. KS south through OK to se., sc. and sw. TX. **Phen:** Mar-May. **Syn:** = Ar, ETx1, FlGr, FNA24, HC, Il, K1, K3, K4, NcTx, RAB, S, Tx, WH3. NatureServe G5 (Secure).

Poa autumnalis Muhlenberg ex Elliott. BLUEGRASS. **Hab:** Moist or dry nutrient-rich forests. **Dist:** N. NJ west to se. MI, south to Panhandle FL and e. TX. **Phen:** Mar-May. **Syn:** = Ar, C, ETx1, F, FlGr, FNA24, G, GW1, HC, Il, K1, K3, K4, Mi, Pa, RAB, S, Tn, Tx, Va, W, WH3, Tucker (1996). NatureServe G5 (Secure).

Poa chapmaniana Lamson-Scribner. CHAPMAN'S BLUEGRASS. **Hab:** Low fields, roadsides, disturbed areas. **Dist:** DE west to IA, south to FL Panhandle and LA. **Phen:** Mar-May. **Syn:** = Ar, C, ETx1, F, FlGr, FNA24, G, HC, Il, K1, K3, K4, Mo1, NcTx, NE, RAB, S, Tn, Tx, Va, W, WH3, WV, Tucker (1996). NatureServe G5 (Secure).

* ***Poa compressa*** Linnaeus. FLAT-STEMMED BLUEGRASS, CANADA BLUEGRASS. **Hab:** Fields, roadsides, disturbed areas. **Dist:** Considered to be a native of Europe, but often found in remote natural areas. **Phen:** Apr-Aug. **Syn:** = Ar, C, ETx1, F, FNA24, G, HC, Il, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WV, Tucker (1996). NatureServe GNR (Not Yet Ranked).



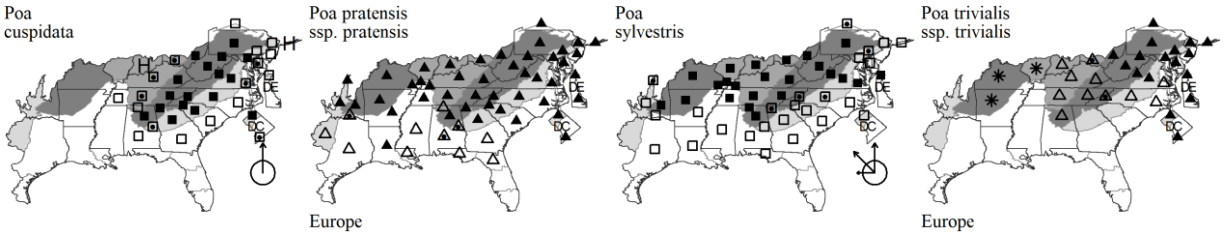
Poa cuspidata Nuttall. **Hab:** Moist forests at low to high elevations, ravines, bluffs. **Dist:** NJ west to s. IN, south to sw. GA and c. AL. **Phen:** Mar-Apr. **Syn:** = C, F, FNA24, G, HC, K1, K3, K4, NY, Pa, RAB, S, Tn, Va, W, WV, Tucker (1996). NatureServe G5 (Secure).

* ***Poa pratensis*** Linnaeus *ssp.* ***pratensis***. KENTUCKY BLUEGRASS, JUNEGRASS, SPEARGRASS. **Hab:** Lawns, roadsides, disturbed areas, and widely naturalized in more natural forests, woodlands, and wetlands. **Dist:** Native of Europe. **Phen:** Apr-Aug. **Syn:** = Ar, FNA24, K1, Mi, NE, NY, Va; = *Poa pratensis* – Il; < *Poa pratensis* – C, ETx1, F, FlGr, G, HC, Meso6, Mo1, NcTx, RAB, S, Tn, Tx, W, WH3, WV, Tucker (1996); < *Poa pratensis* Linnaeus ssp. *pratensis* – K3, K4.

Poa sylvestris A. Gray. FOREST BLUEGRASS, WOODLAND BLUEGRASS. **Hab:** Moist to dry-mesic forests. **Dist:** NY west to MN and SD, south to Panhandle FL and TX. **Phen:** Apr-Jun. **Syn:** = Ar, C, ETx1, F, FlGr, FNA24, G, GW1, HC, Il, K1, K3, K4, Mi, Mo1, NcTx, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV, Tucker (1996). NatureServe G5 (Secure).

* ***Poa trivialis*** Linnaeus *ssp.* ***trivialis***. ROUGH BLUEGRASS. **Hab:** Moist forests, disturbed areas, bottomlands. **Dist:** Native of Europe. **Phen:** Apr-Jun. **Syn:** = FNA24, NE, NY; < *Poa trivialis* – Ar, C, F, G, GW1, HC, Il, K1, K3, K4, Meso6, Mi, Mo1, Pa, RAB, S, Tn, Va, W, WV, Tucker (1996). NatureServe GNRTNR (Not Yet Ranked).

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



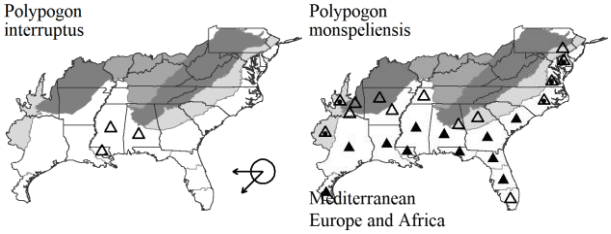
Polypogon Desfontaines 1798

A genus of about 18 species, annuals and perennials, of tropical and warm temperate regions. References: Barkworth (2007o) in FNA24 (2007a); MacRoberts, MacRoberts, & Allen (2020); Tucker (1996).

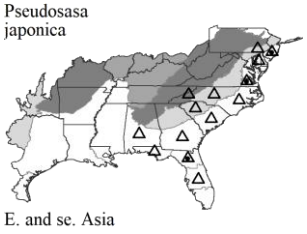
Unkeyed taxa: *Polypogon interruptus*

* ***Polypogon interruptus*** Kunth. DITCH RABBITFOOT GRASS. **Hab:** Ditches, disturbed wet areas. **Dist:** Native of w. North America, Mexico, south through Central America to South America. **Comm:** See Diamond (2013b) for additional information. **Syn:** = FNA24, K3, K4, NY, Tx. NatureServe G5? (Secure).

* ***Polypogon monspeliensis*** (Linnaeus) Desfontaines. ANNUAL RABBITFOOT GRASS, BEARDGRASS, ANNUAL BEARDGRASS. **Hab:** Brackish marshes, fields, nurseries, hammocks, other disturbed areas. **Dist:** Native of s. Europe to w. Asia. **Phen:** Apr-Jul. **Syn:** = C, ETx1, F, FlGr, FNA24, G, GW1, HC, K1, K3, K4, Meso6, Mi, NcTx, NE, NY, Pa, RAB, S, Tx, Va, WH3, Tucker (1996). NatureServe GNR (Not Yet Ranked).



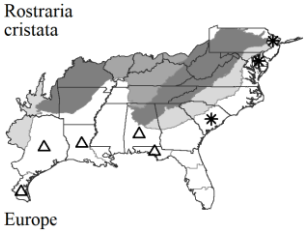
Pseudosasa Makino ex Nakai 1925 (ARROW BAMBOO)



A genus of about 36 species, native of China, Japan, and Korea. References: Judziewicz et al (2000); Stapleton (2007b) in FNA24 (2007a).

* ***Pseudosasa japonica*** (Siebold & Zuccarini ex Steudel) Makino ex Nakai. ARROW BAMBOO. **Hab:** Cultivated as an ornamental, persistent or spreading from plantings. **Dist:** Native of Japan. This species has the potential to become invasive; it is likely already much more common in the Southeast than the map indicates. **Syn:** = FlGr, FNA24, HC, K1, K4, NE, Pa, WH3, Judziewicz et al (2000). NatureServe GNR (Not Yet Ranked).

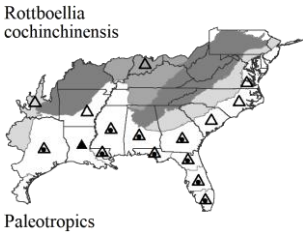
Rostraria Trinius 1820



A genus of about 10 species, native of the Mediterranean region and w. Asia. References: Standley (2007c) in FNA24 (2007a).

* ***Rostraria cristata*** (Linnaeus) Tzvelev. ANNUAL JUNEGRASS, ANNUAL KOELERIA. **Hab:** Open disturbed areas, also in waste areas near wool-combing mills or on ballast. **Dist:** Native of Europe. **Phen:** Mar-Jun. **Syn:** = ETx1, FlGr, K1, K3, K4, NY; = *Koeleria phleoides* (Villars) Persoon – HC, S; ? *Koeleria gerardii* (Villars) Shinners – Tx, WH3; > *Rostraria cristata* var. *cristata* – FNA24; > *Rostraria cristata* var. *glabriflora* (Trautvetter) Doğan – FNA24. NatureServe GNR (Not Yet Ranked).

Rottboellia Linnaeus f. 1782 (ITCH-GRASS)



A genus of about 5 species, native to tropical Asia and Africa. References: Wipff & Rector (1993); Wipff (2003m) in FNA25 (2003a).

* ***Rottboellia cochinchinensis*** (Loureiro) W.D. Clayton. ITCH GRASS. **Hab:** Disturbed ground, pine rocklands, pine savannas, fruit groves. **Dist:** Native of tropical se. Asia. This grass, considered a noxious weed, was found in at least 13 GA counties by 1985 (Duncan 1985; Carter, Baker, & Morris 2009), on a farm in Robeson County, NC in 1984, in cornfields in Westmoreland County, VA in 2007, and in Berkeley County, SC in 2013. **Phen:** Jul-Nov. **Syn:** = Ar, FlGr, FNA25, Il, K1, K3, K4, WH3, Wipff & Rector (1993); = *Manisuris exaltata* (Linnaeus f.) Kuntze – S; = *Rottboellia exaltata* Linnaeus f. – Bah, HC. NatureServe GNR (Not Yet Ranked).

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

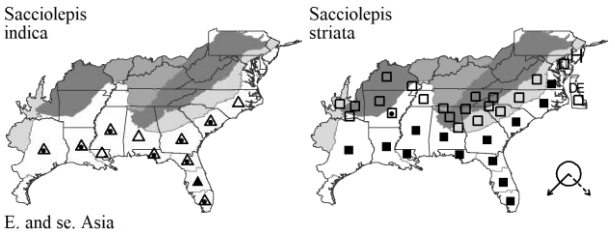
Sacciolepis Nash 1901 (CUPSCALE)

A genus of about 30 species, primarily in the tropics and subtropics. References: Wipff (2003i) in FNA25 (2003a).

1 Annual, cespitose; spikelets 2.5-3.5 mm long; [rare alien] ..... ***Sacciolepis indica***
1 Perennial, from creeping stolons; spikelets (3-) 4-5 mm long; [common native] ..... ***Sacciolepis striata***

* ***Sacciolepis indica*** (Linnaeus) Chase. INDIAN CUPSCALE. **Hab:** Low fields, ditches, disturbed wetlands, moist pine savannas. **Dist:** Native of India. **Phen:** Mar-Nov. **Syn:** = ETx1, FlGr, FNA25, GW1, HC, K1, K3, K4, Meso6, RAB, WH3. NatureServe GNR (Not Yet Ranked).

Sacciolepis striata (Linnaeus) Nash. AMERICAN CUPSCALE. **Hab:** Marshes (especially tidal oligohaline), interdune swales, ditches, swamps. **Dist:** S. NJ south to FL, west to e. TX and OK, nearly limited to the Coastal Plain, but occasionally inland as in w. NC and TN; also native in the West Indies and n. South America. **Phen:** May-Dec. **Syn:** = Ar, C, ETx1, F, FlGr, FNA25, G, GW1, HC, K1, K3, K4, Meso6, Mo1, NcTx, NE, RAB, S, Tn, Tx, Va, W, WH3. NatureServe G5 (Secure).



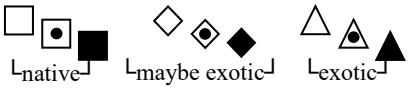
Schizachyrium Nees 1829 (LITTLE BLUESTEM)

A genus of about 60 species, widespread in tropical, subtropical, and warm temperate regions of the World. The issue of the separation of *Schizachyrium* from *Andropogon*, the membership of each genus, the morphological characters that are key and diagnostic (when characters are in conflict), and the reciprocal monophyly of each genus remain very uncertain (see, for instance, Arthan et al. 2017). For now, I retain the predominant usage of recent decades of separating the two genera, and allocate the species to genera on the pragmatic character of single racemes (*Schizachyrium*) vs. 2 or more racemes (*Andropogon*), but that may well prove erroneous. References: Arthan et al (2017); Gandhi (1989); Hatch (1978); Hatch (1984); Wipff (1996a); Wipff (2003l) in FNA25 (2003a).

1 Leaf blades 0.5-1.5 mm wide, with a lighter-colored zone (of bullate cells) in the center of the upper surface; sessile spikelet 3.5-4.5 mm long ..... ***Schizachyrium tenerum***
1 Leaf blades >1.5 mm wide, lacking a distinct lighter zone on the upper surface; sessile spikelet 4-11 mm long.
  2 Pedicels straight, not curving outwards, the raceme therefore appearing straight and strict; pedicel bases 0.2-0.5 mm in diameter, flaring upwards to a diameter 0.3-1.0 mm wide; first glume of sessile spikelet pubescent, scabrous, or glabrous ..... ***Schizachyrium hirtiflorum***
  2 Pedicels curving outwards, the raceme therefore appearing broader and less strict; pedicel bases 0.1-0.2 mm in diameter, flaring upwards to a diameter of ca. 0.5 mm; first glume of sessile spikelet glabrous or scabrous.
    3 Plants rhizomatous, with internodes 6 mm long or longer; sessile spikelet 5-7 mm long ..... ***Schizachyrium stoloniferum***
    3 Plants cespitose, rhizome internodes absent or < 3 mm long, the stem sometimes decumbent at the base and rooting at the lower nodes (appearing nearly rhizomatous); sessile spikelet 6-10 mm long.
      5 Leaf sheaths broad and strongly keeled, hairs of the raceme internodes 2.5-6 mm long; stems decumbent at base, rooting at the lower nodes; plants blue-green.
        6 Ligules 1.5-2 mm long; pedicellate spikelets 1.5-5 mm long; [of the Atlantic Coast] ..... ***Schizachyrium littorale***
        6 Ligules 0.5-1 mm long; pedicellate spikelets 4.5-8.5 mm long; [of the Gulf Coast] ..... ***Schizachyrium maritimum***
      5 Leaf sheaths rounded or weakly keeled; hairs of the raceme internodes either 1-3 (-4) mm long, or to 9 mm long (in *S. gracile* var. *gracile* and *S. sericatum* of s. FL); stems erect, not rooting at the lower nodes; plants green or blue-green.
        10 Pedicellate spikelets of the proximal spikelet units on each raceme staminate, 5-10 mm long, with a lemma, the pedicellate spikelets of the distal units usually smaller (1-4 mm long) and sterile; sheaths and blades densely tomentose to glabrate ..... ***Schizachyrium scoparium var. divergens***
        10 Most pedicellate spikelets sterile, 1-6 mm long, without a lemma; sheaths and blades usually glabrous, occasionally pubescent ..... ***Schizachyrium scoparium var. scoparium***

Schizachyrium hirtiflorum Nees. HAIRY CRIMSON BLUESTEM. **Hab:** Pine flatwoods, longleaf pine sandhills, disturbed sandy sites. **Dist:** Sw. GA and FL west to AZ and south through Central America to South America; West Indies. **Phen:** Aug-Nov. **Tax:** I here interpret *Schizachyrium hirtiflorum* as the New World component , related to Old World *S. sanguineum*, but do not distinguish minor variations in pubescence of the glumes. **Syn:** = *Andropogon hirtiflorus* (Nees) Kunth – S; > *Andropogon hirtiflorus* (Nees) Kunth – HC; > *Andropogon semiberbis* (Nees) Kunth – HC; > *Schizachyrium feense* (Fournier) A. Camus – Tx; < *Schizachyrium sanguineum* – K3, K4, WH3; > *Schizachyrium sanguineum* var. *brevipedicellatum* (Beal) Hatch – WI; > *Schizachyrium sanguineum* (Retzius) Alston var. *hirtiflorum* (Nees) Hatch – FlGr, FNA25, K1, Hatch (1984); >< *Schizachyrium sanguineum* var. *sanguineum* – FlGr, K1, WI; > *Schizachyrium semiberbe* Nees – Bah.

Schizachyrium littorale (Nash) E.P. Bicknell. SEASIDE LITTLE BLUESTEM. **Hab:** Coastal dunes and maritime dry grasslands, often with *Uniola paniculata*, *Panicum amarum*, and other dune plants. **Dist:** E. MA south to NC (or SC?), and inland on the shores of the Great Lakes. Also reported for FL for ne. FL (Duval County) and Panhandle FL (Franklin County), and in s. TX. **Phen:** Aug-Dec. **Syn:** = FlGr, FNA25, GW1, Il, K1, K3, K4, NE, NY, Va; = *Andropogon littoralis* Nash – HC, S; = *Andropogon scoparius* Michaux var. *littoralis* (Nash) A.S. Hitchcock – F, G; = *Schizachyrium scoparium* ssp. *littorale* (Nash) Gandhi & Smeins – Mi; = *Schizachyrium scoparium* ssp. *littoralis* – Tx, orthographic variant; = *Schizachyrium scoparium* var. *littorale* (Nash) Gould – C, Pa, WH3, Wipff (1996a); < *Andropogon scoparius* Michaux – RAB; < *Schizachyrium scoparium* ssp. *littorale* (Nash) Gandhi & Smeins – Gandhi (1989).

Key to Map Symbology:  (native; maybe exotic; exotic) ←rare ←uncommon ←common (see introduction for more)

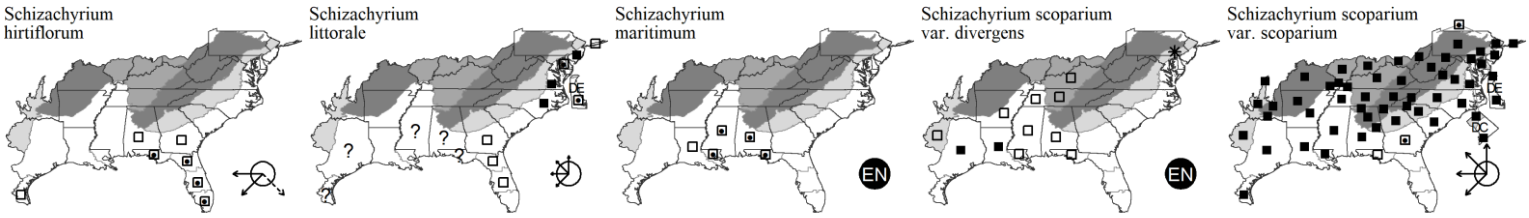
* : waif EN : endemic H : historic

N : no P : planted ? : questionable X : extirpated

Schizachyrium maritimum (Chapman) Nash. GULF COAST BLUESTEM. **Hab:** Coastal dunes and grasslands. **Dist:** AL and FL west to e. LA. **Phen:** Oct-Nov. **Syn:** = FlGr, FNA25, GW1, K1, K3, K4; = *Andropogon maritimus* Chapman – HC, S; < *Schizachyrium scoparium* (Michaux) Nash var. *scoparium* – WH3. NatureServe G3G4Q (Vulnerable).

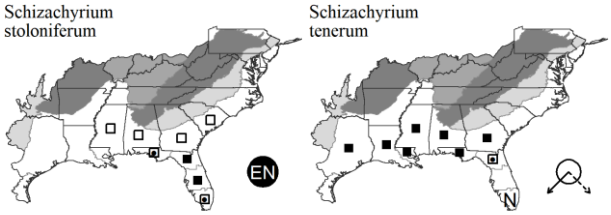
Schizachyrium scoparium (Michaux) Nash *var. **divergens*** (Hackel) Gould. PINEHILL BLUESTEM. **Hab:** Longleaf pine sandhills, upland longleaf pine savannas, barrens, prairies, various other open habitats. **Dist:** KY, AR, and TX, south to Panhandle FL, AL, MS, and LA. **Phen:** Aug-Dec. **Syn:** = Ar, ETx1, FNA25, K1, K3, K4, Tn; = *Andropogon divergens* (Hackel) Andersson ex A.S. Hitchcock – HC; < *Andropogon scoparius* Michaux – S; > *Schizachyrium scoparium* (Michaux) Nash var. *divergens* (Hackel) Gould – Tx; < *Schizachyrium scoparium* (Michaux) Nash var. *scoparium* – FlGr, WH3; >< *Schizachyrium scoparium* var. *virile* (Shinners) Gould – Tx.

Schizachyrium scoparium (Michaux) Nash *var. **scoparium***. COMMON LITTLE BLUESTEM. **Hab:** In a wide range of moist to dry habitats. **Dist:** NB west to AB, south to Panhandle FL and Mexico. **Phen:** (Jun-) Aug-Dec. **Comm:** One of the most ubiquitous plants in the modern landscape of our area, occurring throughout in the majority of habitats. This species is extremely variable, some of the variability correlated with habitat and geography; the recognition of infraspecific taxa is warranted. **Syn:** = Ar, C, ETx1, FNA25, K3, K4, Mo1, NE, NY, Pa, Tn, Va, Wipff (1996a); = *Schizachyrium scoparium* – GW1; = *Schizachyrium scoparium* ssp. *scoparium* – K1, Mi, Gandhi (1989); > *Andropogon praematurus* Fernald – F, G; < *Andropogon scoparius* Michaux – RAB, S, W, WV; > *Andropogon scoparius* var. *frequens* F.T. Hubbard – F; > *Andropogon scoparius* var. *polycladus* Lamson-Scribner & Ball – F; > *Andropogon scoparius* var. *scoparius* – F, G, HC; < *Schizachyrium scoparium* – Il, NcTx; < *Schizachyrium scoparium* ssp. *scoparium* – FlGr; < *Schizachyrium scoparium* (Michaux) Nash var. *scoparium* – WH3.

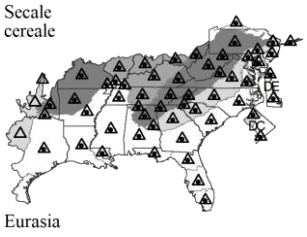


Schizachyrium stoloniferum Nash. CREEPING BLUESTEM. **Hab:** Fall-line sandhills in the inner Coastal Plain, perhaps in other dry habitats, also apparently in seepages in pineland landscapes, mesic to wetland pine savannas and seepage slopes in peninsular Florida, the habitat and range in our area requiring further study. **Dist:** SC and GA south to s. FL and west to s. MS. **Phen:** Aug-Oct. **Comm:** See Wipff (1996a) for additional discussion. **Syn:** = GW1; = *Andropogon stolonifer* (Nash) A.S. Hitchcock – HC, S; = *Schizachyrium scoparium* (Michaux) Nash var. *stoloniferum* (Nash) J. Wipff – FlGr, FNA25, K1, K3, K4, WH3, Wipff (1996a); < *Andropogon scoparius* Michaux – RAB; < *Schizachyrium scoparium* ssp. *littorale* (Nash) Gandhi & Smeins – Gandhi (1989).

Schizachyrium tenerum Nees. SLENDER BLUESTEM, LIEDOWN GRASS. **Hab:** Longleaf pine savannas, sandhills, and flatwoods. **Dist:** S. GA, ne. FL, and FL Panhandle west to e. TX; Mexico, Central America, to South America. **Phen:** Jul-Nov. **Syn:** = ETx1, FlGr, FNA25, K1, K3, K4, Tx, WH3; = *Andropogon tener* (Nees) Kunth – HC, S. NatureServe G5 (Secure).



Secale Linnaeus 1753 (RYE)



A genus of 3 species, native to western w. Asia and the Mediterranean. References: Barkworth (2007j) in FNA24 (2007a); Tucker (1996).

* ***Secale cereale*** Linnaeus. RYE. **Hab:** Fields; commonly cultivated, uncommonly persistent or volunteering after cultivation. **Dist:** Native of Eurasia. **Phen:** May-Jul. **Comm:** The lemmas have awns 2-6 cm long. An important crop, cultivated for at least 8000 years. **Syn:** = Ar, C, ETx1, F, FlGr, FNA24, G, HC, Il, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, WH3, Tucker (1996). NatureServe GNR (Not Yet Ranked).

Setaria Palisot de Beauvois 1807 (FOXTAIL GRASS)

A genus of about 110-140 species, of tropical and warm temperate regions. Webster (1995) merged *Paspalidium* into *Setaria*, but it now appears that *Paspalidium* should be held as separate. References: Allen (2003a) in FNA25 (2003a); Crins (1991); Rominger (2003) in FNA25 (2003a); Webster (1988); Webster (1993b); Webster (1995).

Unkeyed waifs: *Setaria rariflora, Setaria setosa*

5 Bristles 4-12 below each spikelet.
  6 Annual, with fibrous roots.
    ..... ***Setaria pumila***
  6 Perennial, noticeably rhizomatous.

Key to Map Symbology: □ native; ◇ maybe exotic; △ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

8 Panicle 3-8 (10) cm long; plant from knotty rhizomes; [native, common (sometimes weedy)]..... ***Setaria parviflora***
8 Panicle 5-25 cm long; plant from thick rhizomes; [alien, rare]..... ***Setaria sphacelata***
5 Bristles 1-3 (rarely 6) below each spikelet.
9 Bristles retrorsely scabrous.
10 Leaves strigose on the lower surface; sheath margins glabrous; panicles 2-6 cm long..... ***Setaria adhaerens***
10 Leaves scabrous on the lower surface; sheath margins ciliate; panicles 5-15 cm long..... ***Setaria verticillata***
9 Bristles antrorsely scabrous
12 Upper lemmas smooth and shiny (occasionally with obscure rugosity)
13 Culms to 1 m tall; spikelets ca. 3 mm long; [alien, of ruderal sites]..... ***Setaria italica***
13 Culms to 6 m tall; spikelets ca. 2 mm long; [native, of marshes]..... ***Setaria magna***
12 Upper lemmas distinctly transversely rugose, dull.
14 Upper lemmas coarsely rugose; leaves 4-7 mm wide; [native]..... ***Setaria corrugata***
14 Upper lemmas finely rugose; leaves 4-25 mm wide; [aliens, generally of ruderal sites].
15 Panicles verticillate; rachises visible, scabrous..... ***Setaria verticilliformis***
15 Panicles densely spiciform; rachises not visible, villous.
16 Leaves softly pilose on the upper surface; panicles arching and drooping from the base; spikelets 2.5-3.0 mm long..... ***Setaria faberi***
16 Leaves scabrous on the upper surface; panicles nodding only at the tip; spikelets 1.8-2.2 mm long.
17 Panicles 10-20 cm long; culms 10-25 dm tall; leaves 10-25 mm wide..... ***Setaria viridis var. major***
17 Panicles 3-8 cm long; culms 2-10 dm tall; leaves 4-12 mm wide..... ***Setaria viridis var. viridis***

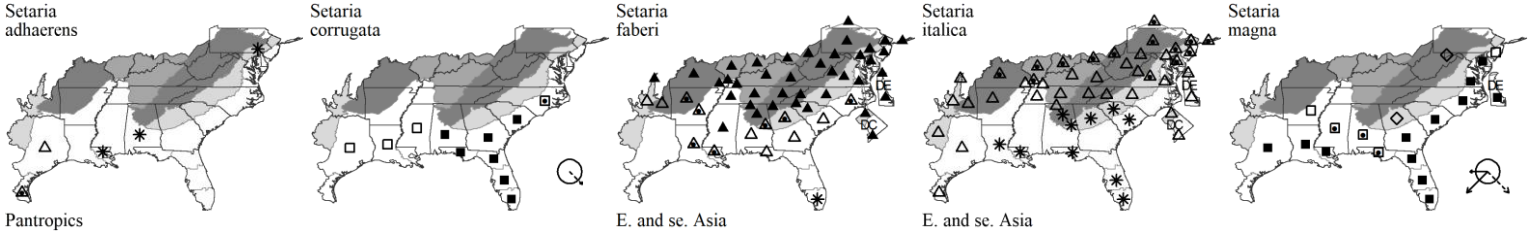
* ***Setaria adhaerens*** (Forsskål) Chiovenda. **Hab:** Disturbed areas. **Dist:** Native of the tropics. Distributed widely throughout the tropics and subtropics, in North America from s. AL west to CA (perhaps only adventive in portions of that distribution). **Comm:** {synonymy incomplete}. **Syn:** = FNA25, K1, K3, K4, Meso6, Tx, Webster (1993b). NatureServe GNR (Not Yet Ranked).

Setaria corrugata (Elliott) J.A. Schultes. COASTAL PLAIN BRISTLEGRASS. **Hab:** Pinelands, disturbed areas. **Dist:** Ne. NC south to s. FL, west to e. TX; Cuba; Dominican Republic. **Phen:** Jul-Oct (-Jun). **Syn:** = ETx1, FlGr, FNA25, HC, K1, K3, K4, RAB, Tx, WH3, Webster (1993b); = *Chaetochloa corrugata* (Elliott) Lamson-Scribner – S. NatureServe G5? (Secure).

* ***Setaria faberi*** R.A.W. Herrmann. NODDING FOXTAIL-GRASS, GIANT FOXTAIL-GRASS. **Hab:** Fields, pastures, roadsides, gardens, other disturbed areas. **Dist:** Native of China. **Phen:** May-Oct. **Syn:** = Ar, C, ETx1, FlGr, FNA25, G, Il, K1, K3, K4, Mi, Mo1, NE, NY, Pa, RAB, Tn, Va, W, WH3; = *Setaria faberii* – F, HC, WV, Webster (1993b), orthographic variant. NatureServe GNR (Not Yet Ranked).

* ***Setaria italica*** (Linnaeus) Palisot de Beauvois. FOXTAIL-MILLET, ITALIAN MILLET, HUNGARIAN MILLET. **Hab:** Fields, roadsides, frequently planted as a cover crop after soil disturbance. **Dist:** Native of Eurasia. **Phen:** Jul-Aug. **Tax:** Probably derived via cultivation and selection from *S. viridis*, and cultivated as a food crop in China since at least 6000 BP and later in Europe (Hancock 2004). **Syn:** = Ar, C, ETx1, F, FlGr, FNA25, G, HC, Il, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, RAB, Tn, Tx, W, WH3, WV, Webster (1993b); = *Chaetochloa italica* (Linnaeus) Lamson-Scribner – S. NatureServe GNR (Not Yet Ranked).

Setaria magna Grisebach. SALTMARSH FOXTAIL-GRASS, GIANT FOXTAIL-GRASS. **Hab:** Tidal marshes (oligohaline and less typically mesohaline), interdune swales, near-coastal marshes, less typically inland, in south Florida interior in deep freshwater marshes and "holes" in cypress domes and strand swamps. **Dist:** NJ south to s. FL, west to e. TX; disjunct inland in GA, AR, LA, TX, and NM; West Indies; Bermuda; Costa Rica, Mexico, Brazil, Argentina. **Phen:** Jun-Oct (-May). **Syn:** = Ar, C, ETx1, F, FlGr, FNA25, G, HC, K1, K3, K4, Meso6, NcTx, RAB, Tx, Va, WH3, Webster (1993b); = *Chaetochloa magna* (Grisebach) Lamson-Scribner – S. NatureServe G4G5 (Apparently Secure).



Setaria parviflora (Poiret) Kerguélen. KNOTROOT BRISTLEGRASS, PERENNIAL FOXTAIL-GRASS. **Hab:** Marshes, ditches, moist disturbed areas, pine rocklands, and dry disturbed areas over limestone. **Dist:** MA to IA south to s. FL and s. TX, south through Mexico to Central America and South America; CA and NV; West Indies. **Phen:** May-Oct (-Apr). **Tax:** Gandhi & Barkworth (2003) provide a detailed discussion of the reasons for the nomenclatural change from the once more familiar *S. geniculata*. **Syn:** = Ar, ETx1, FlGr, FNA25, Il, K1, K3, K4, Meso6, Mo1, NcTx, NE, NY, Pa, Tn, Va, WH3, Webster (1993b); = *Chaetochloa geniculata* (Palisot de Beauvois) Millspaugh & Chase – S; = *Setaria geniculata* Palisot de Beauvois – Bah, C, F, G, HC, RAB, Tx, W, WV. NatureServe G5 (Secure).

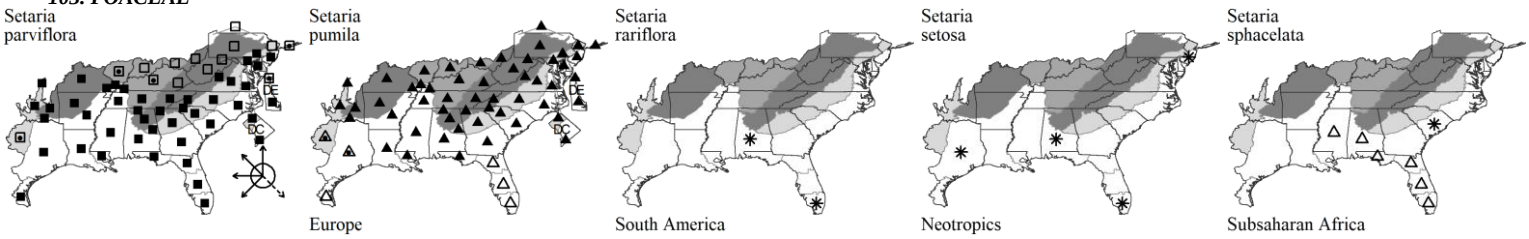
* ***Setaria pumila*** (Poiret) Roemer & J.A. Schultes. YELLOW FOXTAIL. **Hab:** Disturbed areas, lawns, fields, less commonly in natural habitats. **Dist:** Native of Europe. **Phen:** Jun-Oct. **Syn:** = *Chaetochloa lutescens* (Weigel) Stuntz – S; = *Setaria glauca* (Linnaeus) Palisot de Beauvois – C, F, G, Mo1, RAB, Tx, W, WV, misapplied; = *Setaria pumila* (Poiret) Roemer & J.A. Schultes ssp. *pumila* – Ar, FlGr, FNA25, Il, K3, K4, NE, NY, Va; >< *Setaria lutescens* (Weigel) F.T. Hubbard – HC, misapplied; < *Setaria pumila* (Poiret) Roemer & J.A. Schultes – ETx1, Mi, NcTx, Pa, Tn, WH3; >< *Setaria pumila* ssp. *pallidifusca* – K1.

* ***Setaria rariflora*** J.C. Mikan ex Trinius. BRAZILIAN BRISTLEGRASS. **Hab:** Disturbed areas. **Dist:** Native of South America. **Phen:** Sep-Nov. **Comm:** {not yet keyed}. **Syn:** = FlGr, FNA25, K3, WH3; < *Setaria setosa* (Swartz) Palisot de Beauvois var. *setosa* – K4.

* ***Setaria setosa*** (Swartz) Palisot de Beauvois. WEST INDIAN BRISTLEGRASS. **Hab:** Dry, disturbed areas in s. FL, northwards on ballast in old seaports as a waif and apparently not established. **Dist:** Native of the West Indies. **Phen:** Sep-Dec. **Syn:** = Bah, FlGr, FNA25, WH3; < *Setaria setosa* (Swartz) Palisot de Beauvois var. *setosa* – K3, K4. NatureServe G5TNR (Not Yet Ranked).

* ***Setaria sphacelata*** (Schumacher) Stapf & C.E. Hubbard. AFRICAN BRISTLEGRASS. **Hab:** Disturbed areas. **Dist:** Native of Africa. **Phen:** May-Sep. **Syn:** = FlGr, FNA25, K1, K3, K4, WH3; > *Setaria sphacelata* var. *sericea* (Stapf) W. Clayton – Meso6. NatureServe GNR (Not Yet Ranked).

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more)
* : waif EN : endemic H : historic
N : no P : planted ? : questionable
X : extirpated

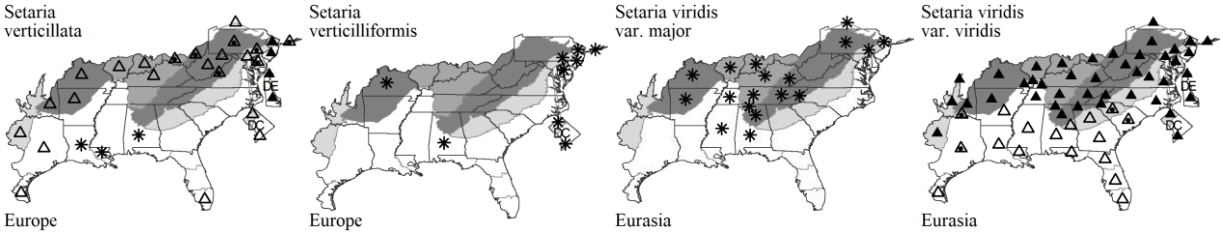


* ***Setaria verticillata*** (Linnaeus) Palisot de Beauvois. HOOKED BRISTLEGRASS. **Hab:** Fields, roadsides, other disturbed areas. **Dist:** Native of Europe. **Phen:** Jan-Dec. **Syn:** = Ar, Bah, ETx1, FlGr, FNA25, G, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, Va, WH3, WV; = *Chaetochloa verticillata* (Linnaeus) Lamson-Scribner – S; = *Setaria verticillata* var. *verticillata* – C, F, HC; < *Setaria verticillata* (Linnaeus) Palisot de Beauvois – Webster (1993b); > *Setaria verticillata* var. *ambigua* (Gussone) Parlatore – Mo1; > *Setaria verticillata* var. *verticillata* – Mo1.

* ***Setaria verticilliformis*** Dumortier. **Hab:** Reported for NJ, PA, MD, and AL (FNA 2003a, Kartesz 1999). **Syn:** = FNA25, K1, K3, K4, NY; = *Chaetochloa ambigua* Gussone – S; = *Setaria verticillata* var. *ambigua* (Gussone) Parlatore – C, F, HC; = *Setaria viridis* (Linnaeus) Palisot de Beauvois var. *ambigua* (Gussone) Cosson & Durieu – G; < *Setaria verticillata* (Linnaeus) Palisot de Beauvois – Webster (1993b). NatureServe GNRTNR (Not Yet Ranked).

* ***Setaria viridis*** (Linnaeus) Palisot de Beauvois *var*. ***major*** S.F. Gray. GIANT GREEN FOXTAIL. **Hab:** Disturbed areas. **Dist:** Native of Eurasia. **Phen:** Jun-Sep. **Syn:** = Ar, C, FNA25, G, Il, K1, K3, K4, Mi, Mo1, NY, Pa, Tn, Webster (1993b); < *Setaria viridis* – HC, RAB. NatureServe GNRTNR (Not Yet Ranked).

* ***Setaria viridis*** (Linnaeus) Palisot de Beauvois *var*. ***viridis***. GREEN BRISTLEGRASS. **Hab:** Fields, pastures, roadsides, other disturbed areas. **Dist:** Native of Eurasia. **Phen:** May-Nov. **Syn:** = Ar, C, ETx1, FlGr, FNA25, Il, K1, K3, K4, Mi, Mo1, NE, NY, Tn, Va, Webster (1993b); = *Chaetochloa viridis* (Linnaeus) Lamson-Scribner – S; < *Setaria viridis* – HC, Meso6, NcTx, RAB, Tx, W, WH3, WV; > *Setaria viridis* var. *breviseta* (Doell) A.S. Hitchcock – G; > *Setaria viridis* (Linnaeus) Palisot de Beauvois var. *viridis* – F, G; > *Setaria viridis* var. *weinmannii* (Roemer & J.A. Schultes) Heynhold – F.



Sorghastrum Nash 1901 (INDIANGRASS)

A genus of about 18-20 species, of tropical and subtropical America and Africa, rarely extending into temperate areas. References: Dávila Aranda & Hatch (2002) in FNA25 (2003a); Hall (1982).

1 Awns 10-22 (-30) mm long, once-geniculate; plants rhizomatous; surfaces of the glumes tan to slightly brown basally; ligule 2-10 mm long, prominently auricled ..... ***Sorghastrum nutans***

1 Awns 16-46 mm long, twice-geniculate; plants cespitose; surfaces of the glumes brown; ligule 1-5 mm long, truncate.

2 Axis of the panicle straight, erect, the branchlets appressed to ascending, the spikelets drooping-secund; spikelets 0.8-1.2 mm wide ..... ***Sorghastrum secundum***

2 Axis of the panicle arching, usually strongly so, the branchlets ascending to spreading, the spikelets not drooping-secund; spikelets 1.1-1.8 mm wide.

3 Axis of the panicle straight, with the branches distributed no more than 180 degrees around the axis (as viewed from above); spikelets 1.3-1.8 mm wide; rachis 0.7-1.3 mm thick; flowering Jul-Aug. ..... ***Sorghastrum apalachicolense***

3 Axis of the panicle arching, with the branchlets distributed through 360 degrees around the axis (as viewed from above); spikelets 1.1-1.4 mm wide; rachis 0.3-0.8 mm thick; flowering Sep-Nov. ..... ***Sorghastrum elliottii***

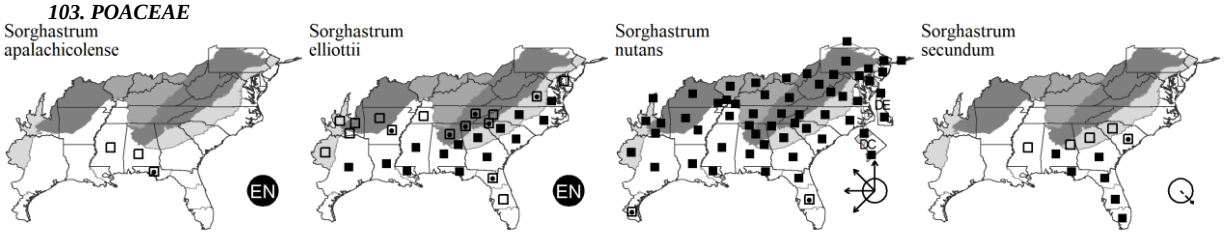
Sorghastrum apalachicolense D.W. Hall. APALACHICOLA INDIANGRASS, OPEN INDIANGRASS. **Hab:** Pine flatwoods and longleaf pine sandhills. **Dist:** Panhandle FL west to s. MS (Sorrie & Leonard 1999). It may well occur as well in GA. **Phen:** Jul-Aug. **Syn:** = K1, K3, K4, WH3, Hall (1982); = *Sorghastrum apalachicolensis* D.W. Hall – FlGr; < *Sorghastrum elliottii* (C. Mohr) Nash – FNA25.

Sorghastrum elliottii (C. Mohr) Nash. SLENDER INDIANGRASS. **Hab:** Woodlands and forests, river-scour areas, including oak-hickory forests and woodlands over mafic rocks. **Dist:** MD south to FL and west to TX, inland to TN, AR, and OK, mainly on the Coastal Plain, but extending inland to other physiographic provinces. **Phen:** Sep-Nov. **Syn:** = C, ETx1, F, FlGr, G, HC, K1, K3, K4, NcTx, RAB, S, Tn, Tx, Va, W, WH3, Hall (1982); < *Sorghastrum elliottii* (C. Mohr) Nash – FNA25.

Sorghastrum nutans (Linnaeus) Nash. YELLOW INDIANGRASS. **Hab:** Xeric and mesic woodlands and forests of a wide variety, prairies, barrens, powerline rights-of-way, roadbanks. **Dist:** ME and QC west to s. MB, south to c. peninsular FL, TX, UT, AZ, and Mexico. **Phen:** Late Aug-Nov. **Comm:** Along with *Andropogon gerardi*, *Schizachyrium scoparium*, and *Panicum virgatum*, *Sorghastrum nutans* is one of the dominant grasses of the tall-grass prairie. It is also common in a variety of open habitats (natural and altered) in the forested landscape of eastern North America. **Syn:** = Ar, C, ETx1, F, FlGr, FNA25, G, HC, Il, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, RAB, S, Tn, Va, W, WH3, WV, Hall (1982); = *Sorghastrum avenaceum* (Michaux) Nash – Tx. NatureServe G5 (Secure).

Sorghastrum secundum (Elliott) Nash. LOPSIDED INDIANGRASS. **Hab:** Longleaf pine sandhills, Florida dry prairies, pine rocklands. **Dist:** S. SC south to s. FL and west to s. AL (Sorrie & Leonard 1999); n. Bahamas. **Phen:** (Jul-) Sep-Nov. **Syn:** = Bah, FlGr, FNA25, HC, K1, K3, K4, RAB, S, WH3, WI, Hall (1982). NatureServe G5 (Secure).

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



Sorghum Moench 1794 (SORGHUM, MILO, JOHNSON GRASS)

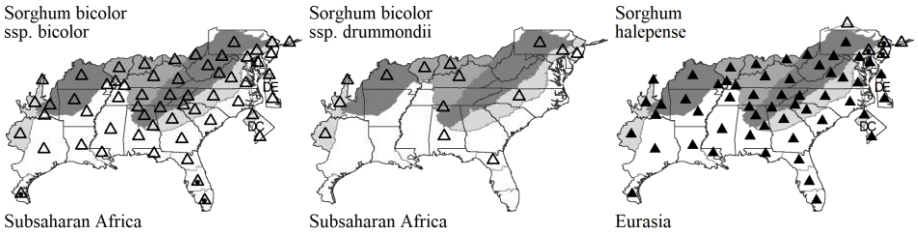
A genus of about 25 species, of tropical and subtropical Old World (1 species in Mexico). References: Barkworth (2003r) in FNA25 (2003a); de Wet (1978).

1 Rhizomatous perennial; leaves 1-2 cm wide ..... ***Sorghum halepense***
1 Fibrous-rooted annual; leaves (2-) 3-5 cm wide.
  2 Inflorescence dense, compact; plants 0.5-1.3 m tall ..... ***Sorghum bicolor ssp. bicolor***
  2 Inflorescence open, with spreading branches; plants 1.0-3.0 m tall ..... ***Sorghum bicolor ssp. drummondii***

* ***Sorghum bicolor*** (Linnaeus) Moench *ssp. **bicolor***. SORGHUM, MILO, BROOMCORN, SORGO. **Hab:** Cultivated, rarely persistent; common in cultivation, rare as an escape. **Dist:** Native of Africa. **Phen:** Oct. **Syn:** = ETx1, FlGr, FNA25, K1, K3, K4, Mo1, NcTx, NE, NY, Pa, WH3; = *Sorghum bicolor* (Linnaeus) Moench var. *bicolor* – C; = *Sorgum vulgare* var. *vulgare* – HC; < *Holcus sorghum* Linnaeus – S; < *Sorghum bicolor* – Mi, Tn, Tx; > *Sorghum bicolor* (Linnaeus) Moench var. *bicolor* – Il; > *Sorghum bicolor* var. *caffrorum* (Retzius) Mohlenbrock – Il; > *Sorghum bicolor* var. *saccharatum* (Linnaeus) Mohlenbrock – Il; < *Sorghum vulgare* Persoon – RAB; < *Sorgum vulgare* – F, orthographic variant. NatureServe GNRTNR (Not Yet Ranked).

* ***Sorghum bicolor*** (Linnaeus) Moench *ssp. **drummondii*** (Steudel) de Wet ex Davidse. SHATTERCANE. **Hab:** Cultivated, rarely persistent; common in cultivation, rare as an escape. **Dist:** Native of Africa. **Phen:** Oct. **Comm:** This is the taller variety with open inflorescences, usually sporadically present in sorghum fields. **Syn:** = K1, K3, Mo1, NcTx, NE, WH3; = *Sorghum bicolor* – K4; = *Sorghum bicolor* ssp. ×*drummondii* (Nees ex Steudel) de Wet – ETx1, FlGr, FNA25, Pa; = *Sorghum bicolor* (Linnaeus) Moench var. *drummondii* (Nees ex Steudel) Mohlenbrock – C, Il; = *Sorghum sudanense* (Piper) Stapf – Mi; = *Sorghum vulgare* Persoon var. *drummondii* (Nees ex Steudel) Hackel ex Chiovenda – HC; < *Holcus sorghum* Linnaeus – S; < *Sorghum bicolor* – Tn, Tx; < *Sorghum vulgare* Persoon – RAB; < *Sorgum vulgare* – F, orthographic variant.

* ***Sorghum halepense*** (Linnaeus) Persoon. JOHNSON GRASS. **Hab:** Fields, pastures, roadsides, waste places, cultivated fields. **Dist:** Native of Eurasia. **Phen:** Apr-Dec. **Comm:** A serious weed, difficult to eradicate. **Syn:** = Ar, Bah, C, ETx1, FlGr, FNA25, GW1, HC, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, W, WH3, WV; = *Holcus halepensis* Linnaeus – S; = *Sorgum halepense* – F, G, orthographic variant. NatureServe GNR (Not Yet Ranked).



Spartina Schreber 1789 (CORDGRASS)

A genus of about 15 species, perennial herbs, of the northern Hemisphere. The recognition of this genus is controversial following the work of Peterson et al. (2014a, 2014b), which shows *Spartina* as derived from within *Sporobolus*. Alternate possibilities to including *Spartina* in *Sporobolus* (the course taken by Peterson et al. 2014a, 2014b) include splitting *Sporobolus* into smaller monophyletic groups. For now and awaiting further study and potential taxonomic changes, we retain an apparently paraphyletic *Sporobolus* and recognize *Spartina*. References: Barkworth (2003j) in FNA25 (2003a); Peterson et al (2014a); Peterson et al (2014b).

1 Leaves with smooth or slightly scabrous margins; spikelets glabrous or nearly so; [of salt to brackish coastal marshes]; [section *Spartina*; subsection *Alterniflori*] ..... ***Spartina alterniflora***
1 Leaves with strongly scabrous margins; spikelets scabrous, at least on the keel; [of brackish to fresh marshes, or inland or upland].
  2 Plants strongly cespitose, forming large clumps with numerous basal leaves and culms; leaves involute; culms 0.5-2 m tall; [of s. SC southward]. ..... ***Spartina spartinae***
  2 Plants with elongate rhizomes, forming large clonal patches, the culms arising singly; leaves involute or flat; culms either 0.5-3.5 m tall; [collectively widespread in our area]; [section *Spartina*; subsection *Spartina*].
    5 Spikes 1-9 per inflorescence; culms 0.5-1 m tall; leaves 0.5-4 (-7) mm wide, usually involute when fresh ..... ***Spartina patens***
    5 Spikes 5-70 per inflorescence; culms 1-3.5 m tall; leaves 5-20 mm wide, usually flat when fresh. ..... ***Spartina cynosuroides***

Spartina alterniflora Loiseleur-Deslongchamps. SALTMARSH CORDGRASS, SMOOTH CORDGRASS. **Hab:** Salt marshes. **Dist:** NL (Newfoundland) south to FL, west to TX; e. South America; introduced in n. Europe. **Phen:** Aug-Dec. **Comm:** *S. alterniflora* is the dominant plant (often essentially a monoculture) of intratidal salt marshes in our area. **Syn:** = C, FNA25, GW1, K1, K3, NE, RAB, Tx, Va, WH3; = *Sporobolus alterniflorus* (Loiseleur) P.M.

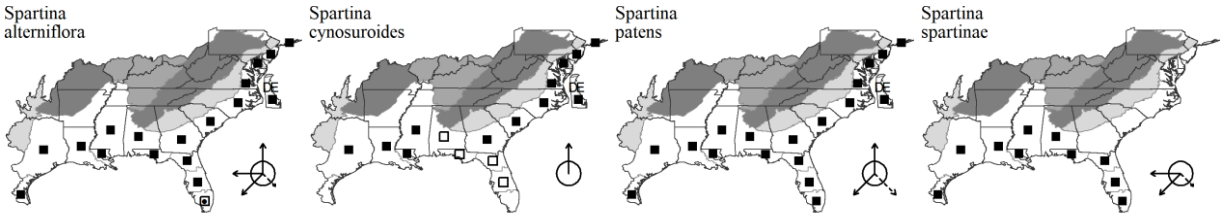
Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more)
* : waif
EN : endemic
H : historic
N : no
P : planted
? : questionable
X : extirpated

Peterson & Saarela – FlGr, K4, K4, NY, Peterson et al (2014a); > *Spartina alterniflora* var. *alterniflora* – F, G, HC, S; > *Spartina alterniflora* var. *glabra* (Muhlenberg ex Bigelow) Fernald – F, G, HC, S; > *Spartina alterniflora* var. *pilosa* (Merrill) Fernald – F, G, HC. NatureServe G5 (Secure).

Spartina cynosuroides (Linnaeus) Roth. GIANT CORDGRASS. **Hab:** Brackish (mesohaline and oligohaline) and freshwater tidal marshes, especially along margins of tidal creeks. **Dist:** MA south to FL, west to e. TX. **Phen:** Jun-Sep. **Syn:** = C, FNA25, G, GW1, HC, K1, K3, NE, RAB, S, Tx, Va, WH3; = *Sporobolus cynosuroides* (Linnaeus) P.M. Peterson & Saarela – FlGr, K4, NY, Peterson et al (2014a); > *Spartina cynosuroides* var. *cynosuroides* – F. NatureServe G5 (Secure).

Spartina patens (Aiton) Muhlenberg. SMALL SALTMEADOW CORDGRASS, SALT HAY, MARSH-HAY CORDGRASS. **Hab:** Dunes, sand flats, upper edges of tidal marshes, maritime wet grasslands, overwash flats. **Dist:** NL (Newfoundland) south to FL, west to TX; West Indies; Mexico and Central America. **Phen:** Mar-Dec. **Comm:** *Spartina patens* var. *monogyna* has spikelets 7-10 mm long (vs. 9-13 mm); second glume acute to obtuse (rarely acuminate) (vs. acuminate); spikes (2-) 4-9 per inflorescence (vs. 1-4); second highest leaf blade on the stem (1-) avg. 2 (-5) dm long (vs. 0.5-2 dm); plants to 15 dm tall (vs. to 8 dm); culms to 6 mm in diameter at base (vs. to 3 mm). Whether var. *monogyna* (name available only in *Spartina*) is worthy of recognition is a matter of debate; there appear to be morphological differences correlated with geography and, according to some authors, habitat, but positive identification to variety is often difficult. **Syn:** = Bah, C, FNA25, GW1, K1, K3, Mi, NE, RAB, S, Tx, Va, WH3; = *Sporobolus pumilus* (Roth) P.M. Peterson & Saarela – FlGr, K4, NY, Peterson et al (2014a); > *Spartina patens* var. *monogyna* – F, G, HC; > *Spartina patens* var. *patens* – F, G, HC.

Spartina spartinae (Trinius) Merrill ex A.S. Hitchcock. GULF CORDGRASS. **Hab:** Brackish marshes, coastal prairies, and inland saline situations. **Dist:** AL and FL west to TX; Bahamas. **Phen:** Mar-Dec. **Syn:** = Bah, ETx1, FNA25, GW1, HC, K1, K3, S, Tx, WH3; = *Sporobolus spartinus* (Trinius) P.M. Peterson & Saarela – FlGr, K4, Peterson et al (2014a). NatureServe G4G5 (Apparently Secure).



Sphenopholis Lamson-Scribner 1906 (WEDGEGRASS)

A genus of 6 species, North American. References: Daniel (2007a) in FNA24 (2007a); Tucker (1996).

Unkeyed taxa: *Sphenopholis interrupta*

1 Spikelets 5-9.5 mm long; second lemma with an awn 3.5-7 mm long ..... ***Sphenopholis pensylvanica***
1 Spikelets 1.5-5 mm long; second lemma awnless, or with an awn up to 3.5 mm long.
  2 Lower leaf blades mostly (10-) 15-45 cm long, usually involute, < 2 mm wide ..... ***Sphenopholis filiformis***
  2 Lower leaf blades mostly < 10 cm long, flat, 2-8 mm wide.
    3 First glume ⅓-⅔ as wide as the second glume; second lemma strongly scabrous ..... ***Sphenopholis nitida***
    3 First glume less than ⅓ as wide as the second glume; second lemma smooth to slightly scabrous.
      5 Panicle open; second glume 3-6× as long as wide, acute at the tip; lowermost rachilla internode 0.8-1.0 mm long ..... ***Sphenopholis intermedia***
      5 Panicle densely cylindrical; second glume 2-3× as long as wide, rounded or truncate at the tip; lowermost rachilla internode 0.5-0.7 mm long ..... ***Sphenopholis obtusata***

Sphenopholis filiformis (Chapman) Lamson-Scribner. **Hab:** Longleaf pine savannas and sandhills, sandy woodlands. **Dist:** Se. VA south to n. peninsular FL, west to e. TX. **Phen:** Mar-May. **Syn:** = Ar, C, ETx1, F, FlGr, FNA24, K1, K3, K4, RAB, S, Tn, Va, WH3, Tucker (1996). NatureServe G4? (Apparently Secure).

Sphenopholis intermedia (Rydberg) Rydberg. SLENDER WEDGEGRASS. **Hab:** Moist nutrient-rich forests, barrens, meadows. **Dist:** NL (Newfoundland) west to c. AK, south to Panhandle FL, c. TX, and AZ. **Phen:** Apr-Jun. **Tax:** Perhaps better treated at the varietal level. **Syn:** = Ar, F, FNA24, Il, K1, K3, K4, Mi, NE, NY, RAB, S, Tn, Tx, WV; = *Sphenopholis obtusata* (Michaux) Lamson-Scribner var. *major* (Torrey) K.S. Erdman – C, ETx1, Mo1, Pa, Tucker (1996); < *Sphenopholis intermedia* (Rydberg) Rydberg – G; < *Sphenopholis obtusata* (Michaux) Lamson-Scribner – FlGr, GW1, Va, W, WH3.

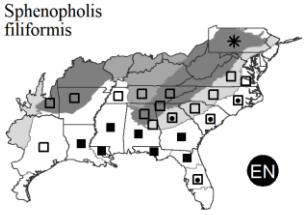
Sphenopholis interrupta (Buckley) Lamson-Scribner. PRAIRIE FALSE OATS. **Hab:** Grasslands, disturbed areas, eastwards in disturbed areas and along railroad tracks, also waste areas near wool-combing mills. **Dist:** OK, CO and AZ south to w. LA (where uncertainly native) TX, NM, and Mexico. **Phen:** Apr-May. **Comm:** See Barger et al. (2012). **Syn:** = Finot et al (2005); = *Sphenopholis interrupta* (Buckley) Lamson-Scribner ssp. *interrupta* – K4; = *Trisetum interruptum* Buckley – ETx1, FNA24, K3, NcTx, Tx. NatureServe G4 (Apparently Secure).

Sphenopholis nitida (Biehler) Lamson-Scribner. **Hab:** Rich forests, moist forests, bottomlands. **Dist:** MA west to IL, south to n. peninsular FL and TX. **Phen:** Mar-Jun. **Syn:** = Ar, C, ETx1, F, FlGr, FNA24, Il, K1, K3, K4, Mi, Mo1, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV, Tucker (1996); > *Sphenopholis nitida* var. *glabra* (Nash) Lamson-Scribner – G; > *Sphenopholis nitida* var. *nitida* – G. NatureServe G5 (Secure).

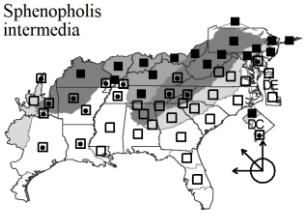
Sphenopholis obtusata (Michaux) Lamson-Scribner. PRAIRIE WEDGEGRASS. **Hab:** Forests, roadsides, disturbed areas. **Dist:** ME west to MN and BC, south to s. FL, TX, c. Mexico, and s. CA. **Phen:** Apr-Jun. **Syn:** = Ar, FNA24, G, Il, K1, K3, K4, Mi, NcTx, NE, NY, RAB, S, Tn, Tx, Va, WV; = *Sphenopholis obtusata* var. *obtusata* – C, ETx1, Mo1, Pa, Tucker (1996); < *Sphenopholis obtusata* (Michaux) Lamson-Scribner – FlGr, GW1, Va, W, WH3; > *Sphenopholis obtusata* var. *obtusata* – F; > *Sphenopholis obtusata* var. *pubescens* (Lamson-Scribner & Merrill) Lamson-Scribner – F.

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

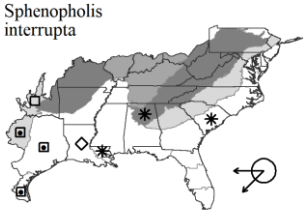
Sphenopholis filiformis



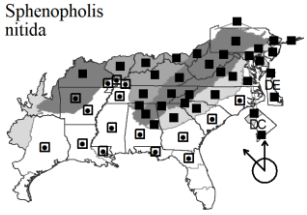
Sphenopholis intermedia



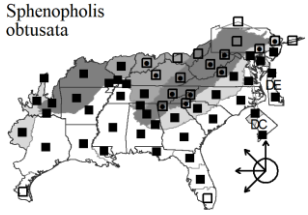
Sphenopholis interrupta



Sphenopholis nitida

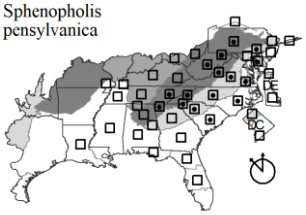


Sphenopholis obtusata



Sphenopholis pensylvanica (Linnaeus) A.S. Hitchcock. SWAMP-OATS. **Hab:** Bogs, ditches, wet forests, tidal swamps, calcareous seeps. **Dist:** MA west to OH and se. MO, south to n. peninsular FL and LA. **Phen:** Apr-Jun. **Syn:** = C, FlGr, FNA24, K1, K3, K4, Mo1, NE, NY, Pa, Tn, Va, WH3, Tucker (1996); = *Sphenopholis pennsylvanica* – GW1, orthographic variant; = *Trisetum pensylvanicum* (Linnaeus) Palisot de Beauvois ex Roemer & J.A. Schultes – F, G, RAB, S, WV. NatureServe G4 (Apparently Secure).

Sphenopholis pensylvanica



Sporobolus R. Brown 1810 (DROPSEED)

A genus of about 193 species, perennials and annuals, of tropical, subtropical, and warm-temperate parts of the New World and Old World. Many studies over many decades have pointed towards the likely and necessary combination of related genera with *Sporobolus*. For *Calamovilfa*, Reeder & Ellington (1960) and Ortiz-Diaz & Culham (2000) showed very close affinities of *Calamovilfa* to portions of *Sporobolus*. Molecular studies have made clear that the genera *Spartina*, *Calamovilfa*, and *Crypsis* (in our flora) are deeply embedded with *Sporobolus*, with affinities to different sections of species of *Sporobolus*, and that an appropriate taxonomic treatment either requires a broad *Sporobolus*, based on Peterson et al. (2014a, 2014b), or the segregation of 6-7 additional genera from *Sporobolus*. Additionally, there is a nomenclatural issue, requiring nomenclatural conservation of the name *Sporobolus* against several names (including *Spartina*) with priority (Peterson et al. 2014b). References: Orzell & Bridges (2022); Peterson et al (2014a); Peterson et al (2014b); Peterson, Hatch, & Weakley (2003) in FNA25 (2003a); Peterson, Romaschenko, & Johnson (2010); Riggins (1977); Rogers (1970); Simon & Jacobs (1999); Thieret (1966); Weakley & Peterson (1998).

Identification Notes: *S. brevipilis* and *S. vaseyi* (of section *Calamovilfa*, subsection *Calamovilfa*) are somewhat similar to *S. pinetorum*, *S. floridanus*, and *S. curtissii* (of section *Calamovilfa*; subsection *Floridani*) -- herbarium specimens of the two groups have been regularly confused. S. brevipilis and *S. vaseyi* are distinguished by leaves tapered to either end and long-acuminate (vs. parallel-margined and abruptly acute in *S. pinetorum*, *S. floridanus*, and *S. curtissii*) and tendency to form larger, clonal patches (*S. pinetorum*, *S. floridanus*, and *S. curtissii* form wiregrass-like bunches or clumps). In flower or fruit, *S. brevipilis* and *S. vaseyi* can be distinguished by characters of the spikelet, by vegetative characters, or by its coarser, generally taller culms, with the panicle branches usually spreading (rather than always ascending in *S. pinetorum*, *S. floridanus*, and *S. curtissii*). These five species have very similar bases, unlike any other grasses in our area – the lower leaf sheaths are indurated and shiny, forming a hard, polished, knotty, and fire-proof covering over the short-creeping rhizome. *Aristida stricta* has a somewhat similar base, but less indurated, less creeping, and with an unpolished appearance. Positive identification in sterile condition is not difficult.

Unkeyed taxa: *Sporobolus fertilis*

3 Inflorescence an array of spikes, the spikelets closely imbricate in 2 rows along the rachis of the spikes, the spikes alternate along the primary inflorescence axis; [genus *Spartina*, or, if treated as part of *Sporobolus*, section *Spartina*]. ..... ***Spartina***

3 Inflorescence a slender or broad panicle.

4 Florets with a conspicuous tuft of hairs on the callus; [genus *Calamovilfa*, or, if treated as part of *Sporobolus*, section *Calamovilfa*; subsection *Calamovilfa*]. ..... ***Calamovilfa***

4 Florets not conspicuously hairy on the callus.

5 Inflorescence a contracted, (superficially) spike-like panicle, < 6 cm broad, the branches appressed to strongly ascending.

6 Inflorescence 2-5 cm long; most inflorescences enclosed by sheaths (or most or all exserted); plant a geniculate annual; [section *Clandestini*].

7 Spikelets (1.3-) 1.6-2.8 mm long; grain falling free of the lemma and palea; lemma glabrous ..... ***Sporobolus neglectus***

7 Spikelets 2.3-5 mm long; grain falling enclosed in the lemma and palea; lemma strigose (use 10× or more magnification) or glabrous.

8 Lemma and palea shorter than the glumes; palea usually shorter than the lemma; lemma glabrous or strigose with hairs < 0.2 mm long; spikelets 2.3 -3.3 (-3.8) mm long; floret (lemma, palea and enclosed grain) 1.6-3.3 (-3.8)× as long as wide ..... ***Sporobolus ozarkanus***

8 Lemma and palea longer than the glumes; palea usually longer than the lemma; lemma strigose with hairs > 0.2 mm long; spikelets 2.8-5 mm long; floret (lemma, palea and enclosed grain) 2.2-5.7 (-7.5)× as long as wide ..... ***Sporobolus vaginiflorus***

6 Inflorescence 4-15 cm long; most inflorescences exserted to partly enclosed; plant a rhizomatous or tufted perennial or cespitose annual.

9 Plant creeping extensively by slender rhizomes; leaf blades cauline, distichous, to 12 cm long; [section *Virginicae*] ..... ***Sporobolus virginicus***

9 Plant loosely tufted, from short rhizomes; leaf blades basal or cauline, not distichous, 10-100 cm long.

10 Spikelets 1.2-2.2 mm long; first glume 0.5-0.8 mm long; leaves primarily basal; [section *Sporobolus*].

11 Panicle branches appressed, 0.5-2 cm long in the middle of the inflorescence; second glume acute, > ½ as long as the spikelet ..... ***Sporobolus indicus***

11 Panicle branches strongly ascending, 2-8 cm long in the middle of the inflorescence; second glume truncate or broadly obtuse, < ½ as long as the spikelet.

12 Plants to 7.5 dm tall; leaf blades to 4 dm long and 2.5-3.5 mm wide ..... ***Sporobolus jacquemontii***

12 Plants to 17 dm tall; leaf blades to 7 dm long and 6-8 mm wide ..... ***Sporobolus pyramidalis***

10 Spikelets 4-8 mm long; first glume 2-5 mm long; leaves cauline and basal; [section *Clandestini*].

13 Lemma pubescent, usually conspicuously shorter than the palea; pericarp loose when moist ..... ***Sporobolus clandestinus***

13 Lemma glabrous, about as long as the palea; pericarp gelatinous when moist.

14 Culms (1.4-) 2.0-5.0 mm thick; uppermost leaf sheath (1.3-) 1.5-6.0 mm wide near its base; panicles with 12-35 primary branches, crowded, densely flowered ..... ***Sporobolus compositus var. compositus***

14 Culms 1.0-2.0 (-2.5) mm thick; terminal sheath 0.8-2.0 (-2.5) mm wide near its base; panicles with 8-18 primary branches, lax, loosely flowered. ..... ***Sporobolus compositus var. drummondii***

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

5 Inflorescence an open panicle, > 2 cm broad, the branches ascending to spreading.
16 Branches of the panicle verticillate, whorled; spikelets 2.5-4 mm long; [section *Triachyrum*] ..... ***Sporobolus junceus***
16 Branches of the panicle alternate (some occasionally rather randomly subopposite or opposite, but never regularly whorled); spikelets either 4-6.5 mm long, or 1.2-3.0 mm long.
17 Spikelets 1.2-3.0 mm long.
..... ***Sporobolus cryptandrus***
17 Spikelets 4-6.5 mm long; [section *Calamovilfa*; subsection *Floridani*].
24 Leaves terete or subterete (wiry), oval in cross-section, sometimes irregularly channeled for part of their length (never with any portion above the sheath flat), < 1 mm wide, tending to senesce and turn tan in autumn, the margins generally smooth; culms (including the inflorescence) (2-) 4-7 (-10) dm tall; culms (from base to first inflorescence branch) 1.5-5 dm tall; first glume averaging about 0.7× as long as the second glume (though variable, ranging from 0.5-0.75×) ..... ***Sporobolus teretifolius***
24 Leaves flat (sometimes inrolled or folded when dry), plane or v-shaped in cross-section, with free margins their entire length, (0.5-) 1.2-10 mm wide, tending to remain green into the winter (at least until December), the margins at least partially scabrous (except in S. curtissii); culms (including the inflorescence) 3-22 dm tall; culms (from base to first inflorescence branch) (4-) 6-10 dm tall; first glume averaging 0.75-1× as long as the second glume (though variable, collectively ranging from about 0.5-1.2×).
..... ***Sporobolus curtissii***

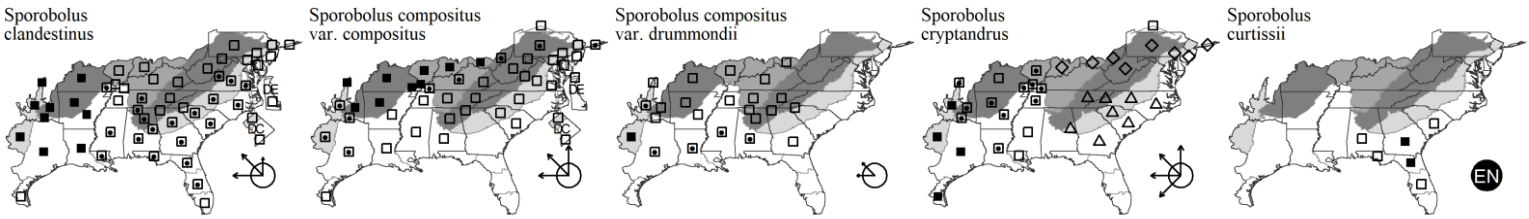
Sporobolus clandestinus (Biehler) A.S. Hitchcock. ROUGH DROPSEED. **Hab:** Glades, barrens, and thin soil of woodlands, also in dry sands and pine rocklands. **Dist:** MA, NY, MI, WI, IA, and KS south to s. FL and TX. **Phen:** Aug-Oct. **Tax:** Wipff & Jones (1995) recommended reducing this taxon to a variety under *S. compositus*, because of its morphologic similarity. While *S. clandestinus* and *S. compositus* are undoubtedly closely related, I prefer to retain the two as species. **Syn:** = Ar, C, ETx1, F, FNA25, G, HC, Il, K1, K3, K4, Mi, Mo1, NE, NY, Pa, S, Tn, Va, W, WH3, Riggins (1977); = *Sporobolus compositus* (Poiret) Merrill var. *clandestinus* (Biehler) J. Wipff & S.D. Jones – FlGr, NcTx, WH3. NatureServe G5 (Secure).

Sporobolus compositus (Poiret) Merrill *var*. ***compositus***. TALL DROPSEED. **Hab:** Diabase glades and barrens, limestone glades and barrens, disturbed areas over diabase or calcareous rocks. **Dist:** The general range is centered in the Plains, but extending east into ne. United States. The name *S. compositus* has nomenclatural priority over the more traditionally familiar *S. asper* (Kartesz & Gandhi 1995). **Phen:** Sep-Nov. **Comm:** This species and variety are reported for NC in a recent revision of the *S. asper* group (Riggins 1977); little is known about the occurrence of this species in NC. **Syn:** = Ar, ETx1, FNA25, K1, K3, K4, Mo1, NcTx, NE, NY, Tn, Va; = *Sporobolus asper* – F, S, WV; = *Sporobolus asper* (Michaux) Kunth var. *asper* – C, G, HC, Riggins (1977); < *Sporobolus asper* – Tx; < *Sporobolus compositus* – Il, Mi, Pa.

Sporobolus compositus (Poiret) Merrill *var*. ***drummondii*** (Trinius) Kartesz & Gandhi. DRUMMOND'S DROPSEED. **Hab:** Glades, barrens, roadsides, disturbed areas, over calcareous substrates. **Dist:** East to the Ridge and Valley province of e. TN (Chester et al. 1993), occurring over limestone, and in sw. SC (on mafic rocks at Wadakoe Mountain), and allegedly also in GA (Kartesz 2015). It could very likely occur in sw. VA, as it is in Hawkins County, TN, immediately adjacent to VA (Chester et al. 1993). **Phen:** Aug-Nov. **Syn:** = Ar, ETx1, FNA25, K1, K3, K4, Mo1, NcTx, NE, Tn; = *Sporobolus asper* (Michaux) Kunth var. *drummondii* (Trinius) Vasey – C, Riggins (1977); = *Sporobolus asper* var. *hookeri* (Trinius) Vasey – G, HC, misapplied; = *Sporobolus drummondii* (Trinius) Vasey – F, S.

Sporobolus cryptandrus (Torrey) A. Gray. SAND DROPSEED. **Hab:** Floodplains, shores, disturbed areas. **Dist:** Native of c. and w. North America, west of the Appalachians. This species is reported for NC by HC, F, and S. **Phen:** May-Nov. **Syn:** = Ar, C, ETx1, FNA25, G, HC, Il, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, S, Tn, Tx, WV, Riggins (1977); > *Sporobolus cryptandrus* var. *cryptandrus* – F. NatureServe G5 (Secure).

Sporobolus curtissii (Vasey ex Beal) Small ex Lamson-Scribner. CURTISS'S DROPSEED. **Hab:** Moist, gummy-clay pine flatwoods. **Dist:** E. SC south to c. FL. Attributions of *S. curtissii* to NC and SC prior to 1993 were apparently based on misapplication or confusion with *S. teretifolius* and/or *Sporobolus pinetorum*. **Phen:** Jul-Nov. **ID Notes:** *Sporobolus curtissii* differs from other 'bunchgrass' *Sporobolus* of our area in having the spikelets short-pedicelled and appressed against the panicle branches (as opposed to long-pedicelled and spreading in *S. teretifolius* and *Sporobolus pinetorum*). **Syn:** = FlGr, FNA25, HC, K1, K3, K4, S, WH3, Orzell & Bridges (2022), Weakley & Peterson (1998). NatureServe G3 (Vulnerable).



* ***Sporobolus fertilis*** (Steudel) Clayton. GIANT PARRAMATTA GRASS. **Hab:** Disturbed areas, roadsides. **Dist:** Native of e. Asia. **Comm:** Appearing and naturalizing aggressively in Mobile County, AL (H. Horne, pers. comm. 2019). Quite possibly already more widespread than yet observed. NatureServe GNR (Not Yet Ranked).

Sporobolus indicus (Linnaeus) R. Brown. SMUT GRASS, BLACKSEED. **Hab:** Low prairies and swales, roadsides, lawns, disturbed situations. **Dist:** Pantropical and subtropical, its original distribution apparently in the New World tropics, but obscured by its weedy capabilities and sometimes considered introduced in whole or in part in our area. **Phen:** (Jan-) Jul-Oct (-Dec). **Syn:** = Ar, Bah, C, ETx1, FlGr, FNA25, GW1, Il, Meso6, Mi, Mo1, NcTx, Tn, Tx, Va, W, Simon & Jacobs (1999); = *Sporobolus indicus* var. *indicus* – K1, K3, K4, WH3; > *Sporobolus berteroanus* (Trinius) A.S. Hitchcock & Chase – S; > *Sporobolus indicus* (Linnaeus) R. Brown – HC, S; > *Sporobolus poiretii* (Roemer & J.A. Schultes) A.S. Hitchcock – F, G, HC, RAB. NatureServe G5T5 (Secure).

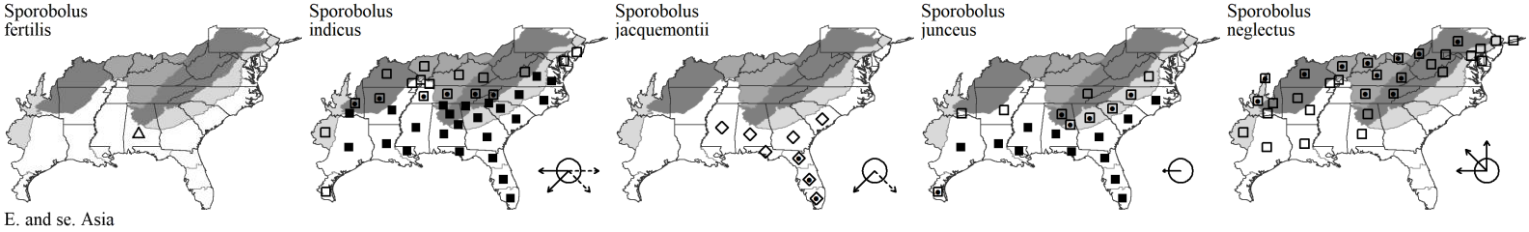
* ***Sporobolus jacquemontii*** Kunth. WEST INDIAN DROPSEED. **Hab:** Pine flatwoods, beaches, roadsides on barrier islands. **Dist:** FL Panhandle (Wakulla County), FL peninsula; West Indies. **Phen:** Jun-Nov. **Comm:** The original distribution is the New World tropics and subtropics, but its exact extent is unclear, and the species may be entirely or partly alien in our area. **Syn:** = Bah, FlGr, FNA25, Meso6, Simon & Jacobs (1999); ? *Sporobolus berteroanus* (Trinius) A.S. Hitchcock & Chase – S; < *Sporobolus indicus* var. *pyramidalis* (Palisot de Beauvois) Veldkamp – K1, K3; < *Sporobolus pyramidalis* Palisot de Beauvois – K4.

Sporobolus junceus (Palisot de Beauvois) Kunth. SANDHILL DROPSEED, PINEYWOODS DROPSEED. **Hab:** Longleaf pine sandhills, glades and barrens over mafic rocks, river-scour bars, sandy prairies, pine rocklands, and other dry, open areas. **Dist:** Se. VA south to s. FL and west to se. OK

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

(Mink, Singhurst, & Holmes 2012) and se. TX; scattered inland in disjunct sites. **Phen:** (Jun-) Sep-Nov (-May). **Syn:** = Ar, C, ETx1, F, FlGr, FNA25, G, HC, K1, K3, K4, RAB, Tn, Tx, Va, WH3, Weakley & Peterson (1998); = *Sporobolus gracilis* (Trinius) Merrill – S. NatureServe G5 (Secure).

Sporobolus neglectus Nash. BARRENS DROPSEED. **Hab:** Dry rocky barrens and outcrops, over calcareous rocks (such as limestone or dolomite). **Dist:** ME west to ND, south to NJ, w. VA, TN, LA, and TX; apparently disjunct in WA and AZ. **Phen:** Aug-Nov. **Tax:** *S. ozarkanus*, *S. neglectus*, and *S. vaginiflorus* form a still very poorly understood complex. **Syn:** = Ar, C, ETx1, F, FNA25, G, HC, Il, K1, K3, K4, Mi, Mo1, NcTx, NE, NY, Pa, S, Tn, Va, W; < *Sporobolus vaginaeflorus* – Tx. NatureServe G5 (Secure).



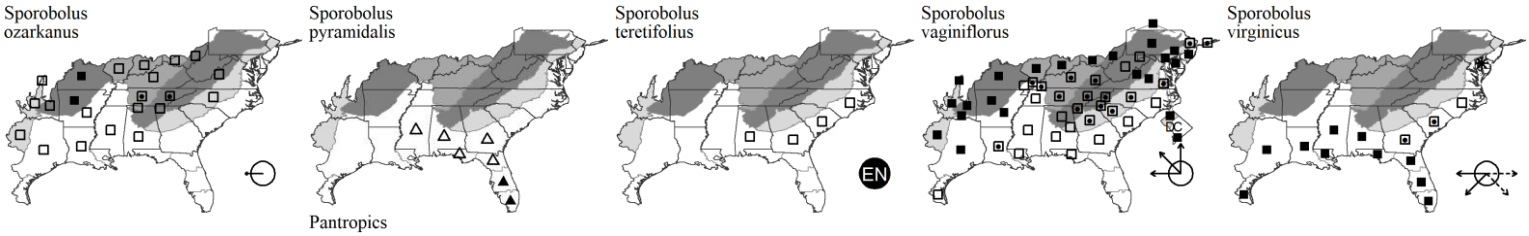
Sporobolus ozarkanus Fernald. OZARK DROPSEED. **Hab:** Limestone glades, diabase glades. **Dist:** KY west to KS, south to e. TN, AR, and TX; disjunct in c. NC. **Phen:** Aug-Oct. **Comm:** In Granville County, NC, it is associated (on glades of diabase, a mafic rock) with other taxa with affinities to midwestern glades and prairies: *Solidago jacksonii, Solidago ptarmicoides, Baptisia aberrans, Symphyotrichum depauperatum, Silphium terebinthinaceum, Parthenium auriculatum, Ruellia humilis*, and others. *S. ozarkanus, S. neglectus,* and *S. vaginiflorus* form a still very poorly understood complex. **Syn:** = C, ETx1, F, G, HC, Il, K1, K4, Mo1, NcTx, Va; = *Sporobolus vaginiflorus* (Torrey ex A. Gray) Wood var. *ozarkanus* (Fernald) Shinners – Ar, FNA25, K3, Tn; < *Sporobolus vaginaeflorus* – Tx. NatureServe G5T5? (Secure).

* ***Sporobolus pyramidalis*** Palisot de Beauvois. GIANT RATSTAIL GRASS. **Hab:** Roadsides. **Dist:** Native of the Old World Tropics. **Comm:** Taxonomically confused with *S. jacquemontii*. **Syn:** = K4, Simon & Jacobs (1999); < *Sporobolus indicus* var. *pyramidalis* (Palisot de Beauvois) Veldkamp – K1, K3, WH3.

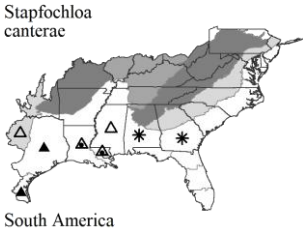
Sporobolus teretifolius R.M. Harper. WIRELEAF DROPSEED. **Hab:** Wet savannas, pitcherplant bogs. **Dist:** Se. NC, ne. SC, s. GA, and se. AL (Houston County). Many of the counties reported for this species in RAB actually are based on misidentified specimens of *S. pinetorum*. **Phen:** Jul-Sep (and later in response to growing-season fire). **Comm:** In a few very wet savannas of Columbus and Brunswick counties, NC, *S. teretifolius* is dominant or codominant over many hectares. Like many savanna grasses, *S. teretifolius* generally flowers only following fire. **ID Notes:** Very similar vegetatively to *Aristida stricta*, *S. teretifolius* can be distinguished by its tuft of hairs at the base of the otherwise glabrous blade (as opposed to line of pilose hairs the length of the blade in *A. stricta*). **Syn:** = FNA25, HC, K1, K3, K4, S, Weakley & Peterson (1998); < *Sporobolus teretifolius* R.M. Harper – RAB.

Sporobolus vaginiflorus (Torrey ex A. Gray) Alph. Wood. POVERTY DROPSEED. **Hab:** Glades, barrens, open disturbed sites. **Dist:** The species occurs nearly throughout e. United States. **Phen:** Aug-Nov. **Tax:** *S. ozarkanus, S. neglectus,* and *S. vaginiflorus* form a still very poorly understood complex. **Syn:** = C, ETx1, FlGr, G, HC, Il, K4, Mi, Mo1, NcTx, NY, Pa, RAB, Tn, Va, W, WH3, WV; = *Sporobolus vaginaeflorus* – S, orthographic variant; = *Sporobolus vaginiflorus* var. *vaginiflorus* – Ar, F, FNA25, K1, K3, NE; < *Sporobolus vaginaeflorus* – Tx. NatureServe G5T5 (Secure).

Sporobolus virginicus (Linnaeus) Kunth. SEASHORE DROPSEED, COASTAL DROPSEED. **Hab:** Salt marshes, tidal mud flats, and low dunes in the outer Coastal Plain. **Dist:** Se. NC along the coast to TX, in the West Indies and into n. South America (its alleged occurrence in se. VA is apparently incorrect); also native in e. Asia, Africa, Australia and the Pacific region (Simon & Jacobs 1999). **Phen:** Sep-Oct (-Aug). **Comm:** *Sporobolus virginicus* is currently treated as a polymorphous and very widespread species, with a wide range of morphology and several ploidy levels (Simon & Jacobs 1999). **ID Notes:** *Sporobolus virginicus* is similar in aspect and growth form to *Distichlis spicata*, with which it occurs in tidal flats. *Sporobolus virginicus* is more delicate, and typically has long hairs on either side of the collar of the sheath; *Distichlis spicata* is generally a coarser plant, and lacks long hairs around the collar of the sheath. **Syn:** = Bah, C, F, FlGr, FNA25, G, GW1, HC, K1, K3, K4, Meso6, RAB, S, Tx, WH3. NatureServe G5 (Secure).



Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



Stapfochloa H. Scholz 2004

A genus of 6-7 species, perennial herbs, of the New World tropics and 1 species in Africa. The species placed here in *Stapfochloa*, following Peterson, Romaschenko, & Herrera Arrieta (2015) and Wipff & Shaw (2018a), have traditionally been included in *Chloris*, but form a clade sister to *Cynodon*. References: Molina & Rúgolo de Agrasar (2004); Peterson, Romaschenko, & Herrera Arrieta (2015); Wipff & Shaw (2018a).

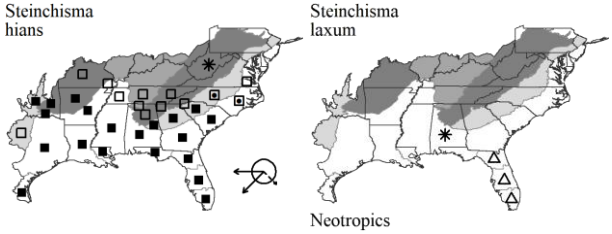
* ***Stapfochloa canterae*** (Arechavaleta) P.M. Peterson. PARAGUAYAN WINDMILL-GRASS. **Hab:** Gravel parking lots, other disturbed areas. **Dist:** Native of Paraguay. Reported for AL (Diamond 2016). **Tax:** The epithet was originally spelled "*canterai*," but should be corrected to the genitive "*canterae*" by the provisions of the ICNafp. **Syn:** = K4, Wipff & Shaw (2018a); = *Chloris canterae* Arechavaleta var. *canterae* – FNA25, K3; = *Chloris canterei* Arechavaleta var. *canterei* – K1; < *Chloris canterae* – ETx1; < *Chloris canterai* – Tx, orthographic variant; < *Chloris cantérai* – HC, orthographic variant; < *Stapfochloa canterae* (Arechavaleta) P.M. Peterson – Peterson, Romaschenko, & Herrera Arrieta (2015). NatureServe GNR (Not Yet Ranked).

Steinchisma Rafinesque 1830 (GAPING PANIC GRASS)

A genus of about 6 species, perennial herbs, of s. North America, Central America, and South America. See discussion following *Panicum* regarding generic concepts. The large, thickened, pale sterile palea of this species is unique among panicoids of our region; it is one of several morphological characters that led to the segregation of *Steinchisma* as a genus, a finding now confirmed by DNA phylogeny. The enlargement of the sterile palea causes the spikelet to spread open, or "gape." *Steinchisma* has an "intermediate C3-C4" pathway. References: Acosta et al (2014); Freckmann & Lelong (2003b) in FNA25 (2003a); Zuloaga et al (1998).

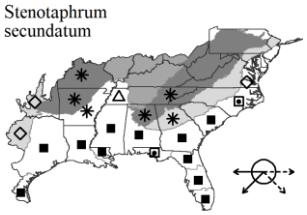
Steinchisma hians (Elliott) Nash. GAPING PANIC GRASS. **Hab:** Stream, pond, and lake shores, low woods, cypress-gum ponds, floodplains, marshes, ditches, seepage slopes. **Dist:** Se. VA south to FL, west to TX and OK, and south through Mexico and Central America to Colombia; also in s. South America. **Phen:** Mar-Nov. **ID Notes:** This species can superficially closely resemble *Sphenopholis obtusata*. **Syn:** = Ar, ETx1, FlGr, FNA25, K1, K3, K4, Tn, Va, Zuloaga et al (1998); = *Panicum hians* Elliott – C, F, G, GW1, HC, NcTx, RAB, S, Tx, W, WH3. NatureServe G5 (Secure).

* ***Steinchisma laxum*** (Swartz) Zuloaga. LAX PANIC GRASS. **Hab:** Bottomland forests, wet agricultural fields, other moist disturbed areas. **Dist:** Native of West Indies and Mexico to South America. **Phen:** Feb-Oct. **Syn:** = FlGr, K3, K4; = *Panicum laxum* – Bah. NatureServe GNR (Not Yet Ranked).



Stenotaphrum Trinius 1820 (ST. AUGUSTINE GRASS)

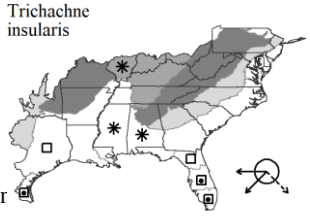
A genus of about 7 species, tropical and subtropical. References: Allred (2003e) in FNA25 (2003a); Sauer (1972).



Stenotaphrum secundatum (Walter) Kuntze. ST. AUGUSTINE GRASS, CARPET GRASS. **Hab:** Brackish and freshwater tidal marshes, roadsides, dunes, lawns. **Dist:** A pioneer species of beaches and shores, *S. secundatum* was known from the Carolinas prior to 1800. It has been interpreted as native or introduced in our area; its original range is probably now impossible to determine. Sauer (1972) maps it as widespread along the coasts of s. North America, Central America, South America, the West Indies, Africa, Australia, and sw. Pacific Islands. In our area it is certainly now more frequently encountered as a lawn or roadside grass than in anything that could be construed as a natural habitat. The other 6 species in the genus are Asian, or on islands of the sw. Pacific or Indian Oceans. **Phen:** Jul-Oct. **Tax:** The nativity of this species is complicated by selection for turfgrass and hybridization with genotypes from the Old World (e.g. s. Africa). Extant populations may represent more aggressive forms than historical. **Syn:** = Ar, Bah, ETx1, FlGr, FNA25, HC, K1, K3, K4, Meso6, Mo1, NcTx, RAB, S, Tx, WH3, Sauer (1972). NatureServe G5 (Secure).

Trichachne Nees 1829

A genus of XX species, perennial herbs, native of the New World. References: Lo Medico et al (2017); Vega et al (2009); Webster (1980); Webster (1987); Wipff & Hatch (1994); Wipff & Shaw (2018b); Wipff (1996b); Wipff (2003e) in FNA25 (2003a).



Trichachne insularis (Linnaeus) Nees. SOURGRASS. **Hab:** Hammocks, rocklands, scrubs, roadsides, disturbed areas. **Dist:** FL, AL, and MS west to TX; West Indies; Mexico, Central America, South America. **Phen:** Jul-Sep (-Jun). **Syn:** = Bah, HC, Il, K4; = *Digitaria insularis* (Linnaeus) Mez ex Ekman – ETx1, FlGr, FNA25, K1, K3, WH3; = *Valota insularis* (Linnaeus) Chase – S; ? *Trichachne nutans* – Tx. NatureServe G5 (Secure).

Key to Map Symbology: □ native; ◇ maybe exotic; △ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : plar; ? : que

Tridens Roemer & J.A. Schultes 1817 (TRIODIA, REDTOP, TRIDENS, FLUFFGRASS)

A genus of about 14 species, native to the Western Hemisphere. References: Valdés-Reyna (2003b) in FNA25 (2003a); Witsell & Baker (2013).

1 Panicle dense and spike-like, > 4× as long as wide, the branches ascending to appressed.
  2 Plants from elongate rhizomes; lemma 4-5 mm long; spikelet 7-9 mm long ..... ***Tridens carolinianus***
  2 Plants cespitose; lemma 2.5-3 mm long; spikelet 4-6 mm long ..... ***Tridens strictus***
1 Panicle open and spreading, < 4× as long as wide, the branches well-developed and spreading-ascending to reflexed.
  3 Spikelets 4-5 mm long, 2.5-3.5 mm wide ..... ***Tridens ambiguus***
  3 Spikelets 6-8 mm long, 1.5-2.2 mm wide.
    4 Primary pulvini densely pubescent, the hairs encircling the base of the panicle branch; secondary pulvini pubescent; spikelets mostly on pedicels 3-20 mm long, these divergent from the inflorescence branchlets; main branches of the inflorescence stiffly spreading ..... ***Tridens chapmanii***
    4 Primary pulvini glabrous to sparsely pubescent, tufted only in the axil (the upper surface of the panicle branch); secondary pulvini glabrous; spikelets on pedicels mostly < 3 mm long, these mainly appressed to the inflorescence branchlets; main branches of the inflorescence spreading, ascending or drooping ..... ***Tridens flavus***

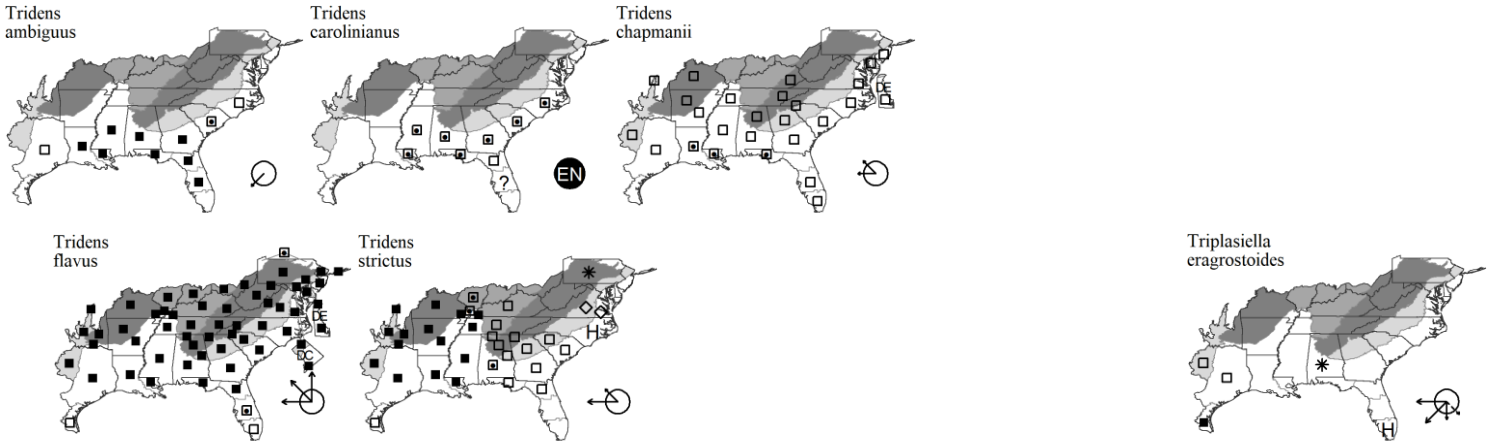
Tridens ambiguus (Elliott) J.A. Schultes. PINELAND TRIODIA, FLATWOODS FLUFFGRASS. **Hab:** Wet pine savannas, clay-based Carolina bays, marshes. **Dist:** S. NC south to FL, west to e. TX. **Phen:** Jul-Oct. **Syn:** = ETx1, FlGr, FNA25, GW1, HC, K1, K3, K4, RAB, Tx, WH3; = *Triodia elliottii* Bush – S. NatureServe G4 (Apparently Secure).

Tridens carolinianus (Steudel) Henrard. CAROLINA TRIODIA, CAROLINA FLUFFGRASS. **Hab:** Mesic swales in sandhills. **Dist:** S. NC south to FL, west to LA. **Phen:** Aug-Nov. **Syn:** = FlGr, FNA25, HC, K1, K3, K4, RAB, WH3; = *Triodia drummondii* Lamson-Scribner & Kearney – S. NatureServe G3G4 (Vulnerable).

Tridens chapmanii (Small) Chase. CHAPMAN'S TRIODIA. **Hab:** Longleaf pine sandhills, loamy sands of disturbed longleaf pine woodlands; inland in glades, river-scour prairies and barrens, sandy barrens, and roadsides. **Dist:** NJ south to FL, west to TX and OK. **Phen:** Aug-Oct. **Syn:** = HC, Tn, Va; = *Tridens flavus* (Linnaeus) A.S. Hitchcock var. *chapmanii* (Small) Shinners – Ar, C, ETx1, FlGr, FNA25, K1, K3, K4, Mo1, RAB, Tx, WH3, Witsell & Baker (2013); = *Triodia chapmanii* (Small) Bush – F, G; < *Triodia flava* (Linnaeus) Smyth – S.

Tridens flavus (Linnaeus) A.S. Hitchcock. REDTOP, TALL REDTOP, PURPLETOP TRIDENS, GREASY GRASS. **Hab:** Roadsides, disturbed areas, glades, barrens. **Dist:** NH west to NE, south to s. FL and TX. **Phen:** Mar-Nov. **Syn:** = HC, Il, NcTx, Pa, Tn, Va; = *Tridens flavus* var. *flavus* – Ar, C, ETx1, FlGr, FNA25, K1, K3, K4, Mo1, NE, RAB, Tx, WH3, Witsell & Baker (2013); = *Triodia flava* (Linnaeus) Smyth – F, G, WV; < *Tridens flavus* (Linnaeus) A.S. Hitchcock – W; < *Triodia flava* (Linnaeus) Smyth – S. NatureServe G5T5 (Secure).

Tridens strictus (Nuttall) Nash. SPIKE TRIODIA, LONGSPIKE FLUFFGRASS, LONGSPIKE TRIDENS. **Hab:** Longleaf pine sandhills, moist pine savannas, woodlands, mesic to wet soils around swamps and marshes, roadsides. **Dist:** S. VA south to AL, west to TX, north in the interior to IL and KS. **Phen:** Aug-Nov. **Comm:** It is possible that this grass is not native north and east of GA. Rhoads & Klein (1993) report an old specimen from w. PA, presumably a waif. **Syn:** = Ar, ETx1, FlGr, FNA25, GW1, HC, Il, K1, K3, K4, Mo1, NcTx, RAB, Tn, Tx, Va, WH3, Witsell & Baker (2013); = *Triodia stricta* (Nuttall) Bentham ex Vasey – F, G, S. NatureServe G5 (Secure).



Triplasiella P.M. Peterson & Romaschenko 2016 (TRIPLASIELLA)

A monotypic genus, a perennial of s. North America, Central America, n. South America (Venezuela), and the West Indies. References: Peterson, Romaschenko, & Herrera Arrieta (2016); Valdés-Reyna (2003b) in FNA25 (2003a).

Triplasiella eragrostoides (Vasey & Lamson-Scribner) P.M. Peterson & Romaschenko. LOVEGRASS TRIDENS. **Hab:** Dry, coastal areas. **Dist:** S. FL (Monroe County, Key West, Matecumbe Key, where last collected in 1898); sw. United States south into Mexico; Cuba. **Phen:** (May-) Sep-Mar. **Comm:** {not yet keyed}. **Syn:** = K4, Peterson, Romaschenko, & Herrera Arrieta (2016); = *Tridens eragrostoides* (Vasey & Lamson-Scribner) Nash – FlGr, FNA25, Tx, WH3, WI; = *Tridentopsis eragrostoides* (Vasey & Lamson-Scribner) P.M. Peterson – Peterson et al (2014); = *Triodia eragrostoides* Vasey & Lamson-Scribner – S. NatureServe G5 (Secure).

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Triplasis Palisot de Beauvois 1812 (SANDGRASS)

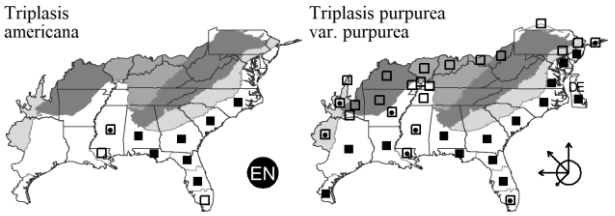
A genus of 2 species, of eastern and central North America south through Mexico to Costa Rica. References: Hatch (2003a) in FNA25 (2003a).

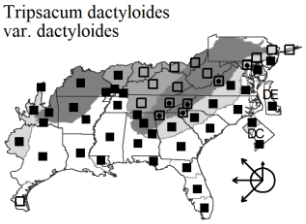
Identification Notes: The foliage of both of our species has a sour taste.

1 Lemma awn 4.5-8 mm long; culm internodes appressed pilose or puberulent; perennial ..... ***Triplasis americana***
1 Lemma awn 0.5-1.5 mm long; culm internodes glabrous to minutely scaberulous; annual (or rarely perennial) ..... ***Triplasis purpurea var. purpurea***

Triplasis americana Palisot de Beauvois. SOUTHERN SANDGRASS. **Hab:** Longleaf pine sandhills, beach dunes, open sandy areas. **Dist:** A Southeastern Coastal Plain endemic: NC south to s. FL, west to e. LA. **Phen:** Aug-Oct. **Syn:** = FlGr, FNA25, HC, K1, K3, K4, RAB, S, WH3. NatureServe G5 (Secure).

Triplasis purpurea (Walter) Chapman *var.* ***purpurea***. PURPLE SANDGRASS. **Hab:** Dunes, maritime dry grasslands, open sandy areas. **Dist:** NH south to s. FL, and west to TX, along the coast; also around the Great Lakes, and in central United States. **Phen:** (May-) Sep-Oct (-Nov). **Comm:** Var. *caribensis* R.W. Pohl is in the New World tropics. **Syn:** = Ar, FNA25, Mo1, NE, NY, Va; > *Triplasis intermedia* Nash – S; < *Triplasis purpurea* – C, ETx1, F, FlGr, G, HC, Il, K1, K3, K4, Mi, NcTx, Pa, RAB, Tn, Tx, WH3; > *Triplasis purpurea* – S. NatureServe G4G5TNR (Not Yet Ranked).

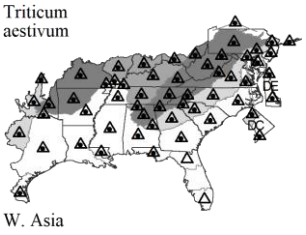




Tripsacum Linnaeus 1759 (GAMA GRASS)

A genus of about 12 species, tropical and subtropical American. References: Barkworth (2003z) in FNA25 (2003a); DeWet, Harlan, & Brink (1982).

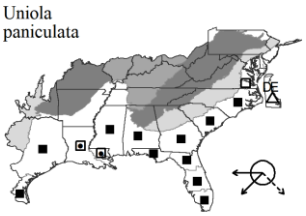
Tripsacum dactyloides (Linnaeus) Linnaeus *var.* ***dactyloides***. GAMA GRASS. **Hab:** Roadsides, moist areas, disturbed areas, moist riverbanks. **Dist:** *Tripsacum dactyloides* is widespread in e. North America north to MA, MI (where adventive), IA, and NE, ranging south into tropical Central and South America; var. *dactyloides* is North American. **Phen:** Mar-Dec. **Comm:** This important species of moist and wetland areas in the Great Plains is generally seen in disturbed habitats in the eastern part of our region; its original habitats in various parts of our area are poorly understood, and it may not be truly native in the easternmost Southeast. **Syn:** = FNA25, NY, Va, DeWet, Harlan, & Brink (1982); < *Tripsacum dactyloides* – Bah, C, ETx1, FlGr, FlGr, G, Il, K1, K3, K4, Mi, Mo1, NcTx, NE, Pa, RAB, S, Tn, Tx, W, WH3, WV; > *Tripsacum dactyloides* (Linnaeus) Linnaeus var. *dactyloides* – F, HC; > *Tripsacum dactyloides* var. *occidentale* Cutler & Anderson – F, HC. NatureServe G5TNR (Not Yet Ranked).



Triticum Linnaeus 1753 (WHEAT)

A genus of about 25 species (the taxonomy complicated by extensive and ancient cultivation), native of w. and c. Asia. References: Morrison (2007) in FNA24 (2007a); Tucker (1996); Zohary & Hopf (1994).

* ***Triticum aestivum*** Linnaeus. BREAD WHEAT. **Hab:** Fields; frequently cultivated, rarely persistent or volunteering following cultivation. **Dist:** Native of Eurasia. **Phen:** Apr-Jun. **Comm:** One of the most important crops in the world. The lemmas can either be awnless or with long awns (to 8 cm long). **Syn:** = Ar, C, ETx1, F, FlGr, FNA24, G, HC, Il, K1, K3, K4, Meso6, NcTx, NE, NY, Pa, RAB, Tn, Tx, WH3, Tucker (1996); > *Triticum aestivum* ssp. *aestivum* – Mo1. NatureServe GNR (Not Yet Ranked).



Uniola Linnaeus 1753 (SEA OATS)

A genus of 2 species, perennial herbs, of warm temperate, subtropical, and tropical shores of s. North America, Central America, n. South America, and the West Indies. The only other species of the genus ranges from Baja California south along the Pacific Ocean to Ecuador; other species previously treated in *Uniola* have been shown to be only distantly related and are now treated as *Chasmanthium*. References: Hodel & Gonzalez (2013); Yates (1966a); Yates (1966b); Yates (2003) in FNA25 (2003a).

Uniola paniculata Linnaeus. SEA OATS. **Hab:** Abundant on unforested primary and secondary dunes on barrier islands, and on dry to mesic sand flats and interdune swales. **Dist:** Se. VA south to FL and west to TX and Mexico (TAB); West Indies (Bahamas, Cuba). **Phen:** Jun-Nov (-Apr). **Tax:** Hodel & Gonzalez (2013) describe genetic differentiation within the species. **Comm:** This is the most important sand-binding grass on ocean

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

dunes from NC south, playing a critical role in primary succession on dunes. **Syn:** = Bah, C, F, FlGr, FNA25, G, HC, K1, K3, K4, Meso6, RAB, S, Tx, Va, WH3, Yates (1966a), Yates (1966b). NatureServe G5 (Secure).

Urochloa Palisot de Beauvois 1812 (PARA-GRASS, SIGNAL-GRASS)

A genus of about 100 species, pantropical and subtropical. References: Crins (1991); Webster (1988); Wipff & Thompson (2003a) in FNA25 (2003a); Wipff & Thompson (2003b) in FNA25 (2003a).

Unkeyed taxa: *Urochloa adspersa, Urochloa arizonica, Urochloa fusca var. reticulata, Urochloa piligera, Urochloa plantaginea, Urochloa reptans, Urochloa subquadripara*
Unkeyed waifs: *Urochloa deflexa, Urochloa pubigera*

2 Upper half of second glume and first lemma with evident transverse veins connecting the longitudinal veins; spikelets 3.5-4.7 mm long..... ***Urochloa platyphylla***
2 Upper half of second glume and first lemma without evident transverse veins, or with very obscure cross-veins; spikelets either 2-4 mm or 5-6 mm long.
  3 Spikelets 2-4 mm long..... ***Urochloa ramosa***
  3 Spikelets 5-6 mm long..... ***Urochloa texana***

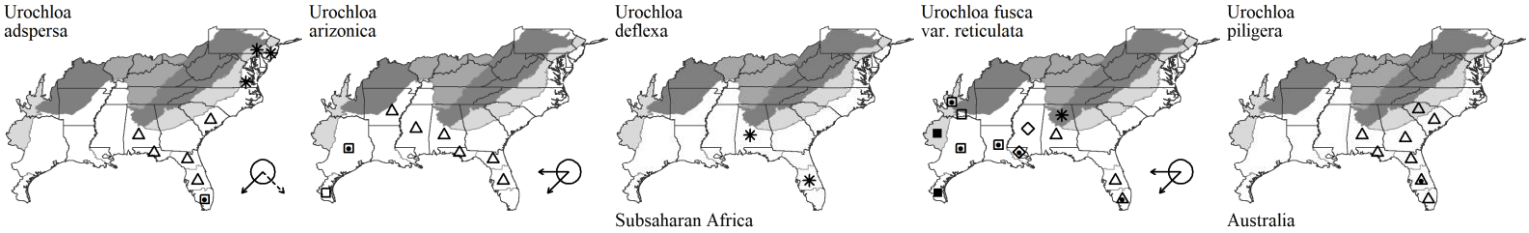
Urochloa adspersa (Trinius) R. Webster. **Hab:** Moist, sunny, disturbed areas, coastal strands, rockland hammock edges, shell middens. **Dist:** Native of s. FL, the West Indies, and Argentina. Reported as adventive from AL, FL peninsula and Panhandle (FNA), and chrome ore piles in Newport News, VA (Reed 1964). **Phen:** Jan-Dec. **Syn:** = FlGr, FNA25, K1, K3, K4, WH3; = *Panicum adspersum* Trinius – Bah.

Urochloa arizonica (Lamson-Scribner & Merrill) Morrone & Zuloaga. ARIZONA SIGNALGRASS. **Hab:** Disturbed areas. **Dist:** Native of sw. United States. **Phen:** Jul-Oct. **Syn:** = Ar, FlGr, K3, K4, WH3.

* ***Urochloa deflexa*** (Schumacher) H. Scholz. GUINEA MILLET. **Hab:** Disturbed areas. **Dist:** Native of Africa. **Phen:** May-Oct. **Syn:** = FlGr, K3, K4.

Urochloa fusca (Swartz) B.F. Hansen & Wunderlin *var.* ***reticulata*** (Torrey) B.F. Hansen & Wunderlin. BROWNTOP SIGNALGRASS. **Hab:** Disturbed areas. **Dist:** OK and AZ south through TX, south through Mexico to tropical America; eastwards as an adventive. **Phen:** May-Oct. **Syn:** = FlGr, WH3; ? *Panicum fasciculatum* Torrey – Bah, HC, Tx; ? *Urochloa fasciculata* (Swartz) R. Webster – K1, Meso6, NcTx; < *Urochloa fusca* – ETx1, FNA25, K3, K4.

* ***Urochloa piligera*** (F. Mueller ex Bentham) R.D. Webster. HAIRY SIGNALGRASS. **Hab:** Roadsides. **Dist:** Native of Australia. Reported for Escambia County in the FL Panhandle (Kunzer et al. 2009) and Lee County, Georgia (Zomlefer et al. 2018). Reported for Lexington and Richland counties, SC (Bradley et al. [in prep.]). **Phen:** Jun-Nov. **Syn:** = FlGr, K4, WH3.



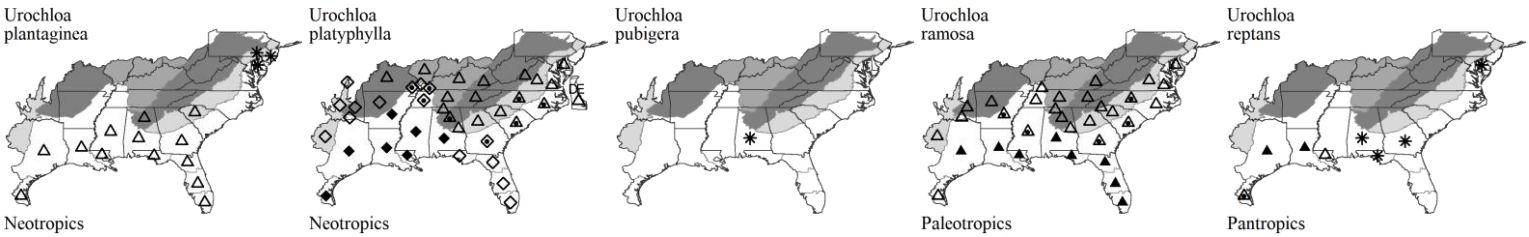
* ***Urochloa plantaginea*** (Link) R. Webster. ALEXANDER GRASS. **Hab:** Disturbed areas. **Dist:** Native of the Neotropics. Reported for s. GA (Jones & Coile 1988), as *Brachiaria plantaginea*, and for Escambia County in the FL Panhandle (Kunzer et al. 2009). **Phen:** Jun-Oct. **Syn:** = FlGr, FNA25, K1, K3, K4, Meso6, WH3, Crins (1991), Webster (1988). NatureServe GNR (Not Yet Ranked).

* ***Urochloa platyphylla*** (Munro ex Wright) R. Webster. BROADLEAF SIGNAL-GRASS. **Hab:** Edges of agricultural fields, other disturbed wet or seasonally moist areas. **Dist:** Apparently native of South America. E. NC south to FL, west to TX, north in the interior to AR, OK, and se. MO; also in MD and DE (Longbottom, Naczi, & Knapp 2016; Terrell & Reveal 1996). **Phen:** Apr-Nov. **Syn:** = Ar, ETx1, FlGr, FNA25, Il, K1, K3, K4, Mo1, Mo1, NcTx, Tn, Va, WH3, Crins (1991), Webster (1988); = *Brachiaria platyphylla* (Munro ex Wright) Nash – GW1, HC, RAB, Tx; ? *Brachiaria extensa* Chase – S. NatureServe G5 (Secure).

* ***Urochloa pubigera*** (Roemer & Schultes) R.D. Webster.

* ***Urochloa ramosa*** (Linnaeus) T.Q. Nguyen. BROWNTOP MILLET, DIXIE SIGNALGRASS. **Hab:** Disturbed areas. **Dist:** Native of tropical Africa and Asia. This species has apparently been widely planted for wildlife food and erosion control in southeastern states. **Phen:** Apr-Nov. **Syn:** = Ar, ETx1, FlGr, FNA25, Il, K1, K3, K4, Tn, Va, WH3, Crins (1991); = *Panicum ramosum* Linnaeus – HC. NatureServe GNR (Not Yet Ranked).

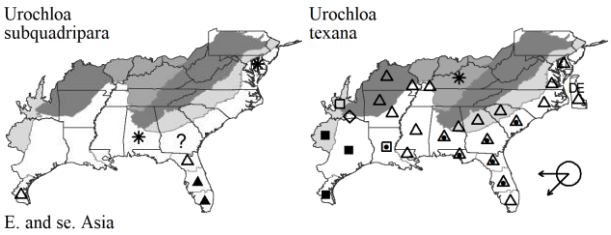
* ***Urochloa reptans*** (Linnaeus) Stapf. SPRAWLING SIGNALGRASS. **Hab:** Disturbed areas. **Dist:** Native of the Neotropics and Paleotropics. **Phen:** Jun-Nov. **Syn:** = ETx1, FlGr, FNA25, K1, K3, K4, Meso6; = *Panicum reptans* Linnaeus – Tx.



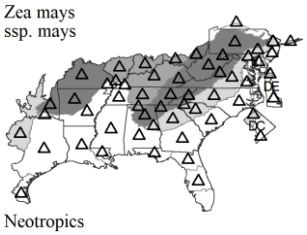
* ***Urochloa subquadripara*** (Trinius) R.D. Webster. SMALL-FLOWERED ALEXANDER GRASS, TROPICAL LIVERSEED GRASS. **Hab:** Disturbed upland areas. **Dist:** Native of tropical and subtropical Asia. **Phen:** Jan-Dec. **Syn:** = FlGr, FNA25; < *Urochloa distachya* (Linnaeus) T.Q. Nguyen – K3, K4.

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated

Urochloa texana (Buckley) R. Webster. TEXAS MILLET, TEXAS SIGNALGRASS. **Hab:** Edges of agricultural fields, other disturbed areas, gardens. **Dist:** Native of TX. OK, NM, and AZ south to TX and Mexico. First reported for SC by Hill & Horn (1997). Apparently spreading in eastern North America. Reported as "new to DE and spreading in MD" by Longbottom, Naczi, & Knapp (2016). **Phen:** May-Dec. **Syn:** = Ar, ETx1, FlGr, K1, K3, K4, Mo1, NcTx, NE, WH3, Crins (1991), Webster (1988); = *Panicum texanum* Buckley – C, HC, RAB, S, Tx. NatureServe G5? (Secure).

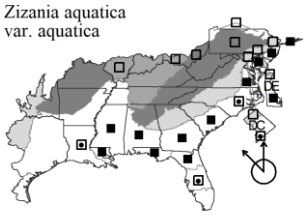


Zea Linnaeus 1753 (CORN, MAIZE)



A genus of about 5 species, native of Mexico and Central America. References: Iltis (2003) in FNA25 (2003a).

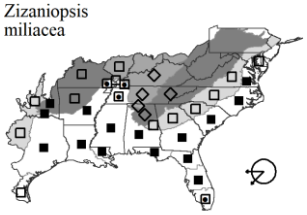
* ***Zea mays*** Linnaeus *ssp. **mays***. CORN, MAIZE. **Hab:** Very commonly cultivated, rarely volunteering in old fields or around trashpiles, common in cultivation, rare as a short-lived escape. **Dist:** Native of Mexico. *Zea* is one of the most important cultivated plants in the world, originating in Mexico, probably from *Zea mays* ssp. *parviglumis* Iltis & Doebley. **Phen:** (Mar-) Jun-Nov. **Comm:** It was initially cultivated in sw. Mexico (before 8000 BP), spreading to the sw. United States before 5000 BP, and to the e. United States by 2000 years BP. At the time of European contact, *Zea mays* ssp. *mays* was an important staple crop from s. Canada south to s. South America (Hancock 2004). **Syn:** = Ar, ETx1, FlGr, FNA25, K1, K3, K4, Mo1, NE, NY, Va, WH3; < *Zea mays* – Bah, F, HC, Il, Mi, NcTx, RAB, S, Tx. NatureServe GNRTUTXC (Unrankable).



Zizania Linnaeus 1753 (WILD-RICE)

A genus of 4 species (and 6 taxa) of northern and eastern North America. References: Judziewicz et al (2000); Terrell (2007a) in FNA24 (2007a); Terrell et al (1997); Tucker (1988).

Zizania aquatica Linnaeus *var*. ***aquatica***. SOUTHERN WILD-RICE. **Hab:** Freshwater marshes, usually tidal. **Dist:** Var. *aquatica* ranges from ME west to WI, south to c. peninsular FL and LA. **Phen:** May-Oct (-Apr, southwards). **Tax:** Var. *brevis* Fassett is restricted to the St. Lawrence River in QC. **Comm:** *Zizania* was formerly an important food for Amerindians; it is now gathered as a specialty grain, commanding high prices. **Syn:** = C, F, FNA24, G, HC, K1, K3, K4, NE, NY, Va, Judziewicz et al (2000), Terrell et al (1997), Tucker (1988); < *Zizania aquatica* – FlGr, GW1, Il, Mi, Pa, RAB, S, WH3. NatureServe G5T5 (Secure).



Zizaniopsis Döll & Ascherson 1871 (GIANT CUTGRASS)

A genus of about 5 species, of tropical and subtropical America. References: Judziewicz et al (2000); Terrell (2007b) in FNA24 (2007a); Tucker (1988).

Identification Notes: Superficially similar to *Zizania* in its habitat and large size, *Zizaniopsis* may be distinguished by its very different inflorescence and by its stout horizontal rhizomes (our taxa of *Zizania* are annual and not rhizomatous).

Zizaniopsis miliacea (Michaux) Döll & Ascherson. SOUTHERN WILD-RICE, GIANT CUTGRASS, WATER-MILLET. **Hab:** Brackish and freshwater marshes, tropical strand swamps, river shores. **Dist:** MD south to FL, west to TX, north in the interior to MO, and disjunct in w. Mexico. **Phen:** May-Jul. **Comm:** The other species of the genus are South American. **Syn:** = C, ETx1, F, FlGr, FNA24, G, GW1, HC, Il, K1, K3, K4, Mo1, NcTx, RAB, S, Tn, Tx, Va, WH3, Judziewicz et al (2000), Tucker (1988). NatureServe G5 (Secure).

Zoysia Willdenow 1801 (ZOYSIA, TEMPLE-GRASS)

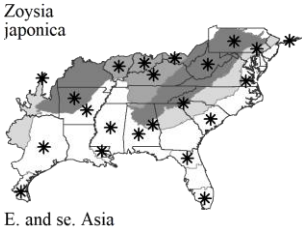
A genus of about 11 species, perennials, of tropical, subtropical, and temperate Asia. References: Anderson (2003) in FNA25 (2003a).

2 Pedicels 1.6-3.5 mm long; spikelets ovate, 1.1.4 mm wide; culm internodes 2-10 mm long; blades ascending ..... ***Zoysia japonica***
2 Pedicels 0.6-1.6 mm long; spikelets lanceolate, 0.6-1.0 mm wide; culm internodes 5-40 mm long, all plants with at least some internodes > 14 mm long; blades spreading at nearly 90 degree angles ..... ***Zoysia matrella***

* ***Zoysia japonica*** Steudel. JAPANESE LAWNGRASS, KOREAN LAWNGRASS, ZOYSIA. **Hab:** Used as a lawngrass, persisting or spreading. **Dist:** Native of Japan. Reported for VA (Kartesz 1999). **Phen:** Jan-Jun. **Syn:** = Ar, C, ETx1, FlGr, FNA25, HC, Il, K1, K3, K4, WH3. NatureServe GNR (Not Yet Ranked).
* ***Zoysia matrella*** (Linnaeus) Merrill. ZOYSIA, MANILA TEMPLE-GRASS. **Hab:** Used as a lawngrass, persisting or spreading. **Dist:** Native of the Philippines. **Phen:** Apr-Dec. **Syn:** = FlGr, FNA25, HC, K3, K4, WH3; = *Zoysia matrella* var. *matrella* – Meso6; > *Zoysia tenuifolia* Willdenow ex Trinius – Bah. NatureServe GNRTNR (Not Yet Ranked).

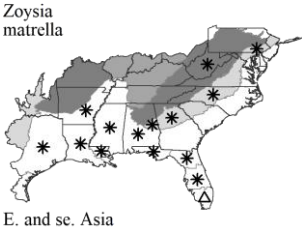
Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Zoysia japonica



E. and se. Asia

Zoysia matrella



E. and se. Asia

Key to Map Symbology:

* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable

X : extirpated

SECTION 6: EUDICOTYLEDONAE (EUDICOTS)

104. CERATOPHYLLACEAE S.F. Gray 1822 (HORNWORT FAMILY) [in CERATOPHYLLALES]

A peculiar and apparently very primitive family, of a single genus and about 6 species, aquatic herbs, of cosmopolitan distribution. References: Les in Kubitzki, Rohwer, & Bittrich (1993); Les (1985); Les (1986); Les (1988a); Les (1988b); Les (1988c); Les (1989); Les (1997) in FNA3 (1997); Szalontai et al (2018).

Ceratophyllum Linnaeus 1753 (HORNWORT, COONTAIL)

A genus of about 6 species, aquatic herbs, of cosmopolitan distribution. References: Les in Kubitzki, Rohwer, & Bittrich (1993); Les (1985); Les (1986); Les (1988a); Les (1988b); Les (1988c); Les (1989); Les (1997) in FNA3 (1997); Szalontai et al (2018); Wilmot-Dear (1985).

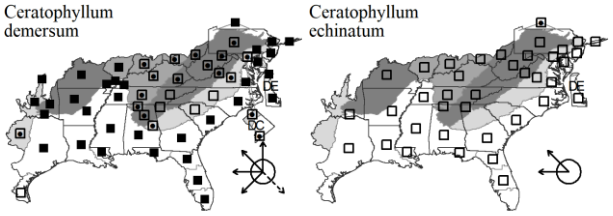
Identification Notes: *Ceratophyllum* is sometimes mistaken for superficially somewhat similar, aquatics, such as *Cabomba* (Cabombaceae), *Utricularia* (Lentibulariaceae), and *Myriophyllum* (Haloragaceae). *Cabomba* has the leaves opposite (rather than whorled), dichotomously divided (like *Ceratophyllum*), but the divisions lacking the marginal denticles of *Ceratophyllum*, and on a 1-3 cm long petiole (vs. sessile or on a petiole 0-2 mm long). *Utricularia* has the leaves sometimes dichotomously divided, but the divisions are usually irregular, the leaves are alternate (in most species), and bladder traps are present. *Myriophyllum* has the leaves pectinately rather than dichotomously divided.

1 Largest leaves forking 1-2× (count branching-nodes from the base of the leaf to the tip of the most-forked division); leaves coarse-textured, stiff, the marginal denticles usually strongly raised on a broad base of green tissue; achene margin wingless, with 2 basal spines or tubercles (these rarely absent), otherwise entire (lacking marginal spines)..... ***Ceratophyllum demersum***

1 Largest leaves forking 3-4× (count branching nodes from the base of the leaf to the tip of the most-forked division); leaves fine-textured, flaccid, the marginal denticles not raised on a broad base of green tissue, sometimes obscure or obsolete; achene margin winged, with 2-20 lateral spines 0.1-6.5 mm long (occasionally spineless), with 2 basal spines (these rarely absent).
..... ***Ceratophyllum echinatum***

Ceratophyllum demersum Linnaeus. COONTAIL. **Hab:** Ponds, pools, slow-moving streams. **Dist:** NL (Newfoundland) west to AK, south to s. FL, TX, CA, and south through the West Indies and Central America to South America. **Phen:** May-Sep. **Syn:** = Ar, C, F, FNA3, G, GrPl, GW2, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, Les (1985), Les (1986), Les (1988a), Les (1988b), Les (1988c), Les (1989), Szalontai et al (2018), Wilmot-Dear (1985). NatureServe G5 (Secure).

Ceratophyllum echinatum A. Gray. **Hab:** Ponds, pools, slow-moving streams. **Dist:** NL (Newfoundland) west to ON and n. MN, south to c. peninsular FL and e. TX; also in BC, WA, and OR. **Phen:** May-Sep. **Syn:** = C, F, FNA3, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NY, Pa, RAB, S, Tn, Tx, Va, WH3, Les (1985), Les (1986), Les (1988a), Les (1988b), Les (1988c), Les (1989), Szalontai et al (2018); = *Ceratophyllum submersum* Linnaeus ssp. *muricatum* (Chamisso) Wilmot-Dear var. *echinatum* (A. Gray) Wilmot-Dear – Wilmot-Dear (1985); < *Ceratophyllum muricatum* Chamisso – GW2.



106b. FUMARIACEAE Marquis 1820 (FUMITORY FAMILY) [in RANUNCULALES]

This family includes 15-20 genera and 500-600 species, herbs, mostly north temperate. The Fumariaceae are often now subsumed into the Papaveraceae and separated as subfamilies (Lidén 1981, 1986; Lidén et al. 1997; Judd, Sanders, & Donoghue 1994), but the option remains (and is here followed) to recognize the two monophyletic clades as families: Papaveraceae s.s. and Fumariaceae. The placement of *Pteridophyllum* (especially) and *Hypecoum* in their own families or basal in either Papaveraceae or Fumariaceae remains unsettled. References: Hill (1992); Lidén in Kubitzki, Rohwer, & Bittrich (1993); Lidén (1981); Lidén (1986); Lidén et al (1997); Pérez-Gutiérrez et al (2012); Pérez-Gutiérrez et al (2015); Stern (1997) in FNA3 (1997); Wang et al (2009).

1 Corolla with the 2 outer petals spurred or saccate at their bases; [tribe *Corydaleae*].
..... ***Dicentra***

1 Corolla with only 1 outer petal spurred or saccate at its base.
4 Ovary and fruit subglobose, with 1 seed; [tribe *Fumarieae*]..... ***Fumaria***
4 Ovary and fruit elongate, with several to many seeds; [tribe *Corydaleae*].
..... ***Corydalis***

Key to Map Symbology: □ native; ◇ maybe exotic; △ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Corydalis A.P. de Candolle 1805 (CORYDALIS)

A genus of about 400 species, herbs, of temperate regions of the Northern Hemisphere (especially China and the Himalayas). References: Lidén in Kubitzki, Rohwer, & Bittrich (1993); Ownbey (1947); Stern (1997) in FNA3 (1997).

2 Fruits pendent or divergent; spurred petal 7-10 mm long; pedicels 6-15 mm long; seeds 1.8-2.5 mm wide, with a narrow, acute ring-margin ..... ***Corydalis flavula***

2 Fruits erect or ascending (pendent or divergent in *C. aurea*); spurred petal 10-15 mm long; pedicels 1-6 mm long (5-10 mm long in *C. aurea*); seeds 1.0-2.2 mm wide, with or without a narrow, acute ring-margin.

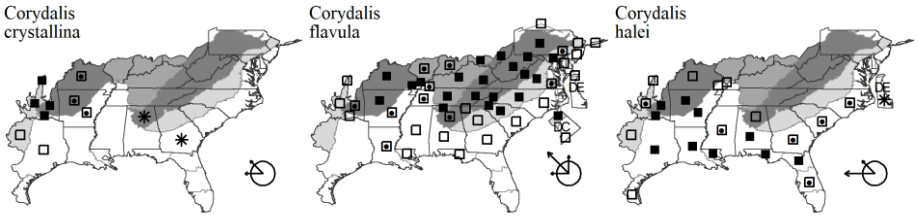
3 Capsule slightly to strongly pubescent with white, pustular-based hairs; outer petals with conspicuous crests..... ***Corydalis crystallina***

3 Capsules glabrous (or if with a few hairs, these not white and pustular-based); outer petals with inconspicuous crests. ..... ***Corydalis halei***

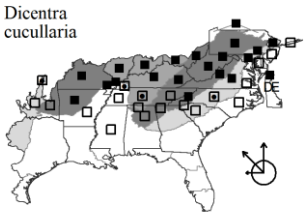
Corydalis crystallina (Torrey & A. Gray) Engelmann ex A. Gray. MEALY CORYDALIS. **Hab:** Glades, prairies, disturbed areas; eastwards in cultivated fields or disturbed areas and probably only a waif. **Dist:** Native of the sc. United States, MO and KS south to s. AR and e. TX. *C. crystallina* was collected in 1930 from an oat field at the Georgia Experiment Station in Laurens County, GA. **Phen:** Apr-Jun. **Syn:** = Ar, F, FNA3, G, GrPl, K1, K3, K4, NcTx, Tx. NatureServe G4G5 (Apparently Secure).

Corydalis flavula (Rafinesque) A.P. de Candolle. YELLOW FUMEWORT, YELLOW HARLEQUIN, SHORT-SPURRED CORYDALIS. **Hab:** Rich moist forests, especially alluvial forests, also in glades and on outcrops over mafic rocks (such as greenstone). **Dist:** S. CT, NY, and s. ON west to SD, south to NC, AL, LA, and OK. **Phen:** Mar-May; May-Jun. **Syn:** = Ar, C, F, FNA3, G, GrPl, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, Tn, Va, W, WH3, WV, Ownbey (1947); = *Capnoides flavulum* (Rafinesque) Kuntze – S. NatureServe G5 (Secure).

Corydalis halei (Small) Fernald & Schubert. SOUTHERN CORYDALIS. **Hab:** Sandy roadsides and disturbed areas. **Dist:** E. NC south to FL, west to TX, and inland north to IL, MO, and OK. **Phen:** Feb-May; Apr-Jun. **Tax:** F and S recognized it as a species distinct from *C. micrantha*; Ownbey reduced it to a subspecies, citing inadequate morphological differences and some alleged intermediates in OK and MO. The two taxa appear readily separable on morphological, ecological, and geographical grounds; species status seems warranted. **Syn:** = F; = *Capnoides halei* Small – S; = *Corydalis micrantha* (Engelmann ex A. Gray) A. Gray ssp. *australis* (Chapman) G.B. Ownbey – FNA3, GrPl, K1, K3, K4, NcTx, RAB, WH3, Ownbey (1947); = *Corydalis micrantha* (Engelmann ex A. Gray) A. Gray var. *australis* (Chapman) Shinners – Ar, C, Tx; > *Corydalis halei* (Small) Fernald & Schubert – Il; < *Corydalis micrantha* (Engelmann ex A. Gray) A. Gray – G; > *Corydalis micrantha* (Engelmann ex A. Gray) A. Gray ssp. *australis* (Chapman) G.B. Ownbey – Il.



Dicentra Bernhardi 1833



A genus of about 12 species, perennial herbs, with a relictual north temperate distribution: e. North America, w. North America, and e. Asia. References: Hatcher (2019); Lidén in Kubitzki, Rohwer, & Bittrich (1993); Stern (1961); Stern (1997) in FNA3 (1997).

Dicentra cucullaria (Linnaeus) Bernhardi. DUTCHMAN'S BRITCHES. **Hab:** Rich, moist forests, especially rich cove forests in the mountains. **Dist:** NS west to n. MN, south to GA, ne. MS (Tishomingo County), AR, and KS; disjunct in WA, OR, and ID. **Phen:** Mar-May; May-Jun. **Tax:** A tetraploid species (2n=32) (Hatcher 2019). **Syn:** = Ar, C, F, FNA3, G, GrPl, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, Tn, Va, W, WV; = *Bicuculla cucullaria* (Linnaeus) Millspaugh – S. NatureServe G5 (Secure).

Fumaria Linnaeus 1753 (FUMITORY)

A genus of about 50 species, annual herbs, primarily Eurasian. References: Boufford (1997c) in FNA3 (1997); Lidén in Kubitzki, Rohwer, & Bittrich (1993); Stace (2010).

1 Corolla (9-) 10-14 mm long, creamy white (to reddish); fruiting pedicels deflexed downward; fruit smooth when dry..... ***Fumaria capreolata***

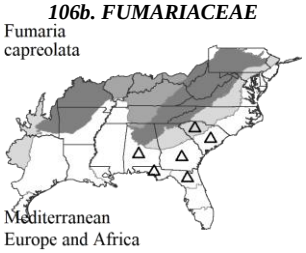
1 Corolla 4-8 (-9) mm long, white to pink or purple; fruiting pedicels ascending; fruit rugose or verrucose when dry. ..... ***Fumaria officinalis***

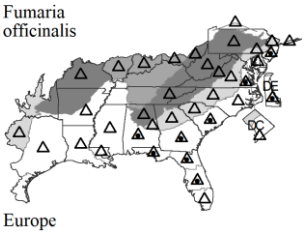
* ***Fumaria capreolata*** Linnaeus. WHITE RAMPING-FUMITORY. **Hab:** Ditches, fields, disturbed areas; rare. **Dist:** Native of sw. Europe. **Phen:** Feb-Jun. **Syn:** = FNA3, K3, K4, WH3, Stace (2010). NatureServe GNR (Not Yet Ranked).

* ***Fumaria officinalis*** Linnaeus. FUMITORY, EARTHSMOKE. **Hab:** Sandy fields, disturbed places, escaped from gardens. **Dist:** Native of Europe. **Phen:** Feb-Sep. **Syn:** = C, F, FNA3, G, GrPl, Il, Mi, Mo1, NcTx, NY, Pa, RAB, S, Tx, Va, WH3, WV; > *Fumaria officinalis* ssp. *officinalis* – K1, K3, K4, NE, Stace (2010); > *Fumaria officinalis* ssp. *wirtgenii* (W.D.J. Koch) Arcangeli – K1, K3, K4, Stace (2010).

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

106b. FUMARIACEAE





106c. PAPAVERACEAE A.L. de Jussieu 1789 (POPPY FAMILY) [in RANUNCULALES]

A family of 23 genera and about 230 species, mainly herbs (some shrubs and small trees), largely north temperate in distribution. References: Hoot, Wefferling, & Wulff (2015); Kadereit in Kubitzki, Rohwer, & Bittrich (1993); Kiger (1997) in FNA3 (1997); Wang et al (2009).

1 Flowering stem scapose, leaves basal only; petals 8-16, white; [subfamily *Chelidonioideae*]..... ***Sanguinaria***
1 Flowering stem with leaves at least low on the stem; petals 0-6, purple, red, orange-red, orange, yellow, cream.
  3 Leaves and fruits prickly; [subfamily *Papaveroideae*]..... ***Argemone***
  3 Leaves and fruits not prickly.
    4 Sepals connate; leaves ternately dissected into linear segments; sap watery; [subfamily *Eschscholzioideae*]..... ***Eschscholzia***
    4 Sepals separate; leaves pinnately lobed; sap yellow, orange, or milky.
      5 Flowers several in a terminal umbel; [subfamily *Chelidonioideae*].
      ..... ***Stylophorum***
      5 Flowers solitary, terminal.
        8 Ovaries and capsules glabrous..... ***Papaver***
        8 Ovaries and capsules sparsely to densely setose-pubescent..... ***Roemeria***

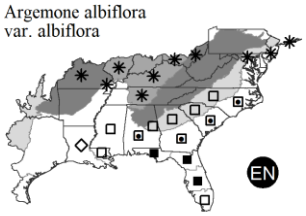
Argemone Linnaeus 1753 (PRICKLY-POPPY)

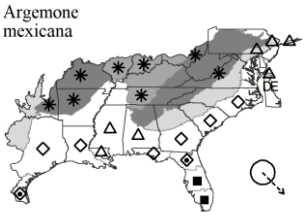
A genus of about 32 species, annual and perennial herbs, of North America, West Indies, Central America, South America, and Hawaii. References: Kadereit in Kubitzki, Rohwer, & Bittrich (1993); Ownbey (1997) in FNA3 (1997).

1 Flowers yellow to cream or bronze; stamens 20-75..... ***Argemone mexicana***
1 Flowers white to pink or pale lavender; stamens > 150.
..... ***Argemone albiflora var. albiflora***

Argemone albiflora Hornemann *var*. ***albiflora***. CAROLINA-POPPY, WHITE PRICKLY-POPPY. **Hab:** Sandy roadsides and disturbed areas. **Dist:** This species is apparently native to the southeastern United States, presumably including portions of our area, south to s. FL, but the native range is unclear. **Phen:** Apr-May (-Sep). **Tax:** Var. *texana* (G.B. Ownbey) Shinners occurs in TX, AR, and LA. **Comm:** The species' weediness suggests that it may be merely adventive in portions of our area. **Syn:** = *Argemone albiflora* ssp. *albiflora* – FNA3, K1, K3, K4, NE, NY; < *Argemone alba* F. Lestiboudois – G, S, WI, misapplied; < *Argemone albiflora* – C, Il, Mi, RAB, WH3. NatureServe G4G5T4T5 (Apparently Secure).

Argemone mexicana Linnaeus. MEXICAN-POPPY, MEXICAN PRICKLY-POPPY. **Hab:** Sandy roadsides and disturbed areas. **Dist:** Native of peninsular FL, West Indies, and maybe Mexico and Central America. **Phen:** Apr-May (-Aug). **Syn:** = Bah, C, FNA3, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, Tx, Tx, WH3, WI. NatureServe G5 (Secure).





Eschscholzia Chamisso 1820 (CALIFORNIA-POPPY)

A genus of about 12 species, annual and perennial herbs, of sw. North America and n. Mexico. References: Clark (1997) in FNA3 (1997); Kadereit in Kubitzki, Rohwer, & Bittrich (1993).

* ***Eschscholzia californica*** Chamisso *ssp*. ***californica***. CALIFORNIA-POPPY. **Hab:** Roadsides, disturbed areas. **Dist:** Native of w. North America. **Phen:** Apr-Aug. **Syn:** = FNA3, K1, NcTx, NE, NY; < *Eschscholtzia californica* – F, Il, K3, K4, RAB, orthographic variant; < *Eschscholzia californica* – Mi, Pa. NatureServe G4T4 (Apparently Secure).

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more)

* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable

X : extirpated

Papaver Linnaeus 1753 (POPPY)

A genus of about 80 species, annual and perennial herbs, of temperate Northern Hemisphere. References: Kadereit in Kubitzki, Rohwer, & Bittrich (1993); Kiger & Murray (1997) in FNA3 (1997); Kiger (1975).

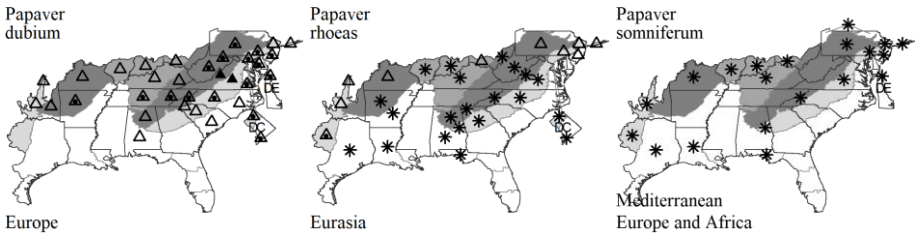
Identification Notes: Additional species are cultivated and may be found in our area persistent, escaped, as waifs, or as naturalized populations.

1 Upper cauline leaves clasping the stem; [section *Papaver*] ..... ***Papaver somniferum***
1 Upper cauline leaves not clasping the stem.
  3 Capsule 2-3× as long as broad; stigmatic lobes 5-9 ..... ***Papaver dubium***
  3 Capsule 1-1.5× as long as broad; stigmatic lobes 8-15 ..... ***Papaver rhoeas***

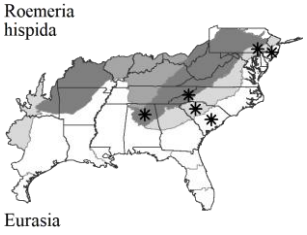
* ***Papaver dubium*** Linnaeus. LONG-HEADED POPPY, BLIND EYES. **Hab:** Roadsides, fields, disturbed areas. **Dist:** Native of Europe. **Phen:** Apr-Jul. **Syn:** = C, F, FNA3, G, GrPl, Il, K1, K3, K4, NE, NY, Pa, RAB, S, Tn, Va, W, WV, Kiger (1975). NatureServe GNR (Not Yet Ranked).

* ***Papaver rhoeas*** Linnaeus. CORN POPPY, FIELD POPPY, RED POPPY, SHIRLEY POPPY, COMMON POPPY. **Hab:** Disturbed areas. **Dist:** Native of Eurasia and n. Africa. **Phen:** May-Oct. **Syn:** = C, F, FNA3, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, Tx, WH3, WV, Kiger (1975). NatureServe GNR (Not Yet Ranked).

* ***Papaver somniferum*** Linnaeus. OPIUM POPPY, COMMON POPPY. **Hab:** Disturbed areas. **Dist:** Native of Mediterranean Europe and Asia Minor. **Phen:** May-Sep. **Syn:** = C, F, FNA3, G, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Tx, WH3, Kiger (1975). NatureServe GNR (Not Yet Ranked).



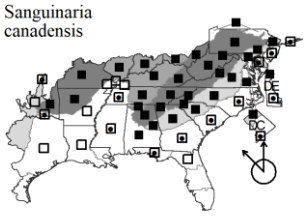
Roemeria Medikus 1792



A genus of 4-5 species, annual herbs, of Mediterranean Europe and w. Asia. References: Banfi et al (2022); Kadereit in Kubitzki, Rohwer, & Bittrich (1993); Morales Torres, Mendoza Castellón, & Romero García (1988); Stace (2017).

* ***Roemeria hispida*** (Lamarck) Stace. ROUGH POPPY. **Hab:** Disturbed areas. **Dist:** Native of Eurasia. **Phen:** May-Jun. **Syn:** = K4, Banfi et al (2022), Stace (2017); = *Papaver hybridum* Linnaeus – FNA3, K1, RAB, Kiger (1975). NatureServe GNR (Not Yet Ranked).

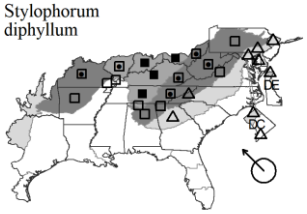
Sanguinaria Linnaeus 1753 (BLOODROOT)



A monotypic genus, a perennial herb, of e. North America. References: Kadereit in Kubitzki, Rohwer, & Bittrich (1993); Kiger (1997) in FNA3 (1997).

Sanguinaria canadensis Linnaeus. BLOODROOT, RED PUCCOON. **Hab:** Moist nutrient-rich forests. **Dist:** NS west to MN and MB, south to Panhandle FL and OK. **Phen:** (Late Jan-) Mar-Apr; Apr-May. **Tax:** Fernald recognized two varieties – var. *rotundifolia*, more southern and the primary form in our area, considered to have leaves less lobed than the more northern var. *canadensis*; leaf shape variability within populations makes it impractical to recognize infraspecific taxa. **Syn:** = Ar, C, FNA3, G, GrPl, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Va, W, WH3; > *Sanguinaria canadensis* var. *canadensis* – F; > *Sanguinaria canadensis* var. *rotundifolia* (Greene) Fedde – F, Tx. NatureServe G5 (Secure).

Stylophorum Nuttall 1818 (CELANDINE-POPPY)



A genus of 2-5 species, perennial herbs, of e. North America and e. Asia. References: Kadereit in Kubitzki, Rohwer, & Bittrich (1993); Kiger (1997) in FNA3 (1997).

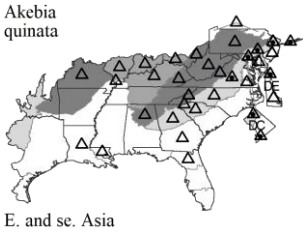
Stylophorum diphyllum (Michaux) Nuttall. CELANDINE-POPPY, WOODS-POPPY. **Hab:** Moist forests over calcareous rocks (such as limestone). **Dist:** S. QU, w. PA, s. MI, and WI, south to sw. VA, e. TN, nw. GA, sc. TN, and AR; introduced elsewhere from horticultural use. **Phen:** Mar-Jun. **Syn:** = Ar, C, F, FNA3, G, Il, K1, K3, K4, Mi, Pa, S, Tn, Va, W, WV. NatureServe G5 (Secure).

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

108. LARDIZABALACEAE Decaisne 1838 (LARDIZABALA FAMILY) [in RANUNCULALES]

A family of about 8 genera and 35 species, shrubs and vines, primarily Asian, but also in s. South America. References: Cheng-Yih & Kubitzki in Kubitzki, Rohwer, & Bittrich (1993); Thieret & Kartesz (1997) in FNA3 (1997); Wang et al (2009).

Akebia Decaisne 1837 (AKEBIA)



A genus of 5 species, vines, of temperate e. Asia. References: Cheng-Yih & Kubitzki in Kubitzki, Rohwer, & Bittrich (1993).

* ***Akebia quinata*** (Houttuyn) Decaisne. FIVE-LEAF, FIVE-LEAF AKEBIA, CHOCOLATE-VINE. **Hab:** Escaped from cultivation to roadbanks, suburban woodlands, and floodplains. **Dist:** Native of Japan, China, and Korea. This species is likely to become a serious invasive alien in the Southeast over the next decades; it forms dense mats in natural forests and is difficult to eradicate. **Phen:** Mar-Jun; Jun-Jul. **Syn:** = C, F, FNA3, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, Va. NatureServe GNR (Not Yet Ranked).

109. MENISPERMACEAE A.L. de Jussieu 1789 (MOONSEED FAMILY) [in RANUNCULALES]

A family of about 72 genera and 450 species, vines, shrubs, trees, and herbs, of tropical, subtropical, and warm temperate areas. References: Hoot et al (2009); Kessler in Kubitzki, Rohwer, & Bittrich (1993); Lian et al (2020); Rhodes (1997) in FNA3 (1997); Wang et al (2009).

Identification Notes: The flowers are unisexual and plants dioecious.

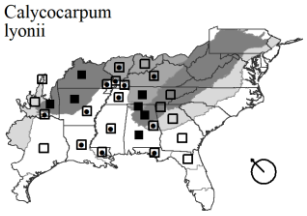
1 Leaves asymmetrically peltate (the stem attached 1-5 mm in from the leaf margin); stamens 4 or 12-36; petals 1, 4, or 6-9; fruit bluish-black or red; [tribe *Menispermeae*]. ..... ***Menispermum canadense***

1 Leaves not peltate, usually cordate (the stem attached at the leaf margin); stamens 6 or 12; petals 6 or 0; fruit red or bluish-black.

3 Leaves 3-7-lobed, the sinuses usually deep, the lobes acute; stamens 12; petals 0; fruit bluish-black, 13-25 mm long; stone concave on one side; [tribe *Tinosporeae*] ..... ***Calycocarpum lyonii***

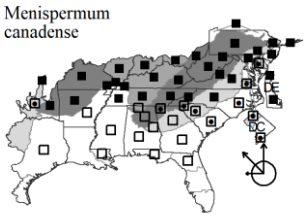
3 Leaves entire to 3-lobed, the sinuses always shallow, the lobes (if present) broadly rounded; stamens 6; petals 6; fruit red or bluish-black, 4-8 mm long; stone flattened on both sides; [tribe *Tiliacoreae*] ..... ***Nephroia***

Calycocarpum Nuttall ex Torrey & A. Gray 1838 (CUPSEED)



A monotypic genus, a woody vine, of e. North America. References: Kessler in Kubitzki, Rohwer, & Bittrich (1993); Rhodes (1997) in FNA3 (1997).

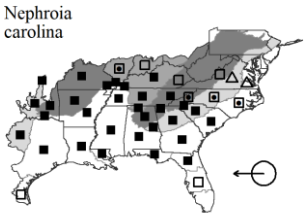
Calycocarpum lyonii (Pursh) A. Gray. CUPSEED, LYONIA-VINE. **Hab:** Mesic upland, riparian, and bottomland forests, stream banks, wet hammocks. **Dist:** E. TN, sc. KY, s. IN, s. IL, MO, and e. KS, south to se. GA, Panhandle FL, s. AL, s. MS, s. LA, and e. TX. Reported from SC, but rejected based on mistaken evidence (K. Bradley, pers.comm., 2020). **Phen:** May-Jul (-Oct); Jul-Sep (-Nov). **Syn:** = Ar, C, F, FNA3, G, GrPl, Il, K1, K3, K4, NcTx, S, Tn, Tx, WH3. NatureServe G5 (Secure).



Menispermum Linnaeus 1753 (MOONSEED)

A genus of 2-4 species, woody vines, of temperate e. North America and temperate e. Asia. References: Kessler in Kubitzki, Rohwer, & Bittrich (1993); Rhodes (1997) in FNA3 (1997).

Menispermum canadense Linnaeus. MOONSEED, YELLOW PARILLA. **Hab:** Moist nutrient-rich forests, especially on floodplains or lower slopes, less commonly in dry calcium-rich forests and woodlands. **Dist:** QC west to MB, south to GA and OK. **Phen:** May-Aug; Jul-Oct. **Syn:** = Ar, C, F, FNA3, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, Va, W, WH3, WV. NatureServe G5 (Secure).



Nephroia Loureiro 1790 (CORALBEADS, SNAILSEED)

A genus of 3 species, lianas, of temperate and subtropical e. North America (including Mexico) and e. Asia. Lian et al. (2020) show that *Cocculus* as previously circumscribed is polyphyletic, and the two North American species are grouped with an Asian species, in a resurrected genus *Nephroia*. The newly circumscribed genera are morphologically distinctive as well. References: Kessler in Kubitzki, Rohwer, & Bittrich (1993); Lian et al (2020); Rhodes (1997) in FNA3 (1997).

Key to Map Symbology:

* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable
X : extirpated

Nephroia carolina (Linnaeus) Lian Lian & Wei Wang. CORALBEADS, CAROLINA MOONSEED, SNAILSEED, RED MOONSEED. **Hab:** Moist to dry forests and thickets, especially where calcareous, also weedy in landscaped areas. **Dist:** VA south to FL, west to TX, north in the interior to s. IN and MO. The occurrences in VA may be primarily adventive. **Phen:** Jun-Aug; Jul-Oct. **Syn:** = K4, Lian et al (2020); = *Cocculus carolinus* (Linnaeus) A.P. de Candolle – C, F, FNA3, G, GrPl, Il, K1, K3, NcTx, RAB, Tx, Va, W, WH3; = *Epibaterium carolinum* (Linnaeus) Britton – S. NatureServe G5 (Secure).

110. BERBERIDACEAE A.L. de Jussieu 1789 (BARBERRY FAMILY) [in RANUNCULALES]

As broadly defined here, a family of about 17 genera and 650 species, herbs and shrubs, of the temperate Northern Hemisphere and Andean South America. There has been much debate and study of whether the Berberidaceae should be recognized as a broadly defined unit, or split into a variety of segregate families (such as Podophyllaceae, Epimediaceae, Nandinaceae, Leonticaceae). Based on molecular studies, Kim & Jansen (1996, 1998) and Kim et al. (2004) conclude that division of the Berberidaceae into segregate families is not warranted. References: Ahrendt (1961); Kim & Jansen (1996); Kim & Jansen (1998); Kim et al (2004); Loconte in Kubitzki, Rohwer, & Bittrich (1993); Loconte & Estes (1989b); Meacham (1980); Stearn (2002); Wang et al (2009); Whetstone, Atkinson, & Spaulding (1997) in FNA3 (1997); Yu & Chung (2017).

1 Leaves 2-3-ternately compound; [subfamily *Nandinoideae*].
  2 Plant a shrub, with multiple leaves; flowers white ..... ***Nandina domestica***
  2 Plant an herb, with 2 leaves; flowers green, greenish yellow, or maroon ..... ***Caulophyllum***
1 Leaves simple (sometimes shallowly to deeply lobed), 2-foliolate, 3-foliolate, or 1-pinnately compound.
  3 Plant a shrub; leaves simple, palmately 3-foliolate, or 1-pinnately compound; flowers yellow; [subfamily *Berberidoideae*]
    4 Leaves simple, fascicled on short spur shoots; stems spiny; leaves deciduous or evergreen ..... ***Berberis***
    4 Leaves 1-pinnately compound or palmately 3-foliolate, either fascicled on short spur shoots (*Alloberberis*) or not fascicled (*Mahonia*); stems not spiny; leaves evergreen. ..... ***Mahonia***
  3 Plant an herb; leaves peltate, 2-parted or radially lobed; flowers white; [subfamily *Podophylloideae*].
    6 Plant acaulescent; flower solitary and scapose; leaf segments 2; fruit a capsule ..... ***Jeffersonia diphylla***
    6 Plant caulescent; flower solitary, or cymose to umbellate, borne on a stem with leaves; leaf segments several; fruit a berry. ..... ***Podophyllum peltatum***

Berberis Linnaeus 1753 (BARBERRY)

A genus of about 500 species, shrubs, of North America, South America, Asia, Europe, and n. Africa. Many authors have favored the inclusion of *Mahonia* in *Berberis*, but we here follow Yu & Chung (2017). References: Chen et al (2020); Kim, Kim, & Landrum (2004); Loconte in Kubitzki, Rohwer, & Bittrich (1993); Whittemore (1997d) in FNA3 (1997); Yu & Chung (2017).

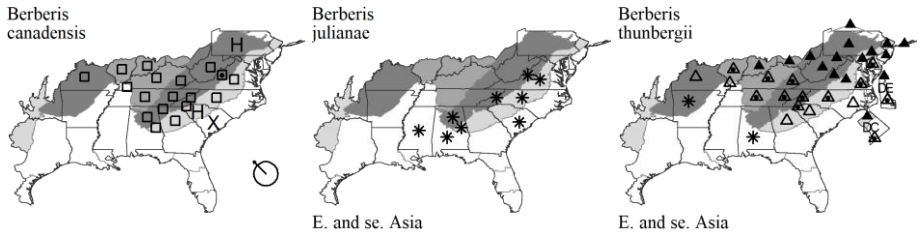
Identification Notes: Other species of *Berberis* are used horticulturally in our area. Though none appear to be established at this time, the possibility of encountering species other than those treated above should be kept in mind.

1 Leaves 1-pinnately compound, > 10 cm long, not fascicled on short spur shoots; stems not spiny; leaves evergreen. ..... ***Mahonia***
1 Leaves simple, < 6 cm long, fascicled on short spur shoots; stems spiny; leaves deciduous or evergreen.
  2 Leaves entire; flowers solitary or 2-4 in umbels; spines mostly simple; [section *Tschonoskyanae*] ..... ***Berberis thunbergii***
  2 Leaves bristly-serrate; flowers 5-many in racemes (sometimes the racemes umbelliform); spines mostly trifurcate (some simple or bifurcate).
    3 Leaves evergreen, coriaceous; leaf teeth tipped with firm prickles; fruits blue-black, pruinose; [section *Wallichianae*] ..... ***Berberis julianae***
    3 Leaves deciduous, herbaceous; leaf teeth tipped with weak bristles; fruits red, not pruinose. ..... ***Berberis canadensis***

Berberis canadensis P. Miller. AMERICAN BARBERRY, ALLEGHENY BARBERRY. **Hab:** Rocky woods, forest openings, glades, usually over mafic rocks (such as diabase) or calcareous rocks (such as limestone), sometimes along fence-rows in sw. VA (presumably spread by birds). **Dist:** A broad Southern Appalachian-Ozarkian endemic, not occurring in Canada (the epithet a misnomer): scattered and local in VA, WV, KY, TN, NC, SC, AL, GA, MO, IL, IN, and sc. PA (where apparently now extirpated). **Phen:** Apr-May; Sep-Oct. **Comm:** Along with *B. vulgaris*, *B. canadensis* has been subjected to organized eradication programs because of its serving as an alternate host for wheat rust (*Puccinia graminis*). **Syn:** = C, F, FNA3, G, Il, K1, K3, K4, Pa, RAB, S, Tn, Va, W. NatureServe G3G4 (Vulnerable).

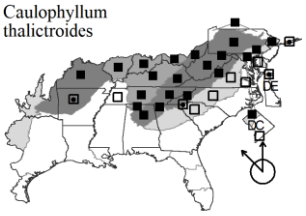
* ***Berberis julianae*** C.K. Schneider. EVERGREEN BARBERRY. **Hab:** Floodplains, also seeding down and escaping locally near horticultural plantings. **Dist:** Native of China. First reported for NC by Pittillo & Brown (1988). **Phen:** Dec-Mar; Feb-May. **Syn:** = K3, K4, NY; = n/a – RAB. NatureServe GNR (Not Yet Ranked).

* ***Berberis thunbergii*** A.P. de Candolle. JAPANESE BARBERRY. **Hab:** Rich forests, old fields. **Dist:** Native of Japan. This species is immune to wheat rust; it is now the most commonly encountered barberry in much of our area. **Phen:** Mar-Apr; May-Sep. **Syn:** = Ar, C, F, FNA3, G, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Va, W. NatureServe GNR (Not Yet Ranked).



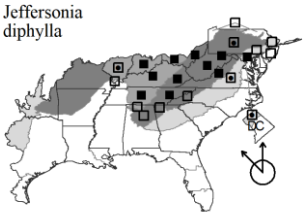
Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Caulophyllum Michaux 1803 (BLUE COHOSH)



A genus of 3 species, herbs, with a relictual north temperate distribution (e. North America, e. Asia). The only other species of the genus is *C. robustum* Maximowicz, of e. Asia. References: Brett (1981); Haines (2003c); Loconte in Kubitzki, Rohwer, & Bittrich (1993); Loconte & Blackwell (1981); Loconte & Blackwell (1984); Loconte & Blackwell (1985); Loconte (1997) in FNA3 (1997); Stearn (2002); Uttal (1985).

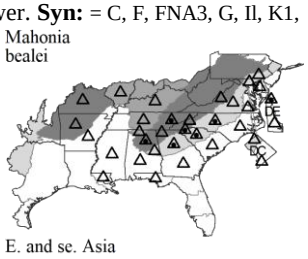
Caulophyllum thalictroides (Linnaeus) Michaux. COMMON BLUE COHOSH, GREEN VIVIAN. **Hab:** Rich forests. **Dist:** NS, QC, ON, and MB, south to GA, AL, AR, and OK. **Phen:** Apr-May; Jul-Aug. **Syn:** = Ar, FNA3, GrPl, Il, K1, K3, K4, Mi, NE, NY, Tn, Va, W, Haines (2003c), Loconte & Blackwell (1981), Loconte & Blackwell (1984), Loconte & Blackwell (1985), Stearn (2002); = *Caulophyllum thalictroides* var. *thalictroides* – C; < *Caulophyllum thalictroides* (Linnaeus) Michaux – F, G, Pa, RAB, S.



Jeffersonia B.S. Barton 1793 (TWINLEAF)

A genus of 2 species, the only other species of the genus is native to e. Asia (eastern Russia, Korea, Manchuria). The closest North American relatives of *Jeffersonia* are *Achlys* and *Vancouveria* of the Pacific Northwest. References: George (1997c) in FNA3 (1997); Loconte in Kubitzki, Rohwer, & Bittrich (1993); Loconte & Estes (1989b); Stearn (2002).

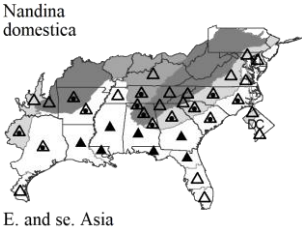
Jeffersonia diphylla (Linnaeus) Persoon. TWINLEAF. **Hab:** Moist and extremely nutrient-rich forests, generally over calcareous or mafic rocks (including limestone, dolostone, amphibolite, greenstone, etc.) or very rich alluvium. **Dist:** The species is widespread in ne. United States, south to MD, NC, and AL. **Phen:** Mar-Apr; May. **ID Notes:** It is somewhat suggestive of *Sanguinaria* in both foliage and flower. **Syn:** = C, F, FNA3, G, Il, K1, K3, K4, Mi, NY, Pa, RAB, S, Tn, Va, W, WV, Stearn (2002). NatureServe G5 (Secure).



Mahonia Nuttall 1818 (MAHONIA, OREGON-GRAPE)

A genus of about 100 species, shrubs, of e. Asia and w. North America south to Central America. References: Chen et al (2020); Kim, Kim, & Landrum (2004); Loconte in Kubitzki, Rohwer, & Bittrich (1993); Whittemore (1997d) in FNA3 (1997); Yu & Chung (2017).

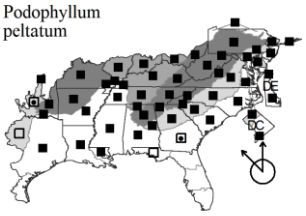
* ***Mahonia bealei*** (Fortune) Carrière. LEATHERLEAF MAHONIA, CHINESE MAHONIA, HOLLY-GRAPE. **Hab:** In deciduous forests in suburban areas, spread from plantings. **Dist:** Native of China. Naturalizing widely (and increasingly aggressively) in the southeastern United States. **Phen:** Dec-Mar; May-Jul. **Syn:** = K1, K3, K4, RAB, Yu & Chung (2017); = *Berberis bealei* Fortune – Ar, FNA3, Tn, Va, WH3. NatureServe GNR (Not Yet Ranked).



Nandina Thunberg 1781 (NANDINA, SACRED-BAMBOO)

A monotypic genus, a shrub, native of Japan, China, and India. Here treated as a monotypic genus in the Berberidaceae, *Nandina* seems to have only a general kinship to the Berberidaceae (see Ehdaie & Russell 1984, Loconte & Estes 1989b, Meacham 1980) and should perhaps be placed in its own monotypic family. References: Ehdaie & Russell (1984); Loconte in Kubitzki, Rohwer, & Bittrich (1993); Whetstone, Atkinson, & Spaulding (1997) in FNA3 (1997).

* ***Nandina domestica*** Thunberg. NANDINA, SACRED-BAMBOO. **Hab:** Forests and woodlands in suburban areas, commonly planted, increasingly escaping and naturalizing. **Dist:** Native of China. *Nandina* has numerous cultivated forms, and is widely planted, especially southward. **Phen:** May-Jun; Oct-Nov. **Comm:** Leaflet shape varies in cultivated forms from broadly ovate to linear. **Syn:** = FNA3, K1, K3, K4, NcTx, RAB, Tn, Va, WH3. NatureServe GNR (Not Yet Ranked).



Podophyllum Linnaeus 1753 (MAY-APPLE)

A monotypic genus, a perennial, rhizomatous herb, of e. North America. Ye et al. (2022) determined that *Podophyllum* is sister to the e. Asian endemic genus Dysosma (with which it is sometimes combined, as *Podophyllum* sensu lato), the clade of *Podophyllum* and *Dysosma* sister to *Diphylleia*. References: George (1997b) in FNA3 (1997); Loconte in Kubitzki, Rohwer, & Bittrich (1993); Shaw (2000); Shaw (2002); Ye et al (2022).

The aspect of a pair of orbicular leaves is shared with *Diphylleia* (Berberidaceae) and *Hydrastis* (Hydrastidaceae, sometimes included in Ranunculaceae).

Podophyllum peltatum Linnaeus. MAY-APPLE, AMERICAN MANDRAKE. **Hab:** Rich forests, bottomlands, slopes, pastures. **Dist:** NS west to MN, south to Panhandle FL and TX. **Phen:** (Late Feb-) Mar-Apr; May-Jun. **Comm:** The ripe fruits are edible; the rest of the plant contains a variety of alkaloids, and is poisonous-medicinal. Compounds from *Podophyllum* are used in wart removal, and show anti-viral and anti-cancer promise. **Syn:** = Ar, C, F, FNA3, G, GrPl, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV; > *Podophyllum peltatum* var. *annulare* J.M.H. Shaw – Shaw (2000), Shaw (2002); > *Podophyllum peltatum* var. *peltatum* – Shaw (2000), Shaw (2002). NatureServe G5 (Secure).

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

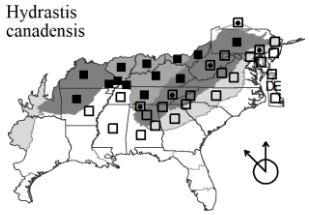
111a. HYDRASTIDACEAE Martinov 1820 (GOLDENSEAL FAMILY) [in RANUNCULALES]

A monotypic family, of temperate e. North America. In chemistry, morphology, and anatomy, *Hydrastis* shows some relationship to *Podophyllum* and *Diphylleia* of the Podophyllaceae (often included in the Berberidaceae). Though usually placed in the Ranunculaceae, Tobe & Keating (1985) present evidence from morphology, anatomy, embryology, palynology, chemistry, and cytology that suggests that *Hydrastis* is best recognized as a monotypic family. They contend that "*Hydrastis* represents a relictual primitive group which very early diverged from a common ancestral stock of the Ranunculaceae, Berberidaceae and probably of Circaeasteraceae, and that *Hydrastis* has evolved in its own evolutionary line parallel with other lines leading to the modern representatives of these families." Thorne (1992) and Reveal (1993a) have also accepted Hydrastidaceae as a distinct family. Tobe in Kubitzki & Bayer places *Hydrastis* with *Glaucidium* Siebold & Zuccarini in a bigeneric Hydrastidaceae. Zhai et al. (2019), like most recent authors, include *Hydrastis* in Ranunculaceae, but show *Glaucidium* and *Hydrastis* as successively basal in their broad Ranunculaceae, which is compatible with family rank recognition of these distinctive groups. References: Tamura in Kubitzki, Rohwer, & Bittrich (1993); Tobe in Kubitzki & Bayer (2002); Wang et al (2009); Whittemore & Parfitt (1997) in FNA3 (1997); Zhai et al (2019).

Hydrastis Linnaeus 1759 (GOLDENSEAL)

A monotypic genus, an herb, endemic to e. North America. References: Ford (1997a) in FNA3 (1997); Tamura in Kubitzki, Rohwer, & Bittrich (1993).

Hydrastis canadensis Linnaeus. GOLDENSEAL. **Hab:** Mesic (rarely drier), very nutrient-rich forests, with circumneutral soils, over calcareous or mafic rocks such as limestone, amphibolite, and dolostone, sometimes forming large colonies after canopy disturbance such as logging. **Dist:** VT and MN south to w. and c. NC, nw. SC (Bradley et al. [in prep.]), n. GA, TN, and AR. **Phen:** Apr-May; May-Jun. **Comm:** Exploited for the herbal trade (and still often used as a home remedy in more remote parts of the mountains), though too rare in the eastern part of our area to support economically significant wild collection. The rhizome and roots are bitter in taste and contain several alkaloids. Reported for SC (P. McMillan, pers.comm., 2002). **Syn:** = Ar, C, F, FNA3, G, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Va, W, WV. NatureServe G3G4 (Vulnerable).



111b. RANUNCULACEAE A.L. de Jussieu 1789 (BUTTERCUP FAMILY) [in RANUNCULALES]

A family of about 62 genera and 2450 species, herbs, shrubs, and vines, primarily of temperate and boreal regions. Classification of subfamilies and tribes follows Wang et al. (2009). References: Carrive (2019); Cossard et al (2016); Keener (1977); Tamura in Kubitzki, Rohwer, & Bittrich (1993); Wang et al (2009); Wang et al (2014); Whittemore & Parfitt (1997) in FNA3 (1997); Zhai et al (2019).

1 Shrub or vine; leaves compound (or sometimes some to most of them simple in *Clematis*).
  2 Leaves opposite, distributed along the stem; sepals 4, white to blue or purplish, 10-50 mm long; wood not yellow; [subfamily *Ranunculoideae*, tribe *Anemoneae*] ..... ***Clematis***
  2 Leaves alternate, clustered together at the top of the usually unbranched, erect stem; sepals 5, maroon, 2-5 mm long; wood yellow; [subfamily *Coptidoideae*] ..... ***Xanthorhiza***
1 Herb; leaves compound or simple.
  3 Leaves simple, sometimes deeply cleft or lobed into rounded or elongate segments; [subfamily *Ranunculoideae*].
    4 Plants in flower ..... ***Key A***
    4 Plants in fruit ..... ***Key B***
  3 Leaves compound, the leaflets either linear or more-or-less petiolulate.
    5 Plants in flower ..... ***Key C***
    5 Plants in fruit ..... ***Key D***

Key A

1 Flowers bilaterally symmetrical, the upper sepal hooded or spurred; [tribe *Delphinieae*].
  2 Upper sepal hooded or helmet-shaped; petals hidden by the sepals; perianth blue or creamy white; stems weak, clambering, reclining, vining, or ascending in a curve ..... ***Aconitum***
  2 Upper sepal spurred; petals at least partly exserted from the sepals; perianth blue, pink, white, or greenish; stems strong, erect, normally straight ..... ***Delphinium***
1 Flowers radially symmetrical, no perianth parts spurred or hooded (except the 5 sepals spurred in *Myosurus*).
  3 Petals present, white or yellow, larger and more conspicuous than the sepals; sepals present, green; [in other words, with a second, green, less conspicuous perianth whorl below the largest and colored perianth whorl; note that some *Anemone* have a calyx-like involucre of 3 bracts subtending each flower]; [tribe *Ranunculeae*].
    4 Basal leaves linear to linear-spatulate, mostly 4-8 cm long, 1-3 mm wide; receptacle elongate, 1-6 cm long (superficially resembling a *Plantago* inflorescence) ..... ***Myosurus***
    4 Basal leaves various, but not as above; receptacle globose to sub-cylindric, mostly < 1 cm long
      5 Sepals 3 (-4); petals 7-12; achenes pubescent, beakless; leaves simple, cordate, unlobed; [introduced garden plants] ..... ***Ficaria***
      5 Sepals (3-) 5 (-6); petals typically 5-9 (10 in some "doubled" forms); achenes smooth or variously ornamented with spines, papillae, or tubercles, sometimes also pubescent; leaves various, usually not at once simple, cordate, and unlobed (except in *Halerpestes*); [native or introduced]. ..... ***Ranunculus***
  3 Petals absent (or modified into relatively inconspicuous nectaries or staminodia); sepals present and petaloid (white, yellow, yellow-green, cream, or blue).
    7 Petaloid sepals 3-5 mm long, caducous; stamens white and showy; [tribe *Ranunculeae*] ..... ***Trautvetteria***

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

7 Petaloid sepals 6-40 mm long, not caducous; stamens not notably white and showy.
8 Leaves opposite, distributed along the stem; style plumose; [tribe *Anemoneae*]..... ***Clematis***
8 Leaves all basal, or with a few alternate or whorled involucrate leaves on the stem; style not plumose.
..... ***Hepatica***

Key B

1 Fruit a follicle, each carpel with 2 or more ovules.
4 Stems weak, clambering, reclining, or vining..... ***Aconitum***
4 Stems strong, erect ..... ***Delphinium***
1 Fruit an achene (or dehiscent utricle in *Trautvetteria*), each carpel with 1 ovule.
6 Leaves opposite, distributed along the stem; style plumose; [tribe *Anemoneae*] ..... ***Clematis***
6 Leaves all basal, or with a few alternate or whorled involucrate leaves on the stem; style not plumose.
7 Basal leaves linear to linear-spatulate, mostly 4-8 cm long, 1-3 mm wide; receptacle elongate, 1-6 cm long (superficially resembling a *Plantago* inflorescence); [tribe *Ranunculeae*] ..... ***Myosurus minimus***
7 Basal leaves various, but not as above, generally long-petiolate, with an expanded, crenate-toothed, 3-lobed, or palmately-lobed blade; receptacle globose to sub-cylindric, mostly < 1 cm long.
8 Fruit a dehiscent utricle; cauline leaves alternate; [tribe *Ranunculeae*]..... ***Trautvetteria***
8 Fruit an achene; cauline leaves opposite or whorled (or alternate in *Ranunculus*, or reduced to alternate scale-like bracts in *Halerpestes*).
9 Cauline leaves opposite or whorled, or reduced to 3 sepal-like involucral bracts immediately subtending the flower; sepals absent (but in *"Hepatica"* mimicked by the bracts); [tribe *Anemoneae*]
..... ***Hepatica***
9 Cauline leaves alternate; sepals present; [tribe *Ranunculeae*]
11 Achenes smooth or variously ornamented with spines, papillae, or tubercles, sometimes also pubescent, usually noticeably beaked, the beak > 0.3 mm long; leaves various, usually not at once simple, cordate, and unlobed ; [native or introduced]..... ***Ranunculus***
11 Achenes not ornamented with spines, papillae, or tubercles, pubescent or glabrous, beakless; leaves simple, unlobed.
..... ***Ficaria***

Key C

1 Leaflets linear, < 1.5 mm wide.
2 Flowers bilaterally symmetrical; [subfamily *Ranunculoideae*, tribe *Delphineae*] ..... ***Delphinium***
2 Flowers radially symmetrical.
3 Aquatic; [native]; [subfamily *Ranunculoideae*, tribe *Ranunculeae*]..... ***Ranunculus***
3 Terrestrial; [alien].
..... ***Adonis***
1 Leaflets broader, rounded, lobed, or toothed.
6 Leaves all cauline, opposite; stems somewhat woody at base; [subfamily *Ranunculoideae*, tribe *Anemoneae*]..... ***Clematis***
6 Leaves basal and cauline, the cauline alternate (or with opposite or whorled involucral bracts).
7 Petals present, conspicuous
8 Flowers dangling; petals red, orange with yellow, or blue, spurred; [subfamily *Thalictroideae*]..... ***Aquilegia***
8 Flowers not dangling; petals yellow, not spurred; [subfamily *Ranunculoideae*, tribe *Ranunculeae*] ..... ***Ranunculus***
7 Petals absent or inconspicuous (soon deciduous or altered into a nectary-bearing clavate structure); sepals sometimes petaloid and conspicuous.
9 Sepals petaloid, conspicuous, white (or cream, rose, pink, or tinged with green).
10 Involucre absent, all leaves on the stem alternate; petaloid sepals 5, white; [subfamily *Thalictroideae*]..... ***Enemion***
10 Involucre of opposite or whorled, leaflike bracts present; petaloid sepals (4-) 5-20 (-30), white, cream, rose, or green.
11 Basal leaves with 3-5 leaflets, these toothed or incised; petaloid sepals white, cream, rose, or green; [subfamily *Ranunculoideae*, tribe *Anemoneae*]..
..... ***Anemone***
11 Basal leaves with > 5 leaflets; these with 0-3 rounded lobes at the tip; petaloid sepals white to pale pink; [subfamily *Thalictroideae*] .....
..... ***Thalictrum thalictroides***
9 Sepals absent, or inconspicuous in comparison to the stamens or pistils.
13 Inflorescence a raceme; [subfamily *Ranunculoideae*, tribe *Cimicifugeae*] ..... ***Actaea***
13 Inflorescence a panicle; [subfamily *Thalictroideae*]..... ***Thalictrum***

Key D

1 Fruit a follicle or capsular (or fleshy and berrylike in some *Actaea*).
2 Mature leaves > 4 dm wide; [subfamily *Ranunculoideae*, tribe *Cimicifugeae*]..... ***Actaea***
2 Mature leaves < 3 dm wide.
3 Leaflets linear; [aliens].
..... ***Delphinium***
3 Leaflets broad, rounded; [mostly natives].
6 Follicles 15-31 mm long, with beaks 7-18 mm long..... ***Aquilegia***
6 Follicles 3.5-6.5 mm long, with beaks 1.5-3 mm long..... ***Enemion***
1 Fruit an achene.
7 Leaves divided into numerous linear segments, all of which are < 1 mm wide.
8 Plant aquatic (if leaves divided into numerous linear segments); [subfamily *Ranunculoideae*, tribe *Ranunculeae*]..... ***Ranunculus***
8 Plant terrestrial.
..... ***Adonis***
7 Leaf segments rounded or cleft, > 1 mm wide.

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more)

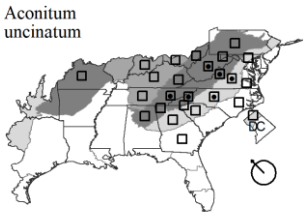
* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable

X : extirpated

10 Leaves cauline, opposite; [subfamily *Ranunculoideae*, tribe *Anemoneae*] ..... ***Clematis***
10 Leaves basal and/or cauline, cauline leaves (if present) alternate (leaflike involucral bracts sometimes present and opposite or whorled).
11 Leaflike involucral bracts present, opposite or whorled.
12 Achenes not ribbed or veined on lateral surfaces; leaf texture moderate to distinctly thick and leathery; [subfamily *Ranunculoideae*, tribe *Anemoneae*] .. ***Anemone***
12 Achenes conspicuously ribbed or veined on lateral surfaces; leaf texture thin, delicate; [subfamily *Thalictroideae*] ..... ***Thalictrum thalictroides***
11 Leaflike involucral bracts not present.
13 Leaflets 3-many, if many the leaflets typically with teeth, or sharp lobes; [subfamily *Ranunculoideae*, tribe *Ranunculeae*] ..... ***Ranunculus***
13 Leaflets many, unlobed or typically with 3-9 rounded lobes; [subfamily *Thalictroideae*] ..... ***Thalictrum***

Aconitum Linnaeus 1753 (MONKSHOOD, ACONITE)



A genus of about 300 species, herbs, of Eurasia, n. Africa, and North America. References: Brink & Woods (1997) in FNA3 (1997); Hardin (1964b); Jabbour & Renner (2011); Jabbour & Renner (2012); Jabbour (2011); Tamura in Kubitzki, Rohwer, & Bittrich (1993).

Aconitum uncinatum Linnaeus. EASTERN BLUE MONKSHOOD, APPALACHIAN BLUE MONKSHOOD. **Hab:** Seepages, saturated swamps, cove forests, other moist forests. **Dist:** C. MD and sw. PA south to e. VA, e. NC, wc. GA, and c. TN; disjunct in sc. MO (Yatskievych 2013). **Phen:** Aug-Oct. **Tax:** Two varieties or subspecies are sometimes recognized, but the character differences seem ambiguous, poorly correlated with one another, and geographically incoherent. A third eastern blue-flowered entity has been variously treated as an additional subspecies or variety of *A. uncinatum*, as a separate species, *A. noveboracense* A. Gray, or as disjunct populations of the otherwise more western *A. columbianum* Nuttall. **Syn:** = FNA3, Il, NE, Pa, RAB, S, Tn, Va, W; > *Aconitum uncinatum* Linnaeus ssp. *muticum* (A.P. de Candolle) Hardin – K1, K3, K4, Hardin (1964b); > *Aconitum uncinatum* ssp. *uncinatum* – K1, K3, K4, Hardin (1964b); > *Aconitum uncinatum* var. *acutidens* Fernald – F; > *Aconitum uncinatum* var. *muticum* A.P. de Candolle – C; > *Aconitum uncinatum* var. *uncinatum* – C, F.

Actaea Linnaeus 1753 (BANEBERRY)

A genus of about 28 species, perennial herbs, of temperate regions of the Northern Hemisphere. Compton, Culham, & Jury (1998) support the inclusion of *Cimicifuga* in *Actaea*, based on morphologic and molecular analyses. References: Compton, Culham, & Jury (1998); Ford (1997c) in FNA3 (1997); Park & Lee (1996); Ramsey (1987); Ramsey (1988); Ramsey (1997) in FNA3 (1997); Tamura in Kubitzki, Rohwer, & Bittrich (1993).

Identification Notes: In rich coves and other mesic Appalachian forests, *Actaea* often grows with a number of other herbs with similarly compound leaves, including *Astilbe* (Saxifragaceae), *Aruncus* (Rosaceae), *Caulophyllum* (Berberidaceae), *Angelica, Thaspium, Osmorrhiza,* and *Ligusticum* (Apiaceae), *Aralia* (Araliaceae), *Thalictrum* (Ranunculaceae), and others. The curious evolutionary convergence of leaf morphology (to a 2-3-ternately compound form) of a large number of unrelated genera of Appalachian cove forests is interesting.

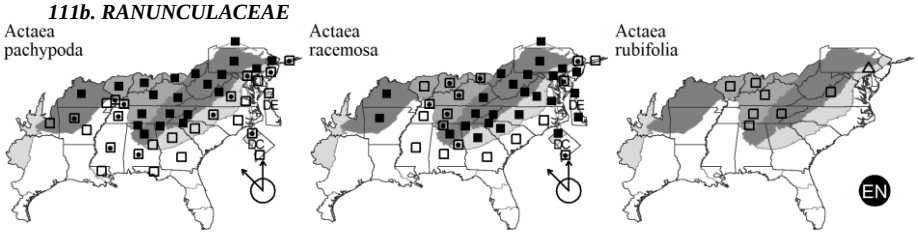
1 Terminal leaflet deeply cordate, mostly > 12 cm wide, with 7-9 major veins arising palmately from the base; principal leaves with 3-9 (-17) leaflets; [section *Oligocarpae*] ..... ***Actaea rubifolia***
1 Terminal leaflet broadly cuneate, rounded, truncate, or subcordate, mostly < 12 cm wide, with 3 major veins arising from the base; principal leaves with (15-) 20-70 leaflets.
3 Fruit dry, follicular, dehiscent; flowering May-Aug ..... ***Actaea racemosa***
3 Fruit fleshy, indehiscent; flowering Apr-May. ..... ***Actaea pachypoda***

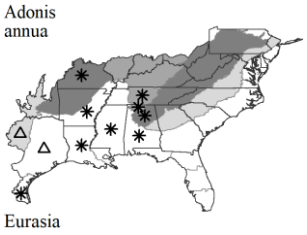
Actaea pachypoda Elliott. WHITE BANEBERRY, DOLLS'-EYES, WHITE COHOSH. **Hab:** Rich cove forests and slopes. **Dist:** QC and MN south to c. GA, FL Panhandle, s. AL, s. MS, e. LA, and OK. **Phen:** Mar-May; Jul-Oct. **Syn:** = Ar, F, FNA3, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, Tn, Va, W, WH3, Compton, Culham, & Jury (1998); = *Actaea alba* (Linnaeus) P. Miller – G, GrPl, S, probably misapplied. NatureServe G5 (Secure).

Actaea racemosa Linnaeus. COMMON BLACK-COHOSH, EARLY BLACK-COHOSH. **Hab:** Rich cove forests, other mesic and moderately to very fertile forests. **Dist:** Primarily Appalachian: w. MA south to SC and c. GA, but extending e. into the Coastal Plain and west to OH, IN, MO, and AR. **Phen:** May-Aug. **Tax:** Var. *dissecta* appears to be a sporadically occurring form, apparently always occurring in small numbers associated with typical material; McCoy (2004) reports its collection in NC. **Syn:** = Ar, K3, K4, Mi, NE, NY, Pa, Va; = *Cimicifuga racemosa* (Linnaeus) Nuttall – C, F, FNA3, Il, RAB, S, Tn, W; > *Actaea racemosa* Linnaeus var. *dissecta* (A. Gray) J. Compton – K1, Compton, Culham, & Jury (1998); > *Actaea racemosa* Linnaeus var. *racemosa* – K1, Compton, Culham, & Jury (1998); < *Cimicifuga racemosa* (Linnaeus) Nuttall – G, (also see C. rubifolia); >< *Cimicifuga racemosa* var. *cordifolia* (Pursh) Gray – F, misapplied in part; > *Cimicifuga racemosa* var. *racemosa* – F.

Actaea rubifolia (Kearney) Kartesz. APPALACHIAN BLACK-COHOSH. **Hab:** Rich cove forests over calcareous rocks (limestone or dolostone), westwards in shaded sandstone ravines. **Dist:** Sw. VA south to e. TN; disjunct in s. IL, w. KY, nw. TN, and nc. AL. **Phen:** Aug-Oct. **Tax:** *Actaea rubifolia* is related to *Actaea elata* (Nuttall) Prantl of nw. North America. **Comm:** This species is alleged by C (1991) to occur in NC, but this is probably an error, based on confusion with *Cimicifuga cordifolia* Pursh, now considered a form of *Actaea racemosa*. For this reason, the name *Actaea cordifolia* used by Compton, Culham, & Jury (1998) does not apply to this taxon. **Syn:** = K1, K3, K4, Va; = *Actaea cordifolia* A.P. de Candolle – Compton, Culham, & Jury (1998), misapplied; = *Cimicifuga rubifolia* Kearney – C, FNA3, Il, S, Tn, W; < *Cimicifuga racemosa* (Linnaeus) Nuttall – G; >< *Cimicifuga racemosa* var. *cordifolia* (Pursh) Gray – F, misapplied in part. NatureServe G3 (Vulnerable).

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated





Adonis Linnaeus 1753 (ADONIS)

A genus of about 26 species, annual and perennial herbs, of Eurasia. References: Parfitt (1997c) in FNA3 (1997); Tamura in Kubitzki, Rohwer, & Bittrich (1993).

* ***Adonis annua*** Linnaeus. AUTUMN ADONIS, BIRD'S-EYE, PHEASANT'S-EYE. **Hab:** Disturbed areas, formerly especially as a weed in grain fields. **Dist:** Native of Eurasia. Naturalized in n. AL and sc. TN (Parfitt in FNA 1997). **Phen:** (Late Mar-) Apr-Jun. **Syn:** = Ar, C, FNA3, G, K1, K3, K4, NcTx, Tx. NatureServe GNR (Not Yet Ranked).

Anemone Linnaeus 1753 (ANEMONE)

A genus of about 140-200 species (depending on circumscription), perennial herbs (rarely shrubs), of Eurasia, North America, Central America, South America, and Africa. The infrageneric classification shown in the key is that of Hoot, Meyer, & Manning (2012). References: Dutton, Keener, & Ford (1997) in FNA3 (1997); Ehrendorfer et al (2009); Hoot, Meyer, & Manning (2012); Hoot, Reznicek, & Palmer (1994); Jiang et al (2017); Keener, Dix, & Dutton (1996); Mlinarec et al (2011); Tamura in Kubitzki, Rohwer, & Bittrich (1993); Ziman et al (2004).

1 Basal leaves lobed but not fully divided into 3 or more leaflets; stem leaves either unlobed and borne immediately below the flower (easily mistakable as a calyx) or lobed and borne well below the flower.
..... ***Hepatica***

1 Basal leaves compound, fully divided into 3 or more leaflets; stem leaves lobed and borne well below the flower.
3 Stem branched, 4-11 dm tall, bearing 2 or more flowers; stem leaves petiolate; [subsection *Virginianae*].
..... ***Anemone virginiana var. virginiana***
3 Stem unbranched, 0.5-4 dm tall, bearing 1 flower; stem leaves sessile or petiolate.
6 Sepals (5-) 8-20, cream-white, violet, blue, pink, or green; stem leaves sessile; [subsection *Anemone*; series *Carolinianae*].
7 Stem densely pubescent above and below the stem leaves; stem leaves borne above the midpoint of the stem at anthesis; plant from a globose, vertically oriented bulb, lacking rhizomes; basal leaves 1-ternate, the 3 lobes sublobed or toothed, but not additionally divided; involucral leaves (1.5-) 3-6 cm long; achene bodies 2.7-3.5 mm long; achene beak sinuous, hidden in the achene indument ..... ***Anemone berlandieri***
7 Stem densely pubescent above the stem leaves, glabrous to very sparsely pubescent beneath the stem leaves; stem leaves borne at or below the midpoint of the stem at anthesis; plant with slender, horizontal rhizomes; basal leaves 1-3-ternate, the 3 primary lobes usually further divided into linear segments; involucral leaves 1-2.5 (-3) cm long; achene bodies 1.5-2.5 (-3.0) mm long; achene beak straight, extending out of the achene indument .....
..... ***Anemone caroliniana***
6 Sepals 5 (-8), white or bright yellow; stem leaves petiolate, the leaflets ovate, obovate, elliptic, lanceolate, or oblanceolate 2-8 cm long, 8-30 mm wide; [subsection *Anemonanthea*].
..... ***Anemone quinquefolia***

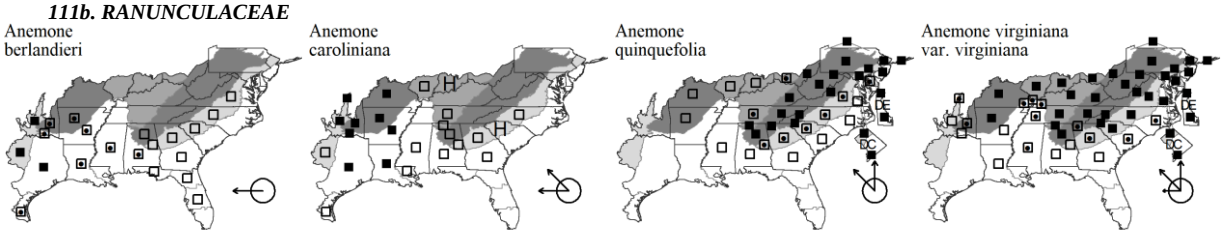
Anemone berlandieri Pritzel. EASTERN PRAIRIE ANEMONE, TEN-PETAL ANEMONE. **Hab:** Thin, circumneutral soils around rock outcrops, calcareous glades, calcareous hammocks (in FL), calcareous bluffs, chalk outcrops & thin-soiled black-belt prairies, lawns and mowed roadsides (over calcareous soils). **Dist:** *A. berlandieri* is primarily a species of midwestern prairies, occurring from n. AR and s. KS south through OK to c. LA and s. TX; disjunct eastward in AL, c. GA, n. FL, c. NC, c. SC, and sc. VA. It reaches its northeastern limit (and only VA occurrence) at calcareous mudstone cliffs on the Banister River (Pittsylvania County); it is scattered in the Piedmont of NC on a variety of rock types, including mafic meta-argillite and plagioclase-rich granite. **Phen:** (Late Feb-) Mar-Apr. **Tax:** *A. berlandieri* and *A. caroliniana* have been much confused in floras; see Joseph & Heimburger (1966) for clarification. **Syn:** = Ar, FNA3, GrPl, K1, K3, K4, NcTx, Va, WH3, Hoot, Meyer, & Manning (2012); < *Anemone caroliniana* Walter – C, F, G, RAB, S, W; > *Anemone heterophylla* Nuttall ex Torrey & Gray – Tx.

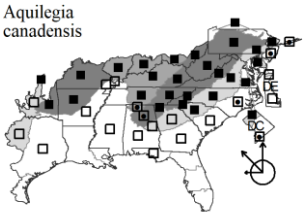
Anemone caroliniana Walter. PRAIRIE ANEMONE, CAROLINA ANEMONE. **Hab:** Clayey soils of post oak and blackjack oak woodlands (Iredell soils), calcareous glades and barrens, wet meadows. **Dist:** Wc. IN, n. IL, WI, MN, and SD south to s. LA and e. and c. TX; disjunct east of the Mississippi River in c. NC south to s. GA, and c. TN south to s. AL. **Phen:** (Late Feb-) Mar-May. **Syn:** = Ar, FNA3, GrPl, Il, K1, K3, K4, NcTx, Tn, Tx, Hoot, Meyer, & Manning (2012); < *Anemone caroliniana* Walter – C, F, G, RAB, S, W.

Anemone quinquefolia Linnaeus. WOOD ANEMONE. **Hab:** Rich, moist forests, grassy balds, often abundant at high elevations. **Dist:** NL, QC, ON, MB, SK, and AB south to SC, GA, AL, MS, AR, and ne. SD. **Phen:** Mar-May. **Syn:** = GrPl, Mi, Pa, RAB, S, W; = *Anemone quinquefolia* var. *quinquefolia* – Ar, FNA3, NE, NY, Tn, Va; < *Anemone quinquefolia* Linnaeus – Hoot, Meyer, & Manning (2012); > *Anemone quinquefolia* var. *bifolia* Farwell – C, G, K1, K2, K3, K4; > *Anemone quinquefolia* var. *interior* Fernald – F, G, Il; > *Anemone quinquefolia* var. *quinquefolia* – C, F, Il, K1, K2, K3, K4.

Anemone virginiana Linnaeus *var*. ***virginiana***. TALL ANEMONE, THIMBLEWEED. **Hab:** Rich forests and woodlands, prairies, especially prevalent on circumneutral soils. **Dist:** NL (Newfoundland), ME, s. ON, and SK, south to GA, AL, MS, LA, OK, and WY. **Phen:** May-Aug. **Tax:** Two other varieties are more northern; see discussion of var. *alba*. **Syn:** = Ar, C, FNA3, K1, K3, K4, Mi, NE, Va; = *Anemone virginiana* – F, G, GrPl, Hoot, Meyer, & Manning (2012); > *Anemone riparia* Fernald – S, misapplied; < *Anemone virginiana* – Il, NY, Pa, RAB, Tn, W; > *Anemone virginiana* – S. NatureServe G5T5 (Secure).

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated





Aquilegia Linnaeus 1753 (COLUMBINE)

A genus of about 80 species, perennial herbs, of the Northern Hemisphere. References: Munz (1946); Tamura in Kubitzki, Rohwer, & Bittrich (1993); Whittemore (1997c) in FNA3 (1997).

Identification Notes: When in leaf, somewhat easily mistaken for *Thalictrum* or *Enemion*; look for old fruits.

Aquilegia canadensis Linnaeus. CANADA COLUMBINE, EASTERN COLUMBINE. **Hab:** Forests, woodlands, rock outcrops, especially (though by no means entirely) on calcareous or mafic substrates. **Dist:** NS, QC, ON, MB, and SK south to Panhandle FL, s. AL, ne. MS (Tishomingo County), w. TN, c. AR, and se. OK; disjunct in Edwards Plateau of TX. **Phen:** Mar-Jun. **Tax:** Disjunct populations in the deep South, on limestone in sw. GA and FL Panhandle, have been described as *A. australis* or *A. canadensis* var. *australis*; they need additional study. **Comm:** One of our most familiar wildflowers. **Syn:** = Ar, C, FNA3, G, GrPl, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, Va, W, WH3; > *Aquilegia australis* Small – S; > *Aquilegia canadensis* Linnaeus – S; > *Aquilegia canadensis* var. *australis* (Small) Munz – Munz (1946); > *Aquilegia canadensis* var. *canadensis* – F, Munz (1946); > *Aquilegia canadensis* var. *coccinea* (Small) Munz – F, Munz (1946); > *Aquilegia canadensis* var. *latiuscula* (Greene) Munz – Tx, Munz (1946); > *Aquilegia coccinea* Small – S.

Clematis Linnaeus 1753 (CLEMATIS, VIRGIN'S-BOWER)

Contributed by Thomas Murphy, Zach Irick, Dwayne Estes, and Alan Weakley

A genus of about 295 species, shrubs, vines, and suffruticose herbs, of Eurasia, North America, South America, Africa, Madagascar, and Oceania. W.A. Weber (1995) proposed generic status (as *Coriflora* W.A. Weber) for the leatherflowers, here treated as *Clematis*, subgenus *Viorna*. References: Essig (1990); Estes (2006); Floden (2013); Keener (1967); Keener (1975); Keener (2017) in Weakley et al (2017); Krakowiak, Shelton, & Shaw (2019); Moreno & Essig (1997) in FNA3 (1997); Murphy (2020); Pringle (1971); Pringle (1997) in FNA3 (1997); Tamura in Kubitzki, Rohwer, & Bittrich (1993); Weber (1995).

Identification Notes: Additional species of *Clematis*, of Asian or European origin, are cultivated as ornamentals and might be encountered.

1 Flowers numerous, in compound cymose-paniculate inflorescences; sepals white; filaments glabrous; [subgenus *Clematis*].
  2 Flowers perfect, with 5-10 carpels; anthers 1.5-3 mm long; leaf margins entire (rarely cleft or with 1-2 rounded teeth or small lobes); leaflets (3-) 5 (-7), often variegated with a silver blaze along the midvein; [alien, in disturbed areas] ..... ***Clematis terniflora***
  2 Flowers mostly polygamo-dioecious, the pistillate with 18-60 carpels; anthers 0.5-1 mm long; leaf margins coarsely toothed with acute teeth; leaflets 3 (*C. virginiana*) or 5-7 (*C. catesbyana*), uniformly green; [native, though sometimes weedy].
    4 Leaves (3-) 5-7-foliolate; pistillate flowers with 18-35 carpels ..... ***Clematis catesbyana***
    4 Leaves 3-foliolate; pistillate flowers with 40-60 carpels ..... ***Clematis virginiana***
1 Flowers solitary or in groups of 3's; sepals usually at least partly bluish, purplish or red; filaments pubescent.
  13 Lower surface of leaves glaucous and glabrous (rarely with a few scattered hairs).
    15 Leaf blade thin in texture; secondary and tertiary veins impressed rather than raised on the upper leaflet surface ..... ***Clematis glaucophylla***
    15 Leaf blade leathery in texture; secondary and tertiary veins forming a prominently raised reticulum on the upper leaflet surface. ..... ***Clematis versicolor***
  13 Lower surface of leaves not glaucous, pubescent (rarely nearly glabrous).
    18 Plants erect, to 2-3 (-5) dm tall, forming clonal patches by underground rhizomes; leaflets linear-lanceolate, averaging ca. 10× as long as wide ..... ***Clematis socialis***
    18 Plants viny, sprawling or climbing, the stems usually over 1 m long, not rhizomatous-clonal; leaflets generally broader.
      19 Leaves coriaceous, the secondary and tertiary veins forming prominent reticulations on the upper surface.
        20 Leaf blade coarsely reticulate-veined, the ultimate closed areoles often > 2 mm long in the longer dimension, the tertiary and quaternary veins not prominently raised; achene beak sparsely pubescent to silky, with ascending or appressed hairs ..... ***Clematis pitcheri var. pitcheri***
        20 Leaf blade finely reticulate-veined, the ultimate closed areoles mostly < 2 mm long in the longest dimension, the tertiary and quaternary veins often prominently raised; achene beak plumose, with spreading hairs ..... ***Key A***
      19 Leaves membranous to subcoriaceous, the secondary and tertiary veins forming faint, indistinct reticulations on the upper surface.
        21 Sepals 2.5-5 cm long, the tips widely spreading, the upper margins thin, crisped, expanded (to 6 mm wide); sepal surfaces glabrous; [widespread, but mainly Coastal Plain] ..... ***Clematis crispa***
        21 Sepals XX-YY cm long, the tips reflexed, the upper margins thick, not expanded; sepal surcaes glabrous to variously hairy; [widespread, but especially inland provinces].
          22 Principal leaves at mid-stem mostly pinnate, pubescent, slightly coriaceous with raised secondary and tertiary veins; inflorescence solitary in leaf axils, or cymose paniculate (1-3 flowered); sepals rarely solidly colored, sepals light pink, white, or bicolored; fruit compact; achene body orbicular in outline, the achene tails short recurvate; [open habitats (glades, barrens, blackbelt prairie remnants) over limestone] ..... ***Key B***
          22 Principal leaves at mid-stem pinnately trifoliate, glabrous or glaucescent, membranous without raised secondary or tertiary veins; inflorescence solitary, terminal, or cymose-paniculate (3-7 flowered); sepals cherry red, magenta pink, or dusky purple; fruit less compact; achene body elliptical in outline, the achene tails long recurvate; [forested systems, forest/woodland ecotones, and grasslands] ..... ***Clematis species 8***

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Key A - *Clematis reticulata* complex

3 Leaflets distinctly coriaceous with dense network of raised reticulate venation, average areole area small, (0.19-) 0.37-0.44 (-0.84) mm2; widest adaxial leaflet veins (not including mid-vein) (0.09-) 0.13-0.15 (-0.28) mm wide; leaflet apices usually rounded to broadly acute; sepal trichomes short with longest trichomes (0.27-) 0.32-0.39 (-0.47) mm long; achene rim (sum of both ends) to achene width ratio (0.22-) 0.26-0.32 (-0.38); [lower Coastal Plain of AL, FL, GA, MS, SC] ..... ***Clematis reticulata***

3 Leaflets distinctly membranaceous to subcoriaceous, average areole area large (0.36-) 0.61-0.94 (-2.69) mm2, raised reticulate venation forming a sparsely concentrated network; widest adaxial leaflet veins (not including mid-vein) (0.04-) 0.07-0.09 (-0.14) mm wide; leaflet apices acute to acuminate, rarely rounded; sepal trichomes puberulent with longest trichomes (0.45-) 0.52-0.66 (-0.84) mm long; achene rim (sum of both ends) to achene width ratio (0.30-) 0.32-0.46 (-0.50); [n. and c. AL (mostly north of the Alabama River), wc. GA, ne. MS, and extreme sc. TN] ..... ***Clematis species 5***

Key B - *Clematis flaccida* complex

2 Inflorescence long arcuate, the flowers arching above the stem; foliose bracts positio 1/4 to 1/2 of the peduncle length from the junction of the stem base; secondary and tertiary leaf veins never raised ..... ***Clematis species 11***

2 Inflorescence short-pendulous, the flowers hanging below the stem; foliose bracts positioned at the base of the peduncle; secondary and tertiary leaf veins raised.

3 Lower leaf surface and sepal exteriors densely pubescent with villous and sericeous hairs; sepal exterior COLOR; pubescence entirely covering the epidermal tissue space between the raised secondand tertiary veins; [endemic to limestone escarpment barrens of the Cumberland Plateau of ne. AL, nw. GA, and TN] ..... ***Clematis morefieldii***

3 Lower leaf surface and sepal exteriors sparsely villous; sepal exterior magenta pink; pubescence absent between the secondary and tertiary veins; [endemic to prairie remnants of the Black Belt of AL] ..... ***Clematis species 6***

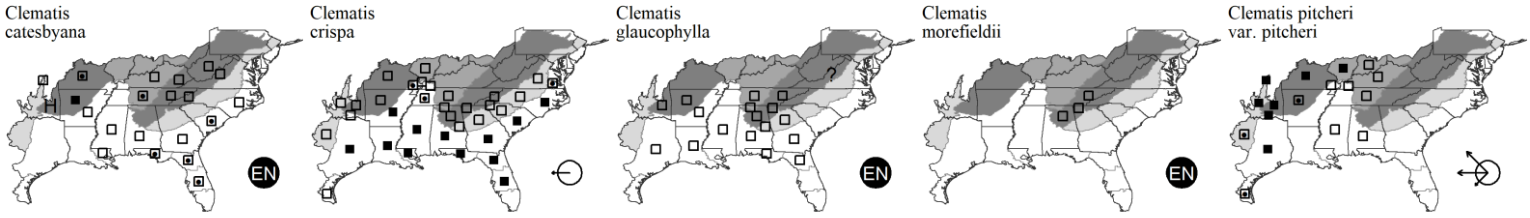
Clematis catesbyana Pursh. COASTAL VIRGIN'S-BOWER, SATIN-CURLS. **Hab:** Dunes and interdune swales with abundant shell hash, calcareous woodlands, thickets, and glades, calcareous hammocks. **Dist:** Se. VA south to c. peninsular FL and west to LA, and inland especially in calcareous parts of c. KY, c. TN and n. AR and s. MO, as well as in the Ridge and Valley of VA and disjunct at Linville Caverns, McDowell County, NC, where on dolomite in a geologic window in the Blue Ridge. **Phen:** Jun-Sep. **Syn:** = Ar, C, Fl2, FNA3, GW2, K1, K3, K4, Tn, Va, WH3; > *Clematis catesbyana* Pursh – S; < *Clematis ligusticifolia* Nuttall ex Torrey & A. Gray – RAB, misapplied; > *Clematis micrantha* Small – S.

Clematis crispa Linnaeus. MARSH CLEMATIS, SOUTHERN LEATHERFLOWER, SWAMP LEATHERFLOWER, BLUE JASMINE. **Hab:** Marshes, tidal and non-tidal swamps, floodplain forests, disturbed wet or moist areas. **Dist:** FL to TX, north to se. VA and s. IL. **Phen:** Apr-Aug (-Sep). **Syn:** = Ar, C, F, Fl2, FNA3, G, GW2, Il, K1, K3, K4, NcTx, RAB, Tn, Va, W, WH3; = *Coriflora crispa* (Linnaeus) W.A. Weber – Weber (1995); = *Viorna crispa* (Linnaeus) Small – S; > *Clematis crispa* var. *crispa* – Tx; > *Clematis crispa* Linnaeus var. *walteri* A. Gray – Tx. NatureServe G5 (Secure).

Clematis glaucophylla Small. WHITE-LEAVED LEATHERFLOWER. **Hab:** Dry rocky river bluffs, scrub-shrub over xeric alluvial deposits and fluvial sand ridges, wet hammocks (FL). **Dist:** Widespread in Southeastern United States, from se. TN and OK, south to FL Panhandle, LA, and TX, but apparently rare and poorly known. Previous attributions of this species for NC, SC, KY, and (perhaps) VA appear to be based on misidentifications. **Phen:** May-Sep. **Syn:** = Ar, C, F, Fl2, FNA3, G, GW2, K1, K3, K4, RAB, Tn, Tx, WH3, Estes (2006); = *Coriflora glaucophylla* (Small) W.A. Weber – Weber (1995); = *Viorna glaucophylla* (Small) Small – S. NatureServe G4? (Apparently Secure).

Clematis morefieldii Kral ex B.R. Keener. MOREFIELD'S LEATHERFLOWER, HUNTSVILLE VASEVINE. **Hab:** On vertical limestone exposures, along seasonal washes in open calcareous woodlands. **Dist:** Endemic to nc. AL, se. TN, and nw. GA. **Phen:** Jun. **Tax:** See Estes & Fleming (2006) for additional information, and B. Keener (2017) for nomenclatural details. **Syn:** = FNA3, K1, K3, K4, Tn, Keener (2017) in Weakley et al (2017). NatureServe G2 (Imperiled); USESA E.

Clematis pitcheri Torrey & A. Gray *var*. ***pitcheri***. BELLFLOWER LEATHERFLOWER. **Hab:** Limestone glades and barrens. **Dist:** IN, IL, IA, and e. NE south to w. KY, c. TN, ne. MS, AR, TX, and NM. **Phen:** Apr-Oct. **Tax:** Var. *dictyota* (Greene) W.M. Dennis occurs in w. TX and s NM south to n. Mexico. **Syn:** = Ar, FNA3, K1, K3, K4; < *Clematis pitcheri* – GrPl, Il, NcTx, Tn, Tx, Tx; < *Coriflora pitcheri* (Torrey & A. Gray) W.A. Weber – Weber (1995); < *Viorna pitcheri* (Torrey & A. Gray) Britton – S. NatureServe G4G5TNR (Not Yet Ranked).



Clematis reticulata Walter. NETLEAF LEATHERFLOWER. **Hab:** Dry, sandy woodlands, such as longleaf pine sandhills and dry hammocks. **Dist:** Se. SC south to c. peninsular FL, west to s. MS. **Phen:** (Late Apr-) May-mid Jul (-Sep). **Syn:** < *Clematis reticulata* Walter – Fl2, FNA3, K1, K3, K4, RAB, Tx, WH3; < *Coriflora reticulata* (Walter) W.M. Weber – Weber (1995); < *Viorna reticulata* (Walter) Small – S.

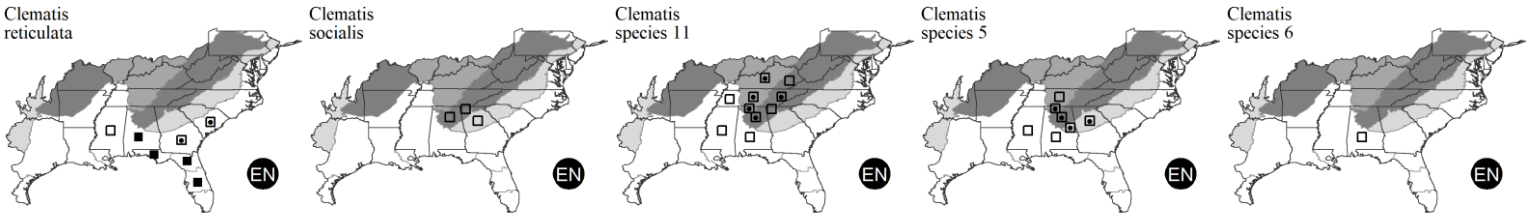
Clematis socialis Kral. ALABAMA LEATHERFLOWER. **Hab:** Wet calcareous flatwoods. **Dist:** Nw. GA (Floyd Co.) and ne. AL (St. Clair and Cherokee counties). Recently discovered in Piedmont of GA (the population needing additional study). **Tax:** Timmerman-Erskine & Boyd (1999) report on reproductive ecology of this endangered species; Goertzen & Boyd (2007) on its genetic diversity. **Syn:** = FNA3, K1, K3, K4. NatureServe G1 (Critically Imperiled); USESA E.

Clematis species 11. **Syn:** = *Viorna flaccida* (Small) Small – S; < *Clematis viorna* Linnaeus – C, F, FNA3, G, K1, K3, K4, Tn.

Clematis species 5. ALABAMA LEATHERFLOWER. **Hab:** Rocky pine-oak woodlands, montane longleaf pine savannas, sandstone river-scour shrublands, xeric sandstone outcrop and glades, sandy bluffs and river banks. **Dist:** Sc. TN, ne. MS, c. and n. AL, and wc. GA. **Phen:** Late Apr-mid Jun. **Tax:** See Murphy (2020). **Syn:** = *Viorna subreticulata* Harbison ex Small – S; < *Clematis reticulata* Walter – FNA3, K1, K3, K4; < *Coriflora reticulata* (Walter) W.M. Weber – Tn, Weber (1995).

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Clematis species 6. BLACKBELT LEATHERFLOWER. **Hab:** Blackbelt prairies. **Dist:** Blackbelt region of AL. **Syn:** < *Clematis viorna* Linnaeus – FNA3, K1, K3, K4.

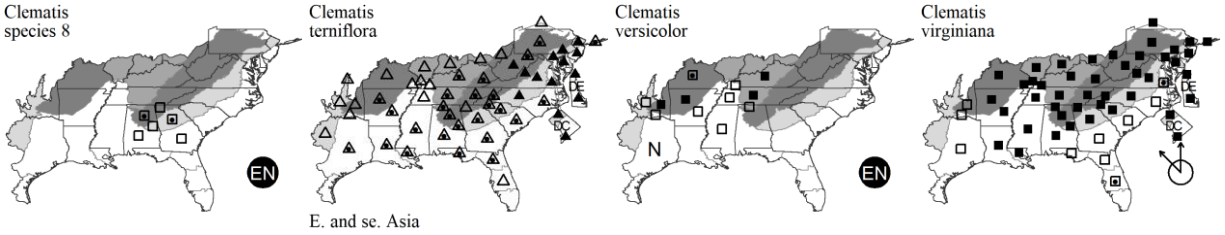


Clematis species 8. WARE'S LEATHERFLOWER. **Dist:** GA and AL. **Syn:** < *Clematis viorna* Linnaeus – FNA3, K1, K3, K4.

* ***Clematis terniflora*** A.P. de Candolle. SWEET AUTUMN CLEMATIS, YAM-LEAVED CLEMATIS, "CLEMATHY-VINE". **Hab:** Disturbed areas. **Dist:** Native of e. Asia (Japan, China, Korea). **Phen:** Jul-Oct (-Dec). **ID Notes:** The leaflets are often variegated, with whitish-green blazes along the main veins. **Syn:** = Ar, C, Fl2, FNA3, GrPl, GW2, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, Tn, Va, W, WH3; >< *Clematis dioscoreifolia* Léveillé & Vaniot – RAB, Tx, misapplied; > *Clematis dioscoreifolia* Léveillé & Vaniot var. *robusta* Carrière & Rehder – F; ? *Clematis paniculata* Thunberg – S. NatureServe GNR (Not Yet Ranked).

Clematis versicolor Small ex Rydberg. PALE LEATHERFLOWER. **Hab:** Rocky, calcareous woodlands, bluffs, and cliffs. **Dist:** Sc. KY, c. TN, nc. AL (Barger et al. 2019); Ozarks and Ouachitas of s. MO, n. and c. AR, and e. OK. Records from e. TX and e. TN are misidentifications. **Phen:** May-Aug. **Syn:** = Ar, FNA3, K1, K3, K4, Tn, Tx, Estes (2006); = *Coriflora versicolor* (Small ex Rydberg) W.A. Weber – Weber (1995); = *Viorna versicolor* (Small ex Rydberg) Small – S. NatureServe G4? (Apparently Secure).

Clematis virginiana Linnaeus. VIRGIN'S-BOWER. **Hab:** In a wide variety of moist forests, thickets, and openings. **Dist:** Nova Scotia, ON, and MB, south to wc. peninsular FL and TX. **Phen:** Jul-Sep. **ID Notes:** Vegetatively, this species can be distinguished from *C. viorna* and *C. crispa* (the other common and widespread species in our area) by its leaves with three relatively symmetrical leaflets (vs. leaves with 3-many irregular leaflets). **Syn:** = Ar, C, F, Fl2, FNA3, GrPl, GW2, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3; ? *Clematis virginiana* var. *virginiana* – G. NatureServe G5 (Secure).



Delphinium Linnaeus 1753 (LARKSPUR)

A genus of about 360 species, annual and perennial herbs, of Eurasia, Africa, and North America. Jabbour & Renner (2011a, 2011b, 2012) show convincingly that *Consolida* should be included in *Delphinium*. References: Jabbour & Renner (2011); Jabbour & Renner (2012); Jabbour (2011); Kral (1976); Tamura in Kubitzki, Rohwer, & Bittrich (1993); Warnock (1995); Warnock (1997a) in FNA3 (1997); Warnock (1997b) in FNA3 (1997).

1 Annual; pistil 1; petals 2, connate; leaf lobes < 1.5 mm wide; [section *Consolida*]; [aliens].
..... ***Delphinium ajacis***

1 Perennial; pistils 3 (-5); petals 4, separate; leaf lobes > 0.5 mm wide; [natives].
6 Follicles divergent; inflorescence a raceme or divergently branched panicle, 0.5-2 (-3) dm long; flowering plants 2-9 (-13) dm tall; flowering Mar-early Jul; [section *Diedropetala*; subsection *Grumosa*].
9 Stems (4.5-) 6-9 (-13) dm tall; flowers (sepals) deep blue; lower stem pubescent; [in sunny or semi-sunny situations, apparently endemic to n. AL] .....
..... ***Delphinium alabamicum***
9 Stems 2-6 dm tall; flowers (sepals) deep bluish purple, pink, or white; lower stem glabrous or nearly so; [usually in deep shade, widespread in our area] .....
..... ***Delphinium tricorne***
6 Follicles erect; raceme > 3 dm long; flowering plants 5-20 dm tall; flowering May-Sep.
11 Basal leaves absent at anthesis; flowers (sepals) blue to purplish (rarely white); stems (3-) 6-10 (-15) dm tall; blade of midstem leaves not distinctly 3-parted, the ultimate segments 12-25 in number, 0.5-1.5 mm wide..... ***Delphinium carolinianum ssp. carolinianum***
11 Basal leaves usually present at anthesis; flowers (sepals) blue or white; stems 2-8 (-10) dm tall; blade of midstem leaves distinctly 3-7-parted (and then usually additionally divided), the ultimate segments 3-15 in number, 2-10 mm wide.
..... ***Delphinium carolinianum ssp. calciphilum***

* ***Delphinium ajacis*** Linnaeus. ROCKET LARKSPUR, GARDEN LARKSPUR. **Hab:** Roadsides, fields, waste places, disturbed ground. **Dist:** Native of Europe. **Phen:** May-Sep. **Syn:** = F, G, GrPl, NY, RAB, S, Tx, WV; = *Consolida ajacis* (Linnaeus) Schur – Ar, FNA3, Il, K3, K4, Mi, NcTx, NE, Pa, Tn, Va, WH3; = *Consolida ambigua* (Linnaeus) P.W. Ball & Heywood in Heywood & P.W. Ball – W; = *Delphinium ambiguum* Linnaeus – C. NatureServe GNR (Not Yet Ranked).

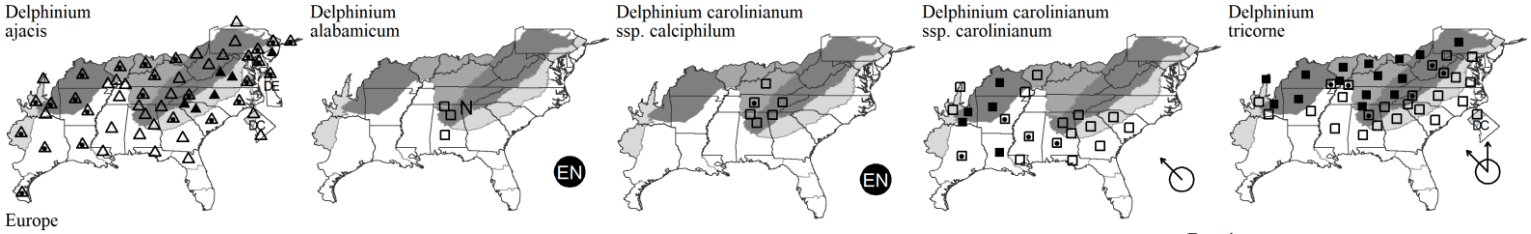
Delphinium alabamicum Kral. ALABAMA LARKSPUR. **Hab:** Limestone prairies and glades. **Dist:** Endemic to c. and n. AL and (allegedly) nw. GA (but see Delphinium species 1). **Phen:** Apr-May. **Syn:** = FNA3, K1, K3, K4.

Delphinium carolinianum Walter *ssp. calciphilum* M.J. Warnock. GLADE LARKSPUR, LIMESTONE LARKSPUR, TENNESSEE LARKSPUR. **Hab:** Limestone glades and barrens. **Dist:** KY south through e. and c. TN to ne. AL and nw. GA. **Syn:** = FNA3, K1, K3, K4, Tn; < *Delphinium carolinianum* Walter – S; < *Delphinium carolinianum* var. *carolinianum* – F; < *Delphinium virescens* Nuttall – C, G; < *Delphinium virescens* Nuttall var. *virescens* – Kral (1976).

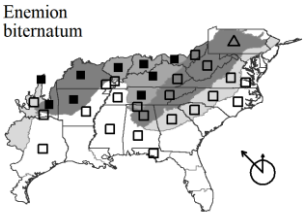
Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Delphinium carolinianum Walter *ssp.* ***carolinianum***. OZARK LARKSPUR, PRAIRIE LARKSPUR, CAROLINA LARKSPUR, BLUE LARKSPUR. **Hab:** Rocky woodlands, granite outcrops, Altamaha Grit outcrops, blackland prairies, calcareous glades, moist sandy woodlands associated with longleaf pine. **Dist:** IL west to e. KS, south to LA and TX, with disjunct occurrences eastward in SC, GA, AL, Panhandle FL (Gadsden County), and MS; questionably reported for c. TN. The flowers are a pale to medium blue. This species has been reported for NC (by C) and 'north to Va.' (by F and S). I know of no documentation for its past or present occurrence in NC or VA, but its presence in those states is plausible. **Phen:** (Apr-) May-Jul. **Syn:** = Ar, FNA3, Il, K1, K3, K4, NcTx, Tn; = *Delphinium carolinianum* Walter – C, G, GrPl, WH3, Kral (1976); < *Delphinium carolinianum* Walter – S, Tx; < *Delphinium carolinianum* var. *carolinianum* – F. NatureServe G5T5 (Secure).

Delphinium tricorne Michaux. DWARF LARKSPUR. **Hab:** Rich, moist forests, especially over mafic or calcareous rocks, less commonly (as along the Roanoke River in ne. NC) on very fertile alluvial deposits, moist prairies. **Dist:** Sw. PA and MN south to NC, nw. GA, AL, and OK. **Phen:** Mar-May. **Comm:** The flowers are variable in color, usually a deep bluish violet, but ranging through pink to pure white. **Syn:** = Ar, C, F, FNA3, G, GrPl, Il, K1, K3, K4, Pa, RAB, S, Tn, Va, W, WV, Kral (1976). NatureServe G5 (Secure).



Enemion Rafinesque 1820 (ISOPYRUM)

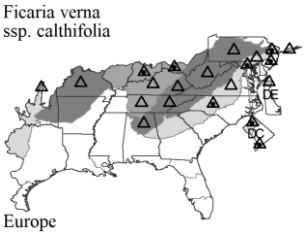


A genus of about 6 species, perennial herbs, of temperate North America and e. Asia. The issue of the separation of the genus *Enemion* from *Isopyrum* remains somewhat controversial; I here follow Keener (1977), Tamura (1993), and Ford (1997). References: Ford (1997g) in FNA3 (1997); Keener (1977); Tamura in Kubitzki, Rohwer, & Bittrich (1993).

Identification Notes: *Enemion* is somewhat superficially similar to the more common and widespread (in the Flora area) *Thalictrum thalictroides*, with which it also sometimes grows, but can be distinguished by the following characters: stem leaves 1-4 and alternate (vs. stem leaves 2 and opposite), fruit an aggregate of follicles (vs. fruit an aggregate of achenes), petaloid sepals 5 (vs. 5-10, usually some at least of the flowers on a plant with 6 or more), leaflets deeply lobed, at least some of the leaflets on a plant with sinuses at least 1/3 as long as the leaflet (vs. leaflets shallowly lobed, the notches < 2 mm long).

Enemion biternatum Rafinesque. ISOPYRUM, FALSE RUE-ANEMONE. **Hab:** Rich forests, either on natural levees with very nutrient rich sediments or on slopes with underlying mafic rocks. **Dist:** Mainly west of the Appalachians, W. NY, s. ON and MN south to TN, ne. MS (Tishomingo County), and AR; disjunct east and south of the Blue Ridge in VA, NC, SC, the FL Panhandle, and s. AL. Buckingham, Singhurst, & Paez (2020) discussed its distribution in Texas. **Phen:** (Jan-) Mar-Apr; May. **Syn:** = Ar, FNA3, Il, K1, K3, K4, Mi, NY, Tn, Va, WH3; = *Isopyrum biternatum* (Rafinesque) Torrey & Gray – C, F, G, GrPl, RAB, S, Tx. NatureServe G5 (Secure).

Ficaria Schaeffer 1760 (LESSER CELANDINE)



A genus of about 5 species, herbs, of Europe west to c. Asia. Best treated as a genus separate from *Ranunculus*, based on morphology and molecular phylogenetics; *Myosurus* is (for instance) more closely related to *Ranunculus* than is *Ficaria* (Paun et al. 2005; Emadzade et al. 2010). Post et al. (2009) analyze the presence in North America of the various infrataxa recognized in Europe and find evidence that all are naturalizing. The species is reported to be developing into a seriously invasive species in ne. United States and adjacent Canada (Axtell, DiTommaso, & Post 2010) and increasingly as well in at least the more northern or montane parts of our area. References: Banfi, Galasso, & Soldano (2011); Emadzade et al (2010); Paun et al (2005); Sell (1994); Stace (2010); Tamura in Kubitzki, Rohwer, & Bittrich (1993); Whittemore (1997a) in FNA3 (1997).

Identification Notes: When in flower, *Ficaria* is sometimes confused with the superficially similar *Caltha*. *Ficaria* has both yellow petals and (usually 3) green (or greenish yellow) sepals, whereas *Caltha* has only yellow sepals and no green (sepaloid) structures. The yellow petals of *Ficaria* are oblong, > 2× as long as wide, whereas the yellow petaloid sepals of *Caltha* are broadly ovate, obovate, or orbicular, < 1.5× as long as wide. *Ficaria* has entire leaves, while *Caltha* has a strongly toothed leaf margin. The utility of attempting to recognize the multiple European subspecies in the United States is questionable.

* ***Ficaria verna*** Hudson *ssp.* ***calthifolia*** (Reichenbach) Nyman. **Hab:** Disturbed rich forests and bottomlands, mesic suburban forests, lawns, naturalized locally from horticultural plantings. **Dist:** Native of ec. and se. Europe. Naturalized in the US in CT, DE, DC, IL, KY, MD, MA, MI, MO, NJ, NY, OH, OR, PA, TN, VA, WA, WV, WI (Post et al. 2009). **Syn:** = *Ficaria calthifolia* Reichenbach – Banfi, Galasso, & Soldano (2011); = *Ranunculus ficaria* Linnaeus ssp. *calthifolius* (Reichenbach) Arcangeli – Sell (1994); < *Ficaria verna* – Mi, NY, Va; < *Ficaria verna* Hudson ssp. *calthifolia* (Reichenbach) Nyman – K4; < *Ranunculus ficaria* Linnaeus – C, F, FNA3, G, Pa, Tn, WV; < *Ranunculus ficaria* ssp. *bulbifer* Lambinon; < *Ranunculus ficaria* var. *bulbifera* Marsden-Jones – K1, K3.

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

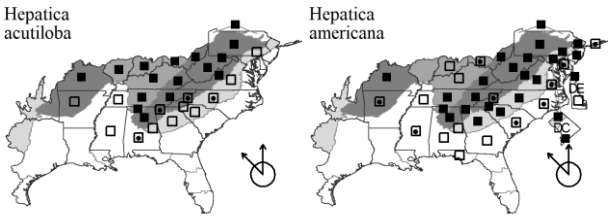
Hepatica P. Miller 1754 (HEPATICA, LIVERLEAF)

A genus of 7-12 species, perennial herbs, of Eurasia and e. North America. Although Hoot, Meyer, & Manning (2012), Hoot, Reznicek, & Palmer (1994), and others argued that *Hepatica* should be included in *Anemone*, a series of later papers cast doubt on that course; it now seems best to leave (or return) *Hepatica* to generic rank, pending additional research. References: Dutton, Keener, & Ford (1997) in FNA3 (1997); Hoot, Meyer, & Manning (2012); Jiang et al (2017); Steyermark & Steyermark (1960).

1 Leaves 3 (-7) lobed, the lobes acute, the primary sinuses deep, over halfway to the petiole (the middle lobe 70-90% as long as the total length of the leaf blade); involucral bracts acute ..... ***Hepatica acutiloba***
1 Leaves 3-lobed, the lobes broadly rounded, the primary sinuses less deep, about halfway to the petiole (the middle lobe 50-70% as long as the total length of the leaf blade); involucral bracts obtuse ..... ***Hepatica americana***

Hepatica acutiloba A.P. de Candolle. SHARP-LOBED HEPATICA, SHARP-LOBED LIVERLEAF. **Hab:** Moist forests, especially over calcareous or mafic rocks. **Dist:** ME, s. QC, s. ON, and MN south to SC, AL, MS (Tishomingo County), and AR. **Phen:** (Late Jan-) Mar-Apr. **Tax:** See comments under *H. americana* about the taxonomy of our two taxa of *Hepatica*. **Syn:** = C, F, G, Il, Mi, NY, RAB, Tn, W, WV, Jiang et al (2017); = *Anemone acutiloba* (A.P. de Candolle) G. Lawson – Ar, FNA3, NE, Pa, Va, Hoot, Meyer, & Manning (2012); = *Hepatica acuta* (Pursh) Britton – S; = *Hepatica nobilis* P. Miller var. *acuta* (Pursh) Steyermark – K1, K3, K4, Steyermark & Steyermark (1960). NatureServe G5T5 (Secure).

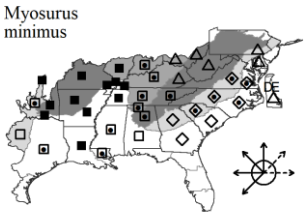
Hepatica americana (A.P. de Candolle) Ker Gawler. ROUND-LOBED HEPATICA, ROUND-LOBED LIVERLEAF. **Hab:** Moist forests. **Dist:** NS, s. QC, s. ON, and MB south to Panhandle FL, AL, MS, and AR. **Phen:** (Jan-) Feb-May. **Tax:** The two North American taxa of *Hepatica* seem entirely distinct in our region; they have sometimes been described as hybridizing freely or merging indistinguishably, but this seems inaccurate. They are also both related to the European *H. nobilis* P. Miller. Steyermark & Steyermark (1960) chose to treat the three entities as varieties of *H. nobilis*; I prefer to retain them at the specific level, a position also carefully supported by Yatskievych (2013). **Syn:** = C, F, G, Il, Mi, NY, RAB, Tn, W, WV, Jiang et al (2017); = *Anemone americana* (A.P. de Candolle) H. Hara – Ar, FNA3, NE, Pa, Va, WH3, Hoot, Meyer, & Manning (2012); = *Hepatica nobilis* P. Miller var. *obtusa* (Pursh) Steyermark – K1, K3, K4, Steyermark & Steyermark (1960); < *Hepatica hepatica* (Linnaeus) Karsten – S. NatureServe G5T5 (Secure).



Myosurus Linnaeus 1753 (MOUSETAIL)

A genus of about 15 species, annual scapose herbs, nearly cosmopolitan (lacking in e. Asia and tropical regions), with a center of diversity in w. North America. References: Campbell (1952); Emadzade et al (2010); Tamura in Kubitzki, Rohwer, & Bittrich (1993); Whittemore (1997b) in FNA3 (1997).

Identification Notes: The tremendously elongated receptacle of the flower is easily mistaken for a spikelike inflorescence (such as of *Plantago*).



Myosurus minimus Linnaeus. MOUSETAIL. **Hab:** Usually in disturbed areas, such as fields in floodplains. **Dist:** The species is circumboreal and also found in various places in the Southern Hemisphere. **Phen:** Mar-May. **Tax:** A number of subspecies have been described; if these are recognized, our material in eastern North America is the typic ssp. *minimus*. **Comm:** Widely distributed in North America, Eurasia, and the Southern Hemisphere. The pre-Columbian occurrence of *Myosurus* in parts of our area (such as the Coastal Plain and Piedmont of the Atlantic states) is uncertain; it may well be an alien, early introduced from more western parts of se. North America. The plant is a winter annual, sprouting from seed in the fall, overwintering as a rosette, and flowering in early spring. **Syn:** = Ar, C, F, FNA3, G, GrPl, GW2, Il, K1, K3, Mi, NcTx, NE, NY, RAB, S, Tn, Tx, Va; = *Ranunculus minimus* (Linnaeus) E.H.L. Krause – K4; > *Myosurus minimus* ssp. *minimus* – Campbell (1952).

Ranunculus Linnaeus 1753 (BUTTERCUP, CROWFOOT, SPEARWORT)

A genus of about 550 species, perennial and annual herbs, nearly cosmopolitan (most diverse in temperate and boreal regions of the Northern Hemisphere), here following the circumscription of Emadzade et al. (2010), with removal of numerous small genera more closely related to *Myosurus* and *Trautvetteria*. Subgeneric and sectional taxonomy follows Hörandl & Emadzade (2012). In the *R. hispidus* complex, I follow Duncan's (1980) taxonomic entities, though recognizing some of his varieties as species; distributions given in many works for the *R. hispidus* complex are apparently garbled by differences in taxonomic concepts. References: Duncan (1980); Emadzade et al (2010); Haines (2007b); Hörandl & Emadzade (2012); Keener & Hoot (1987); Keener (1976); Paun et al (2005); Tamura in Kubitzki, Rohwer, & Bittrich (1993).; Whittemore (1997a) in FNA3 (1997); Wiegleb, Bobrov, & Zalewska-Gałosz (2017).

Identification Notes: Mature or relatively mature achenes are necessary for the identification of some species. Shape and pubescence of the receptacle is also a frequently used taxonomic character, best judged by stripping off the achenes.

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

1 Petals dull, white; achenes roughly transverse-ridged; plants aquatic, the leaves finely dissected to merely shallowly lobed; [native, occurring in circumneutral waters]; [subgenus *Auricomus*; section *Batrachium*] ..... ***Ranunculus longirostris***
1 Petals shiny, yellow (sometimes fading or bleaching to whitish); achenes usually not transverse-ridged (though often variously ornamented); plants aquatic or terrestrial, the leaves various; [native or introduced, occurring in various habitats].
2 Cauline leaves all simple, mostly lanceolate, either entire, denticulate, or serrate, but not lobed or deeply divided; [native, occurring in marshes or other wetlands]; [subgenus *Auricomus*; section *Flammula*] ..... ***Key B***
2 Cauline leaves (at least most them) lobed, divided, or compound; [native or introduced, occurring in various habitats].
3 Basal leaves not divided, mostly cordate, reniform, or ovate (and merely toothed), distinctly unlike the deeply divided cauline leaves; achenes turgid, ovoid, 1-2.5 mm long, without pronounced marginal rims; petals 1.5-6.5 mm long; [native, occurring in mesic to dry forests and woodlands, and also (especially *R. abortivus*) weedy]; [subgenus *Auricomus*; section *Auricomus*] ..... ***Key C***
3 Basal leaves mostly deeply parted or compound, the cauline leaves generally similar but smaller and often less divided; achenes various, 1-5 mm long, with or without pronounced marginal rims; petals 2-15 mm long; [native or introduced, occurring in various habitats].
4 Achenes markedly spiny, papillose, or tuberculate (the protuberances few and small in *R. sardous*, keyed both here and below); [introduced, usually weedy and in disturbed habitats] ..... ***Key D***
4 Achenes smooth (rarely pubescent or papillose); [native or introduced, occurring in various habitats].
5 Achenes turgid, 1-1.5 (-2) mm long, the marginal rims scarcely or not at all evident, the achenes corky-thickened at their bases for dispersal by floating; [of mucky marshes or ditches, or aquatic in pools]; [subgenus *Auricomus*; section *Hecatonia*] ..... ***Key E***
5 Achenes moderately turgid or flattened, 1.5-3.8 mm long, with a pronounced (at 10× or more) marginal rim appearing as a differentiated border or flange, more-or-less flattened, and separated from the central bulge of the achene by a concavity or even a groove, the achenes not corky-thickened at their bases; [of mostly terrestrial habitats or in bottomland forests] ..... ***Key F***

Key B - subgenus *Auricomus*; section *Flammula* (simple-leaved buttercups) (Spearworts)

1 Petals 1-3 (-5); petals 1-2 mm long, about as long as the sepals; annual ..... ***Ranunculus pusillus***
1 Petals (4-) 5-9; petals 2-8 mm long, distinctly longer than the sepals; annual or perennial.
..... ***Ranunculus laxicaulis***

Key C - subgenus *Auricomus*; section *Auricomus*

2 Petals 4-8 mm long, longer than the sepals ..... ***Ranunculus harveyi***
2 Petals 1.5-3.5 mm long, slightly shorter than the sepals.
3 Leaves and stems glabrous or nearly so (or the upper stem puberulent); basal leaves 1-6 (-10) cm wide, reniform to cordate at the base; roots usually all filiform; receptacle surface (with achenes removed or fallen off) pubescent (at least sparsely so); achenes shiny ..... ***Ranunculus abortivus***
3 Leaves and stems villous, at least sparsely so and at least toward the base of the plant; basal leaves 1-2.5 cm wide, truncate to cuneate (rarely cordate) at the base; roots sometimes in part fusiform-thickened; receptacle surface glabrous; achenes dull ..... ***Ranunculus micranthus***

Key D - subgenus *Ranunculus*; sections *Polyanthemos*, *Ranunculus*, and *Echinella*

1 Flowers sessile, opposite the petioles; sepals 3; petals 3; [section *Polyanthemos*] ..... ***Ranunculus platensis***
1 Flowers pedunculate, axillary; sepals usually 5; petals usually 5.
2 Petals 1-2 (-3) mm long; receptacles glabrous; [section *Ranunculus*] ..... ***Ranunculus parviflorus***
2 Petals (3-) 4-12 mm long; receptacles pubescent.
3 Achenes bodies 1.5-3 mm long, 30-60 per head; achene beak ca. 0.5 mm long; achene with conical protuberances or short spines, to 0.16 mm long; achene beak 0.1-0.5 mm long; basal leaves compound; [section *Polyanthemos*].
4 Achene with a few conical protuberances; petals 5-12 mm long; plant sparsely to densely hirsute; achenes 30-40 per head ..... ***Ranunculus sardous***
4 Achene with numerous short spines; petals (3-) 4-5 mm long; plant with a few, widely scattered, long hairs; achenes 40-60 per head ..... ***Ranunculus trilobus***
3 Achenes 2.5-5 mm long, 4-20 per head; achene beak 1.5-3.0 mm long (or 0.8-1 mm long in *R. marginatus*); achene conspicuously spiny, the longer spines mostly 0.30-0.85 mm long (or only ca. 0.2 mm long in *R. marginatus*); basal leaves simple (but deeply lobed) or compound.
5 Achenes 4-9 per head, in a single whorl; achene margins spiny, as also the faces; beak of the achene 2.5-3 mm long; [section *Echinella*] ..... ***Ranunculus arvensis***
5 Achenes 10-20 per head, in several whorls; achene margins smooth, the spines restricted to the faces; beak of the achene 1.5-2.5 mm long; [section *Polyanthemos*].
6 Achene faces with short protuberances ca. 0.2 mm long; achene beak 0.8-1.0 mm long; peduncle usually longer than the subtending leaf ..... ***Ranunculus marginatus var. trachycarpus***
6 Achene faces with stout spines ca. 0.5 mm long; achene beak 2.0-2.5 mm long; peduncle usually shorter than the subtending leaf ..... ***Ranunculus muricatus***

Key E - subgenus *Auricomus*; section *Hecatonia*

1 Petals 6-14 mm long; achene body 1.3-2.5 mm long, the beak 0.7-1.5 mm long; plants with submersed leaves dissected into numerous linear segments; [aquatic] ..... ***Ranunculus flabellaris***
1 Petals 2-4 (-5) mm long; achene body 0.8-1.2 mm long, the beak 0-0.1 mm long; plants without distinctive, dissected submersed leaves; [terrestrial or semi-aquatic] ..... ***Ranunculus sceleratus var. sceleratus***

Key F - subgenus *Ranunculus*; section *Polyanthemos* (and *Ranunculus*)

1 Petals 2-6 mm long, about as long as the sepals; [section *Polyanthemos*].
..... ***Ranunculus recurvatus var. recurvatus***

Key to Map Symbology:

←rare ←uncommon ←common (see introduction for more)

* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable

X : extirpated

111b. RANUNCULACEAE

1 Petals 5-15 mm long, (1.3-) 1.5× or more as long as the sepals; achene beak straight, flexuous, slightly curved, or hooked, 0.2-3.0 mm long.
- 4 Achene beaks recurved or hooked, the stigmatic surface elongate, along the upper (curved) side of the style (beak) (visible at 10×); [introduced, usually weedy in disturbed habitats].
  - 5 Stems repent, rooting at the nodes; [section *Polyanthemos*] ..... ***Ranunculus repens***
  - 5 Stems erect, not rooting at the nodes.
    - 6 Petals 5-8 mm long; plant a soft-based annual; achene face usually with at least a few conical protuberances (if examined carefully at 10× or more); [section *Polyanthemos*] ..... ***Ranunculus sardous***
    - 6 Petals 8-16 mm long; plant a cormose or hard-based perennial; achene face truly smooth.
      - 7 Sepals spreading; stems not cormose-thickened at the base; larger leaves appearing (3-) 5-parted, all of the segments sessile; plant to 12 dm tall; [section *Ranunculus*] ..... ***Ranunculus acris***
      - 7 Sepals tightly reflexed; stems cormose-thickened at the base; larger leaves pinnately 3-5-parted, the terminal segment long-stalked; plant to 6 dm tall; [section *Polyanthemos*] ..... ***Ranunculus bulbosus***
- 4 Achene beaks straight or slightly curved, flexuous, the stigmatic surface limited to the tip of the style (beak); [native, normally in more-or-less natural habitats]; [section *Polyanthemos*].
  - 8 Larger leaves mostly pinnately 3-7-foliolate, the terminal leaflet larger than the lateral leaflets, the leaflets (especially the terminal) often further cleft or lobed, the blade usually longer than wide in outline, the segments often rather narrow; naked receptacle conical, tapering gradually to the apex (the region of staminal attachment as thick as the region of gynoecial attachment, which tapers through all or nearly all of its length, best seen by stripping off the achenes); rhizome regenerating totally each growing season, producing both fibrous and (at the end of the growing season) tuberous roots (1.3-4.9 mm in diameter); [rare in our area, in calcareous, mafic, or ultramafic sites with prairie affinities] ..... ***Ranunculus fascicularis***
  - 8 Larger leaves mostly palmately 3-foliolate, the terminal leaflet about the same size as the lateral leaflets, the leaflets sometimes further cleft or lobed, the blade usually as wide as long or wider; naked receptacle clavate or ellipsoid (the region of staminal attachment distinctly narrower than the region of gynoecial attachment, thus forming a waist, from which the gynoecial region expands and then tapers to the apex); rhizome regenerated partially each growing season, producing uniform, fibrous roots (up to 3.0 mm in diameter); leaves usually simple and ovate, or trifoliate with ovate leaflets; [collectively widespread in our area].
    - 9 Achenes wide-margined (wider portions of the margin 1/4 to 2/3 as wide as the achene body); plants colonial, sending out stolons (by the time of fruiting) which root at the nodes, forming new plants; sepals reflexed at full anthesis ..... ***Ranunculus septentrionalis***
    - 9 Achenes narrow-margined (wider portions of the margin 1/8 or less as wide as the achene body); plants usually erect or repent by the time of fruiting (if repent sometimes forming adventitious roots at the nodes, but not generally developing new plants); sepals spreading at full anthesis (sometimes reflexed later).
      ..... ***Ranunculus hispidus***

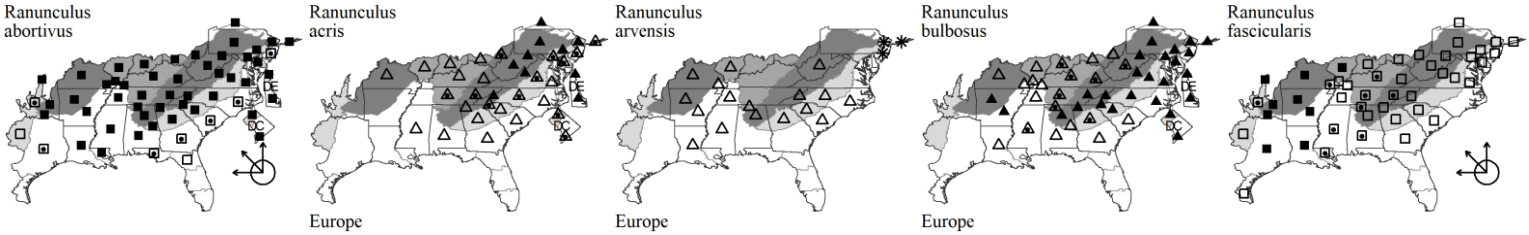
Ranunculus abortivus Linnaeus. KIDNEYLEAF BUTTERCUP, EARLY WOOD BUTTERCUP. **Hab:** Bottomland and other moist forests, low fields, disturbed areas, lawns, roadsides. **Dist:** NL (Labrador) to AK, south to FL, TX, and CO. **Phen:** (Feb-) Mar-Jun. **ID Notes:** A common plant, sometimes pretty weedy, in shady and sunny places, recognizable from its cordate, basal leaves that are broader than long, and with distinctive broad teeth that are flattish. **Syn:** = Ar, FNA3, GrPl, GW2, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Tx, Va, W, WH3, WV, Keener (1976); > *Ranunculus abortivus* var. *abortivus* – C, F, G, Il; > *Ranunculus abortivus* Linnaeus var. *acrolasius* Fernald – F, Il; > *Ranunculus abortivus* Linnaeus var. *eucyclus* Fernald – F; > *Ranunculus abortivus* Linnaeus var. *indivisus* Fernald – F.

* ***Ranunculus acris*** Linnaeus. TALL BUTTERCUP, BITTER BUTTERCUP. **Hab:** Pastures, fields, roadsides, lawns, disturbed areas. **Dist:** Native of Europe. **Phen:** May-Aug. **Syn:** = C, F, FNA3, G, GrPl, GW2, Il, Mi, NE, NY, Pa, RAB, S, Tn, W, WV, Keener (1976); > *Ranunculus acris* var. *acris* – K1, K3, K4. NatureServe G5T5 (Secure).

* ***Ranunculus arvensis*** Linnaeus. CORN CROWFOOT, HUNGERWEED. **Hab:** Fields, disturbed areas. **Dist:** Native of Europe. **Phen:** Apr-Jun. **Syn:** = Ar, C, FNA3, G, GrPl, GW2, Il, K1, K3, K4, NY, WV, Keener & Hoot (1987), Keener (1976); > *Ranunculus arvensis* var. *arvensis* – RAB; > *Ranunculus arvensis* var. *tuberculatus* (A.P. de Candolle) Koch – RAB. NatureServe GNR (Not Yet Ranked).

* ***Ranunculus bulbosus*** Linnaeus. BULBOUS BUTTERCUP, ST. ANTHONY'S TURNIP. **Hab:** Fields, roadsides, disturbed areas. **Dist:** Native of Europe. **Phen:** Apr-Jul. **Syn:** = Ar, C, FNA3, GrPl, GW2, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Va, W, WV, Keener (1976); > *Ranunculus bulbosus* var. *bulbosus* – F; > *Ranunculus bulbosus* var. *dissectus* Barbey – F; > *Ranunculus bulbosus* var. *valdepubens* (Jordan) Briquet – F. NatureServe GNR (Not Yet Ranked).

Ranunculus fascicularis Muhlenberg ex Bigelow. THICK-ROOT BUTTERCUP, EARLY BUTTERCUP. **Hab:** Wet flats with prairie affinities (with *Camassia scilloides*), rocky barrens and glades over mafic rocks (such as gabbro or diabase), ultramafic outcrop barrens (over olivine), limestone barrens, prairies, oak savannas. **Dist:** MA and NY west to s. ON, MN, and se. MB, south to c. NC, nc. SC, sw. GA, and e. TX; occurrences which are both south of New England and east of the Appalachians are scattered and disjunct. **Phen:** Feb-May; Mar-Jun. **Comm:** This species is tetraploid (n = 16). **Syn:** = Ar, C, FNA3, GrPl, GW2, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, S, Tn, Va, W, Duncan (1980), Keener (1976); > *Ranunculus fascicularis* var. *apricus* (Greene) Fernald – Tx; > *Ranunculus fascicularis* var. *fascicularis* – F, G, Tx. NatureServe G5 (Secure).



Ranunculus flabellaris Rafinesque. YELLOW WATER CROWFOOT. **Hab:** Pools in floodplains of small stream swamps, ponds, borrow pits, other stagnant or slowly moving waters. **Dist:** ME west to BC, south to ne. NC, KY, IN, IL, LA, OK, UT, and CA. **Phen:** Mar-Jul. **Syn:** = Ar, C, F, FNA3, G, GrPl, GW2, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, Tn, Va, Keener (1976); = *Ranunculus delphiniifolius* Torrey ex Eaton – S. NatureServe G5 (Secure).

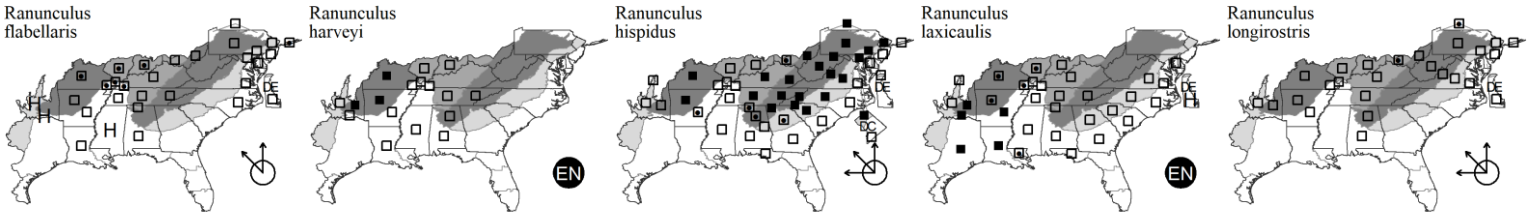
Ranunculus harveyi (A. Gray) Britton. **Hab:** Forests, savannas, shaley bluffs, and prairies, mostly on acidic substrates. **Dist:** IN, IL, MO, and OK south to TN, AL, and LA. **Phen:** Mar-May. **Syn:** = *Ranunculus harveyi* var. *harveyi* – Ar, FNA3, K1; < *Ranunculus harveyi* (A. Gray) Britton – C, F, G, Il, K3, K4, Tn. NatureServe G4 (Apparently Secure).

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Ranunculus hispidus Michaux. HISPID BUTTERCUP, HAIRY BUTTERCUP. **Hab:** Rich moist forests, creekbanks, mesic to dry woodlands and forests, bottomlands. **Dist:** MA and VT west to s. ON, n. IL, and se. KS, south to e. and c. NC, s. GA, s. AL, AR, and ne. OK. **Phen:** Mar-Jun. **Tax:** This species is tetraploid (n = 16). **Syn:** = GW2, NE, NY, RAB, S, Va, W, Haines (2007b), Keener (1976); = *Ranunculus hispidus* var. *hispidus* – Ar, C, FNA3, GrPl, K1, K3, K4, Mi, Pa, Tn, Duncan (1980); > *Ranunculus hispidus* var. *eurylobus* L. Benson – F, G, WV; > *Ranunculus hispidus* var. *falsus* Fernald – F; > *Ranunculus hispidus* var. *hispidus* – F, G, Il, WV; > *Ranunculus hispidus* var. *marilandicus* (Poiret) L. Benson – G, Il.

Ranunculus laxicaulis (Torrey & A. Gray) Darby. COASTAL PLAIN SPEARWORT. **Hab:** Marshes, swamps, tidal cypress swamps. **Dist:** DE south to sw. GA, Panhandle FL (L. Anderson, pers.comm., 2021), west to e. TX, inland in the interior to w. TN, s. IN, s. IL, MO, and KS, almost entirely on the southeastern Coastal Plain. **Phen:** Apr-Sep. **Tax:** *R. subcordatus* E.O. Beal, allegedly endemic to NC, is conspecific with *R. laxicaulis*. **Syn:** = Ar, F, FNA3, G, GrPl, Il, K1, K3, K4, RAB, Tn, Tx, Va, W, WH3; > *Ranunculus laxicaulis* (Torrey & A. Gray) Darby – GW2, Keener (1976); ? *Ranunculus oblongifolius* Elliott – S, misapplied; > *Ranunculus subcordatus* E.O. Beal – GW2, Keener (1976); ? *Ranunculus texensis* Engelmann – C.

Ranunculus longirostris Godron. WHITE WATER CROWFOOT. **Hab:** Submerged in streams and spring ponds. **Dist:** Sw. QC west to SK, ID, and OR, south to DE, VA, KY, nc. TN, AL, AR, TX, NM, and AZ. **Phen:** May-Sep. **Syn:** = C, F, GrPl, GW2, Il, K1, K3, Mi, Tx, Va, WV, Keener (1976), Wiegleb, Bobrov, & Zalewska-Gałosz (2017); ? *Batrachium trichophyllum* – S, misapplied; < *Ranunculus aquatilis* Linnaeus var. *diffusus* Withering – Ar, FNA3, NE, NY, Tn; ? *Ranunculus circinatus* Sibthorp – G.



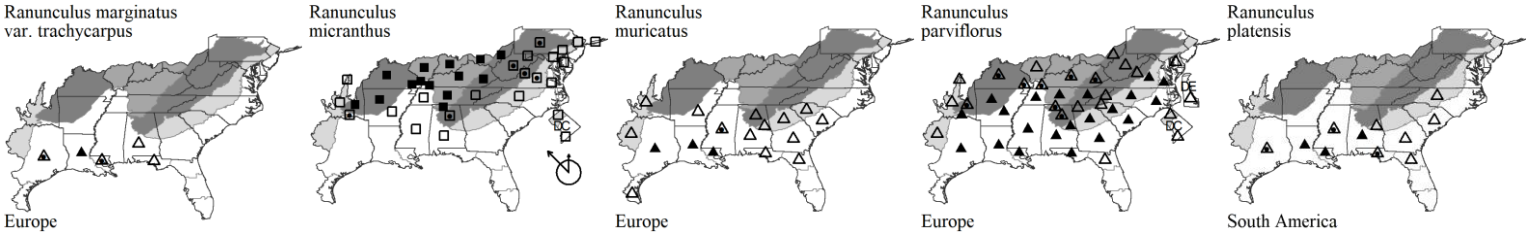
* ***Ranunculus marginatus*** d'Urville *var*. ***trachycarpus*** (Fischer & C.A. Meyer) Aznavour. ST. MARTIN'S BUTTERCUP. **Hab:** Moist, disturbed areas, roadsides. **Dist:** Native of e. Mediterranean Europe. **Syn:** = K4, WH3; < *Ranunculus marginatus* – FNA3. NatureServe GNRTNR (Not Yet Ranked).

Ranunculus micranthus Nuttall. SMALL-FLOWERED BUTTERCUP, ROCK BUTTERCUP. **Hab:** Rich bottomland forests, also upslope on mesic to dry forests and rock outcrops over mafic or calcareous substrates. **Dist:** MA west to SD, south to e. VA, c. NC, sc. TN, WV, OH, and OK. **Phen:** Mar-Jun. **Syn:** = Ar, C, FNA3, G, GrPl, GW2, Il, K1, K3, K4, NE, NY, Pa, RAB, S, Tn, Va, W, WV, Keener (1976); > *Ranunculus micranthus* var. *cymbalistes* (Greene) Fernald – F; > *Ranunculus micranthus* var. *delitescens* (Greene) Fernald – F; > *Ranunculus micranthus* var. *micranthus* – F. NatureServe G5 (Secure).

* ***Ranunculus muricatus*** Linnaeus. ROUGHSEED BUTTERCUP. **Hab:** Ditches and marshes. **Dist:** Native of Europe. **Phen:** Feb-Jun. **Syn:** = FNA3, GW2, K1, K3, K4, NcTx, NY, RAB, S, Tx, WH3, Keener & Hoot (1987), Keener (1976). NatureServe GNR (Not Yet Ranked).

* ***Ranunculus parviflorus*** Linnaeus. SMALL-FLOWERED BUTTERCUP, STICKSEED CROWFOOT. **Hab:** Disturbed areas. **Dist:** Native of Europe. **Phen:** Feb-Jul. **Syn:** = Ar, C, F, FNA3, G, GW2, Il, K1, K3, K4, NcTx, RAB, S, Tn, Tx, Va, W, WH3, Keener & Hoot (1987), Keener (1976). NatureServe GNR (Not Yet Ranked).

* ***Ranunculus platensis*** Sprengel. **Hab:** Lawns, ditches. **Dist:** Native of South America. Reported for Beaufort, Berkeley, Lee, and Orangeburg counties, SC (Bradley et al. [in prep.]). **Syn:** = FNA3, GW2, K1, K4, Tx, WH3, Keener & Hoot (1987), Keener (1976). NatureServe GNR (Not Yet Ranked).



Ranunculus pusillus Poiret. LOW SPEARWORT, SMALL SPEARWORT. **Hab:** Marshes, ditches, other wet habitats. **Dist:** S. NY south to c. peninsular FL, west to c. TX, north in the interior to OH, IN, and MO. **Phen:** Apr-Jun. **Syn:** = Ar, C, F, FNA3, G, GW2, Il, K3, K4, NcTx, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV, Keener (1976); > *Ranunculus pusillus* var. *pusillus* – K1.

Ranunculus recurvatus Poiret *var*. ***recurvatus***. HOOKED BUTTERCUP, HOOKED CROWFOOT. **Hab:** Bottomland forests, cove forests, swamps, mesic slope forests. **Dist:** ME and QC west to MN, south to sw. GA, MS, and OK. **Phen:** Apr-Jul. **Tax:** Var. *tropicus* (Grisebach) Fawcett & Rendle occurs in Puerto Rico and other islands of the West Indies. **Syn:** = Ar, FNA3, K1, K3, K4, NE, NY, Va; < *Ranunculus recurvatus* – C, G, GrPl, GW2, Il, Mi, Pa, RAB, S, Tn, Tx, W, WH3, Keener (1976); > *Ranunculus recurvatus* var. *adpressipilis* Weatherby – F, WV; > *Ranunculus recurvatus* Poiret var. *recurvatus* – F, WV. NatureServe G5T5 (Secure).

* ***Ranunculus repens*** Linnaeus. CREEPING BUTTERCUP, MEG-MANY-FEET. **Hab:** Low meadows, disturbed areas. **Dist:** Native of Europe. **Phen:** May-Sep. **Syn:** = Ar, FNA3, G, GW2, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tx, Va, W, Keener (1976); > *Ranunculus repens* var. *degeneratus* Schur – C, Il; > *Ranunculus repens* var. *glabratus* A.P. de Candolle – C, F; > *Ranunculus repens* var. *pleniflorus* Fernald – F, WV; > *Ranunculus repens* var. *repens* – C, F, Il, WV.

* ***Ranunculus sardous*** Crantz. SARDINIAN BUTTERCUP, HAIRY BUTTERCUP. **Hab:** Low fields, disturbed areas. **Dist:** Native of Europe. **Phen:** Apr-Jul (-Oct). **Syn:** = Ar, C, F, FNA3, G, GrPl, GW2, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, Tn, Tx, Va, WH3, Keener & Hoot (1987), Keener (1976). NatureServe GNR (Not Yet Ranked).

Ranunculus sceleratus Linnaeus *var*. ***sceleratus***. CURSED BUTTERCUP, CELERY-LEAF CROWFOOT. **Hab:** Marshes, ditches, and stream margins. **Dist:** The species is circumboreal, ranging south in North America (partly introduced, at least southward) to n. FL, LA, TX, and CA. **Phen:** Apr-Sep. **Tax:** Var. *sceleratus* is widespread and the only variety in e. North America; var. *multifidus* occurs in w. North America. The epithet has sometimes been misspelled '*scleratus*'. **Syn:** = Ar, C, F, FNA3, G, GrPl, K1, K3, K4, NE, NY, Va; < *Ranunculus sceleratus* – GW2, Il, Mi, NcTx, Pa, RAB, S, Tn, Tx, W, WH3, Keener (1976). NatureServe G5T5 (Secure).

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* : waif
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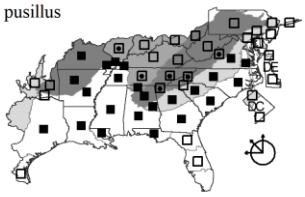
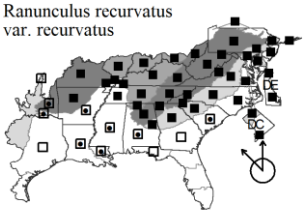
N : no
P : planted
? : questionable

X : extirpated

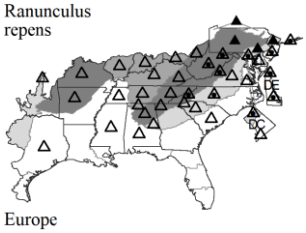
Ranunculus pusillus



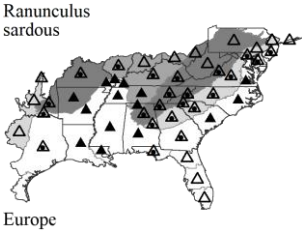
Ranunculus recurvatus var. recurvatus



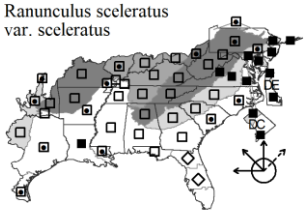
Ranunculus repens



Ranunculus sardous



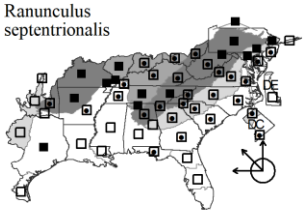
Ranunculus sceleratus var. sceleratus



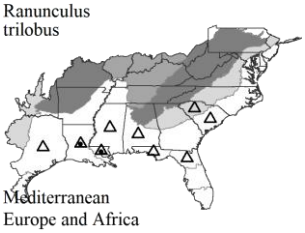
Ranunculus septentrionalis Poiret in Lamarck. CAROLINA BUTTERCUP. **Hab:** Swamp forests, wet woodlands, open marshy wetlands. **Dist:** NY west to s. ON, WI, and MN, south to n. peninsular FL, LA, and e. TX. **Phen:** Mar-Aug. **Tax:** This species is tetraploid (n = 16). **Syn:** = NY, Haines (2007b); = *Ranunculus carolinianus* A.P. de Candolle – F, G, GW2, Il, RAB, Va, W, WV, Keener (1976); = *Ranunculus hispidus* Michaux var. *nitidus* (Chapman) T. Duncan – Ar, C, FNA3, GrPl, K1, K3, K4, Mi, NcTx, Pa, Tn, WH3, Duncan (1980); > *Ranunculus carolinianus* var. *carolinianus* – Tx; > *Ranunculus carolinianus* var. *villicaulis* Shinners – Tx; > *Ranunculus palmatus* Elliott – S; > *Ranunculus septentrionalis* Poiret in Lamarck – S.

* ***Ranunculus trilobus*** Desfontaines. **Hab:** Fields, roadsides, ditches. **Dist:** Native of sw. Europe. **Syn:** = FNA3, K1, WH3, Keener & Hoot (1987), Keener (1976). NatureServe GNR (Not Yet Ranked).

Ranunculus septentrionalis



Ranunculus trilobus



Thalictrum Linnaeus 1753 (MEADOW-RUE)

A genus of about 330 species, perennial herbs, of Eurasia, North America, South America, and Africa. Ro & McPheron (1997) corroborated via molecular phylogeny that *Anemonella* should be included in *Thalictrum*; in fact, *T. thalictroides* appears to form a "basal" subclade in *Thalictrum* with *T. clavatum* (and presumably *T. mirabile*). References: Park & Festerling (1997) in FNA3 (1997); Park (1992); Ro & McPheron (1997); Tamura in Kubitzki, Rohwer, & Bittrich (1993).

Identification Notes: *Thalictrum thalictroides* is superficially similar to *Enemion biternatum*, but can be distinguished by the following characters: fruit an achene (vs. fruit a follicle), petaloid sepals 5-10 (vs. 5).

1 Sepals petaloid, conspicuous, white (or tinged with pink or green); leaflike involucral bracts present, opposite or whorled; inflorescence an umbel; [section *Anemonella*]..... ***Thalictrum thalictroides***
1 Sepals absent, or inconspicuous in comparison to the stamens or pistils; leaflike involucral bracts not present; inflorescence a panicle, corymb or raceme.
2 Fruit (achene) scimitar-shaped, borne on a stipe 1.5-4 mm long; flowers perfect; [section *Physocarpum*].
..... ***Thalictrum mirabile***
2 Fruit (achene) not scimitar-shaped, not borne on a stipe (except *T. coriaceum*); flowers unisexual (or sometimes a few or more bisexual).
5 Most of the leaflets with (3-) 4-6 (-9) lobes or teeth; [section *Heterogamia*].
7 Largest leaflets > 15 mm long; stems 30-80 cm tall, erect..... ***Thalictrum dioicum***
7 Largest leaflets < 15 mm wide; stems 10-40 cm tall, reclining
..... ***Thalictrum debile***
5 Most of the leaflets with 1-3 (-5) lobes or teeth; [section *Leucocoma*].
9 Leaflet undersurfaces, peduncles, and achenes with stipitate glands or papillae.
10 Anthers 1-3.6 (-4) mm long; stigmas 1.5-4.7 (-6) mm long..... ***Thalictrum dasycarpum***
10 Anthers 0.5-2.8 mm long; stigmas 0.6-3.5 mm long.
..... ***Thalictrum amphibolum***
9 Leaflet undersurfaces, peduncles, and achenes glabrous or pubescent, lacking both stipitate glands and papillae.
12 Leaflet undersurfaces, peduncles, and achenes finely pubescent..... ***Thalictrum pubescens***
12 Leaflet undersurfaces, peduncles, and achenes glabrous.
13 Leaflets entire to 3-lobed, averaging about 10 mm wide, the broadest usually < 20 mm wide; filaments (2-) 3-4.5 (-6.5) mm long (averaging 3.6 mm)..... ***Thalictrum macrostylum***
13 Leaflets 3-lobed (rarely entire), averaging 15-23 mm wide, the broadest usually 15-60 mm wide; filaments (2-) 4-5 (-8) mm long (averaging 4.5 mm).
14 Anthers 1-3.6 (-4) mm long; stigmas 1.5-4.7 (-6) mm long..... ***Thalictrum dasycarpum***
14 Anthers 0.5-2.8 mm long; stigmas 0.6-3.5 mm long.
..... ***Thalictrum amphibolum***

Thalictrum amphibolum Greene. SKUNK MEADOWRUE, WAXY MEADOWRUE. **Hab:** Mesic to dry forests, woodlands, barrens, and prairies, over hornblende, greenstone, dolostone, and serpentinized olivine. **Dist:** QC and ON south to n. FL, LA, and TX, and scattered southwest to CO, NV, and AZ. **Phen:** May-Aug. **Tax:** The name *T. revolutum* is illegitimate, as de Candolle cited *T. pubescens* Pursh in synonymy when he named it; it must be replaced by *T. amphibolum* Greene. **Comm:** The species is normally stipitate-glandular or papillose, but can be glabrous, as accounted for in the key. **Syn:** = K4; = *Thalictrum revolutum* A.P. de Candolle – Ar, C, F, G, GW2, Il, K1, K3, Mi, NE, NY, RAB, S, Va, W, WH3, WV; < *Thalictrum revolutum* A.P. de Candolle – FNA3, Pa.

Key to Map Symbology:

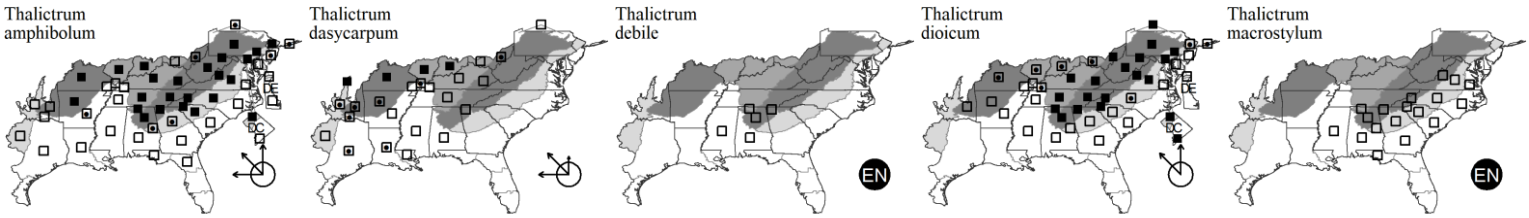
* : waif
EN : endemic
H : historic
N : no
P : planted
? : questionable
X : extirpated

Thalictrum dasycarpum Fischer & Avé-Lallemant. PURPLE MEADOWRUE. **Hab:** Forest, woodlands, and prairies. **Dist:** QC and YT south to PA, KY, TN, nw. GA, AL, MS, LA, TX, NM, AZ, and WA. It has been reported for scattered localities in VA (Harvill et al. 1992); Park (1992) and FNA do not document the occurrence of *T. dasycarpum* in VA. These are likely misidentifications; substantiation is needed. **Phen:** Late May-Jul. **Syn:** = Ar, FNA3, GrPl, K1, K3, K4, Mi, NcTx, NE, NY, Pa; > *Thalictrum dasycarpum* var. *dasycarpum* – C, F, G, Il, Tx; > *Thalictrum dasycarpum* var. *hypoglaucum* (Rydberg) B. Boivin – C, F, G, Il, Tx.

Thalictrum debile Buckley. TRAILING MEADOWRUE. **Hab:** Moist to wet forests over limestone. **Dist:** Nw. GA west to e. MS. **Syn:** = FNA3, GW2, K1, K3, K4, S. NatureServe G2G3 (Imperiled).

Thalictrum dioicum Linnaeus. EARLY MEADOWRUE, QUICKSILVER-WEED. **Hab:** Seepages, moist forests. **Dist:** ME, QC, and MN south to SC, c. GA, AL, MO, and nc. AR. **Phen:** Apr-May. **Syn:** = Ar, C, F, FNA3, G, GrPl, GW2, Il, K1, K3, Mi, NE, NY, Pa, RAB, S, Tn, Va, W, WV. NatureServe G5 (Secure).

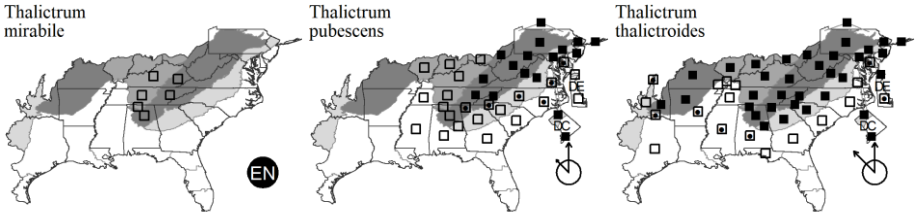
Thalictrum macrostylum Small & A. Heller. SMALL-LEAVED MEADOWRUE. **Hab:** Moist places, perhaps associated with circumneutral soils, moist to dry ultramafic outcrop barrens (over serpentinized olivine), tidal freshwater marshes, rarely pineland seepages with calcareous substrate. **Dist:** Se. VA south and west through NC, SC, sc. GA, FL, and AL to MS. **Phen:** May-Aug. **Tax:** Under taxonomic study by D.B. Poindexter and A.S. Weakley. **Syn:** = C, F, FNA3, G, GW2, K1, K3, K4, S, Va, WH3, Park (1992); > *Thalictrum macrostylum* Small & A. Heller – RAB; > *Thalictrum subrotundum* B. Boivin – RAB.



Thalictrum mirabile Small. ROCKHOUSE MEADOWRUE. **Hab:** Wet sandstone cliffs, primarily in the Cumberland Plateau (and especially associated with sandstone rockhouses). **Dist:** KY south through TN to n. AL and nw. GA (and additionally cited in FNA as occurring in w. NC, a record that is apparently erroneous, presumably based on misidentification of *T. clavatum*). **ID Notes:** A delicate relative of *T. clavatum*, the inflorescence appears sparser because of the shorter and narrower achenes borne on longer stipes. **Syn:** = FNA3, GW2, K1, K3, K4, S, Tn. NatureServe G4?Q (Apparently Secure).

Thalictrum pubescens Pursh. COMMON TALL MEADOWRUE, LATE MEADOWRUE, KING-OF-THE-MEADOW. **Hab:** Bogs, marshes, wet forests. **Dist:** NL (Labrador), NL (Newfoundland), and ON south to GA, SC and MS. **Phen:** May-Jul. **Syn:** = *Thalictrum pubescens* var. *pubescens* – W; < *Thalictrum polygamum* Muhlenberg ex Sprengel – F, G, RAB, S, nomen nudum; < *Thalictrum pubescens* Pursh – C, FNA3, GW2, Il, K1, K3, K4, Mi, NE, NY, Pa, Tn, Va, WV, Park (1992).

Thalictrum thalictroides (Linnaeus) A.J. Eames & B. Boivin. RUE-ANEMONE, WINDFLOWER. **Hab:** Moist forests. **Dist:** ME, MN, and KS, south to Panhandle FL, MS, AR, and OK. **Phen:** Mar-Jun. **Syn:** = Ar, FNA3, K1, K3, K4, Mi, NE, NY, Pa, RAB, Tn, Va, W, WH3, WV; = *Anemonella thalictroides* (Linnaeus) Spach – C, F, G, GrPl, Il; = *Syndesmon thalictroides* (Linnaeus) Hoffmannsegg ex Britton – S. NatureServe G5 (Secure).



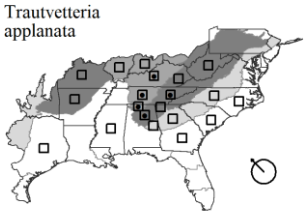
Trautvetteria Fischer & C.A. Meyer 1835 (TASSEL-RUE)

Contributed by Aaron J. Floden and Alan S. Weakley

A genus of 5-7 closely related species, perennial herbs, disjunctly distributed in temperate e. North America, w. North America, and Japan.
References: Floden & Schilling (2018a); Floden (2011); Johansson (1998); Parfitt (1997a) in FNA3 (1997); Tamura in Kubitzki, Rohwer, & Bittrich (1993).

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

111b. RANUNCULACEAE

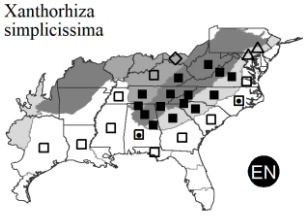


Trautvetteria applanata Greene. OZARK TASSEL-RUE. **Hab:** Dolomite and other calcareous bluffs along rivers, moist streamsides. **Dist:** E. KY, c. IN, wc. IL, and sc. MO south through e. and c. TN to nw. GA, c. AL, c. AR (Sundell et al. 1999), and ne. TX (Floden 2011). Populations far east and south of the Blue Ridge in GA, SC, and NC are tentatively placed here while under additional study. **Tax:** See Floden & Schilling (2018) for discussion. The epithet was originally spelled '*applanta*' by Greene, but that is an apparent typographical error for an intended '*applanata*' and is correctable. **Comm:** The discovery of *Trauvetteria* in the edge of a calcareous savanna (Camp Branch Savanna, Brunswick County, NC) in the outer Coastal Plain of NC was surprising; the small population has since apparently been destroyed by intensive silvicultural practices. *Trautvetteria nervata* Greene, named from the Coastal Plain of s. GA, needs additional evaluation (Floden 2011); the type specimen is striking in its deeply and multiply divided leaf segments. *Trautvetteria* populations in the Coastal Plain of NC, SC, and GA and lowermost Piedmont of NC are tentatively assigned here on partial morphological and molecular data. **Syn:** = Floden & Schilling (2018a), orthographic variant; < *Trautvetteria caroliniensis* (Walter) Vail – Ar, C, F, FNA3, G; < *Trautvetteria caroliniensis* var. *caroliniensis* – K4.

Xanthorhiza Marshall 1785 (YELLOWROOT)

A monotypic genus, a shrub, of temperate e. North America. References: Parfitt (1997e) in FNA3 (1997); Tamura in Kubitzki, Rohwer, & Bittrich (1993).

Identification Notes: An unmistakable plant, the woody stems usually about knee-high and unbranched, bearing a cluster of pinnate leaves near the tip, and the rhizomes with a bright yellow, staining, bitter-tasting alkaloid.



Xanthorhiza simplicissima Marshall. YELLOWROOT, BROOK-FEATHER. **Hab:** Streambanks and riverbanks, less typically in moist rocky forests. **Dist:** Se. VA, w. VA, WV, and s. OH south to FL Panhandle and s. MS; disjunct west of the Mississippi in w. LA and e. TX; also scattered northward as naturalized populations from cultivation in PA, MD, NY, MA, CT, and ME. **Phen:** (Late Jan-) Mar-May; May-Jun. **ID Notes:** See Colenbaugh & Hagan (2021) for a detailed discussion of *X. simplicissima*. **Syn:** = C, F, FNA3, G, GW2, K1, K3, K4, NY, Pa, RAB, Tn, Tx, Va, W, WH3, WV; = *Xanthorrhiza simplicissima* – S, orthographic variant. NatureServe G5 (Secure).

113. NELUMBONACEAE A. Richard 1827 (LOTUS-LILY FAMILY) [in PROTEALES]

A family of 1 genus and 2 species, aquatic herbs, of temperate and subtropical e. North America and e. Asia. References: Wiersema (1997a) in FNA3 (1997); Williamson & Schneider in Kubitzki, Rohwer, & Bittrich (1993).

Nelumbo Adanson 1763 (LOTUS-LILY, LOTUS, SACRED-LOTUS, SACRED-BEAN)

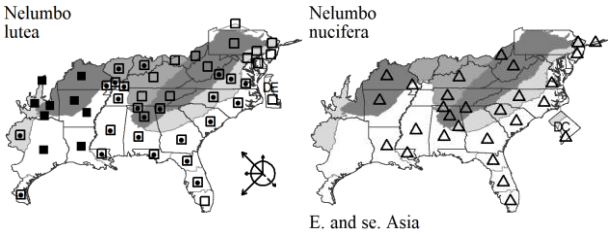
A genus of 2 species, aquatic herbs, of temperate and subtropical e. North America and e. Asia. References: Wiersema (1997a) in FNA3 (1997); Williamson & Schneider in Kubitzki, Rohwer, & Bittrich (1993).

Identification Notes: *Nelumbo* can be immediately distinguished in vegetative condition from the other 'pads' (*Nymphaea*, *Nuphar*, and *Nymphoides*) by its peltate leaves, and from the peltate *Brasenia* by the much larger size and round (rather than elliptic) leaves.

1 Petals yellow; flower stalks and petioles smooth; mature fruits ('nuts') usually < 1.25× as long as wide ..... ***Nelumbo lutea***
1 Petals pink or white; flower stalks and petioles roughened; mature fruits ('nuts') usually > 1.5× as long as wide ..... ***Nelumbo nucifera***

Nelumbo lutea Willdenow. YONKAPIN, AMERICAN LOTUS-LILY, YELLOW LOTUS, YOCKERNUT, WATER-CHINQUAPIN, POND-NUTS. **Hab:** Ponds, natural lakes, sluggish streams, freshwater tidal marshes. **Dist:** NY and s. ON west to MN and IA, south to s. FL and e. TX, and south into the West Indies and Mexico. **Phen:** Jun-Sep. **Syn:** = Ar, C, F, FNA3, G, GrPl, GW2, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV. NatureServe G4 (Apparently Secure).

* ***Nelumbo nucifera*** Gaertner. SACRED-LOTUS, ORIENTAL LOTUS-LILY, PINK LOTUS. **Hab:** Ponds, lakes, canals. **Dist:** Native of Asia. **Phen:** Jun-Sep. **Syn:** = Ar, C, F, FNA3, G, GW2, Il, K1, K3, K4, RAB, WH3. NatureServe G5 (Secure).

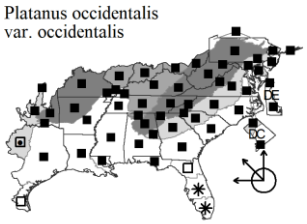


Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

114. PLATANACEAE T. Lestiboudois 1826 (PLANE-TREE FAMILY) [in PROTEALES]

A family of a single genus and about 7 species (and several additional infrataxa), trees, of North America south to Central America and w. Asia to se. Asia. Probably with a close relationship to the Proteaceae (Angiosperm Phylogeny Group 2009), and sometimes included there (Angiosperm Phylogeny Group 1998, 2003). References: Kaul (1997) in FNA3 (1997); Kubitzki, Rohwer, & Bittrich (1993).

Platanus Linnaeus 1753 (PLANE-TREE, SYCAMORE)



A genus of about 7 species (and several additional infrataxa), trees, of North America south to Central America and w. Asia to se. Asia. References: Grimm & Denk (2010); Kaul (1997) in FNA3 (1997); Kubitzki, Rohwer, & Bittrich (1993); Nixon & Poole (2003).

Identification Notes: The exposed white inner bark on the middle and upper trunks make *Platanus occidentalis* recognizable at long distances, especially in winter.

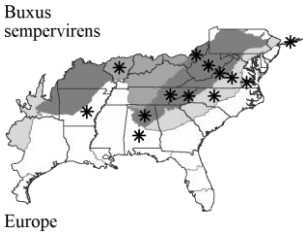
Platanus occidentalis* var. *occidentalis. SYCAMORE, PLANE-TREE. **Hab:** Riverbanks and alluvial forests, streambanks, sometimes weedy on rocky roadcuts. **Dist:** S. ME west to s. ON, MI, and MN, south to Panhandle FL and TX. **Phen:** Apr-Jun; Sep-Nov. **Tax:** *P. palmeri* Kuntze, sometimes treated as *P. occidentalis* var. *palmeri* (Kuntze) Nixon & Poole ex Geerinck, but better interpreted as a species (Grimm & Denk 2010), occurs from central TX south into Coahuila. **Comm:** One of the largest trees in e. North America, and probably the largest that is widespread in the Piedmont of our area. **Syn:** = Nixon & Poole (2003); = *Platanus occidentalis* Linneaus – Ar, K4, Mi, NcTx, NY, Tx, Va, Grimm & Denk (2010); < *Platanus occidentalis* Linneaus – C, FNA3, G, GrPl, GW2, Il, K1, Pa, RAB, S, Tn, W, WH3, WV; >< *Platanus occidentalis* var. *glabrata* (Fernald) Sargent – F; > *Platanus occidentalis* var. *occidentalis* – F.

117. BUXACEAE Dumortier 1822 (BOXWOOD FAMILY) [in BUXALES]

A family of 517 genera and about 120 species, mainly shrubs, mainly of the Northern Hemisphere. References: Boufford (2021a) in FNA10 (2021); Channell & Wood (1987); Köhler in Kubitzki, Bayer, & Stevens (2007); von Balthazar, Endress, & Qiu (2000).

1 Plant a woody shrub; leaves opposite, < 1 cm wide, entire ..... ***Buxus***
1 Plant a suffrutescent herb; leaves alternate, 1.5-7 cm wide, coarsely toothed ..... ***Pachysandra***

Buxus Linnaeus 1753 (BOXWOOD)

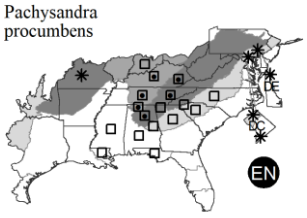


A genus of about 50-90 species, shrubs, of tropical to temperate areas of Europe, Africa, West Indies, Central America, and e. Asia (Köhler in Kubitzki, Bayer, & Stevens 2007). References: Boufford (2021a) in FNA10 (2021); Köhler in Kubitzki, Bayer, & Stevens (2007).

* ***Buxus sempervirens*** Linnaeus. BOXWOOD. **Hab:** Persistent for decades at abandoned homesites, and spreading weakly from dumped hedge trimmings and other cuttings. **Dist:** Native of Europe. Reported for AL Coastal Plain (Diamond 2013) and the Arkansas Coastal Plain (Serviss et al. 2020). **Phen:** Jul-Oct. **Comm:** Popular for hedges and landscaping; also sometimes cultivated for wreathing. **Syn:** = FNA10, K1, K3, K4, NY; = n/a – RAB. NatureServe GNR (Not Yet Ranked).

Pachysandra Michaux 1803 (PACHYSANDRA)

A genus of 3-4 species, 1 of e. North America, the others of e. Asia, suffruticose herbs and shrubs. References: Boufford (2021a) in FNA10 (2021); Köhler in Kubitzki, Bayer, & Stevens (2007); Robbins (1968).



Pachysandra procumbens Michaux. MOUNTAIN PACHYSANDRA, ALLEGHENY-SPURGE. **Hab:** Moist rich forests, mainly over calcareous or mafic rocks. **Dist:** C. KY south to w. NC, nw. SC, w. GA, Panhandle FL (Jackson County only), AL, MS, and e. LA (on loess in the Tunica Hills). **Phen:** Feb-May; Jul-Aug. **Comm:** Its distribution (and, for that matter, that of the genus as a whole) appears to be relictual and to reflect a poor ability to disperse itself and colonize new territory. Channell & Wood (1987) refer to *P. procumbens* as a "nonaggressive if not 'senile' species with a very low evolutionary potential". The only locations for this species in NC are in Polk County, NC, which has other notable disjunctions of species which normally occur west of the Blue Ridge (*Veratrum woodii*, *Smilax lasioneura*). **Syn:** = C, F, FNA10, G, K1, K3, K4, Pa, RAB, S, Tn, W, WH3, Robbins (1968). NatureServe G4G5 (Apparently Secure).

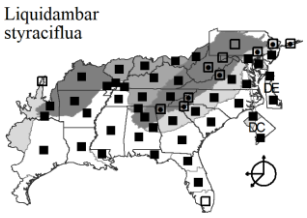
Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

123. ALTINGIACEAE Horaninow 1846 (SWEET-GUM FAMILY) [in SAXIFRAGALES]

A monogeneric family of 1 genus and about 15 species, trees, of e. Asia, Indomalaysia, e. North America, Central America, and e. Mediterranean. References: Endress in Kubitzki, Rohwer, & Bittrich (1993); Hoot, Magallón, & Crane (1999); Ickert-Bond & Wen (2013).

Liquidambar Linnaeus 1753 (SWEET GUM)

A genus of about 15 species, trees, north temperate, of e. North America, Central America (Mexico to Nicaragua), e. Asia (s. China, Taiwan, Vietnam, Cambodia), and e. Mediterranean (Turkey, Rhodos, Cyprus). The circumscription of *Liquidambar* here follows Ickert-Bond & Wen (2013) in including *Altingia* and *Semiliquidambar*. References: Endress in Kubitzki, Rohwer, & Bittrich (1993); Ickert-Bond & Wen (2013); Li & Donoghue (1999); Meyer (1997b) in FNA3 (1997); Morris et al (2008).



Liquidambar styraciflua Linnaeus. SWEET GUM, RED GUM. **Hab:** Swamp forests, floodplains, moist forests, depressional wetlands, pond and lake margins, old fields, disturbed areas, nearly ubiquitous in the modern southeastern United States landscape. **Dist:** CT west to s. OH, s. IL and OK, south to s. FL and TX; Mexico; Guatemala. **Phen:** (Mar-) Apr-May; Aug-Sep. **Tax:** Morris et al. (2008) report on the genetic diversity within *L. styraciflua* as it relates to post-Pleistocene plant migrations. A form with rounded leaf lobes ('*Rotundiloba*') is sometimes grown horticulturally. **Comm:** One of the most spectacular of our trees in the fall; a single tree often has a mixture of green, yellow, orange, dark red, bronze, and purple leaves. The sap was previously gathered as a source of chewing gum. The bark is one of the favorite foods of beavers. Although sometimes thought of as a small and weedy tree, *Liquidambar* reaches its greatest abundance and size in Coastal Plain swamp forests, where it can reach 2 meters in diameter. Along with such species as *Pinus taeda*, *Quercus phellos*, and others, *Liquidambar* is a good example of a primarily bottomland tree which has proven to be an excellent colonizer of disturbed uplands. The twigs sometimes have irregular corky growths. **Syn:** = Ar, C, F, FNA3, G, GW2, Il, K1, K3, K4, Mo1, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV, Ickert-Bond & Wen (2013). NatureServe G5 (Secure).

124. HAMAMELIDACEAE R. Brown 1818 (WITCH-HAZEL FAMILY) [in SAXIFRAGALES]

A family of ca. 27 genera and ca. 87 species, trees and shrubs, tropical to temperate, and especially e. Asian. References: Endress in Kubitzki, Rohwer, & Bittrich (1993); Meyer (1997b) in FNA3 (1997).

1 Leaves 5-7-palmately lobed and palmately veined, glabrous.....***Altingiaceae***
1 Leaves unlobed, pinnately veined, stellate-pubescent beneath (at least when young).
  2 Leaves entire or with very obscure teeth (visible at 10×); petals 4-5 (-6), white, cream, or pink.....***Loropetalum***
  2 Leaves coarsely crenate, at least towards the apex; petals 0 or 4, if present, greenish, yellow, or reddish.
    3 Petals 0; stamens 10-32; flowers numerous in dense globose or elongate spikes; leaves with a symmetric or asymmetric (oblique) base, the lateral veins marginal for a distance of at least 2-3 mm (*F. major*) or included in the blade tissue; [tribe *Fothergilleae*].....***Fothergilla***
    3 Petals 4; stamens 4; flowers few in small clusters; leaves with a weakly to strongly asymmetric (oblique) base, the lateral veins included in the blade tissue or barely exposed for a distance of <1 mm; [tribe *Hamamelideae*].....***Hamamelis***

Fothergilla Murray in Linnaeus 1774 (WITCH-ALDER)

A genus of 4 species, shrubs (to shrubby, small trees), of temperate e. North America. Diploid taxa have only recently been generally recognized as distinct from *F. gardenii* (Haynes et al. 2020). References: Darke (2008); Endress in Kubitzki, Rohwer, & Bittrich (1993); Haynes et al (2020); Meyer (1997b) in FNA3 (1997); Qi et al (2015); Ranney et al (2007); Weaver (1969).

Identification Notes: *Fothergilla major* often occurs with *Hamamelis virginiana*, with which it is easily confused in vegetative condition; a reliable character is the base of the lowermost lateral veins (marginal in *Fothergilla*, included in leaf tissue in *Hamamelis*). Most of the cultivated material of *Fothergilla*, including the best known cultivar 'Mount Airy,' are *Fothergilla* ×*intermedia* Ranney & Fantz, a pentaploid hybrid of tetraploid *F. gardenii* and hexaploid *F. major* (Ranney et al. 2007; Darke 2008).

1 Leaf blades 3.6-13.0 cm wide, at least some on a branch > 5.2 cm wide; leaf bases V-cordate to V-rounded (the lowermost secondary veins forming a V shape in an otherwise larger cordate or rounded base); stamens 14-32, the filaments 7.3-16.2 mm long; [inland provinces, NC and TN south to c. and w. SC, n. GA, and ne. AL; disjunct in nw. AR].....***Fothergilla major***
1 Leaf blades 1.0-6.2 cm wide; leaf base cordate, rounded, truncate, to cuneate, but not V-cordate; stamens 10-24, the filaments 3.6-13.8 mm long; [Coastal Plain, NC to FL Panhandle and s. AL].
  2 Leaf bases cordate; width of blade from the lowermost secondary vein to margin > 0.5× as wide as the distance along the midvein from the lowermost to the next lowermost secondary vein; leaves borne in a drooping posture; petioles 4.4-17.8 mm long.....***Fothergilla parvifolia***
  2 Leaf bases rounded, truncate, or cuneate (rarely shallowly cordate); width of blade from the lowermost secondary vein to the margin < 0.5× as wide as distance along the midvein from the lowermost to the next lowermost secondary vein; leaves borne in a spreading to erect-ascending posture; petioles 2.6-10.5 mm long. .....***Fothergilla milleri***

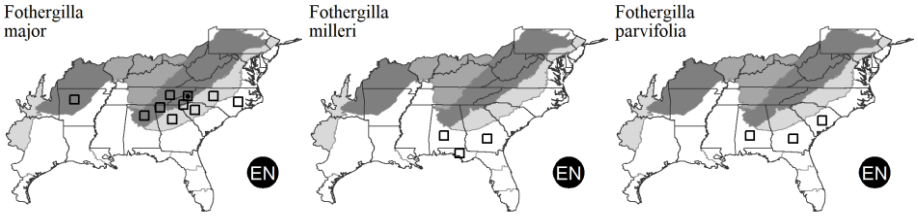
Fothergilla major (Sims) Loddiges. LARGE WITCH-ALDER. **Hab:** Dry ridgetop forests of middle elevation ridges in the mountains, especially along the Blue Ridge Escarpment, summits and upper slopes of Piedmont monadnocks, north-facing bluffs and along small streams in the lower Piedmont. **Dist:** C. NC west to ne. TN, south to nc. GA and nc. AL; disjunct in AR. **Phen:** Apr-May; Jul-Oct. **Tax:** Most cultivated *Fothergilla*

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

(notably the cultivar 'Mt. Airy') is the pentaploid hybrid of *Fothergilla gardenii* × *major* (= *F.* ×*intermedia* Ranney & Fantz) (Ranney et al. 2007). **Comm:** A hexaploid species 2*n*=6*x*=72. **Syn:** = Ar, FNA3, K1, K3, K4, RAB, S, Tn, W, Haynes et al (2020), Weaver (1969). NatureServe G3 (Vulnerable).

Fothergilla milleri W.D. Phillips & J.E. Haynes. MILLER'S WITCH-ALDER. **Hab:** Seepy, acid wetlands. **Dist:** Coastal Plain of wc. GA, s. AL, and Panhandle FL. **Tax:** See Haynes et al. (2020) for detail. A diploid species (2*n*=2*x*=24), and apparently involved as a parental lineage of both *F. gardenii* and *F. major*. **Syn:** = Haynes et al (2020); < *Fothergilla gardenii* Linnaeus – FNA3, GW2, K1, K3, K4, WH3, Weaver (1969).

Fothergilla parvifolia Kearney. KEARNEY'S WITCH-ALDER. **Hab:** Wet savannas, pocosins, and margins of pocosins, and pitcherplant bogs. **Dist:** Inner Coastal Plain (fall-line Sandhills) of SC and inner and outer Coastal Plain of e. GA. **Tax:** A diploid species (Haynes et al. 2020). **Syn:** = Haynes et al (2020); < *Fothergilla gardenii* Linnaeus – FNA3, GW2, K1, K3, K4, RAB, Weaver (1969); >< *Fothergilla parvifolia* Kearney – S.



Hamamelis Linnaeus 1753 (WITCH-HAZEL)

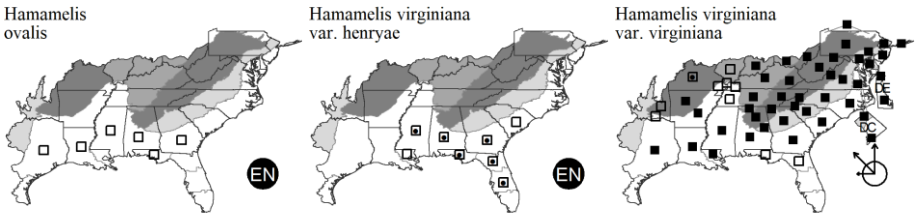
A genus of 5-6 species, shrubs and small trees, of e. North America and e. Asia (China and Japan). References: Endress in Kubitzki, Rohwer, & Bittrich (1993); Jenne (1966); Lane (2005); Leonard (2006); Meyer (1997b) in FNA3 (1997); Wen & Shi (1999).

1 Outer surface of calyx yellow; petals 7-20 mm long, yellow, flowering Oct-Jan; leaves 3.7-16.7 cm long, 2.5-13 cm wide; leaf lateral veins 9 or 10 (5 on one side of the leaf, 4-5 on the other); [plants collectively widespread in our area].
  2 Stellate trichomes of the leaves moderately dense to dense, averaging 0.09 mm across, with 7-11 rays; leaves (3.6-) avg. 6.4 (-10.3) cm long, (1.8-) avg. 4.1 (-6.2) cm wide; petals 7-15 mm long, 0.5-0.8 mm wide; [e. SC south to Panhandle FL, west to se. LA in the Coastal Plain]..... ***Hamamelis virginiana var. henryae***
  2 Stellate trichomes of the leaves sparse to moderately dense, averaging 0.16-0.40 mm across, with 3-6 (-8) rays; leaves (4.7-) avg. 9.9 (-14.0) cm long, (3.9-) avg. 6.6 (-9.2) cm wide; petals 15-20 mm long, 1 mm wide; [widespread in our area]..... ***Hamamelis virginiana var. virginiana***
1 Outer surface of calyx scarlet; petals red or reddish (often yellow-tipped, or rarely completely yellow), flowering late Dec to Apr; leaves 7-24 cm long, 4-17 cm wide; leaf lateral veins 9, 10, or 11 (5 on one side of the leaf, 4, 5, or 6 on the other); [Gulf Coast of GA to TX, Interior Highlands of MO, AR, and OK]. ..... ***Hamamelis ovalis***

Hamamelis ovalis S.W. Leonard. RUNNING WITCH-HAZEL, SOUTHERN RED WITCH-HAZEL, BIGLEAF WITCH-HAZEL. **Hab:** Dry-mesic pineland ravines. **Dist:** Originally believed to be possibly endemic to sc. MS (Perry County) (Leonard 2006), but now found as well in five counties in s. AL (Butler, Clarke, Covington, Crenshaw, and Monroe Counties.) (Keener 2010, Diamond 2013), in e. GA (T. Patrick, pers. comm., 2015), e. TX (Lewandowski, pers. comm., 2016), and w. Panhandle FL (Loran Anderson and Steve Leonard, pers. comm. 2018). **Phen:** Late Dec-early Feb. **Syn:** = K3, K4, Leonard (2006); < *Hamamelis vernalis* Sargent – Tx.

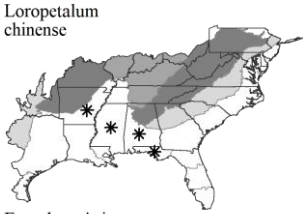
Hamamelis virginiana Linnaeus *var*. ***henryae*** Jenne ex C. Lane. SMALL-LEAVED WITCH-HAZEL. **Hab:** Sandhill margins, xeric hammocks, streamheads. **Dist:** E. SC (Horry and Hampton counties), s. GA, and Panhandle FL west to se. LA. **Phen:** Nov-Jan. **Tax:** Though cited in Lane (2005) as var. *henryi*, the honoree is collector Mary G. Henry; thus the honorific epithet is corrected to the feminine. Additional study is needed of these small-leaved Coastal Plain populations. **Syn:** = *Hamamelis virginiana* var. *henryi* Jenne ex C. Lane – Jenne (1966), Lane (2005), orthographic error; < *Hamamelis virginiana* – FNA3, GW2, K1, K3, K4, S, WH3.

Hamamelis virginiana Linnaeus *var*. ***virginiana***. NORTHERN WITCH-HAZEL. **Hab:** Moist to dryish forests. **Dist:** QC and NS west to n. MI and MN, south to FL and TX. **Phen:** Sep-Dec; Oct-Nov (of the following year). **Comm:** The bark is still gathered in large quantities in the Southern Appalachians, as the source for witch hazel liniment. The name 'witch-hazel' alludes to its superficial resemblance to *Corylus*, the true hazel, and to the 'perversity' of its flowering in the fall as it drops its leaves. **Syn:** = Va, Jenne (1966), Lane (2005); < *Hamamelis virginiana* – Ar, C, FNA3, G, GW2, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Tx, W, WH3, WV; > *Hamamelis virginiana* var. *parvifolia* Nuttall – F; > *Hamamelis virginiana* Linnaeus var. *virginiana* – F.



Loropetalum R. Brown 1828 (LOROPETALUM)

A genus of 3 species, shrubs and small trees, native of China, n. and e. India, and Japan. References: Endress in Kubitzki, Rohwer, & Bittrich (1993); Zhang, Zhang, & Endress (2003).



Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no E. and se. Asia; P : planted; ? : questionable

124. HAMAMELIDACEAE

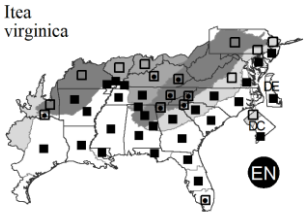
Identification Notes: *Loropetalum* has leaves that are reminiscent of *Hamamelis* in their oblique base and distichous array on the twigs, but the leaves are much smaller and only obscurely toothed.

* ***Loropetalum chinense*** (R. Brown) Oliver. LOROPETALUM. **Hab:** Disturbed urban and suburban areas, spreading at least locally around plantings in suburban and urban areas, both by seed and by root sprouts. **Dist:** Native of e. Asia. **Comm:** Var. *rubrum* seems to be merely a form; root sprouts revert from pink to white petal color and coppery to green leaf color. **Syn:** = K4; > *Loropetalum chinense* var. *rubrum* Yieh – Zhang, Zhang, & Endress (2003).

127. ITEACEAE J. Agardh 1858 (SWEETSPIRE FAMILY) [in SAXIFRAGALES]

A family of 1 genus and about 27 species, shrubs, of e. and se. Asia (about 25 species), e. North America (1 species), and sub-Saharan Africa (1 species). References: Kubitzki, Bayer, & Stevens (2007); Morin (2009a) in FNA8 (2009).

Itea Linnaeus 1753 (VIRGINIA-WILLOW, SWEETSPIRE, TASSEL-WHITE)



A genus of about 27 species, shrubs and trees, all but 2 (ours and 1 in sub-Saharan Africa) are in e. and se. Asia. The closest relative of our species is *I. japonica* Oliver, of Japan. Variously treated in a very broadly-conceived Saxifragaceae (RAB, F, G, GW, W), a less comprehensive Grossulariaceae (C, K), a narrow Escalloniaceae, or a very narrow (single genus) Iteaceae (S), the relationships of *Itea* remain problematic. Recent molecular data suggest that the relationship between *Itea* and other woody "saxifragaceous" genera (including *Escallonia*) is only distant (Morgan & Soltis 1993). *Itea* is here conservatively treated in a narrow Iteaceae. References: Bohm et al (1999); Kubitzki, Bayer, & Stevens (2007); Morgan & Soltis (1993); Morin (2009a) in FNA8 (2009); Spongberg (1972).

Identification Notes: Sometimes confused needlessly with *Clethra*, whose much more coarsely serrate, obovate leaves contrast with the serrulate, elliptic leaves of *Itea*. Also often confused with *Eubotrys racemosus* in vegetative condition.

Itea virginica Linnaeus. VIRGINIA-WILLOW, SWEETSPIRE, TASSEL-WHITE. **Hab:** Moist forests and thickets, especially along the banks of streams. **Dist:** S. NJ south to s. FL and west to e. TX and OK, north in the interior (especially in the Mississippi Embayment) to s. IL and se. MO. **Phen:** Apr-Jun. **Syn:** = Ar, C, F, FNA8, G, GW2, Il, K1, K3, K4, Pa, RAB, S, Tn, Tx, Va, W, WH3. NatureServe G4 (Apparently Secure).

128. GROSSULARIACEAE A.P. de Candolle 1805 (CURRANT FAMILY) [in SAXIFRAGALES]

A family of one genus, of the northern hemisphere and montane South America (Andes). The familial distinction from the Saxifragaceae is supported by recent molecular data, though the affinities of Grossulariaceae and Saxifragaceae (sensu stricto) are closer than those of many other groups traditionally included in the Saxifragaceae, such as *Parnassia*, *Lepuropetalon*, and *Penthorum* (Morgan & Soltis 1993). References: Morin (2009b) in FNA8 (2009); Weigend in Kubitzki, Bayer, & Stevens (2007).

Ribes Linnaeus 1753 (CURRANT, GOOSEBERRY)

A genus of 150-200 species, temperate, of the Northern Hemisphere and montane South America. The genus is separated into distinctive subgenera, these sometimes maintained as full genera (as by S). A molecular study suggests that recognition of *Grossularia* as a genus distinct from *Ribes* is not warranted, though it does form a monophyletic group nested within *Ribes* s.l. (Senters & Soltis 2003; Weigend, Mohr, & Motley 2002). The dried "currants" commonly available in stores are actually raisins made from a small variety of grape, and have nothing to do with *Ribes*. References: Minney & Landsman (2018); Morin (2009b) in FNA8 (2009); Schultheis & Donoghue (2004); Senters & Soltis (2003); Sinnott (1985); Spongberg (1972); Weigend in Kubitzki, Bayer, & Stevens (2007); Weigend, Mohr, & Motley (2002).

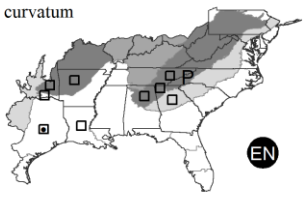
6 Calyx lobes 7.5-9 mm long; stamens 6-7.5 mm long ..... ***Ribes curvatum***
6 Calyx lobes 2.5-4 mm long; stamens 1-2 mm long or 4-6 mm long
..... ***Ribes cynosbati***

Ribes curvatum Small. GRANITE GOOSEBERRY. **Hab:** Rocky upland and riparian forests and woodlands, bluffs, glade margins. **Dist:** E. TN, AR, and OK south to GA, AL, LA, and TX. Also reported for NC by Sinnott (1985); the specimens came from cultivated plants in a botanist's garden, so there is no evidence that *R. curvatum* is a native or naturalized component of NC's flora. **Phen:** Mar-May. **Syn:** = Ar, FNA8, K3, K4, Tn, Tx, Sinnott (1985); = *Grossularia curvata* (Small) Coville & Britton – S. NatureServe G4 (Apparently Secure).

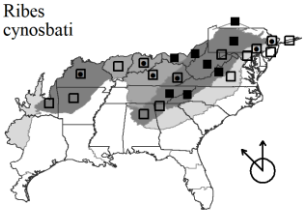
Ribes cynosbati Linnaeus. PRICKLY GOOSEBERRY, DOGBERRY. **Hab:** Moist slopes, periglacial boulderfields, talus, grassy balds, especially at medium to high elevations. **Dist:** NB, ON, MN, and ND south to w. NC, e. TN, n. GA, n. AL, AR, and OK. **Phen:** Apr-Jun; Jul-Sep. **Syn:** = C, FNA8, G, GrPl, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, Tn, Va, W, WV, Sinnott (1985); = *Grossularia cynosbati* (Linnaeus) P. Miller – S; > *Ribes cynosbati* var. *cynosbati* – F; > *Ribes cynosbati* var. *glabratum* Fernald – F. NatureServe G5 (Secure).

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated

Ribes curvatum



Ribes cynosbati



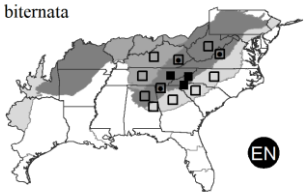
129. SAXIFRAGACEAE A.L. de Jussieu 1789 (SAXIFRAGE FAMILY) [in SAXIFRAGALES]

If narrowly circumscribed (as here), a family of about 35 genera and 500-650 species, herbs (mainly perennial), nearly cosmopolitan, but especially diverse in warm temperate and cold temperate regions of North America and Eurasia. The circumscription of a much narrower Saxifragaceae is clearly warranted, based on a wide variety of data, and strongly corroborated by molecular data (Morgan & Soltis 1993 and many later references).
References: Morgan & Soltis (1993); Soltis in Kubitzki, Bayer, & Stevens (2007); Spongberg (1972); Wells & Elvander (2009) in FNA8 (2009).

1 Leaves compound ..... ***Astilbe***
1 Leaves simple (sometimes cleft or lobed).
  2 Stem creeping, the leaves all cauline, opposite; leaves short-petioled or sessile, < 2 cm long ..... ***Chrysosplenium***
  2 Stem erect, the leaves mostly or entirely basal, alternate (stem leaves opposite in *Mitella*); leaves long-petioled, > 4 cm long (except short-petioled or sessile and sometimes < 4 cm long in *Micranthes*).
    3 Basal leaves short-petioled or sessile, the petioles 0-1× as long as the blade; basal leaves cuneate or rounded at the base; leaf venation predominately pinnate.
      4 Leaves entire, serrate, or coarsely dentate. ..... ***Micranthes***
      4 Leaves deeply trilobed ..... ***Saxifraga tridactylites***
    3 Basal leaves long-petioled, the petioles (1-) 2-5× as long as the blade; basal leaves cordate at the base; leaf venation predominantly palmate. {add to key *Saxifraga (stolonifera)*}
      5 Petals fimbriate; inflorescence a raceme; flowers on pedicels 1-2 (-5) mm long ..... ***Mitella***
      5 Petals not fimbriate; inflorescence a panicle or raceme; flowers mostly on pedicels > 3 mm long.
        6 Inflorescence racemose; stamens 10 ..... ***Tiarella***
        6 Inflorescence paniculate; stamens 5.
          8 Stems normally with several petiolate leaves much like the basal leaves (though typically somewhat smaller); ovary with 2 locules; leaves cleft > ½ way to base ..... ***Boykinia***
          8 Stems with only very reduced sessile bracts unlike the basal leaves; ovary with 1 locule; leaves cleft < ½ way to base ..... ***Heuchera***

Astilbe Buchanan-Hamilton ex D. Don 1825 (ASTILBE, FALSE GOAT'S-BEARD)

Astilbe biternata

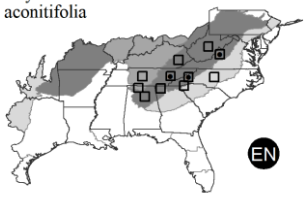


A genus of 14-25 species, perennial herbs, of e. Asia and e. North America. References: Mellichamp (2009a) in FNA8 (2009); Soltis in Kubitzki, Bayer, & Stevens (2007); Zhu et al (2013).

Identification Notes: Superficially, *Astilbe* is quite similar to *Aruncus* (Rosaceae). *Astilbe* may be distinguished by the following characteristics: pubescence of the stem and lower leaf surface glandular, plants monoecious, carpels 2 per flower, stamens 10 per flower (vs. *Aruncus*: pubescence nonglandular, plants dioecious, carpels 3-4 per flower, stamens 15-20 per flower).

Astilbe biternata (Ventenat) Britton. APPALACHIAN ASTILBE, APPALACHIAN FALSE GOAT'S-BEARD. **Hab:** Cove forests, seepage slopes, boulderfield forests. **Dist:** VA, sw. WV, and KY south to n. GA. **Phen:** May-Jun; Jul-Aug. **Syn:** = C, F, G, K1, K3, K4, S, Tn, Va, W; < *Astilbe biternata* (Ventenat) Britton – FNA8, RAB. NatureServe G4G5 (Apparently Secure).

Boykinia aconitifolia



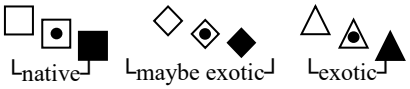
Boykinia Nuttall 1834 (BOYKINIA)

A genus of 7 species, herbs, of e. Asia, e. North America, and w. North America, a classic relictual distribution. The other species are distributed primarily in the Pacific Northwest or Rocky Mountains, with several endemics in Japan and an endemic in the unglaciated portions of AK and e. Siberia. References: Gornall (2009) in FNA8 (2009); Soltis in Kubitzki, Bayer, & Stevens (2007).

Identification Notes: Sometimes mistaken in vegetative condition for *Trautvetteria*, which is a coarser plant, often occupying similar habitats.

Boykinia aconitifolia Nuttall. BROOK-SAXIFRAGE, ACONITE-SAXIFRAGE, EASTERN BOYKINIA, ALLEGHENY BROOKFOAM. **Hab:** Streambanks, riverbanks, in crevices in spray cliffs around waterfalls, seepages. **Dist:** A Southern Appalachian endemic: sw. VA and s. WV, south through w. NC, e. TN, and nw. SC, to n. GA and ne. AL. **Phen:** Jun-Jul. **Tax:** Apparently closely related to the Japanese endemic *B. lycoctonifolia* (Maximowicz) Engler. **Syn:** = C, F, FNA8, G, GW2, K1, K3, K4, RAB, Tn, Va, W; = *Therophon aconitifolium* (Nuttall) Millspaugh – S. NatureServe G4 (Apparently Secure).

Key to Map Symbology:

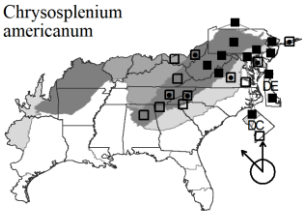


←rare ←uncommon ←common (see introduction for more)

* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable

X : extirpated



Chrysosplenium Linnaeus 1753 (GOLDEN-SAXIFRAGE)

A genus of about 60 species, herbs, of Europe, ne. Asia, n. North America, n. Africa, and temperate South America. References: Freeman & Levsen (2009) in FNA8 (2009); Soltis in Kubitzki, Bayer, & Stevens (2007).

Chrysosplenium americanum Schweinitz ex Hooker. GOLDEN-SAXIFRAGE, WATER-MAT, WATER-CARPET. **Hab:** In shaded, rocky, gravelly, and/or mossy seeps and seepage swamps. **Dist:** QC west to SK, south to e. VA, w. NC, n. GA, e. TN, and n. IN. **Phen:** Mar-Jun. **Syn:** = C, F, FNA8, G, GW2, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Va, W. NatureServe G5 (Secure).

Heuchera Linnaeus 1753 (ALUMROOT)

Contributed by R.A. Folk and A.S. Weakley

A genus of about 37 (or more) species, perennial herbs, of North America. Sections and subsections recognized follow Folk & Freudenstein (2014). References: Folk & Freudenstein (2014); Folk & Freudenstein (2015); Folk et al (2018); Rosendahl, Butters, & Lakela (1936); Schuette et al (2018); Soltis in Kubitzki, Bayer, & Stevens (2007); Wells & Shipes (2009) in FNA8 (2009); Wells (1979); Wells (1984).

Identification Notes: Vegetatively, *Heuchera* resembles *Tiarella* and *Mitella*. *Heuchera* usually has leaves as wide as long and with prominent variegation, while *Tiarella* and *Mitella* usually have leaves longer than wide and lacking variegation (except in cultivated forms of *Tiarella*).

1 Calyx glandular-villous, white or pink, often with green-tipped lobes, 1.3-3.3 mm long, 1.1-2.9 mm in diameter; free hypanthium 0.1-0.4 mm long; petals linear or oblanceolate, 2-3× as long as the calyx lobes, glabrous; plants flowering (Jun-) Jul-Oct; [section *Holochloa*, subsection *Villosae*].
  2 Leaves with widely to narrowly triangular lobes and triangular teeth; petals linear, often coiled; seeds echinate; internodes of flora branches 0.3-2.9 mm long.
    4 Leaves shallowly lobed, the terminal lobe wider than long; bracts of the inflorescence oblong to spatulate, at least the lower ones toothed; petioles densely villous; rhizomes > 1 cm in diameter; lower leaf surface hirsute; [of the Alleghenies, Cumberlands, and Interior Low Plateau, usually in calcareous or subcalcareous substrates] ..... ***Heuchera macrorhiza***
    4 Leaves deeply and sharply lobed, the terminal lobe longer than wide; bracts of the inflorescence linear, rarely toothed; petioles loosely villous; rhizomes < 1 cm in diameter; lower leaf surface glabrous to sparsely pubescent; [primarily of Ridge and Valley, Blue Ridge, and upper Piedmont, usually in very acidic substrates] ..... ***Heuchera villosa***
  2 Leaves with rounded lobes and rounded teeth; petals oblanceolate, reflexed; seeds smooth; internodes of floral branches 2.5-11.2 mm long. ..... ***Heuchera missouriensis***
1 Calyx glandular-puberulent, greenish, 2.9-13.2 mm long, 2.4-7.5 mm in diameter; free hypanthium 0.6-7.0 mm long; petals rhombic-spatulate, slightly shorter to slightly longer than the calyx lobes, glandular-puberulent on the lower surface; plants flowering Apr-Jun; [section *Heuchera*, subsection *Heuchera*].
  8 Free hypanthium < 2 mm long; calyx weakly zygomorphic; calyx urceolate, subglobose, or campanulate. ..... ***Heuchera americana***
  8 Free hypanthium > 2 mm long; calyx weakly to strongly zygomorphic; calyx subglobose, campanulate, or tubular. ..... ***Heuchera longiflora***

Heuchera americana Linnaeus. AMERICAN ALUMROOT. **Hab:** Rocky forests, rock outcrops, particularly where soils are subacidic to circumneutral. **Dist:** CT and NY west to s. ON, n. IN, s. IL, and sc. MO south to c. GA, c. AL, n. MS, n. LA, and ne. TX. **Phen:** Apr-Aug. **Tax:** *Heuchera americana* var. *heteradenia* may warrant recognition, and is likely the basis of some eastern records considered to be *H. hirsuticaulis*; further study is needed. **Comm:** *H. americana* is the most widespread species of *Heuchera* in e. North America. Within the range of *H. caroliniana*, *H. americana* is nearly absent. **Syn:** = C, Pa, Va; = *Heuchera americana* var. *americana* – Ar, FNA8, K1, K3, K4, NE, NY, Tn, Schuette et al (2018), Wells (1984); < *Heuchera americana* Linnaeus – RAB, W; > *Heuchera americana* var. *americana* – F, G, WV; > *Heuchera americana* var. *brevipetala* Rosendahl, Butters, & Lakela – G, NcTx, Tx, Rosendahl, Butters, & Lakela (1936); > *Heuchera americana* var. *calycosa* (Small) Rosendahl, Butters, & Lakela – Rosendahl, Butters, & Lakela (1936); > *Heuchera americana* var. *heteradenia* Fernald – F; > *Heuchera americana* var. *subtruncata* Fernald – F; > *Heuchera americana* var. *typica* – Rosendahl, Butters, & Lakela (1936); > *Heuchera calycosa* Small – S; > *Heuchera curtisii* – S; > *Heuchera lancipetala* Rydberg – S. NatureServe G5T5 (Secure).

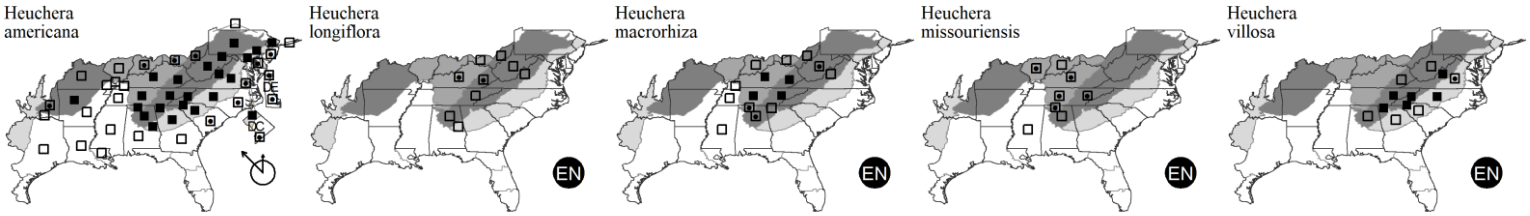
Heuchera longiflora Rydberg. LONG-FLOWERED ALUMROOT. **Hab:** Rich shaded forests and woodlands over calcareous rocks such as limestone, dolostone, or calcite-cemented shales, siltstones, or sandstones, in circumneutral soils. **Dist:** This species is nearly limited to sedimentary rocks, occurring in e. and c. KY, s. OH, sw. WV, sw. VA, ne. TN, and c. AL. **Phen:** May-Jun. **Tax:** Wells (1984) calls *H. longiflora* × *aceroides* "most distinctive", "characterized by a unique combination of floral characters: long, tubular calyx, deeply included styles, inflexed calyx lobes and petals that close the mouth of the flower obliquely, and horizontal orientation of the flowers". **Syn:** = *Heuchera longiflora* var. *longiflora* – Folk et al (2018); = *Heuchera longiflora* var. *typica* – Rosendahl, Butters, & Lakela (1936); < *Heuchera longiflora* Rydberg – C, F, FNA8, G, K1, K3, K4, Tn, W, WV, Wells (1984); > *Heuchera longiflora* Rydberg – S; ? *Heuchera pubescens* Pursh – RAB, misapplied; > *Heuchera scabra* Rydberg – S.

Heuchera macrorhiza Small. GIANT ALUMROOT. **Hab:** Cliffs, riverbanks, especially in calcareous or subcalcareous substrates. **Dist:** S. WV, s. OH, and s. IN south through c. KY and c. TN to n. AL and ne. MS. **Phen:** (Late Apr) May-Jul (and sometimes reblooming Sep-Oct). **Tax:** This taxon has usually been disregarded in recent years, but is recognized by Chester et al. (1997). This plant is generally sharply distinct from typical *H. villosa*, and actually may be more closely related to *H. arkansana*. A few intermediates and intergrades with *H. villosa* may be encountered; they have been called *H. villosa* var. *intermedia*. In the Ozarks of AR, *H. macrorhiza* is replaced by the related *H. arkansana* Rydberg [*H. villosa* var. *arkansana* (Rydberg) E.B. Smith] with shorter and narrower inflorescence, shorter pedicels, and larger flowers. "*Heuchera macrorhiza* differs from typical *villosa* (Small 1898, F, W) in its relatively short, broad bractlets, which are densely long-ciliate (versus narrowly lanceolate to subulate, glabrous to thinly ciliate); bracts are oblong to spathulate, and at least the lower ones toothed (versus linear, mostly entire); its stems are "shaggily" villous (versus loosely); leaves are hirsute below, with long soft hairs along veins (versus glabrous to thinly hairy, with appressed stiff hairs along veins); leaf lobes are all shallow, much broader than long (versus deep and sharp, especially the terminal); rhizomes are ca. 1-2 cm thick (versus 5-9

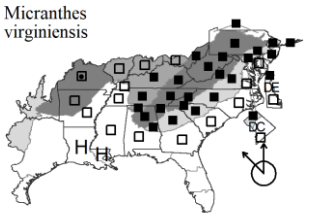
mm)" (Campbell 2012). **Comm:** *Heuchera macrorhiza* is popular horticulturally as a native wildflower, almost invariably labeled as "*Heuchera villosa*". **Syn:** = S, S; = *Heuchera villosa* Michaux var. *macrorhiza* (Small) Rosendahl, Butters, & Lakela – G, Tn; > *Heuchera villosa* var. *intermedia* Rosendahl, Butters, & Lakela – F, WV, Rosendahl, Butters, & Lakela (1936); > *Heuchera villosa* Michaux var. *macrorhiza* (Small) Rosendahl, Butters, & Lakela – F, WV, Rosendahl, Butters, & Lakela (1936); < *Heuchera villosa* Michaux var. *villosa* – C, FNA8, K1, K3, K4, Wells (1984).

Heuchera missouriensis Rosendahl. INTERIOR LOW PLATEAU GROTTO ALUMROOT. **Hab:** Shaded cliff bases, usually under overhangs, on grotto floors, nearly always in deeply shaded situations where little or no direct sunlight falls. **Dist:** S. IN and s. IL south through Cumberland TN to n. AL and ne. MS (Tishomingo County). **Phen:** Jul-Sep. **Tax:** See Folk & Freudenstein (2014, 2015) for discussion of this species. **Syn:** = K4, Folk & Freudenstein (2015); < *Heuchera parviflora* – S, Tn; < *Heuchera parviflora* Bartling var. *parviflora* – C, FNA8, K1, K3, Wells (1984); < *Heuchera parviflora* var. *rugelii* (Shuttleworth) Rosendahl, Butters, & Lakela – F, G, Il, Rosendahl, Butters, & Lakela (1936).

Heuchera villosa Michaux. CRAG-JANGLE, ROCK ALUMROOT. **Hab:** In crevices of rock outcrops, or in thin soil over boulders, a characteristic component of the flora of high elevation cliffs and summits (to at least 1920 m), not particular about the rock type, occurring on a wide range of rock types in our area, including felsic gneisses and schists, mafic gneisses, granites, quartzites, and others, probably the most acidophilic of our taxa of *Heuchera*. **Dist:** W. VA and s. WV south through w. NC and e. TN to nw. SC, n. GA, ne. AL (primarily a Southern Blue Ridge endemic). **Phen:** Late Jun-Oct. **Tax:** See *H. macrorhiza* for discussion of that taxon, not included in *H. villosa* in this treatment. **Syn:** = S; = *Heuchera villosa* var. *typica* – Rosendahl, Butters, & Lakela (1936); = *Heuchera villosa* Michaux var. *villosa* – F, G, Tn, Va; < *Heuchera villosa* Michaux – RAB, W; < *Heuchera villosa* Michaux var. *villosa* – C, FNA8, K1, K3, K4, Wells (1984). NatureServe G5T5 (Secure).



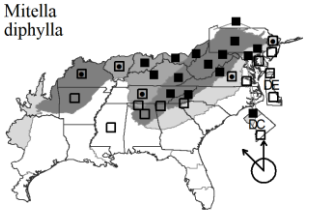
Micranthes Haworth 1812 (SAXIFRAGE)



A genus of about 85 species, perennials, mostly of north temperate, boreal, and arctic regions of North America, South America, and Eurasia. As shown by molecular data, *Saxifraga*, as often broadly defined, is polyphyletic, and all of our native species belong in *Micranthes* (Soltis 1995, Soltis et al. 1996, Mort & Soltis 1999, Tkach et al. 2015). Soltis et al. (1996) demonstrate that *Micranthes* is closely allied with *Heuchera*, *Mitella*, and *Tiarella*, less closely related to *Astilbe*, *Boykinia*, *Sullivantia*, and *Chrysosplenium*, and least closely related to the bulk of *Saxifraga*. Sectional classification follows Tkach et al. (2015). References: Brouillet & Elvander (2009a) in FNA8 (2009); Brouillet & Gornall (2007); Cushman, Richards, & McMillan (2020); Lanning & Mathews (2019); Lanning (2009); Soltis in Kubitzki, Bayer, & Stevens (2007); Tkach, Röser, & Hoffmann (2015).

Micranthes virginiensis (Michaux) Small. EARLY SAXIFRAGE. **Hab:** Rock outcrops, moist alluvial and slope forests, streambanks, riverbanks. **Dist:** NB west to MB, south to c. GA, LA, and AR. **Phen:** Feb-Jun. **Syn:** = Ar, FNA8, Il, K3, K4, Mi, NE, NY, S, Tn, Va, Brouillet & Gornall (2007), Tkach, Röser, & Hoffmann (2015); = *Saxifraga virginiensis* Michaux – C, F, G, GW2, Pa, RAB, W, WV; > *Saxifraga virginiensis* var. *virginiensis* – K1.

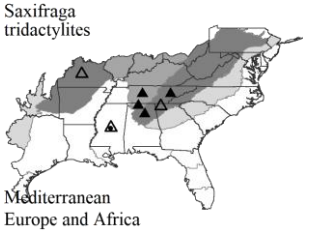
Mitella Linnaeus 1753 (MITERWORT)



As traditionally circumscribed, a genus of about 20 species, herbs, of cold temperate e. North America, w. North America, and e. Asia. Soltis (2007), Okuyama, Pellmyr, & Kato (2008), and Folk & Freudenstein (2014) indicate that *Mitella* as currently circumscribed is polyphyletic and is likely to be divided; our species will remain in a narrowly circumscribed *Mitella* of 2-3 species. References: Soltis in Kubitzki, Bayer, & Stevens (2007); Soltis & Freeman (2009) in FNA8 (2009).

Mitella diphylla Linnaeus. TWO-LEAVED MITERWORT. **Hab:** Mesic, rocky forests, rocky seeps, and seepage swamps, especially over mafic or calcareous rocks. **Dist:** QC west to MN, south to e. VA, w. NC, nw. SC, ne. GA, nw. GA, MO, and n. AR. **Phen:** Apr-Jun. **Comm:** The fringed petals will reward a close look. **Syn:** = Ar, C, F, FNA8, G, GW2, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Va, W, WV. NatureServe G5 (Secure).

Saxifraga Linnaeus 1753 (SAXIFRAGE)



A genus of ca. 390 species, herbs (mainly perennial), of mainly north temperate regions. Sectional classification follows Tkach et al. (2015). References: Alley et al (2020); Brouillet & Elvander (2009b) in FNA8 (2009); Ladd (2019); Tkach, Röser, & Hoffmann (2015).

* ***Saxifraga tridactylites*** Linnaeus. RUE-LEAVED SAXIFRAGE. **Hab:** Gravel and thin soils along roads and highways and in parking lots, especially in calcareous areas. **Dist:** Native of Mediterranean Europe, n. Africa, and w. Asia. Reported for MO by Ladd (2019). See Alley et al. (2020) for detailed information on the naturalization of this species in our region. **Syn:** = FNA8, K3, K4, Alley et al (2020), Ladd (2019). NatureServe GNR (Not Yet Ranked).

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more)

* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable
X : extirpated

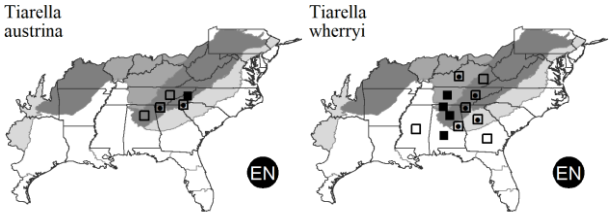
Tiarella Linnaeus 1787 (FOAMFLOWER)

A genus of 3-6 species, perennial herbs, of temperate North America and e. Asia. References: Fernald (1943); Jog (2009) in FNA8 (2009); Lakela (1937); Nesom (2021a); Soltis in Kubitzki, Bayer, & Stevens (2007); Spongberg (1972); Wherry (1940); Wherry (1949).

1 Plants always with herbaceous, leafy stolons.
..... ***Tiarella austrina***
1 Plants without herbaceous, leafy stolons.
..... ***Tiarella wherryi***

Tiarella austrina (Lakela) Nesom. **Hab:** Moist forests, cove forests, rock outcrops, well-drained bottomland forests. **Dist:** S. Blue Ridge of sw. NC, se. TN, nw. SC, ne. GA; disjunct slightly westwards in sc. TN and n. AL. **Syn:** = Nesom (2021a); = n/a – RAB.

Tiarella wherryi Lakela. **Hab:** Moist forests, cove forests, rock outcrops, well-drained bottomland forests. **Dist:** KY south through TN to GA, AL, and MS. **Syn:** = Nesom (2021a).

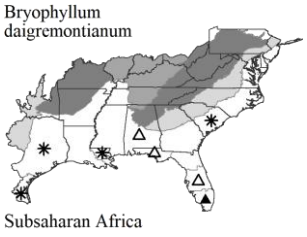


130. CRASSULACEAE J. Saint-Hilaire 1805 (STONECROP FAMILY) [in SAXIFRAGALES]

A family of about 34-35 genera and 1100-1410 species, succulent shrubs and herbs, nearly cosmopolitan, but with centers of diversity in s. Africa and Mexico. References: Gontcharova, Artyukova, & Gontcharov (2006); Messerschmid et al (2020); Moran (2009a) in FNA8 (2009); Nikulin et al (2016); Thiede & Eggli (2007) in Kubitzki, Bayer, & Stevens (2007).

1 Leaves connate at the base, opposite; flowers solitary in the axils of leaves; flowers 3-4-merous; [subfamily *Crassuloideae*] ..... ***Crassula***
1 Leaves distinct, whorled or alternate; flowers in terminal cymose inflorescences; flowers 4-5 (-8)-merous.
2 Petals connate as a tube; leaves serrate, bearing plantlets in the serrations; [subfamily *Kalanchoideae*] ..... ***Bryophyllum***
2 Petals distinct or at most basally connate; leaves entire, crenate, or serrate, but not bearing plantlets along the margin; [subfamily *Sempervivoideae*].
5 Perennials without rosettes, the stems 0.5-10 dm tall (dying back in winter to the rootstock); leaves large, relatively thin in texture, usually 5-25 times as wide as thick, often crenate; flowers pink, purple, white, or greenish.
..... ***Hylotelephium***
5 Perennials or annuals with or without rosettes, the stems < 2 dm tall (the perennials with stems persistent through the winter); leaves smaller, flat or terete, relatively thicker, entire; flowers white or yellow; [tribe *Sedeae*].
9 Carpels united basally (to about 1/3 their length); petals cucullate, initially partly enclosing 4 of the 8 stamens; follicles dehiscing by a tear-shaped valve on the lower surface; stem and leaves normally red; [of granitic flatrocks of the Piedmont of GA, NC, SC, and VA, and sandstone glades in TN, nw. GA, and AL] ..... ***Diamorpha smallii***
9 Carpels free; petals flat, never enclosing any of the 8 anthers; follicle dehiscing by a longitudinal slit along the adaxial (upper) suture; stem and leaves normally green, sometimes somewhat pink or reddish; [collectively of various habitats, including similar habitats as *Diamorpha*] ..... ***Sedum***

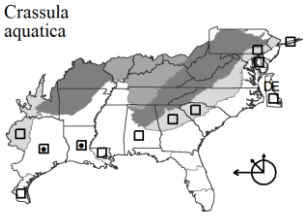
Bryophyllum Salisbury 1805



A genus of about 30 species, perennial herbs, of islands of the Indian Ocean. *Bryophyllum* is often treated as a subgenus of *Kalanchoe*; the appropriate names for our species in *Kalanchoe* are provided in synonymy. References: Moran (2009e) in FNA8 (2009); Thiede & Eggli (2007) in Kubitzki, Bayer, & Stevens (2007).

* ***Bryophyllum daigremontianum*** (Raymond-Hamet & H. Perrier) A. Berger. MATERNITY PLANT, DEVIL'S BACKBONE, ALLIGATOR-PLANT, MOTHER-OF-MILLIONS. **Hab:** Disturbed areas. **Dist:** Native of Madagascar. Barger et al. (2012) describe the first naturalizing population in AL; McNair, Alford, & Turnbull (2014) describe its naturalization in Orleans Parish, LA. **Phen:** Jan-Dec. **Syn:** = FNA8; = *Kalanchoe daigremontiana* Raymond-Hamet & H. Perrier – Bah, K3, K4, WH3. NatureServe GNR (Not Yet Ranked).

Crassula Linnaeus 1753



A genus of 195-250 species, nearly cosmopolitan (centered in s. Africa). Mort et al. (2009) provide strong evidence supporting the inclusion of *Tillaea* in *Crassula*. References: Bywater & Wickens (1984); Moran (2009b) in FNA8 (2009); Mort et al (2009); Thiede & Eggli (2007) in Kubitzki, Bayer, & Stevens (2007).

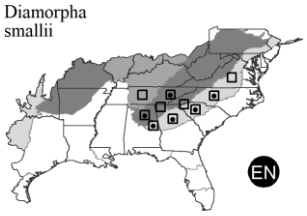
Crassula aquatica (Linnaeus) Schönland. PYGMYWEED. **Hab:** Tidal marshes and shores, shores and mudflats

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

of artificial lakes and reservoirs. **Dist:** Occurring in tidal marshes and shores, south to MD and se. PA, and also inland along shores and mudflats of inland reservoirs in SC, GA, and AL (Kartesz 1999, FNA, England 2013). Reported for AL by England (2013). **Phen:** Apr-Aug; May-Sep. **Tax:** Inland records have fruiting pedicels 1-19 mm long (such populations sometimes considered as the segregate taxon *C. saginoides*), while coastal populations have fruiting pedicels which remain < 1 mm long. **Syn:** = FNA8, K1, K3, K4, NE, Pa; = *Tillaea aquatica* Linnaeus – GW2; = *Tillaeastrum aquaticum* (Linnaeus) Britton – S; > *Crassula aquatica* (Linnaeus) Schönland – Bywater & Wickens (1984); > *Crassula saginoides* (Maximilian) Bywater & Wickens – Bywater & Wickens (1984); < *Tillaea aquatica* Linnaeus var. *aquatica* – Tx.

Diamorpha Nuttall 1818 (ELF-ORPINE)

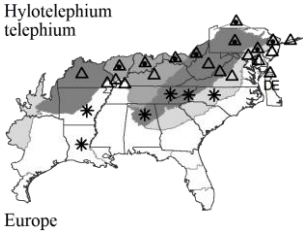
A monotypic genus, a succulent annual, endemic to se. North America. It is quite likely that *Diamorpha* will be re-included in *Sedum*, unless alternatively *Sedum* is itself split finely (Thiede & Eggli 2007). References: Clausen (1975); Moran (2009h) in FNA8 (2009); Thiede & Eggli (2007) in Kubitzki, Bayer, & Stevens (2007); Wilbur (1988a).



Diamorpha smallii Britton ex Small. ELF-ORPINE. **Hab:** In very thin soil (generally less than 2 cm deep) of vernally wet depressions on granite and sandstone flatrocks and other acidic outcrops. **Dist:** Primarily limited to granitic flatrocks of the Piedmont, ranging from sc. VA to ec. AL, and on sandstone from se. TN south into c. AL. **Phen:** Apr-May; May-Jun. **Comm:** This species is both one of the most typical and one of the most interesting of the dozens of species endemic (or largely so) to granite flatrocks of the southeastern Piedmont. See Wilbur (1988a) for a thorough discussion of the muddled nomenclatural history of this remarkable species, as well as for a detailed summary of systematic and ecological information. **Syn:** = FNA8, GW2, K1, K3, K4, Tn, Va, Wilbur (1988a); = *Diamorpha cymosa* (Nuttall) Britton ex Small – Clausen (1975); = *Sedum smallii* (Britton ex Small) H.E. Ahles – RAB, W; > *Diamorpha cymosa* (Nuttall) Britton ex Small – S; > *Diamorpha smallii* Britton ex Small – S. NatureServe G4 (Apparently Secure).

Hylotelephium H. Ohba 1977 (LIVE-FOR-EVER)

A genus of about 30 species, of temperate Eurasia and North America. References: Clausen (1975); Moran (2009f) in FNA8 (2009); Thiede & Eggli (2007) in Kubitzki, Bayer, & Stevens (2007).



* ***Hylotelephium telephium*** (Linnaeus) H. Ohba. LIVE-FOR-EVER. **Hab:** Disturbed areas. **Dist:** Native of Europe. **Phen:** Sep-Oct; Oct-Nov. **Syn:** = FNA8, Il, K4, Mi, Pa, Va; = *Hylotelephium telephium* ssp. *telephium* – K1, K3; > *Hylotelephium telephium* ssp. *fabaria* (W.D.J. Koch) H. Ohba – NE; > *Hylotelephium telephium* ssp. *telephium* – NE; > *Sedum purpureum* (Linnaeus) Link – C, F, RAB, WV, Clausen (1975); > *Sedum telephium* – F, Pa; > *Sedum telephium* ssp. *fabaria* (Koch) Schinz & R. Keller – G; > *Sedum telephium* Linnaeus ssp. *purpureum* (Link) Schinz & R. Keller – G.

Sedum Linnaeus 1753 (STONECROP, ORPINE, SEDUM)

A genus of perhaps 200 species, depending on circumscription. There is considerable controversy about the circumscription of the genus *Sedum*. *Diamorpha* is usually separated, but Thiede & Eggli (2007) include it in *Sedum*. The removal from *Sedum* of the plants treated here in genera *Aizopsis*, *Hylotelephium*, *Petrosedum*, *Phedimus*, and *Rhodiola* is uncontroversial. Other segregates from *Sedum* which would affect the species treated below have been proposed, such as *Chetyson*, *Clausenellia*, and *Oreosedum* (see synonymy); these remain controversial, with some advocating for them and others for a broad (remnant of) *Sedum*. The circumscription of a broad remnant of *Sedum* would likely also include *Diamorpha* and *Lenophyllum*. References: Calie (1981); Clausen (1975); Messerschmid et al (2020); Nikulin et al (2016); Ohba (2009) in FNA8 (2009); Thiede & Eggli (2007) in Kubitzki, Bayer, & Stevens (2007).

Identification Notes: Other species of *Sedum* are grown as ornamentals, especially in rock gardens; some are aggressive and rather weedy and can be expected eventually to become a naturalized part of our flora.

Unkeyed taxa: *Sedum diffusum*

1 Leaves primarily whorled in 3's or 4's (to 5's).
  2 Largest leaves distinctly spatulate, much wider than thick, 8-20 mm wide; flowers and fruits 4-merous; petals white; [native, of moist forest and rock outcrops]; [section *Ternata*] ..... ***Sedum ternatum***
  2 Largest leaves linear-lanceolate, oblanceolate, or elliptic, almost as thick as wide, < 7 mm wide; flowers and fruits 5-merous; petals yellow; [alien]. ..... ***Sedum sarmentosum***
1 Leaves primarily alternate.
  5 Flowers and fruits 5-merous. ..... ***Sedum acre***
  5 Flowers and fruits 4-merous.
    9 Leaves of flower-bearing stems linear, sagittate-spurred at the base (the spurs clasping the stem); petals pink to white; annual; [section *Ternata*] ..... ***Sedum pulchellum***
    9 Leaves of flower-bearing stems narrowly elliptic, oblanceolate, spatulate, cuneate or short-spurred at the base (not clasping); petals white; perennial or annual.
      10 Plants annual; sepals 0.4-1 mm long; petals 1.4-4.2 mm long; [restricted to shallow soils of granitic flatrocks of the Piedmont, from s. NC south to wc. GA]; [section *Tetrorum*] ..... ***Sedum pusillum***
      10 Plants perennial; sepals 2-9 mm long; petals 4-9 mm long; [of outcrops of various rocks, not as above]; [section *Ternata*]. ..... ***Sedum nevii***

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

130. CRASSULACEAE

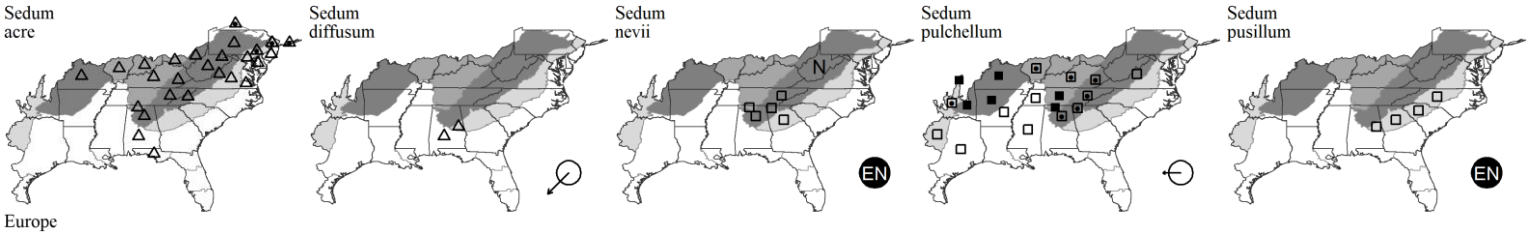
* ***Sedum acre*** Linnaeus. WALLPEPPER, MOSSY STONECROP, GOLDEN CARPET, GOLD-MOSS, BITTER STONECROP. **Hab:** Rock outcrops, gravel parking lots, disturbed areas, commonly cultivated. **Dist:** Native of Europe. **Phen:** May-Jun; Jun-Jul. **Syn:** = C, F, FNA8, G, Il, K1, K3, K4, Mi, Mo2, NE, NY, Pa, RAB, S, Va, W, WH3, WV, Clausen (1975). NatureServe GNR (Not Yet Ranked).

* ***Sedum diffusum***. **Hab:** Granite flatrocks, cemetery lawns. **Dist:** Native of Mexico. Discovered naturalized on a granite flatrock in ec. AL (N. Yawn, pers.comm. 2021), and in a cemetery lawn in the Coastal Plain of Pike County, AL (Diamond & Keener 2021).

Sedum nevii A. Gray. NEVIUS'S STONECROP. **Hab:** Gneiss and phyllite rock outcrops on river bluffs. **Dist:** Endemic to se. TN (Polk County, just west of Cherokee County, NC) (Chester, Wofford, & Kral 1997), nc. and ec. AL, and wc. GA (where it occurs on gneiss outcrops along the Chattahoochee River in Muscogee and Harris counties), and reported for s. WV (Greenbrier County) by Harmon, Ford-Werntz, & Grafton (2006). **Phen:** Apr-Jun. **Syn:** = FNA8, K1, K3, K4, Tn, W, Calie (1981), Clausen (1975); < *Sedum nevii* A. Gray – S.

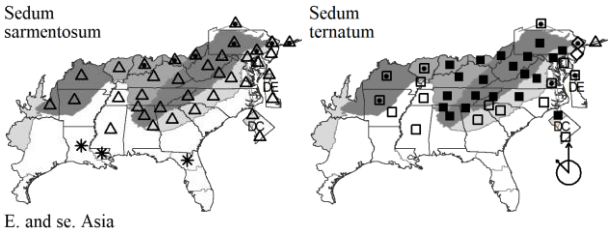
Sedum pulchellum Michaux. WIDOW'S-CROSS, BLUFF MOSS. **Hab:** Calcareous rock outcrops. **Dist:** E. TN (Monroe, Knox, and Bradley counties) (Chester, Wofford, & Kral 1997) and nw. GA (Jones & Coile 1988) west to KS, OK, and TX. **Phen:** Mar-Jun. **ID Notes:** This species is easily distinguished from other *Sedum* by its clasping stem leaves with auricles. **Syn:** = Ar, C, F, FNA8, G, GrPl, Il, K1, K3, K4, Mo2, NcTx, Tn, Tx, W, Calie (1981), Clausen (1975); > *Sedum pulchellum* Michaux – S; > *Sedum vigilimontis* Small – S. NatureServe G5 (Secure).

Sedum pusillum Michaux. PUCK'S ORPINE. **Hab:** In very thin soil (generally less than of vernally wet depressions on granite flatrocks, often in mats of the moss *Hedwigia ciliata*. **Dist:** Endemic to granite flatrocks of the southeastern Piedmont, from sc. NC south to wc. GA. **Phen:** Mar-Apr; Apr-May. **Comm:** Superficially rather similar to *Diamorpha smallii*, and historically confused with it (see Wilbur 1988 for details). Wyatt (1983) discussed the reproductive biology of this species. **Syn:** = FNA8, GW2, K1, K3, K4, RAB, S, Clausen (1975). NatureServe G3 (Vulnerable).



* ***Sedum sarmentosum*** Bunge. **Hab:** Xeric rock outcrops, stone walls, disturbed areas. **Dist:** Native of China. **Phen:** May-Jun; Jun-Jul. **Syn:** = Ar, C, F, FNA8, G, Il, K1, K3, K4, Mi, Mo2, NE, NY, Pa, RAB, Tn, Va, W, WH3, WV, Clausen (1975). NatureServe GNR (Not Yet Ranked).

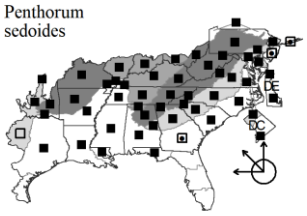
Sedum ternatum Michaux. MOUNTAIN STONECROP, WHORLED STONECROP. **Hab:** Moist forests, coves, bottomlands, shaded rock outcrops. **Dist:** NJ west to MI and IA, south to nw. GA, c. AL, and sw. AR. **Phen:** Apr-Jun; May-Jul. **Syn:** = Ar, C, F, FNA8, G, Il, K1, K3, K4, Mi, Mo2, NE, NY, Pa, RAB, S, Tn, Va, W, WV, Calie (1981), Clausen (1975). NatureServe G5 (Secure).



133. PENTHORACEAE Rydberg ex Britton 1901 (PENTHORUM FAMILY) [in SAXIFRAGALES]

A family of one genus and 2 species, herbs, of e. North America and e. Asia. *Penthorum* has been variously placed in the Crassulaceae, Saxifragaceae, or in the Penthoraceae. Haskins & Hayden (1987) concluded that *Penthorum* was best treated in a monogeneric Penthoraceae, a conclusion based on extensive anatomical evidence. Among those who do not favor a monotypic family, there is nearly evenly divided opinion between the Crassulaceae and Saxifragaceae; this in itself perhaps supports segregation in the Penthoraceae. Molecular evidence supports the recognition of the Penthoraceae, and suggests closer affinities with the Haloragaceae than with either the Crassulaceae or the Saxifragaceae (Morgan & Soltis 1993). References: Freeman (2009a) in FNA8 (2009); Thiede in Kubitzki, Bayer, & Stevens (2007).

Penthorum Linnaeus 1753 (PENTHORUM, DITCH-STONECROP)



A genus of 2 species, herbs, of e. North America and e. and se. Asia. The only other species in the genus is *P. chinense* Pursh, of e. Russia, China, Korea, and Japan. References: Freeman (2009a) in FNA8 (2009); Haskins & Hayden (1987); Thiede in Kubitzki, Bayer, & Stevens (2007).

Penthorum sedoides Linnaeus. AMERICAN PENTHORUM, MARSH-STONECROP, DITCH-STONECROP. **Hab:** Shores, drawdown areas, moist forests, floodplain forests, moist disturbed areas, ditches. **Dist:** NB west to MB, south to Panhandle FL and TX; introduced from BC south to OR. **Phen:** Jun-Oct. **Syn:** = Ar, C, F, FNA8, G, GrPl, GW2, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV, Haskins & Hayden (1987). NatureServe G5 (Secure).

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

134. HALORAGACEAE R. Brown 1814 (WATER-MILFOIL FAMILY) [in SAXIFRAGALES]

A family of 8-10 genera and about 120-150 species, mainly aquatic and wetland herbs (including all our taxa), also with some shrubs and trees, cosmopolitan but centered in the Southern Hemisphere (especially Australia). The family has sometimes been spelled 'Haloragidaceae'. References: Kubitzki, Bayer, & Stevens (2007); Scribailo & Alix (2021) in FNA10 (2021).

1 Leaves whorled or alternate; stamens 4 or 8; carpels 4; emersed leaves bract-like and much-reduced (except in *M. aquaticum*) ..... ***Myriophyllum***
1 Leaves alternate; stamens 3; carpels 3; emersed leaves foliaceous, little if at all reduced..... ***Proserpinaca***

Myriophyllum Linnaeus 1753 (WATER-MILFOIL)

Contributed by B.A. Sorrie and A.S. Weakley

A genus of about 68 species, aquatic and wetland herbs, cosmopolitan, with a primary center of diversity in Australia and secondary centers in North America and Asia. The species taxonomy and infrageneric classification used here follow Moody & Les (2010). References: Aiken (1981); Crow & Hellquist (2000a); Moody & Les (2010); Scribailo & Alix (2021) in FNA10 (2021).

Identification Notes: Stranded plants of *M. heterophyllum* and *M. humile* (and perhaps others) produce leaves that are reduced in size. Leaves and bracts become pectinate or pinnate, so that plants resemble *M. pinnatum*. Such plants are the source of nearly all inland records of *M. pinnatum* in the VA-NC-SC-GA area. *M. heterophyllum* usually flowers and fruits when stranded and may be distinguished from *M. pinnatum* by its much denser disposition of leaves and bracts, and by its dull red fruits obscurely tuberculate (vs. tan or pale brown fruits strongly tuberculate). From stranded *M. humile*, *M. heterophyllum* may be distinguished by leaves and bracts which are clearly whorled and much more densely disposed. *M. humile* differs from *M. pinnatum* by its wholly alternate leaves and bracts, and by its smooth fruits.

2 Flowers/fruits absent and emersed shoots with leaves closely similar in size and shape to submersed ones; widespread alien; [subgenus *Myriophyllum*; section *Pectinatum*] ..... ***Myriophyllum aquaticum***
2 Flowers/fruits present; emersed shoots present or not.
  3 Flowers/fruits in axils of leaves.
    ..... ***Myriophyllum aquaticum***
  3 Flowers/fruits in erect spikes emersed from water, flowers/fruits subtended by bracts much smaller than the normally submersed leaves.
    6 Uppermost flowers/fruits alternate; leaves alternate or whorled or both; [subgenus *Brachytheca*; section *Tessaronia*; subsection *Spondylastrum*].
      7 Bracts much shorter than floral internodes, varying from pectinate to entire; fruit surface smooth or papillose ..... ***Myriophyllum laxum***
      7 Bracts usually longer than floral internode, pinnatifid to pectinate; fruit surface strongly tuberculate..... ***Myriophyllum pinnatum***
    6 Uppermost flowers/fruits opposite; leaves whorled (technically pseudo-whorled in many *M. heterophyllum*) (note that early season plants of *M. pinnatum* may have flowers opposite, but at least some leaves will be alternate).
      8 Bracts usually > 2× as long as pistillate flowers; stems drying brown, pale brown, or reddish.
        ..... ***Myriophyllum heterophyllum***
      8 Bracts usually < 2× as long as pistillate flowers; stems drying pale tan or whitish]; [subgenus *Myriophyllum*; section *Myriophyllum*; subsection *Myriophyllum*].
        ..... ***Myriophyllum spicatum***

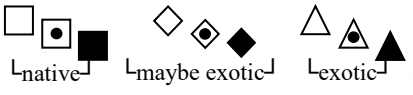
Alternate key

4 Emersed shoots with feathery leaves about same size and shape as submersed leaves; flowers/fruits rarely produced; [widespread alien] [subgenus *Myriophyllum*; section *Pectinatum*] ..... ***Myriophyllum aquaticum***
4 Emersed shoots with bracts subtending flowers/fruits; these bracts much different in shape than submersed leaves. [stranded plants may produce bracts and leaves of similar size and shape, but these not feathery].
  6 Bracts usually longer than the internodes; [subgenus *Brachytheca*; section *Tessaronia*; subsection *Spondylastrum*].
    7 Leaves whorled or pseudo-whorled; fruits with low bumps ..... ***Myriophyllum heterophyllum***
    7 Leaves strictly alternate; fruits strongly tuberculate..... ***Myriophyllum pinnatum***
  6 Bracts usually shorter than the internodes.
    9 Leaves alternate, pseudo-whorled, or both; plain green; [of se. VA and southward] ; [subgenus *Brachytheca*; section *Tessaronia*; subsection *Spondylastrum*]...
      ..... ***Myriophyllum laxum***
    9 All leaves whorled, grayish green; [collectively widespread]; [subgenus *Myriophyllum*; section *Myriophyllum*; subsection *Myriophyllum*].
      ..... ***Myriophyllum spicatum***

* ***Myriophyllum aquaticum*** (Vellozo) Verdcourt. PARROT-FEATHER. **Hab:** Ditches, slow-moving rivers, pools, ponds. **Dist:** Native of South America. An introduced species now widespread in se. United States, north to NY, WV, and MO. **Phen:** Apr-Sep. **Syn:** = Ar, C, FNA10, GW2, K1, K3, K4, Meso4.1, NcTx, NE, NY, Pa, Tn, Va, W, WH3, Aiken (1981), Crow & Hellquist (2000a), Moody & Les (2010); = *Myriophyllum brasiliense* Cambessedes – F, G, GrPl, RAB, Tx, WV; = *Myriophyllum proserpinacoides* Gillies ex Hooker & Arnott – S. NatureServe GNR (Not Yet Ranked).

Myriophyllum heterophyllum Michaux. SOUTHERN WATER-MILFOIL. **Hab:** Ditches, slow-moving waters of rivers and streams, pools, ponds, springs. **Dist:** NY west to ON and MN, south to FL, TX, and Mexico (VER). **Phen:** Apr-Oct. **Syn:** = Ar, C, F, FNA10, G, GrPl, GW2, Il, K1, K3, K4, Meso4.1, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, WH3, WV, Aiken (1981), Crow & Hellquist (2000a), Moody & Les (2010). NatureServe G5 (Secure).

Myriophyllum laxum Shuttleworth ex Chapman. LOOSE WATER-MILFOIL. **Hab:** Limesink depression ponds (dolines), spring-runs, rarely also in lakes. **Dist:** Se. VA south to n. FL, s. AL, s. MS (Sorrie & Leonard 1999), and e. LA (Reid et al. 2021). Documented for VA by a 1922 specimen from Princess Anne County at GH (Sorrie, pers. comm.). **Phen:** Jun-Oct. **ID Notes:** *M. laxum* and *M. heterophyllum* both have reddish submersed

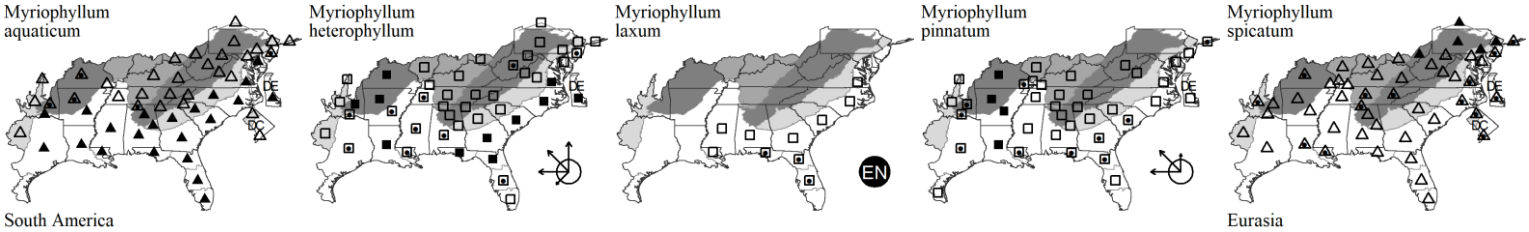
Key to Map Symbology: 

* : waif
EN : endemic
H : historic
N : no
P : planted
? : questionable
X : extirpated

stems and present difficulties in identification when in sterile condition. *M. laxum* has a total of 7-15 (-17) segments per leaf, vs. (15-) 17-31 (-37) segments in *M. heterophyllum*. **Syn:** = FNA10, GW2, K1, K3, K4, RAB, S, Va, WH3, Aiken (1981), Moody & Les (2010); = *Myriophyllum ×laxum* Shuttleworth ex Chapman (pro species) – NE. NatureServe G3 (Vulnerable).

Myriophyllum pinnatum (Walter) Britton, Sterns, & Poggenburg. ALTERNATE-LEAVED WATER-MILFOIL, CUTLEAF WATER-MILFOIL, GREEN PARROT'S-FEATHER. **Hab:** Pools, ditches, ponds. **Dist:** NB, VT, and MA west to IA and SD, south to GA and TX. **Phen:** Mar-Oct. **Syn:** = Ar, C, F, FNA10, G, GrPl, GW2, Il, K1, K3, K4, NcTx, NE, NY, RAB, S, Tn, Tx, Va, W, WH3, WV, Aiken (1981), Crow & Hellquist (2000a), Moody & Les (2010). NatureServe G5 (Secure).

* ***Myriophyllum spicatum*** Linnaeus. EURASIAN WATER-MILFOIL. **Hab:** Ponds and impoundments. **Dist:** Native of Eurasia. Easily confused with *M. sibiricum*, *M. spicatum* is an introduced species, now widespread in e. United States. Reported for SC by Hill & Horn (1997). **Phen:** Apr-Oct. **Syn:** = Ar, C, FNA10, GW2, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, Tn, Va, W, WH3, Aiken (1981), Crow & Hellquist (2000a), Moody & Les (2010); >< *Myriophyllum spicatum* var. *exalbescens* – Tx, misapplied. NatureServe GNR (Not Yet Ranked).



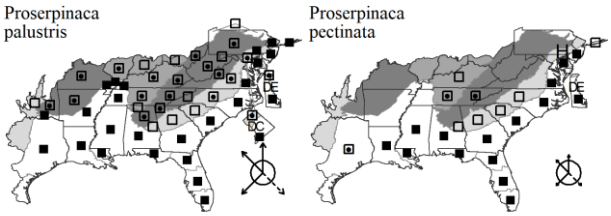
Proserpinaca Linnaeus 1753 (MERMAID-WEED)

A genus of 2 species, aquatic and wetland herbs, of e. North America, the West Indies. Central America, and South America. References: Alix & Scribailo (2021) in FNA10 (2021); Catling (1998); Crow & Hellquist (2000a).

1 Bracteal (emersed) leaves serrate; submersed pectinate leaves with 8-14 pairs of divisions 5-30 mm long; fruits 2.3-6.0 mm wide ..... ***Proserpinaca palustris***
1 Bracteal (emersed) leaves pinnatifid to pectinate; submersed pectinate leaves with 4-12 pairs of divisions 2-7.5 mm long; fruits 2.0-3.6 mm wide ..... ***Proserpinaca pectinata***

Proserpinaca palustris Linnaeus. COMMON MERMAID-WEED. **Hab:** Wet places, swamp forests. **Dist:** Throughout e. North America and south to the Caribbean and Central and South America. **Phen:** Jun-Oct. **Tax:** Various varieties and an additional species have sometimes been recognized in this variable species (see synonymy). **Syn:** = Ar, Bah, FNA10, GW2, Meso4.1, Mi, NE, NY, Va, Crow & Hellquist (2000a); > *Proserpinaca ×intermedia* – NE; > *Proserpinaca intermedia* – C, F, G, K1, K3, K4, RAB, Tn, Catling (1998); > *Proserpinaca palustris* Linnaeus – K4, RAB, S, Tn; > *Proserpinaca palustris* var. *amblyogona* – C, F, G, K1, NcTx, Tx, Catling (1998); > *Proserpinaca palustris* var. *crebra* – C, F, G, Il, K1, Pa, WV, Catling (1998); > *Proserpinaca palustris* var. *palustris* – C, F, G, Il, K1, Pa, Catling (1998); > *Proserpinaca platycarpa* Small – S.

Proserpinaca pectinata Lamarck. FEATHERY MERMAID-WEED. **Hab:** Bogs, savannas, ditches, other wet places. **Dist:** NS south to s. FL and west to w. LA, mostly on the Coastal Plain, but scattered inland as well, as in c. TN; Cuba; Central America. **Phen:** Jun-Oct. **Syn:** = C, F, FNA10, G, GW2, K1, K3, K4, Meso4.1, Mi, NE, NY, Pa, RAB, S, Tn, Tx, Va, WH3, Catling (1998). NatureServe G5 (Secure).



136. VITACEAE A.L. de Jussieu 1789 (GRAPE FAMILY) [in VITALES]

A family of about 14-16 genera and 900 species, vines (rarely small trees or herbs), of tropical, subtropical, and temperate regions of the Old and New Worlds. Tribes and genera follow Ma et al. (2020), with the exception of separating *Muscadinia* (and extraregional *Ampelocissus*) from *Vitis*, as is suggested as equally parsimonious by their findings. References: Chen, Ren, & Wen (2007); Ma et al (2020); Moore & Wen (2016) in FNA12 (2016); Péros et al (2011); Ren et al (2011); Soejima & Wen (2006); Tröndle et al (2010); Wen in Kubitzki, Bayer, & Stevens (2007); Wen et al (2018).

1 Leaves simple, sometimes shallowly or deeply 3-5 (-7)-lobed.
  3 Petals separate at their tips, falling individually; pith white, continuous through the node; bark adherent; tendrils bifid or trifid ..... ***Ampelopsis***
  3 Petals connate at their tips, falling together; pith tan to brown, interrupted by a diaphragm at each node (*Vitis*) or continuous through the node (*Muscadinia*); bark adherent (*Muscadinia*) or exfoliating (*Vitis*); tendrils bifid or trifid (*Vitis*) or simple (*Muscadinia*); [tribe Viteae].
    5 Tendrils simple; bark adherent (on all but the largest stems), with prominent lenticels; pith continuous through nodes; leaves relatively small (< 10 cm long and wide) and coarsely toothed, pentagonal in outline, but never deeply lobed ..... ***Muscadinia***
    5 Tendrils bifid to trifid; bark shedding, the lenticels inconspicuous; pith interrupted by diaphragms at nodes; leaves relatively large (well-developed leaves usually > 10 cm wide and long) and finely toothed, often deeply lobed ..... ***Vitis***

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

136. VITACEAE

1 Leaves compound with either 3-5 (-7) or numerous leaflets.
  6 Leaves bipinnate to tripinnate, the leaflets on at least the better-developed leaves > 7; inflorescences axillary; [tribe Ampelopsideae] ..... ***Nekemias arborea***
  6 Leaves 3-7-foliolate; inflorescences axillary, leaf-opposed, or terminal.
    8 Leaves pedately 5-foliolate (the lateral 2 leaflets on either side borne on a common stalk, attached to one another above the summit of the petiole); [tribe Cayratieae] ..... ***Causonis japonica***
    8 Leaves palmately 3-7-foliolate (the petiolules of all leaflets joined at the summit of the petiole).
      9 Inflorescences leaf-opposed or apparently terminal; leaves 3-7-foliolate; [tribe Parthenocisseae] ..... ***Parthenocissus***
      9 Inflorescences axillary or leaf-opposed; leaves 3-foliolate (even the largest and best-developed). ..... ***Cissus trifoliata***

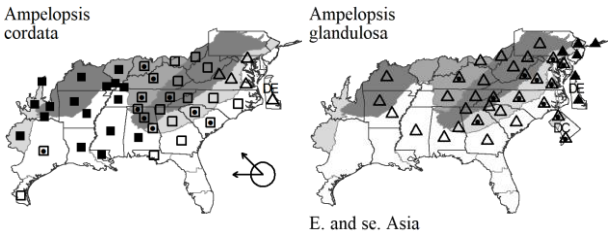
Ampelopsis Michaux 1803 (PEPPERVINE)

A genus of about 25 species, woody vines, of temperate and subtropical America and Asia. See Wen, Boggan, & Nie (2014) and Soejima & Wen (2006) for the reasons for separating *Ampelopsis* sect. *Leeaceifoliae* as genus *Nekemias*. References: Chen, Ren, & Wen (2007); Moore & Wen (2016) in FNA12 (2016); Soejima & Wen (2006); Wen in Kubitzki, Bayer, & Stevens (2007); Wen, Boggan, & Nie (2014).

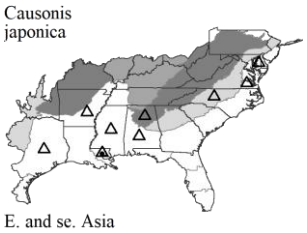
1 Leaves bipinnate to tripinnate, with > 11 leaflets; [native and alien species] ..... ***Nekemias***
1 Leaves simple and palmately veined (grape-like), or palmately 5-foliolate (the leaflets additionally pinnately lobed); [alien species].
  3 Leaves not lobed (to shallowly 3-lobed); young twigs green, glabrous ..... ***Ampelopsis cordata***
  3 Leaves 3-5 lobed; young twigs purplish, sparsely puberulent (sometimes becoming glabrate) ..... ***Ampelopsis glandulosa***

Ampelopsis cordata Michaux. HEARTLEAF PEPPERVINE, RACCOON-GRAPE, FALSE-GRAPE. **Hab:** Moist forests, bottomlands, and thickets, particularly where disturbed. **Dist:** E. VA south to Panhandle FL, west to TX, north in the interior to s. OH, s. IN, s. IL, MO, and NE; also introduced at scattered sites inland. **Phen:** Apr-Jun; Jul-Sep. **Syn:** = Ar, C, F, Fl3, FNA12, G, GrPl, GW2, Il, K1, K3, K4, NcTx, NE, NY, RAB, S, Tn, Tx, Va, W, WH3. NatureServe G5 (Secure).

* ***Ampelopsis glandulosa*** (Wallroth) Momiyama. PORCELAIN-BERRY, AMUR PEPPERVINE. **Hab:** Riverbanks, thickets and disturbed areas. **Dist:** Native of ne. Asia. **Phen:** May-Aug; Sep-Oct. **Syn:** = FNA12, NY; > *Ampelopsis brevipedunculata* (Maximowicz) Trautvetter – Ar, C, F, Il, K1, Pa, RAB, Tn, Va; > *Ampelopsis glandulosa* (Wallroth) Momiyama var. *brevipedunculata* (Maximowicz) Momiyama – K3, K4, Chen, Ren, & Wen (2007); < *Ampelopsis heterophylla* (Thunberg) Siebold & Zuccarini – S; > *Ampelopsis heterophylla* (Thunberg) Siebold & Zuccarini var. *brevipedunculata* (Maximowicz) C.L. Li – NE. NatureServe G5 (Secure).

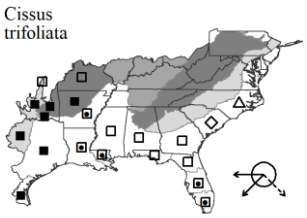


Causonis Rafinesque 1830 (BUSHKILLER)



A genus of 25 species, lianas and herbaceous vines, of the Old World tropics and subtropics. Our single introduced species has been traditionally placed in *Cayratia* subgenus *Discypharia*, but this has been shown to be more closely allied to *Tetrastigma* than to *Cayratia* s.s., and so has been separated as *Causonis* (Lu et al. 2013). References: Chen, Ren, & Wen (2007); Krings & Richardson (2006); Lu et al (2013); Moore & Wen (2016) in FNA12 (2016); Wen in Kubitzki, Bayer, & Stevens (2007).

* ***Causonis japonica*** (Thunberg) Rafinesque. BUSHKILLER, SORREL VINE. **Hab:** Disturbed areas, suburban woodlands. **Dist:** Native of temperate and subtropical se. Asia. Reported for NC from several suburban areas, as in Forsyth County (Krings & Richardson 2006) and Mecklenburg, Davidson, and Franklin counties (Soule et al. 2008). Reported as naturalized in AL (Hansen & Goertzen 2006), MS, LA, and TX. Reports of *Nekemias megalophylla* (Diels & Gilg) J. Wen & Z.L. Nie as naturalized in MS are misidentifications based on *Causonis japonica* (S.W. Leonard, pers. comm., 2006). **Phen:** May-Jun; Aug-Sep. **Syn:** = FNA12; = *Cayratia japonica* (Thunberg) Gagnepain – K1, K3, K4; > *Cayratia japonica* var. *japonica* – Chen, Ren, & Wen (2007). NatureServe GNR (Not Yet Ranked).



Cissus Linnaeus 1753

A genus of about 350 species, woody vines, herbaceous vines, and rarely shrubs, of tropical and rarely warm temperate areas. References: Moore & Wen (2016) in FNA12 (2016); Wen in Kubitzki, Bayer, & Stevens (2007).

Cissus trifoliata (Linnaeus) Linnaeus. MARINE-IVY, SORREL-VINE. **Hab:** Coastal hammocks, dunes, disturbed coastal areas, inland in exposed bluffs, glades, and rocky, open woodlands, disturbed thickets, agricultural field edges. **Dist:** Se. SC (Jasper County) south through GA, FL, and west along the Gulf Coast to TX, AR, and Mexico, thence south through Central America to South America; West Indies. **Phen:** Apr-Jun; Aug-Sep. **ID Notes:** The leaves have a strong fragrance reminiscent of stale chocolate, or

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

also described as "a disagreeable, pungent, nitrogenous odor similar to that of jimson-weed" (Great Plains Flora Association 1986). **Syn:** = Ar, Bah, Fl3, FNA12, K1, K3, K4, WH3; > *Cissus incisa* (Nuttall) Des Moulins – GrPl, GW2, NcTx, S, Tx; > *Cissus trifoliata* (Linnaeus) Linnaeus – S.

Muscadinia (Planchon) Small 1903 (MUSCADINE, SCUPPERNONG)

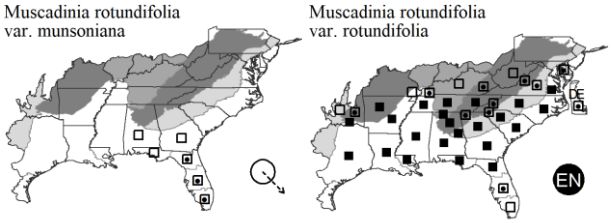
A genus of 2 species and 4 taxa, woody vines, of se. North America (including Mexico) and the West Indies. In the past decade, a number of molecular phylogenetic studies of the Vitaceae have been undertaken, using different genes and different sampling within the family; overall, they all corroborate the clear distinction of the muscadines from the true grapes. Some studies suggest that muscadines are sister to *Vitis* s.s., while others show equivocal results as to whether *Muscadinia* + *Vitis* is a monophyletic group. Overall, and even if *Muscadinia* is basal to but forms a monophyletic clade with *Vitis* s.s., recognition of *Muscadinia* at generic rank is warranted, based on the long-recognized morphological distinctiveness of *Muscadinia* vs. *Vitis* s.s. (see key), the genetic distance of it from *Vitis* s.s., the different chromosome numbers (40 in *Muscadinia*, 38 in *Vitis* s.s.), the frequent past and current recognition of *Muscadinia*, and the standards of morphological distinctiveness of genera in the Vitaceae (Nie et al. 2012; Ren et al. 2011; Péros et al 2011; Tröndle et al. 2010; Rossetto et al. 2002; Soejima & Wen 2006; Weakley et al. 2011). References: Comeaux, Nesbitt, & Fantz (1987); Moore & Wen (2016) in FNA12 (2016); Moore (1991); Ward (2006b); Weakley et al (2011); Wen in Kubitzki, Bayer, & Stevens (2007); Wen et al (2018).

1 Mature fruits 12-25 mm in diameter; infructescences with 2-8 (-12) berries; seeds > 9 mm long; leaf blades usually > 6 cm long and wide; [widespread in our area]... ***Muscadinia rotundifolia var. rotundifolia***

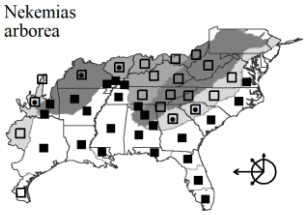
1 Mature fruits 5-10 (-13) mm in diameter; infructescences with 12-30 berries; seeds < 6 mm long; leaf blades 2-8 cm long and wide; [of s. GA southward]. ***Muscadinia rotundifolia var. munsoniana***

Muscadinia rotundifolia (Michaux) Small *var.* ***munsoniana*** (J.H. Simpson ex Planchon) Weakley & Gandhi. MUNSON GRAPE, BULLACE GRAPE. **Hab:** Pinelands, scrub, floodplain forests, banks of blackwater rivers. **Dist:** Sc. GA and s. AL south to s. FL; Bahamas. **Phen:** Late Apr-May; late Jul-Sep. **Tax:** Recent evidence suggests that the "*munsoniana* entity" likely warrants specific status. **Syn:** = Weakley et al (2011); = *Vitis rotundifolia* Michaux var. *munsoniana* (J.H. Simpson ex Munson) M.O. Moore – K3; < *Muscadinia munsoniana* (J.H. Simpson ex Planchon) Small – K4, S; < *Vitis munsoniana* J.H. Simpson ex Munson – Bah; < *Vitis rotundifolia* Michaux – Fl3, WH3; < *Vitis rotundifolia* Michaux var. *munsoniana* (J.H. Simpson ex Munson) M.O. Moore – FNA12, K1, Moore (1991), Ward (2006b). NatureServe G5T4? (Apparently Secure).

Muscadinia rotundifolia (Michaux) Small *var.* ***rotundifolia***. MUSCADINE, SCUPPERNONG. **Hab:** Dry upland forests (especially sandy or rocky), other forests, swamps, dunes, roadsides, thickets. **Dist:** DE west to s. WV, KY, and MO, south to FL and TX. **Phen:** May-Jun; Aug-Oct. **Comm:** Cultivars of this species are popular in the Southeastern United States as table grapes and the source of a distinctive wine. **Syn:** = Weakley et al (2011); = *Muscadinia rotundifolia* (Michaux) Small – K4, S; = *Vitis rotundifolia* Michaux – C, F, GW2, RAB, Tn, W, WV, Comeaux, Nesbitt, & Fantz (1987); = *Vitis rotundifolia* Michaux var. *rotundifolia* – FNA12, K1, K3, Moore (1991), Ward (2006b); < *Vitis rotundifolia* Michaux – Ar, Fl3, NcTx, Tx, WH3. NatureServe G5T5 (Secure).

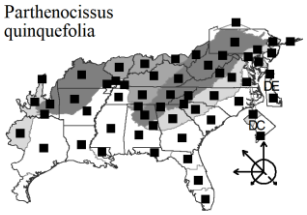


Nekemias Rafinesque 1833 (PEPPERVINE)



A genus of ca. 9 species, lianas, of e. Asia and e. North America. See Wen, Boggan & Nie (2014) for a discussion of the issues of generic circumscription. References: Chen, Ren, & Wen (2007); Moore & Wen (2016) in FNA12 (2016); Soejima & Wen (2006); Wen in Kubitzki, Bayer, & Stevens (2007); Wen, Boggan, & Nie (2014).

Nekemias arborea (Linnaeus) J. Wen & Boggan. PEPPERVINE. **Hab:** Swamp forests, marshes, wet thickets, moist to wet maritime forests. **Dist:** Se. VA (and MD?) south to s. FL, west to TX and n. Mexico, north in the interior to s. IL and sw. WV. **Phen:** Jun-Oct; Sep-Oct. **Syn:** = FNA12, K4, Wen, Boggan, & Nie (2014); = *Ampelopsis arborea* (Linnaeus) Koehne – Ar, C, F, Fl3, G, GW2, Il, K1, K2, NcTx, RAB, S, Tn, Tx, Va, W, WH3, WV. NatureServe G5 (Secure).



Parthenocissus Planchon 1887 (VIRGINIA-CREEPER, WOODBINE)

A genus of about 15 species, woody vines, of temperate Asia and North America. References: Chen, Ren, & Wen (2007); Moore & Wen (2016) in FNA12 (2016); Wen in Kubitzki, Bayer, & Stevens (2007).

Parthenocissus quinquefolia (Linnaeus) Planchon. VIRGINIA-CREEPER. **Hab:** Swamp forests, bottomlands, maritime forests and thickets, rock outcrops, mesic forests. **Dist:** ME west to IA and NE, south to s. FL and TX; West Indies (Bahamas, Cuba); Central America (El Salvador, Guatemala). **Phen:** May-Jul; Jul-Aug. **Syn:** = Ar, Bah, C, F, Fl3, FNA12, G, GrPl, Il, K1, K3, K4, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, W, WH3, WV, Chen, Ren, & Wen (2007); > *Parthenocissus hirsuta* (Pursh) Graebner – S; > *Parthenocissus quinquefolia* (Linnaeus) Planchon – S. NatureServe G5 (Secure).

Key to Map Symbology: □ native; ◇ maybe exotic; △ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Vitis Linnaeus 1753 (GRAPE)

A genus of about 60-65 species, vines, of temperate regions of Eurasia and North America. References: Comeaux, Nesbitt, & Fantz (1987); Mabberley (1999); Moore & Wen (2016) in FNA12 (2016); Moore (1991); Ward (2006b); Wen in Kubitzki, Bayer, & Stevens (2007); Wen et al (2018); Wen et al (2020). [also see *Muscadinia*]

1 Tendrils simple; bark adherent (on all but the largest stems), with prominent lenticels; pith continuous through nodes; leaves relatively small (< 10 cm long and wide) and coarsely toothed, pentagonal in outline but never deeply lobed ..... ***Muscadinia***
1 Tendrils bifid to trifid; bark shedding, the lenticels inconspicuous; pith interrupted by diaphragms at nodes; leaves relatively large (well-developed leaves usually > 10 cm wide and long) and finely toothed, often deeply lobed.
3 Mature leaves glaucous beneath (the glaucescence sometimes rather obscured by pubescence); nodes often glaucous; inflorescence rachis (flowering and young-fruiting) orange-red arachnoid-pubescent; [series *Aestivales*].
4 Mature 3-4-seeded berries < 9 mm in diameter; mature leaves glabrous to glabrate beneath; nodes usually glaucous; nodal diaphragms usually < 2 mm in diameter ..... ***Vitis aestivalis var. bicolor***
4 Mature 3-4-seeded berries > 9 mm in diameter; mature leaves slightly to strongly arachnoid-pubescent beneath; nodes usually not glaucous; nodal diaphragms usually > 2 mm in diameter ..... ***Vitis aestivalis var. aestivalis***
3 Mature leaves not glaucous beneath; nodes not glaucous; inflorescence rachis (flowering and young-fruiting) glabrous, hispid, or white-floccose.
7 Leaves densely pubescent beneath, so as to obscure the surface; [series *Labruscae* or hybrid involving that series].
8 Tendrils or inflorescences present at 3 or more consecutive nodes. ..... ***Vitis labrusca***
8 Tendrils or inflorescences present at only 2 consecutive nodes.
11 Stipules 1.5-4 mm long; nodal diaphragms 1.5-3 mm thick; [AL, MS, LA, TX, and OK] ..... ***Vitis mustangensis***
11 Stipules < 1 mm long; nodal diaphragms 2.5-6 mm thick; [FL and s. AL] ..... ***Vitis shuttleworthii***
7 Leaves glabrous or somewhat pubescent beneath (but not so densely as to completely obscure the leaf surface).
13 Nodal diaphragms < 1 mm wide, usually < 0.5 mm wide; growing shoot tips enveloped by enlarging, unfolded leaves; inflorescence rachis (flowering or early-fruiting) glabrous or glabrescent; [section *Riparieae*] ..... ***Vitis riparia***
13 Nodal diaphragms > 1 mm wide; growing shoot tips not enveloped by enlarging, unfolded leaves; inflorescence axis (flowering or early-fruiting) hispid and/or white-floccose.
14 Branchlets of the season more or less terete, glabrous or arachnoid-pubescent; mature 3-4 seeded berries usually > 8 mm in diameter; nodes usually not banded with red pigmentation; inflorescence rachis (flowering or early-fruiting) densely hispid (never floccose); [series *Cordifoliae*].
15 Nodal diaphragms > 2.5 mm wide; leaves strongly 3-lobed, the tips usually long-acuminate; branchlets of the season with a red or purplish cast ..... ***Vitis palmata***
15 Nodal diaphragms < 2.5 mm wide; leaves unlobed or shallowly lobed, the tips acute to short-acuminate; branchlets of the season gray, green, or brown (sometimes purple only on one side) ..... ***Vitis vulpina***
14 Branchlets of the season angled, arachnoid-pubescent and/or hirtellous-pubescent (or nearly glabrous); mature 3-4 seeded berries < 8 mm in diameter; nodes frequently banded with red pigmentation; inflorescence rachis (flowering or early-fruiting) white-floccose (and sometimes also hispid); [series *Cinerescentes*].
16 Branchlets of the season sparsely to densely hirtellous pubescent, often with arachnoid pubescence as well; leaf undersurfaces usually more-or-less uniformly hirtellous on the veins; [western, east to w. KY, w. TN, sc. AL, and Panhandle FL] ..... ***Vitis cinerea***
16 Branchlets of the season lacking evident hirtellous trichomes (if present, obscured by the arachnoid pubescence; leaf undersurfaces lacking hirtellous pubescence, or only very sparsely so; [collectively widespread in our area].
17 Branchlets glabrate to only slightly arachnoid-pubescent; nodes usually banded with red pigmentation; leaves glabrous to very slightly arachnoid-pubescent beneath; [mostly of the Piedmont and Mountains] ..... ***Vitis baileyana***
17 Branchlets slightly to densely arachnoid-pubescent; nodes usually not banded with red pigmentation; leaves slightly to densely arachnoid-pubescent beneath; [mostly of the Coastal Plain] ..... ***Vitis simpsonii***

Vitis aestivalis Michaux *var*. ***aestivalis***. SUMMER GRAPE. **Hab:** Forests and woodlands, mostly upland. **Dist:** MA west to MO and IA, south to s. FL and e. TX. **Phen:** May-Jun; Sep-Oct. **Syn:** = C, F, G, Il, K1, K3, NcTx, NE, RAB, Tn, Va, WH3, WV, Moore (1991); = *Vitis aestivalis* – S; < *Vitis aestivalis* – Ar, Fl3, FNA12, GrPl, GW2, K4, NY, Pa, Tx, W; < *Vitis aestivalis* Michaux var. *aestivalis* – Comeaux, Nesbitt, & Fantz (1987), Ward (2006b).

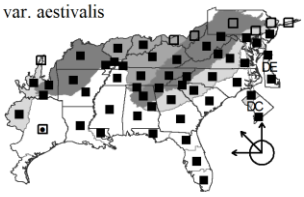
Vitis aestivalis Michaux *var*. ***bicolor*** Deam. SILVERLEAF GRAPE. **Hab:** Forests and woodlands, mostly upland. **Dist:** ON and MN south to n. GA and n. AL. **Phen:** May-Jun; Sep-Oct. **Syn:** = K3, NE, Tn, Va, Moore (1991); = *Vitis aestivalis* var. *argentifolia* (Munson) Fernald – C, F, G, Il, K1, RAB, WV, Comeaux, Nesbitt, & Fantz (1987); = *Vitis bicolor* Le Conte – S; < *Vitis aestivalis* – FNA12, GrPl, GW2, K4, NY, Pa, W.

Vitis baileyana Munson. POSSUM GRAPE. **Hab:** Forests and woodlands, mostly bottomlands. **Dist:** Sw. PA, s. OH, and se. IN south to c. SC, c. GA, and AL. **Phen:** Late May-Jun; Sep-Oct. **Syn:** = C, F, G, RAB, S, Wen et al (2018); = *Vitis cinerea* (Engelmann in A. Gray) Engelmann ex Millardet var. *baileyana* (Munson) Comeaux – FNA12, K1, K3, K4, Pa, Va, Comeaux, Nesbitt, & Fantz (1987), Moore (1991); < *Vitis cinerea* (Engelmann) Engelmann ex Millardet – Il, W, WV; < *Vitis vulpina* Linnaeus – GW2.

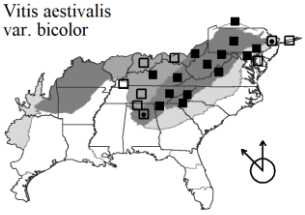
Vitis cinerea (Engelmann) Engelmann ex Millardet. GRAYBARK GRAPE, PIGEON GRAPE. **Hab:** Hammocks, most forests. **Dist:** VA (?), w. KY, wc. TN, IN, and WI, south to Panhandle FL (Okaloosa County), sc. AL and TX. **Phen:** May-Jul; Sep-Nov. **Syn:** = Wen et al (2018); = *Vitis cinerea* (Engelmann) Engelmann ex Millardet var. *cinerea* – C, F, FNA12, G, K1, K3, K4, NcTx, RAB, Tn, Moore (1991); < *Vitis cinerea* (Engelmann) Engelmann ex Millardet – Ar, GrPl, GW2, Il, W; > *Vitis cinerea* (Engelmann) Engelmann ex Millardet var. *canescens* (Engelmann) Bailey – Tx; > *Vitis cinerea* (Engelmann) Engelmann ex Millardet var. *cinerea* – Tx. NatureServe G4G5TNR (Not Yet Ranked).

Vitis labrusca Linnaeus. FOX GRAPE. **Hab:** Forests and woodlands, mainly in wet to moist situations. **Dist:** ME west to s. MI, south to n. GA, n. AL, and n. MS. **Phen:** May-Jun; Sep-Oct. **Syn:** = C, FNA12, GW2, Il, K1, K3, K4, NE, NY, Pa, RAB, S, Tn, Va, W, Comeaux, Nesbitt, & Fantz (1987), Moore (1991); < *Vitis labrusca* Linnaeus; > *Vitis labrusca* var. *labrusca* – F, G; > *Vitis labrusca* var. *subedentata* Fernald – F, G.

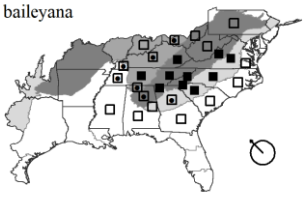
Vitis aestivalis var. aestivalis



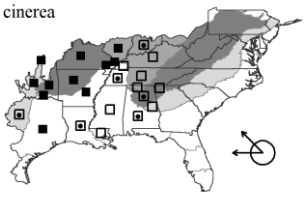
Vitis aestivalis var. bicolor



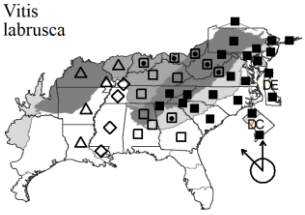
Vitis baileyana



Vitis cinerea



Vitis labrusca



Vitis mustangensis Buckley. MUSTANG GRAPE. **Hab:** Woodland edges, fencerows, thickets, lowland woods, disturbed areas. **Dist:** AR and s. OK south to s. LA and s. TX; disjunct east of the Mississippi River in MS and AL. **Phen:** May-early Jun; Aug-Sep. **Syn:** = FNA12, K1, K3, NcTx; > *Vitis mustangensis* Buckley var. *diversa* (Bailey) Shinners – Tx; > *Vitis mustangensis* var. *mustangensis* – Tx. NatureServe G4G5 (Apparently Secure).

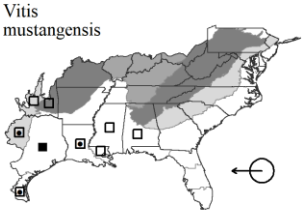
Vitis palmata Vahl. RED GRAPE, CAT GRAPE, CATBIRD GRAPE. **Hab:** Floodplain forests, riverbanks. **Dist:** IN, sw. VA (Townsend, pers. comm. 2009), c. TN (Chester, Wofford, & Kral 1997), sc. GA (Jones & Coile 1988), and FL Panhandle west to MO, OK, and TX. **Phen:** Mid Jun-late Jun; late Jul-Oct. **Syn:** = Ar, C, F, Fl3, FNA12, G, GW2, Il, K1, K3, K4, NcTx, NE, S, Tn, Tx, Va, WH3, Moore (1991), Ward (2006b). NatureServe G4 (Apparently Secure).

Vitis riparia Michaux. RIVERBANK GRAPE. **Hab:** Forests and woodlands, mostly moist to wet. **Dist:** NB west to se. SK, south to VA, NC, c. and w. TN, n. MS, LA, and e. TX, and in the Pacific Northwest. **Phen:** Apr-Jun; Aug-Sep. **Syn:** = Ar, C, FNA12, G, GW2, K1, K3, K4, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, W, WV, Moore (1991); > *Vitis riparia* var. *praecox* Engelmann – F, GrPl, Il; > *Vitis riparia* var. *riparia* – F, GrPl, Il; > *Vitis riparia* var. *syrticola* (Fernald & Wiegand) Fernald – F, GrPl, Il.

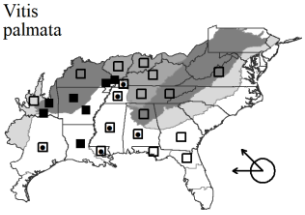
Vitis shuttleworthii House. CALUSA GRAPE. **Hab:** Moist hammocks, disturbed areas. **Dist:** N. peninsular FL south to s. FL. **Phen:** Apr-Jun. **Syn:** = Fl3, FNA12, GW2, K3, K4, WH3, Moore (1991), Ward (2006b); = *Vitis coriacea* Shuttleworth – S. NatureServe G4 (Apparently Secure).

Vitis simpsonii Munson. FLORIDA GRAPE. **Hab:** Hammocks, floodplain and other moist forests. **Dist:** Se. VA south to s. FL, west to s. MS. **Phen:** Late May-Jun; Aug-Oct. **Syn:** = S, Ward (2006b); = *Vitis cinerea* (Engelmann in A. Gray) Engelmann ex Millardet var. *floridana* Munson – C, F, Fl3, FNA12, G, K1, K3, K4, RAB, Va, WH3, Comeaux, Nesbitt, & Fantz (1987), Moore (1991); < *Vitis cinerea* (Engelmann) Engelmann ex Millardet – GW2, W. NatureServe G4G5TNR (Not Yet Ranked).

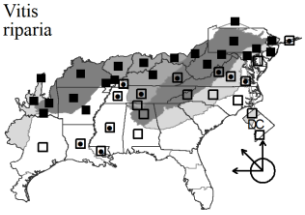
Vitis mustangensis



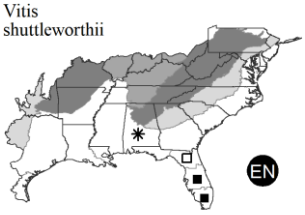
Vitis palmata



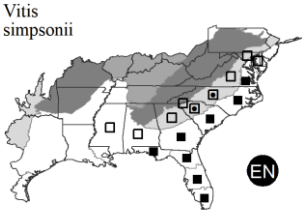
Vitis riparia



Vitis shuttleworthii

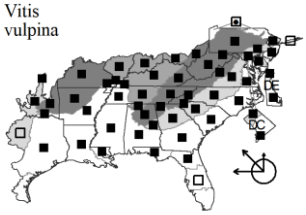


Vitis simpsonii



Vitis vulpina Linnaeus. FROST GRAPE, WINTER GRAPE, CHICKEN GRAPE. **Hab:** Forests and woodlands, primarily upland, but also in bottomlands. **Dist:** Se. NY west to MO and e. KS, south to c. peninsular FL and nc. TX. **Phen:** May-Jun; Jul-Nov. **Syn:** = Ar, C, F, Fl3, FNA12, G, GrPl, Il, K1, K3, K4, NcTx, NE, NY, Pa, RAB, Tn, Va, W, WH3, WV, Comeaux, Nesbitt, & Fantz (1987), Moore (1991), Ward (2006b); > *Vitis cordifolia* Michaux – S, Tx; < *Vitis vulpina* Linnaeus – GW2; > *Vitis vulpina* Linnaeus – S, Tx.

Vitis vulpina



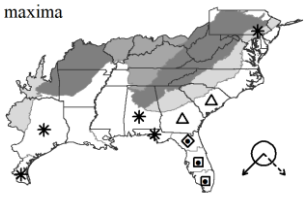
138. ZYGOPHYLLACEAE R. Brown 1814 (CREOSOTE-BUSH FAMILY) [in ZYGOPHYLLALES]

A family of about 27 genera and 240 species, trees, shrubs, and (rarely) herbs, of tropical and subtropical regions of the Old and New Worlds. References: Porter (2016) in FNA12 (2016); Sheahan in Kubitzki, Bayer, & Stevens (2007).

3 Fruit with tubercles, at maturity separating into 10 mericarps ..... ***Kallstroemia***
3 Fruit with spines, at maturity separating into 5 mericarps ..... ***Tribulus***

Kallstroemia Scopoli 1777

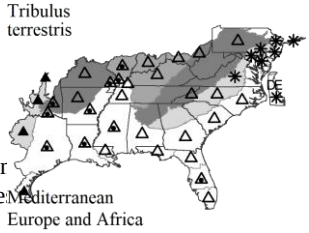
Kallstroemia maxima



A genus of about 18 species, herbs, of tropical and subtropical America. References: MacRoberts & MacRoberts (2011a); Porter (1969); Porter (2016) in FNA12 (2016); Sheahan in Kubitzki, Bayer, & Stevens (2007); Turner (2016).

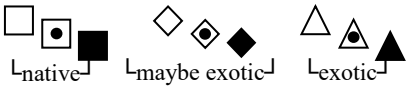
Kallstroemia maxima (Linnaeus) Hooker & Arnott. GREATER CALTROP. **Hab:** Disturbed areas, dunes; native status uncertain, probably native in FL peninsula, but probably early introduced in more northern parts of our area from the Neotropics. **Dist:** SC south to FL; West Indies; Mexico (Sinaloa and Tamaulipas) south through Central America to northern South America (Venezuela, Colombia). The native status of this species in the se. United States is uncertain; early collections from Charleston (Stephen Elliott) and Savannah suggest the probability of early introduction via ballast, at least north of the FL peninsula. **Syn:** = Bah, Fl3, FNA12, K1, K3, K4, RAB, S, Tx, WH3, WI, Porter (1969), Turner (2016). NatureServe GNR (Not Yet Ranked).

Tribulus terrestris



Tribulus Linnaeus 1753 (CALTROP)

Key to Map Symbology:



←rare ←uncommon ←common (see introduction for more)

* : waif
EN : endemic
H : historic

N : no
P : plar
? : que

Mediterranean Europe and Africa

138. ZYGOPHYLLACEAE

A genus of about 25 species, herbs, of tropical and subtropical parts of the Old World (introduced in the New World). References: Porter (2016) in FNA12 (2016); Sheahan in Kubitzki, Bayer, & Stevens (2007).

* ***Tribulus terrestris*** Linnaeus. PUNCTURE-WEED, CALTROP, DEVIL'S-THORN. **Hab:** Dunes, sandy roadsides, ballast. **Dist:** Native of Mediterranean Europe. **Phen:** Mar-Dec. **Syn:** = Ar, Bah, C, F, Fl3, FNA12, G, GrPl, Il, K1, K3, K4, NcTx, NE, NY, Pa, RAB, S, Tx, WH3, WI. NatureServe GNR (Not Yet Ranked).

140. FABACEAE Lindley 1836 (LEGUME FAMILY) [in FABALES]

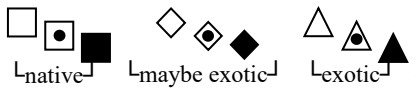
A family of about 730 genera and 20,000 species, trees, shrubs, and herbs, cosmopolitan. Classification of subfamilies follows LPGW (2017). References: SE3; Isely (1998); Lewis et al (2005); Robertson & Lee (1976); Wilbur (1963a); Wojciechowski, Lavin, & Sanderson (2004).

Subfamily Cercidioideae: *Bauhinia, Cercis, Phanera* Subfamily Detarioideae: *Tamarindus* Subfamily Caesalpinioideae ["Caesalpinioid clade"]: *Caesalpinia, Cassia, Chamaecrista, Delonix, Denisophytum, Erythrostemon, Gleditsia, Guilandina, Gymnocladus, Hoffmannseggia, Parkinsonia, Peltophorum, Pomaria, Senna* Subfamily Caesalpinioideae ["Mimosoid Clade"]: *Acacia, Acaciella, Adenanthera, Albizia, Calliandra, Desmanthus, Ebenopsis, Enterolobium, Havardia, Leucaena, Lysiloma, Mimosa, Neptunia, Pithecellobium, Prosopis, Samanea, Senegalia, Vachellia* Subfamily Papilionoideae (Faboideae): *Abrus, Acmispon, Aeschynomene, Alhagi, Alysicarpus, Amorpha, Amphicarpaea, Andira, Anthyllis, Apios, Arachis, Astragalus, Baptisia, Cajanus, Callerya, Canavalia, Caragana, Centrosema, Chapmannia, Cicer, Cladrastis, Clitoria, Colutea, Coursetia, Cullen, Cytisus, Dalbergia, Dalea, Dermatophyllum, Desmodium, Erythrina, Eysenhardtia, Galactia, Galega, Genista, Gliricidia, Glycine, Glycyrrhiza, Hedysarum, Hylodesmum, Indigofera, Kummerowia, Lablab, Lackeya, Ladeania, Lathyrus, Lens, Leptospron, Lespedeza, Lonchocarpus, Lotononis, Lotus, Lupinus, Maackia, Macroptilium, Medicago, Melilotus, Millettia, Mucuna, Neonotonia, Onobrychis, Ononis, Orbexilum, Oxytropsis, Pachyrhizus, Pediomelum, Phaseolus, Piscidia, Pisum, Psophocarpus, Pueraria, Rhynchosia, Robinia, Scorpiurus, Securigera, Sesbania, Sigmoidotropis, Sophora, Strophostyles, Stylosanthes, Styphnolobium, Tephrosia, Thermopsis, Trifolium, Trigonella, Ulex, Vicia, Vigna, Wisteria, Zornia*

1 Trees, shrubs, or woody vines; [subfamilies *Caesalpinioideae*, *Mimosoideae*, and *Faboideae*]
  2 Leaves 1-3-foliolate, or leaves reduced to flattened phyllodia or phyllodial spines. ..... ***Key A***
  2 Leaves 4-many-foliolate.
    3 Leaves bipinnately compound ..... ***Key B***
    3 Leaves pinnately compound.
      4 Leaves evenly 1-pinnate, with 1 or more lateral pairs of leaflets and 0 terminal leaflet ..... ***Key C***
      4 Leaves oddly 1-pinnate, with a terminal leaflet ..... ***Key D***
1 Herbs (including herbaceous vines).
  5 Leaves 4-many-foliolate.
    6 Leaves palmately compound, with 4 or more leaflets; [subfamily *Faboideae*] ..... ***Key E***
    6 Leaves pinnately or bipinnately compound.
      7 Leaves bipinnately compound ..... ***Key F***
      7 Leaves pinnately compound
        8 Leaves evenly 1-pinnate, with 1 or more lateral pairs of leaflets and 0 terminal leaflet ..... ***Key G***
        8 Leaves oddly 1-pinnate, with a terminal leaflet ..... ***Key H***
  5 Leaves 0-3-foliolate ; [subfamily *Faboideae*].
    9 Leaves 2-foliolate ..... ***Key G***
    9 Leaves 0, 1, or 3-foliolate.
      10 Leaves unifoliolate, or with leaf or leaflet blades absent, replaced by a tendril (and with foliaceous stipules) ..... ***Key I***
      10 Leaves trifoliolate (plants with some upper stem or lower stem leaves unifoliolate but with other trifoliolate leaves should be keyed here).
        11 Leaves palmately 3-foliolate (the petiolules of the 3 leaflets usually of similar length (if the apparent petiolule of the terminal leaflet is slightly longer, it does not have a joint between a rachis and the petiolule of the terminal leaflet) ..... ***Key J***
        11 Leaves pinnately 3-foliolate ..... ***Key K***

Key A - woody legumes with all leaves 1-, 2-, or 3-foliolate, or reduced to flattened phyllodia or phyllodial spines

2 Leaves 1- or 2-foliolate and > 2 cm wide; trees, shrubs, or lianas. ..... ***Cercis***
2 Leaves 3-foliolate, or reduced to phyllodial spines, or 1-foliolate (but then < 2 cm wide); shrubs or woody vines (rarely trees in *Erythrina*); [subfamily Faboideae].
  6 Woody vine (*Pueraria*, a robust herbaceous vine, is also keyed here as a failsafe).
    8 Calyx 4.5-6 mm long; leaflets unlobed; [tribe Phaseoleae] ..... ***Lackeya multiflora***
    8 Calyx 10-12 mm long; leaflets generally lobed; [tribe Phaseoleae] ..... ***Pueraria montana var. lobata***
  6 Shrub or tree.
    9 Shrub with angled or flanged green twigs; leaves palmately trifoliolate, unifoliolate, or reduced to spine-tipped phyllodes; [introduced]; [tribe Genisteae]. ..... ***Cytisus***
    9 Shrub or tree with twigs various, but not conspicuously green or flanged; leaves pinnately trifoliolate or unifoliolate.
      15 Leaves unifoliolate; [tribe Genisteae] ..... ***Lupinus***
      15 Leaves trifoliolate.
        16 Corolla 30-50 mm long, scarlet; legume with several seeds; leaflets lobed or not; [tribe Phaseoleae] ..... ***Erythrina***
        16 Corolla 8-15 mm long, purplish, pink, or white; legume 1-seeded; leaflets not lobed.

Key to Map Symbology:  ←rare ←uncommon ←common (see introduction for more)

* : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated

..... ***Lespedeza***

Key B - woody legumes (trees, shrubs, or woody vines) with bipinnately compound leaves

1 Leaves variously modified from strict 2-even-pinnateness, either with 1) a mixture (on a tree) of 1-even-pinnate and 2-even-pinnate leaves, and/or 2) the pinnae or leaflets often subopposite or fully alternate, and/or 3) with an odd number of pinnae per leaf (the tip of the rachis with a pair of lateral pinnae and a terminal pinna, but the leaflets of the pinnae still in opposite pairs), and/or 4) the basal pair of pinnae evolutionarily replaced by a single pair of leaflets larger than the other leaflets.
  3 Leaves characteristically a mixture (on a tree) of 1-even-pinnate (mainly on spurs) and 2-even-pinnate (mainly on new growth), the pinnae and the leaflets strictly opposite or subopposite; leaflets 1.5-4 cm long, acute to rounded at the apex; trunks with simple, trident, or multiply branched thorns to 20 cm long (or unarmed) ..... ***Gleditsia***
  3 Leaves all 2-even-pinnate, the basalmost "pinna pair" usually replaced by a pair of leaflets larger than the others, the pinnae and the leaflets often 'straying' to subopposite or fully alternate arrangement (some pinnae appearing odd-pinnate); leaflets 3-6 cm long, acuminate at the apex; trunks unarmed ..... ***Gymnocladus dioicus***

1 Leaves strictly 2-even-pinnate (with pinna pairs borne opposite one another and no pinna terminal on the rachis, and with leaflets also born in opposite pairs).
  6 Pinna pairs 1-6 (-7) per leaf; leaflets 4-ca. 250 per leaf.
    7 Leaflets 1.5-14 mm long.
      8 Glands absent on petioles and rachises.
..... ***Parkinsonia***
      8 Glands (stalked, columnar, or domed) 1 or more on petioles or rachises, on the petiole or at rachis nodes.
..... ***Vachellia***
    7 Leaflets 10-60 mm long (at least the larger leaflets on a plant > 14 mm long).
..... ***Albizia***
  6 Pinna pairs 4-25 per leaf (at least the larger leaves on a plant with > 6 pinna pairs); leaflets 150-3000 per leaf.
    29 Glands absent on petioles and rachises.
..... ***Mimosa***
    29 Glands (stalked, columnar, or domed) or nonglandular spheroid projections 1 or more on petioles or rachises, on the petiole or at rachis nodes.
      31 Branches unarmed.
..... ***Albizia julibrissin***
      31 Branches variously armed, with nodal spines, thorn spurs, or catclaw prickles scattered along internodes.
        37 Branches armed with stout thorn spurs (these simple or branched); inflorescences cylindrical, bicolored, the base of pink or whitish staminodes, the tip of yellow stamens; fruits flattened, but also curved and contorted ..... ***Dichrostachys cinerea ssp. africana***
        37 Branches armed with paired nodal spines, these <u>either</u> narrow and needle-like *or* massive, hollow, and with an entrance hole; fruits turgid, straight or slightly curved ..... ***Vachellia***

Key C - woody legumes with evenly 1-pinnately compound leaves with 2 or more leaflets [subfamilies *Faboideae* and *Caesalpinioideae*]

1 Flowers with 5 petals, 2 fused to form the keel (papilionaceous); corolla rose, yellow, orange, red, pink, or white; [subfamily Faboideae].
..... ***Sesbania***
1 Flowers with 5 or 3 petals, all distinct (caesalpinaceous); corolla yellow, orange, red, or pink; [subfamily Detarioideae or Caesalpinioid clade].
..... ***Senna***

Key D - woody legumes with oddly 1-pinnately compound leaves with 5 or more leaflets [subfamilies

1 Liana, climbing by twining; [tribe Millettieae]
..... ***Wisteria***
1 Shrubs and trees, lacking climbing adaptations.
  3 Leaflets glandular-punctate (not requiring magnification).
    5 Corolla reduced to a single petal (the standard); flowers whitish, sky blue, dark blue, purple, or violet; [collectively widespread] ..... ***Amorpha***
    5 Corolla of 5 petals; flowers white to cream, sometimes 'fading' to dark purple; [s. FL, TX].
..... ***Dalea***
  3 Leaflets lacking punctate glands.
    7 Leaflets 3-9 per leaf; leaflets 2-15 (-20) cm long; small or large tree (to shrub in *Dermatophyllum secundiflorum*).
..... ***Cladrastis kentukea***
    7 Leaflets (5-) 7-31 per leaf, at least the larger and better developed leaves on a plant with 11 or more leaflets; leaflets 0.4-12 cm long; shrub, small tree, or large tree.
      13 Corollas 5-6 mm long, pink or purplish; fruits 15-35 mm long, 1-3 mm wide ..... ***Indigofera tinctoria***
      13 Corollas 9-30 mm long, yellow, white, pink, or purplish; fruits 25-150 (-200) mm long, 5-35 mm wide.
..... ***Robinia***

Key E - herbaceous legumes with palmate leaves with 4 or more leaflets [subfamily *Faboideae*]

1 Leaflets 4; corolla yellow; [tribe *Dalbergieae*] ..... ***Zornia bracteata***
1 Leaflets 5 or more (at least on the largest and best developed leaves); corolla blue, pink, or violet (except yellow in *Lupinus luteus*).
  2 Leaflets and fruits not glandular-punctate; stamens monadelphous; [tribe *Genisteae*] ..... ***Lupinus***
  2 Leaflets and fruits glandular-punctate; stamens diadelphous; [tribe *Psoraleeae*].
    3 Leaflets linear to very narrowly oblanceolate, 0.5-2.0 (-3.5) mm wide, > 10× as long as wide; [Coastal Plain] ..... ***Orbexilum lupinellus***
    3 Leaflets broader, > 5 mm wide, 2-4.5× as long as wide; [collectively more widespread] ..... ***Pediomelum***

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Key F - herbaceous legumes with bipinnate leaves [subfamily *Mimosoideae*]

6 Petiole with 1-several glands; stems ascending to erect; flowers greenish-white ..... ***Desmanthus***
6 Petiole without glands; stems prostrate to weakly arching; flowers pink-purple, yellow, or greenish-yellow.
7 Flowers pink-purple; legume ribbed, the ribs with prickles ..... ***Mimosa***
7 Flowers yellow to greenish-yellow; legume not ribbed or prickly ..... ***Neptunia***

Key G - herbaceous legumes with once-pinnately, even-pinnately compound (or 'palmately' 2-foliolate) leaves with 2 or more leaflets [subfamilies *Faboideae* and *Caesalpinioideae*]

1 Flowers nearly regular; stamens 5-10, separate; [subfamily Caesalpinioideae, tribe Cassieae].
2 Leaflets 5-25 pairs, each leaflet 0.5-1.5 cm long; stipules persistent, striate ..... ***Chamaecrista***
2 Leaflets (2-) 3-12 pairs, each leaflet 1.5-12 cm long; stipules caduceus, small, not striate ..... ***Senna***
1 Flowers papilionoid; stamens diadelphous or monadelphous; [subfamily Faboideae].
3 Tendrils lacking on all leaves; stamens monadelphous or diadelphous.
4 Leaflets 2 per leaf; [tribe Aeschynomeneae] ..... ***Zornia***
4 Leaflets 4-60 per leaf.
6 Leaflets 20-60 per leaf; strong herbs (or woody) 1-4 m tall, simultaneously erect, > 1 m tall, and with stems usually > 5 mm in diameter
7 Fruit a loment, with single-seeded segments separated by sutures; stamens monadelphous or diadelphous in 2 phalanges of 5; [tribe Aeschynomeneae] . ..... ***Aeschynomene***
7 Fruit a legume; stamens diadelphous; [tribe Sesbanieae] ..... ***Sesbania***
6 Leaflets 4-18 per leaf; weak or sprawling herbs to 1.5 m long, with weak stems usually < 5 mm in diameter (or if thicker, then < 1 m long; stamens monadelphous or diadelphous.
8 Leaflets 4 per leaf; stamens monadelphous; [tribe Dalbergieae] ..... ***Arachis***
8 Leaflets 4-16 per leaf; stamens monadelphous, diadelphous (9 and 1, or 5 and 5) ..... ***Vicia***
3 Tendrils present in the terminal position on some or all leaves; stamens diadelphous; [tribe Fabeae].
10 Stipules foliaceous, typically larger than the leaflets ..... ***Pisum***
10 Stipules smaller, typically much smaller than the leaflets.
12 Style stout, flattened or folded, with a dense longitudinal band of hairs longitudinally arrayed along the inner side; stems ridged, angled, or longitudinally winged; leaflets 2-6 (-8) cm long; calyx 5-12 mm long ..... ***Lathyrus***
12 Style slender and hair-like, terete (round in ×-section), glabrous except for a ring of short hairs just below the stigma; stems ridged or angled, but not longitudinally winged; leaflets 0.5-4.5 cm long (except larger in a few waifs); calyx 2-8 mm long (except larger in a few waifs) ..... ***Vicia***

Key H - herbaceous legumes with once-pinnately, odd-pinnately compound leaves with 5 or more leaflets [subfamilies *Faboideae* and *Caesalpinioideae*]

1 Lateral veins of each leaflet neatly straight and parallel to one another; [tribe Millettieae] ..... ***Tephrosia***
1 Lateral veins of each leaflet complicatedly and less regularly arrayed.
2 Leaves (at least the largest and those with the most leaflets) with ≥ 13 leaflets.
4 Leaflets conspicuously dentate; [tribe Cicereae] ..... ***Cicer arietinum***
4 Leaflets entire.
5 Hairs dolabriform (with 2 branches parallel to the surface and pointing at 180° from each other). ..... ***Indigofera***
5 Hairs basifixed.
7 Fruit a loment (jointed between each seed and splitting into single-seeded segments).
8 Loments cylindrical, jointed but not noticeably constricted between the seeds; Inflorescence an umbel of (7-) 10-15 flowers; corolla white and pink (or yellow in the rare waif *S. securidaca*); [tribe Loteae] ..... ***Securigera***
8 Loments flattened, prominently constricted between the seeds; inflorescence a raceme of 2-6 flowers; corolla primarily yellow (sometimes also marked with pink or orange); [tribe Dalbergieae] ..... ***Aeschynomene***
7 Fruit a legume (lacking joints between each seed, though sometimes the pod constricted).
9 Inflorescences pedunculate, axillary racemes; leaflets eglandular; fruits dehiscent; [tribe Galegeae] ..... ***Astragalus***
9 Inflorescences terminal racemes, spikes, or heads; leaflets glandular-punctate or not; fruits indehiscent. ..... ***Dalea***
2 Leaves (the largest and those with the most leaflets) with < 11 leaflets.
11 Fruit a loment (constricted between each seed and splitting into single-seeded segments); petals primarily yellow (sometimes also marked with pink or orange); [of the se. Coastal Plain, from e. GA southwards and westwards]; [tribe Dalbergieae]. ..... ***Ctenodon viscidulus***
11 Fruit a legume (lacking constrictions between the seeds); petals variously colored; [collectively widespread].
15 Plants erect or ascending herbs.
16 Leaves with 5 leaflets, the 2 basal leaflets positioned like stipules at the base of the leaf (the leaf thus sessile); [tribe Loteae] ..... ***Lotus***
16 Leaves with 5-9 (or fewer or more and then keyed elsewhere), the lower leaflets positioned above a definite petiole.
17 Hairs dolabriform (with 2 branches parallel to the surface and pointing at 180° from each other; petals reddish orange and/or with some pink or salmon; flowers papilionaceous; stamens 10, diadelphous (9+1); leaflets often > 5 mm wide; legume 3+-seeded; flowers 5-12 mm long, in racemes; [tribe Indigofereae] ..... ***Indigofera***
17 Hairs basifixed; petals of various colors; flowers not papilionaceous, barely bilaterally symmetrical; stamens 5, monadelphous; leaflets 0.5-5 mm wide; legume 1-seeded; flowers very small, < 5.5 mm long, aggregated into tight spike; [tribe Amorpheae] ..... ***Dalea***
15 Plants prostrate or twining herbaceous vines.
18 Hairs dolabriform (with 2 branches parallel to the surface and pointing at 180° from each other; petals reddish orange and/or with some pink or salmon; [tribe Indigofereae] ..... ***Indigofera***

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

18 Hairs basifixed; petals of various colors; [tribe Phaseoleae].
20 Corolla purplish, maroon, brownish, or yellowish green; leaflets 4-9 cm long, on petioles 3-5 mm long; keel coiled ..... ***Apios***
20 Corolla either white with red striations or lavender; leaflets 2-5 cm long, on petioles 1-2 mm long; keel carinate, not coiled ..... ***Galactia***

Key I - herbaceous legumes with all leaves unifoliolate or leaflets absent [subfamily *Faboideae*]

1 Tendrils present on plant; leaves modified into tendrils (leaflike structures present clearly interpretable as stipules); [tribe *Fabeae*].
2 Legume 4-7 mm wide; corolla 10-13 mm long ..... ***Lathyrus aphaca***
2 Legume 12-20 mm wide; corolla 18-25 mm long ..... ***Pisum***
1 Tendrils absent; leaves or stipules present on plant and interpretable as leaves with 1 leaflet.
3 Leaflet blades roundish, 0.6-1.5× as long as wide.
4 Leaves with a well-developed petiole, > 0.5 cm long.
..... ***Rhynchosia***
4 Leaves sessile, subsessile, or perfoliate.
6 Corolla bright or creamy yellow; stamens separate; leaves all 1-foliolate; leaflet blades perfoliate or sessile; [tribe *Thermopsideae*] ..... ***Baptisia***
6 Corolla violet to blue (drying pale); stamens diadelphous; leaves 1-foliolate and with some leaves 3-foliolate or 2-foliolate; leaflet blades cuneate, subsessile; [tribe *Psoraleeae*] ..... ***Pediomelum canescens***
3 Leaflet blades elongate, 1.5-15× as long as wide.
7 Leaves basally disposed.
..... ***Lupinus***
7 Leaves all or primarily cauline.
11 Stamens monadelphous; corolla yellow, 8-30 mm long; [tribe *Crotalarieae*] ..... ***Crotalaria***
11 Stamens diadelphous; corolla purple, lavender, or cream, 5-15 mm long.
13 Flowers solitary in leaf axils; [tribe *Loteae*] ..... ***Acmispon***
13 Flowers in racemose inflorescences; [tribe *Desmodieae*] ..... ***Alysicarpus***

Key J - herbaceous legumes with palmately trifoliolate leaves [subfamily *Faboideae*]

1 Stamens separate, unfused; stipules (at least the lower on the stem) often persistent, foliaceous, not striate; corollas yellow, white, or purple-blue.
2 Legumes turgid, inflated; corolla white, cream, yellow, blue, or purple; [widespread in our area, especially Coastal Plain] ..... ***Baptisia***
2 Legumes laterally compressed; corolla yellow; [primarily montane, elsewhere as an escape from cultivation] ..... ***Thermopsis***
1 Stamens monadelphous or diadelphous; stipules either caducous or well-developed and persistent, and then separate or adnate to the petiole; corollas pink, blue, violet, yellow, or white.
3 Stamens monadelphous; corollas 7-20 mm long.
..... ***Crotalaria***
3 Stamens diadelphous (9 and 1); corollas 3-16 mm long.
7 Foliage punctate-glandular; corollas blue, violet, or white.
..... ***Pediomelum***
7 Foliage eglandular; corollas purple, pink, red, or white.
9 Lateral veins of each leaflet lateral veins neatly straight and parallel to one another; leaflets entire; [tribe *Desmodieae*] ..... ***Kummerowia***
9 Lateral veins of each leaflet complicatedly and irregularly arrayed; leaflets denticulate; [tribe *Trifolieae*] ..... ***Trifolium***

Key K - herbaceous legumes with pinnately trifoliolate leaves [subfamily *Faboideae*]

1 Leaflets denticulate (sometimes inconspicuously so); [tribe Trifolieae].
2 Inflorescences elongate racemes with an axis 5-15 cm long, the flowers well-spaced along the axis, the overall inflorescence much longer than its diameter.....
..... ***Melilotus***
2 Inflorescences umbellate or headlike clusters or short racemes with an axis < 2 cm long, the flowers closely clustered, the overall inflorescence little (if at all) longer than its diameter.
3 Legumes spirally coiled or curved, often tuberculate or prickly; stems 4-angled towards the tip ..... ***Medicago***
3 Legumes straight or nearly so, never tuberculate or prickly; stems terete or flattened (2-angled) towards the tip ..... ***Trifolium***
1 Leaflets entire (and sometimes also with 1 or 2 broad lobes), or with scattered, irregular large teeth (*Pachyrhizus erosus*).
4 Main stems erect or ascending, not trailing, twining, or otherwise vine-like.
5 Flowers not papilionaceous (the wings and keel epistemonous, arising terminally or laterally from the stamen tube), barely bilaterally symmetrical; stamens 5, monadelphous; [tribe Amorpheae] ..... ***Dalea pinnata var. trifoliata***
5 Flowers papilionaceous; stamens 10, diadelphous or monadelphous.
6 Plants with separate leafy and flowering stems (the flowering stems naked or nearly so of leaves).
7 Standard bright red, remaining folded, 30-50 mm long; leaves hastately lobed; fruit a torulose legume, 6-20 cm long, the seeds red; [tribe Phaseoleae]...
..... ***Erythrina herbacea***
7 Standard white or pink, expanded, 4-8 mm long; leaves not hastate; fruit a flattened loment, < 5 cm long, the seeds drab; [tribe Desmodieae] .....
..... ***Hylodesmum nudiflorum***
6 Plants bearing leaves and flowers on the same stems.
8 Leaves, stems, and/or calyces glandular-punctate.
9 Corollas pink or lavender/purplish; leaflets estipellate; fruit 1-seeded, indeciscent; [tribe Psoraleae] ..... ***Orbexilum***
9 Corollas yellow; leaflets stipellate; fruit 2-many-seeded, dehiscent; [tribe Phaseoleae, subtribe Cajaninae]
..... ***Rhynchosia***
8 Leaves, stems, and calyces lacking punctate glands.
11 Leaflet blades large, at least the largest terminal leaflets on a plant > 5 cm long.
12 Stipels absent on the petiolules of mature leaflets; stamens monadelphous.

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

13 Fruit a legume (not segmented into 1-seed dispersal units), hairy but the hairs not hooked; [plants cultivated as garden plants, rare as waifs] ... ***Canavalia ensiformis***

13 Fruit a loment (separating into single-seeded segments), uncinulate (with hooked hairs, the fruits attaching to hairs or clothes as 'stick-tights'); [plants widespread, common] ***Hylodesmum***

12 Stipels present, persistent; stamens diadelphous (9 and 1).

14 Fruit a loment (separating into single-seeded segments), uncinulate (with hooked hairs, the fruits attaching to hairs or clothes as 'stick-tights'); [plants widespread, common] ***Desmodium***

14 Fruit a legume (not segmented into 1-seed dispersal units), hairy but the hairs not hooked; [plants cultivated as crops or garden plants, rare as waifs]

15 Keel of corolla coiled 1-3 turns; stipules inconspicuous; [soy beans] ***Glycine max***

15 Keel of corolla not coiled; stipules conspicuous, persistent, striate; [bush green beans or lima beans] ***Phaseolus***

11 Leaflet blades smaller, all on a plant < 5 cm long.

16 Stipels present, persistent.

17 Fruit a loment (separating into single-seeded segments), uncinulate (with hooked hairs, the fruits attaching to hairs or clothes as 'stick-tights') ***Desmodium***

17 Fruit a several- to many-seeded legume, glabrous to hairy (but not uncinulate) ***Galactia***

16 Stipels absent on the petiolules of mature leaflets.

18 Fruits dehiscent, a legume with 2 or more seeds. ***Acmispon***

18 Fruits indehiscent: either 1-seeded, or a loment with 2 or more one-seeded (indehiscent) segments.

20 Petioles fused most of length with amplexicaul stipules, the leaves thus appearing sessile or nearly so; corollas lemon to orangy yellow; flowers subsessile; fruit a loment of 2 segments, the terminal segment fertile, the lower segment either sterile or fertile ... ***Stylosanthes***

20 Petioles free from stipules, leaves evidently petiolate; corollas white to pink; flowers pedicellate; fruit either 1-seeded, or a loment normally with 3+ segments

21 Fruit a loment, with 1-3 segments; terminal leaflets 3-10 cm long, 1-1.5× as long as wide; stamens monadelphous ***Hylodesmum***

21 Fruit 1-seeded; terminal leaflets 1-5 cm long, 1.2-8× as long as wide; stamens diadelphous (9 and 1) ***Lespedeza***

4 Main stems trailing, twining, creeping, or climbing or sprawling over other vegetation.

22 Leaves, stems, and/or calyces glandular-punctate; corollas yellow. ***Rhynchosia***

22 Leaves, stems, and calyces lacking punctate glands; corollas yellow, pink, purplish, white, red, blue.

23 Leaflet blades smaller, all on a plant < 5 cm long.

24 Stipels absent on the petiolules of mature leaflets.

25 Fruit a loment of 2 segments, the terminal segment fertile, the lower segment either sterile or fertile; corollas lemon to orangy yellow ... ***Stylosanthes***

25 Fruit 1-seeded; corollas pink-purplish to white, or bronze to brick-red. ***Lespedeza***

24 Stipels present, persistent (minute in *Amphicarpaea*).

27 Fruit a loment (separating into single-seeded segments), uncinulate (with hooked hairs, the fruits attaching to hairs or clothes as 'stick-tights').

28 Flowers in axillary or terminal racemes; leaflets rotund, broadly ovate, broadly elliptic, or narrowly elliptic, the larger > 1 cm long. ... ***Desmodium***

28 Flowers in axillary clusters; leaflets broadly obovate, 0.5-1 cm long ***Grona triflora***

27 Fruit a legume, dehiscent (at least tardily), unsegmented, and with 2+ seeds.

29 Flowers resupinate (the pedicel twisted 180 degrees), the banner 2.5-5.5 cm long and positioned lowermost.

30 Calyx lobes equal to or longer than the calyx tube; fruits 3-5 mm wide ***Centrosema***

30 Calyx lobes shorter than the calyx tube; fruits 5-8 mm wide ***Clitoria***

29 Flowers not resupinate, the banner 0.7-2.5 cm long and positioned uppermost.

31 Stipules caducous ***Galactia***

31 Stipules persistent, sometimes conspicuous, sometimes striate.

32 Keel petal and the included style straight to gently upcurved; stems very slender, < 0.75 mm in diameter ***Amphicarpaea***

32 Keel petal and the included style either strongly curved upwards 90-180 degrees, or even more extensively coiled (asymmetrically and spirally) in towards the flower center; stems slender to thicker, > 0.75 mm in diameter.

33 Keel petal and the included style strongly curved upwards 90-180 degrees; corollas yellow or pink to lavender (or whitish).

34 Corollas pink to lavender (or whitish); corolla keel usually somewhat twisted, asymmetrical; [widespread in our region] ... ***Strophostyles***

34 Corollas yellow; corolla keel symmetrical; [mainly outer Coastal Plain] ***Vigna***

33 Keel petal and the included style extensively coiled > 180 degrees (asymmetrically and spirally) in towards the flower center; corollas pink, purple, maroon, purple-black (or whitish).

35 Peduncles long, the flowers borne in clusters on a raceme axis shorter than the peduncle; plants glabrate to villous, the hairs not hooked ***Macroptilium***

35 Peduncles short, the flowers scattered along a (sometimes branched) raceme axis, the raceme axis about as long as or longer than the peduncle; plants uncinulate pubescent (use 20× magnification, or touch the plant for the 'tacky' feel) ***Phaseolus***

23 Leaflet blades large, at least the largest terminal leaflets on a plant > 5 cm long.

36 Stipels absent on the petiolules of mature leaflets; stamens monadelphous ***Canavalia***

36 Stipels present, persistent (minute in *Amphicarpaea*); stamens diadelphous (9 and 1) or monadelphous (*Pueraria*).

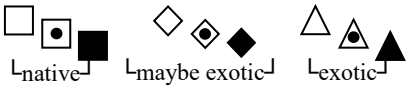
37 Stamens monadelphous; robust herbaceous vine with stems to 30 m long; flowers purple, when fresh smelling like artificial grape flavoring. ... ***Pueraria montana var. lobata***

37 Stamens diadelphous (9 and 1); herbacous vines with stems usually < 5 m long; flowers various in color, not 'grapy' in odor.

38 Flowers resupinate (the pedicel twisted 180 degrees), the banner (standard) petal lowermost; banner (standard) 25-50 mm long, much larger than the other petals.

39 Calyx lobes equal to or longer than the calyx tube; fruits 3-5 mm wide ***Centrosema***

39 Calyx lobes shorter than the calyx tube; fruits 5-8 mm wide ***Clitoria***

Key to Map Symbology: 

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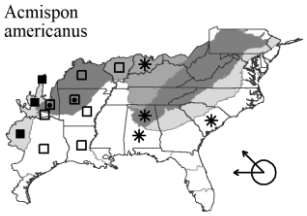
38 Flowers not resupinate, the banner (standard) uppermost; banner (standard) < 25 mm long, or if up to 30 mm then not much llonger than the other petals.
40 Fruit a loment (separating into single-seeded segments), uncinulate (with hooked hairs, the fruits attaching to hairs or clothes as 'stick-tights') ..... ***Desmodium***
40 Fruit a several- to many-seeded legume, glabrous to hairy (but not uncinulate).
41 Keel incurved < 90 (-120) degrees; style glabrous or pubescent.
42 Stipules inconspicuous or obsolescent.
45 Bracteoles below the calyx persistent; ventral suture of the fruit bumpy-nodose; style bearded ..... ***Lablab purpureus***
45 Bracteoles caducous; ventral suture of the fruit not bumpy-nodose; style glabrous. ..... ***Lackeya multiflora***
42 Stipules persistent and conspicuous.
49 Keel petal and the included style straight to gently upcurved; stems very slender, < 0.75 mm in diameter ..... ***Amphicarpaea***
49 Keel petal and the included style strongly curved upwards 90-180 degrees; stems slender to thicker, > 0.75 mm in diameter..... ***Strophostyles***
41 Keel petal and the included style either strongly curved upwards 90-180 degrees, or even more extensively coiled (asymmetrically and spirally) in towards the flower center; style or stigma pubescent.
50 Plants uncinulate pubescent (use 20× magnification, or touch the plant for the 'tacky' feel) ..... ***Phaseolus***
50 Plants glabrate to villous, the hairs not hooked.
51 Keel petal and the included style strongly curved upwards 90-180 degrees ..... ***Strophostyles***
51 Keel petal and the included style even more extensively coiled (asymmetrically and spirally) in towards the flower center. ..... ***Macroptilium***

Acmispon Rafinesque 1832 (AMERICAN BIRD'S-FOOT-TREFOIL, PRAIRIE-TREFOIL)



A genus of about 8 species, annual and perennial herbs, of temperate North America and South America. New World taxa often referred to *Lotus* are not closely related to it, and should be segregated (Degtjareva et al 2006; Allan & Porter 2000). References: Allan & Porter (2000); Degtjareva et al (2006); Grant & Small (1996); Isely (1981); Isely (1998); Sokoloff (2000).

Acmispon americanus (Nuttall) Rydberg. WESTERN PRAIRIE-TREFOIL. **Hab:** Prairies, glades, bluff-tops, roadsides; eastwards a waif, as near wool waste-combing mills, other disturbed areas. **Dist:** MB and SK south to w. LA and c. TX; also BC south to s. CA, AZ, NM, and Mexico. **Phen:** Mid May-Aug. **Syn:** = *Acmispon americanum* – S, orthographic variant; = *Acmispon americanus* var. *americanus* – K3, K4, NY; = *Lotus purshianus* F.E. & E.G. Clements var. *purshianus* – C, SE3, Isely (1981), Isely (1998); = *Lotus unifoliolatus* (Hooker) Bentham var. *unifoliolatus* – Ar, K1, NE; < *Lotus americanus* (Nuttall) Bischoff – F; < *Lotus purshianus* F.E. & E.G. Clements – G, GrPl, Tx; < *Lotus unifoliolatus* – Il, NcTx.

Aeschynomene Linnaeus 1753 (JOINTVETCH)

A genus of about 115 species, herbs and shrubs, pantropical and warm temperate. The genus as currently circumscribed includes at least three disparate clades (Cardoso et al. 2019), one of which has been removed (Cardoso et al. 2020) as *Ctenodon*. References: Arrighi et al (2013); Cardoso et al (2019); Cardoso et al (2020); Carulli, Tucker, & Dill (1988); Isely (1998); Rudd (1955); Vanni (2016).

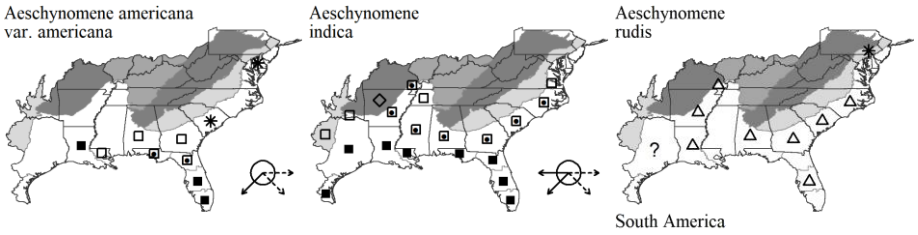
2 Prostrate perennial; leaves with 3-19 leaflets; stipules basifixed; loment articles separated by a joint and also an isthmus; calyx campanulate; [of dry, sandy or of disturbed areas]..... ***Ctenodon***
2 Erect or ascending annual; leaves with 21-51 or more leaflets; stipules peltate or medifixed; loment articles separated by only a joint; calyx bilabiate; [of moist to wet habitats].
3 Leaflets with 2-4 longitudinal nerves; mature fruit stipe 1.5-3 mm long ..... ***Aeschynomene americana var. americana***
3 Leaflets with 1 longitudinal nerve; mature fruit stipe 4-25 mm long; [section *Aeschynomene*].
6 Paired bracts subtending each flower entire (rarely toothed); leaflets 2.5-13 mm long, 1-2.5 mm wide; fruit segments 4-5 mm long, 3.5-5 mm wide..... ***Aeschynomene indica***
6 Paired bracts subtending each flower toothed (rarely entire); leaflets 6-25 mm long, 1.5-4 mm wide; fruit segments 5-6 mm long, 5-6 mm wide..... ***Aeschynomene rudis***

Aeschynomene americana Linnaeus *var. **americana***. SHYLEAF. **Hab:** Moist, disturbed sites. **Dist:** S. GA (Jones & Coile 1988, SE), south to s. FL, westwards in Panhandle FL, s. AL, and s. LA; West Indies; Mexico, Central America, and South America; reported for se. Asia. **Syn:** = SE3, Isely (1998), Rudd (1955); < *Aeschynomene americana* – Fl3, K1, K3, K4, S, WH3, Vanni (2016). NatureServe G5 (Secure).

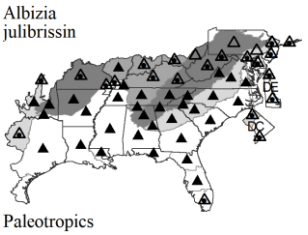
Aeschynomene indica Linnaeus. SOUTHERN JOINTVETCH. **Hab:** Marshes, ditches, disturbed wetlands. **Dist:** Apparently native to se. North America, from NC west to AR, south to s. FL and TX, now widespread in the tropics and subtropics of the Old World and New World. **Phen:** Jul-Oct. **Tax:** A member of the American sect. *Aeschynomene* clade (Oliveira Silva Cardoso et al. 2019). At least some s. TX material may represent *Aeschynomene evenia* C. Wright (see Correll & Johnston (1970). **Comm:** Perry, Ware, & McKenney-Mueller (1998) discuss the occurrence of this species in VA. Apparently a tetraploid derivative of *A. evenia* and *A. scabra* (Arrighi et al. 2013). **Syn:** = Ar, Fl3, GW2, K1, K3, K4, Mo2, SE3, Va, WH3, Carulli, Tucker, & Dill (1988), Isely (1998), Rudd (1955); < *Aeschynomene virginica* (Linnaeus) Britton, Sterns, & Poggenburg – S.

* ***Aeschynomene rudis*** Bentham. FRISOLILLO. **Hab:** Roadside ditches, rice fields, disturbed wetlands. **Dist:** Native of South America. Native to South America, introduced in se. United States, recently becoming a weed. **Phen:** Jul-Oct. **Tax:** A member of the American sect. *Aeschynomene* clade (Oliveira Silva Cardoso et al. 2019). **Comm:** A diploid, and one of the parents of *A. virginica* (Arrighi et al. 2013). **Syn:** = Ar, Fl3, K1, K3, K4, Mo2, SE3, WH3, Carulli, Tucker, & Dill (1988), Isely (1998), Rudd (1955), Vanni (2016). NatureServe GNR (Not Yet Ranked).

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



Albizia Durazzini 1772 (SILKTREE)



A genus of about 100-120 species, trees, shrubs, and vines, of tropical, subtropical, and warm temperate Asia, Africa, and America. References: Barneby & Grimes (1996); Isely (1973); Isely (1998).

* ***Albizia julibrissin*** Durazzini. MIMOSA, SILKTREE. **Hab:** Disturbed areas, suburban woodlots, escaped and persistent in forests and woodlands. **Dist:** Native of warm-temperate and subtropical Asia. A serious weed tree; "literally almost everywhere in the 'Dixie' south" (Isely 1973). **Phen:** May-Aug; Jul-Nov. **Syn:** = Ar, C, Fl3, GrPl, Il, K1, K3, K4, NcTx, NE, NY, Pa, RAB, SE3, Tn, Tx, Va, W, WH3, Barneby & Grimes (1996), Isely (1973), Isely (1998); = *Albizzia julibrissin* – F, G, S, orthographic variant. NatureServe GNR (Not Yet Ranked).

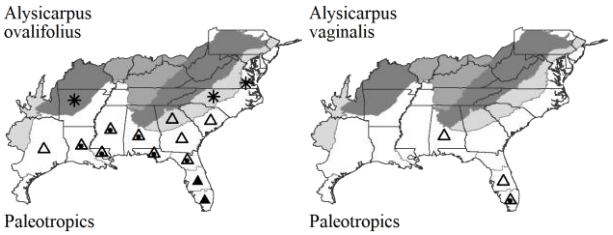
Alysicarpus Necker ex Desvaux 1813 (ALYCE CLOVER)

A genus of about 25-30 species, herbs, native of the Old World tropics. References: Isely (1998); Woods & Diamond (2016).

1 Plant annual, erect, 1.0-1.5 meters tall; lower and middle cauline (unifoliolate) leaves oblong or oblong-elliptical, 3.0-6.5 cm long, 2.0-3.0 cm wide; upper cauline leaves reduced, 2.5-4.0 cm long, 0.25-1.5 cm wide; loments without septa between the segments ..... ***Alysicarpus ovalifolius***
1 Plant perennial, procumbent to ascending, < 0.5 m tall; lower and middle cauline (unifoliolate) leaves orbicular to broadly oblong, 1.5-3.0 cm long, 1.0-2.0 cm wide; upper cauline leaves lanceolate, 1.0-3.0 cm long, 0.25-1.0 cm wide; loments with septa between the segments..... ***Alysicarpus vaginalis***

* ***Alysicarpus ovalifolius*** (Schumacher) J. Léonard. ALYCE CLOVER. **Hab:** Disturbed areas. **Dist:** Native of the Old World Tropics, planted as a forage crop (at least formerly), and rarely naturalized. The VA occurrence is from chrome ore piles in Newport News and presumably a waif. Present in the SC Coastal Plain (Bradley et al. [in prep.]). **Syn:** = Fl3, K3, K4, WH3, Woods & Diamond (2016); < *Alysicarpus vaginalis* (Linnaeus) A.P. de Candolle – Ar, K1, SE3, Isely (1998).

* ***Alysicarpus vaginalis*** (Linnaeus) A.P. de Candolle. RED MONEYWORT. **Hab:** Disturbed areas. **Dist:** Native of Old World. **Phen:** Jul-Sep. **Syn:** = Bah, Fl3, K3, K4, WH3, Woods & Diamond (2016); < *Alysicarpus vaginalis* (Linnaeus) A.P. de Candolle – K1, SE3, Isely (1998).



Amorpha Linnaeus 1753 (INDIGO-BUSH, LEADPLANT)

A genus of about 15 species, shrubs, of temperate North America. References: Isely (1998); Straub, Sorrie, & Weakley (2009); Wilbur (1954); Wilbur (1964); Wilbur (1975).

7 Calyx lobes (1.2-) 2.0-3.5 mm long (thus approaching, equal to, or exceeding the length of the calyx tube); racemes 3-8 (-15) cm long; [Piedmont and low Mountains, NC, SC, GA, and AL]..... ***Amorpha schwerinii***
7 Calyx lobes (0-) 0.2-1.2 mm long (thus distinctly shorter than the calyx tube); racemes 5-20 (-25) cm long; [collectively widespread].
  9 Calyx lobes obsolete to very small, (0-) 0.2-0.6 (-0.8) mm long; plants glabrous to glabrate; leaflets usually not mucronate, the midrib commonly terminating in a sessile or shortly exserted (0.2-0.4 mm), slightly enlarged, glandular tip; leaflets (9-) 11-15 (-19)..... ***Amorpha glabra***
  9 Calyx lobes small, 0.2-1.2 mm long (the lowermost lobe usually 0.8-1.2 mm long); plants pubescent or puberulent, usually conspicuously so; leaflets usually mucronate, the midrib usually slender, exserted, 0.5-1.5 mm long and tapering; leaflets 9-23 (-31).
    10 Foliage blackening when dried; leaflets (7-) 9-15 (-19) per leaf, usually shiny above when fresh; [of s. SC and southward]..... ***Amorpha nitens***
    10 Foliage remaining green when dried; leaflets (7-) 9-23 (-31) per leaf, dull to somewhat shiny above when fresh; [widespread in our area].
    ..... ***Amorpha fruticosa***

Amorpha fruticosa Linnaeus. TALL INDIGO-BUSH. **Hab:** Riverbanks, forests, woodlands, marsh edges, sometimes in disturbed sites. **Dist:** NB west to WA, south to s. FL, TX, s. CA, and Mexico (BCN, CHH, SON). **Phen:** Apr-Jun; Jun-Oct. **Syn:** = Ar, C, Fl3, G, GrPl, GW2, K1, K3, K4, Mi,

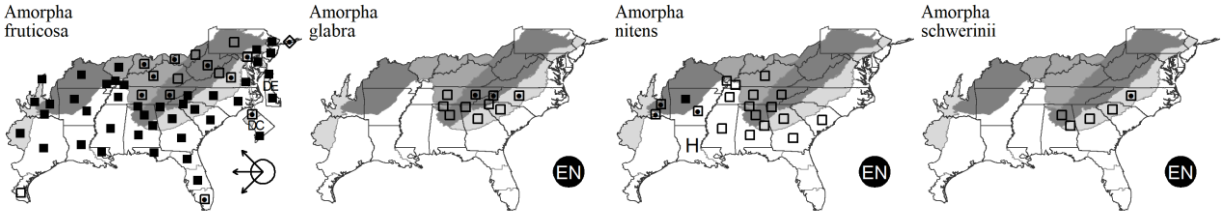
Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

NcTx, NE, NY, Pa, RAB, SE3, Tn, Va, W, WH3, Isely (1998), Wilbur (1975); > *Amorpha curtissii* Rydberg – S; > *Amorpha fruticosa* Linnaeus – S; > *Amorpha fruticosa* var. *angustifolia* Pursh – Il, Tx; > *Amorpha fruticosa* var. *croceolanata* (P.W. Watson) Schneider – Il, Tx; > *Amorpha fruticosa* var. *fruticosa* – F, Il, Tx; > *Amorpha fruticosa* var. *occidentalis* (Abrams) Kearney & Peebles – Tx; > *Amorpha fruticosa* var. *tennesseensis* (Shuttleworth) E.J. Palmer – F; > *Amorpha tennesseensis* Shuttleworth – S; > *Amorpha virgata* Small – S.

Amorpha glabra Desfontaines ex Persoon. APPALACHIAN INDIGO-BUSH, MOUNTAIN INDIGO. **Hab:** Dry to dry-mesic ridgetop and slope forests, primarily in the Blue Ridge escarpment. **Dist:** Endemic to the Southern Appalachian mountains (and nearby provinces) of n. AL, ne. GA, w. NC, nw. SC, and e. and c. TN. **Phen:** May-Jul; Jul-Oct. **Syn:** = K1, K3, K4, RAB, S, SE3, Tn, W, Isely (1998), Wilbur (1975). NatureServe G4? (Apparently Secure).

Amorpha nitens F.E. Boynton. DARK INDIGO-BUSH, SHINING INDIGO-BUSH. **Hab:** Dry to mesic upland and riparian forests, ravines, bluffs, stream banks, glade margins, sandy woodlands, rocky slopes, bottomland forests. **Dist:** S. SC south to GA, west to s. LA, north in the interior to w. KY, s. IL, AR, and e. OK. First reported for SC by Nelson & Kelly (1997) and for MS by John Kees (2021). **Phen:** Apr-Jun. **Syn:** = Ar, Il, K1, K3, K4, S, SE3, Tn, Isely (1998), Wilbur (1975); = n/a – RAB. NatureServe G3? (Vulnerable).

Amorpha schwerinii C. Schneider. PIEDMONT INDIGO-BUSH. **Hab:** Forests and woodlands, primarily rather xeric and rocky (though not exclusively so). **Dist:** Endemic to the Piedmont (rarely adjacent provinces) of sc. NC, c. SC, nc. GA, e. AL, and ne. MS. **Phen:** Apr-Jun; Jun-Oct. **Syn:** = K1, K3, K4, RAB, S, SE3, Isely (1998), Wilbur (1975). NatureServe G3G4 (Vulnerable).



Amphicarpaea Elliott ex Nuttall 1818 (HOG-PEANUT)

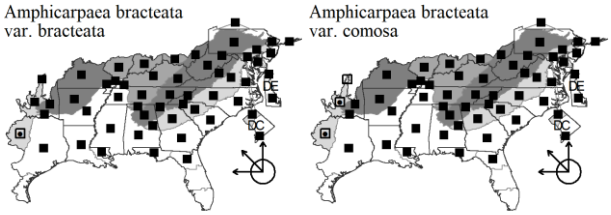
A genus of 5-6 species, of e. and se. Asia, North America, and montane Africa. It now appears that 3 (or more?) semi-cryptic taxa should be recognized in what has traditionally been considered a single species of *Amphicarpaea* (Kartzinel et al. 2016; Callahan 1997; Parker 1996). The genus name has been corrected to *Amphicarpaea* from the frequently used *Amphicarpa*. References: Callahan (1997); Isely (1998); Kartzinel et al (2016); Parker (1996); Parker, Doyle, & Doyle (2004).

Identification Notes: Producing inflorescences of two types, one with chasmogamous flowers and aerial legumes, the other with cleistogamous flowers and subterranean legumes.

1 Petiole 3.5-5.3 cm long; petiolule of the terminal leaflet (not including the rachis extending from the point of connection of the lateral leaflets to the joint marking the beginning of the petiolule of the terminal leaflet) 1.0-1.4 mm long; terminal leaflet 4.2-5.2 cm long ..... ***Amphicarpaea bracteata var. bracteata***
1 Petiole 6.0-6.8 cm long; petiolule of the terminal leaflet 1.7-1.9 mm long; terminal leaflet 5.5-6.1 cm long ..... ***Amphicarpaea bracteata var. comosa***

Amphicarpaea bracteata (Linnaeus) Fernald *var*. ***bracteata***. HOG-PEANUT. **Hab:** Dry to moist forests, thickets. **Dist:** Widely distributed in eastern North America but more common eastwards. **Phen:** Jul-Sep; Aug-Oct. **Comm:** {The distributions and habitats of the two varieties in our area require herbarium and field investigation}. **Syn:** = Il, K1, K3, K4, Mi, Callahan (1997), Parker (1996); = *Amphicarpa bracteata* var. *bracteata* – F, G, orthographic variant; < *Amphicarpa bracteata* – Pa, RAB, orthographic variant; < *Amphicarpaea bracteata* – Ar, C, GrPl, NcTx, NE, NY, SE3, Tn, Tx, Va, WH3, Isely (1998); < *Falcata comosa* (Linnaeus) Kuntze – S. NatureServe G5T5 (Secure).

Amphicarpaea bracteata (Linnaeus) Fernald *var*. ***comosa*** Fassett. HOG-PEANUT. **Hab:** Dry to moist forests, thickets. **Dist:** Widely distributed in eastern North America, but more common westwards. **Phen:** May-Sep; Aug-Oct. **Comm:** {The distributions and habitats of the two varieties in our area require herbarium and field investigation}. **Syn:** = Il, K1, K3, Mi, Callahan (1997), Parker (1996); = *Amphicarpa bracteata* var. *comosa* – F, G, orthographic variant; < *Amphicarpa bracteata* – Pa, RAB, orthographic variant; < *Amphicarpaea bracteata* – Ar, C, GrPl, NcTx, NE, NY, SE3, Tn, Tx, Va, WH3, Isely (1998); < *Falcata comosa* (Linnaeus) Kuntze – S. NatureServe G5T5? (Secure).



Apios Fabricius 1759 (GROUNDNUT)

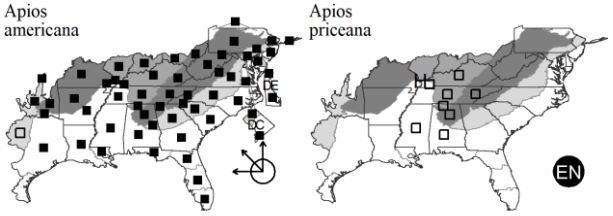
A genus of about 6 species, perennial vines, of temperate e. Asia and e. North America. Our two species are sister to one another, and otherwise most closely related to *A. delavayi* Franchon (Himalayan) and *A. fortunei* Maximowicz (of Japan, China, and Taiwan) (Li et al. 2014). References: Isely (1998); Li et al (2014); Woods (2005).

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated

1 Petiole 20-58 mm long; flower deep maroon to pale maroon and white; style glabrous; legume 6-10 (-12) cm long; seed 5-6 mm long; tubers several in a chain, each 2-10 cm in diameter.....***Apios americana***
1 Petiole 70-75 mm long; flower pale green and rose-purple; style bearded; legume 12-15 (-18) cm long; seed 7.2-11.0 mm long; tuber 1, 15-20 cm in diameter.....***Apios priceana***

Apios americana Medikus. COMMON GROUNDNUT. **Hab:** Marshes (tidal and non-tidal), wet thickets, streambanks, bottomland forests. **Dist:** NS, NB, and QC west to MN and SD, south to s. FL and TX. **Phen:** Jun-Aug; Jul-Sep. **Syn:** = Ar, C, Fl3, GrPl, GW2, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, SE3, Tn, Tx, Va, W, WH3, Isely (1998), Woods (2005); = *Glycine apios* Linnaeus – S; > *Apios americana* var. *americana* – F, G; > *Apios americana* var. *turrigera* Fernald – F, G. NatureServe G5 (Secure).

Apios priceana B.L. Robinson. KENTUCKY GROUNDNUT, PRICE'S POTATO-BEAN. **Hab:** Mixed oak woods, especially over limestone. **Dist:** Sw. KY, c. TN, ne. MS, and n. and c. AL. **Phen:** Jul-Sep. **Syn:** = C, F, G, Il, K1, K3, K4, SE3, Tn, Isely (1998), Woods (2005); = *Glycine priceana* (B.L. Robinson) Britton – S. NatureServe G3 (Vulnerable); USESA T.



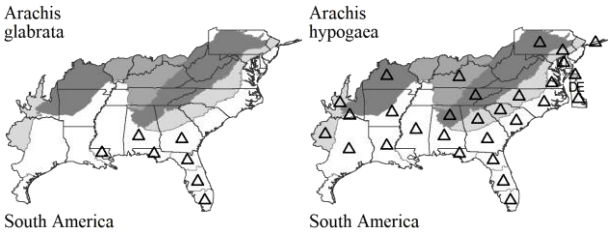
Arachis Linnaeus 1753 (PEANUT)

A genus of about 60 species, annual and perennial herbs, native of South America (especially Brazil). References: Isely (1998).

1 Petiole 2.5-3.5 cm long; corolla 1.8-2 cm long; perennial .....***Arachis glabrata***
1 Petiole 5-10 cm long; corolla 1-1.5 cm long; annual .....***Arachis hypogaea***

* ***Arachis glabrata*** Bentham. GRASSNUT. **Hab:** Disturbed areas. **Dist:** Native of South America, planted on roadsides and spreading. Anderson (2007) states that this is "naturalized and spreading"; the species is also reported for Charlton County, GA (Carter, Baker, & Morris 2009), Baldwin County, AL (Keener, 2012; Barger et al. 2012), and Orleans Parish LA (Allen 2015). **Phen:** Jul-Oct. **Syn:** = Fl3, SE3, WH3, Isely (1998); = *Arachis glabrata* var. *glabrata* – K2; = *Arachis prostrata* Bentham – K1, misapplied; > *Arachis glabrata* var. *glabrata* – K4; > *Arachis glabrata* var. *hagenbeckii* (Harms) F.J. Hermann – K4. NatureServe GNR (Not Yet Ranked).

* ***Arachis hypogaea*** Linnaeus. PEANUT. **Hab:** Fields; commonly cultivated, rarely persistent. **Dist:** Native of South America. This remarkable plant bears normal aerial flowers, but following pollination the pedicels elongate and arch downward, the legume soon buried and developing underground. **Phen:** Jul-Oct. **Syn:** = C, F, Fl3, Il, K1, K2, K4, NcTx, NE, RAB, S, SE3, WH3, Isely (1998). NatureServe G5 (Secure).



Astragalus Linnaeus 1753 (MILKVETCH)

A genus of 2300-2500 species, herbs and shrubs, most diverse in arid regions of w. North America and w. and c. Asia. The habitats of the southeastern species may be characterized as rocky or sandy, "relictual islands" of aridity in the generally moist landscape of eastern North America. References: Barneby (1964); Isely (1998).

1 Legume pilose with hairs > 1 mm long; stems conspicuously pubescent, the hairs spreading and simple; plants decumbent, spreading, or ascending, the stems 0.5-4 dm long.
  2 Corolla 14-19 mm long; leaflets 17-29; legume bilocular; calyx lobes shorter than the calyx tube; [of calcareous habitats of the interior].....***Astragalus tennesseensis***
  2 Corolla 8-12 mm long; leaflets (5-) 7-15; legume unilocular; calyx lobes equaling or longer than the calyx tube [of dry sandy habitats from SC south].....***Astragalus villosus***
1 Legume glabrous; stems glabrous or inconspicuously pubescent, the hairs appressed, simple or dolabriform; plants erect with stems (3-) 4-15 dm long, or decumbent with stems 1-3 dm long (*A. distortus* var. *distortus* and *A. bibullatus*).
  3 Plants erect, stems (3-) 4-15 dm long; legume straight to moderately curved.....***Astragalus canadensis var. canadensis***
  3 Plants decumbent or ascending, stems 1-5 dm long; legume either dry and strongly curved (about 90 degrees), or globose and initially fleshy.
    7 Corolla 4-7 mm long; legume 2-3.5 mm wide.....***Astragalus nuttallianus var. nuttallianus***

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

7 Corolla (7-) 8-15 mm long; legume 4-7 mm wide.
.....***Astragalus obcordatus***

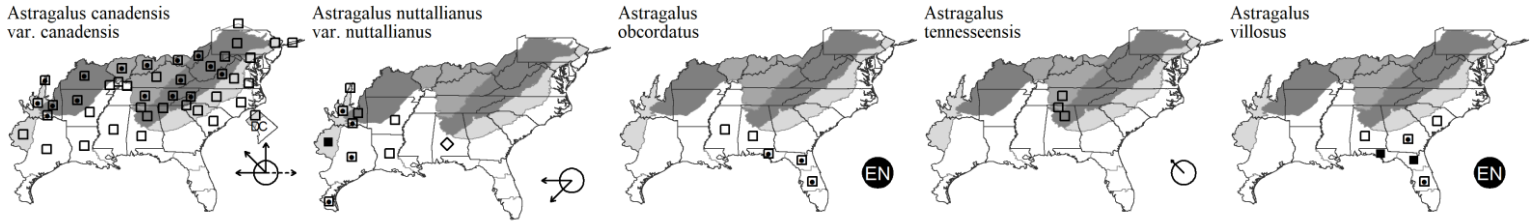
Astragalus canadensis Linnaeus *var*. ***canadensis***. CANADA MILKVETCH. **Hab:** Forests, woodlands, streambanks, rocky slopes and bluffs, prairies. **Dist:** Ranging through much of North America, from QC and Hudson Bay west to BC, south to GA, TX, NM, and CA; also apparently disjunct in Siberia. **Phen:** Jun-Aug; Jul-Oct. **Tax:** The other varieties occur farther west. See Barneby (1964) for a detailed discussion of taxonomic and nomenclatural problems involving *A. canadensis*. Barneby comments that "the eastern mountain race [in the Appalachians] is commonly distinguished from var. *canadensis* of the Mississippi Valley and northward by a narrower and more open flowering and fruiting raceme, and the flowers at the same time are relatively small. There is something to be said in favor of recognizing an eastern montane variety, so long as we confine its distinguishing characteristic to a loose raceme". The distribution, as mapped by Barneby, is suggestive of a composite map of two (or more) different taxa, one of them being centered in the Southern and Central Appalachians (extending out into nearby provinces). F and G separate var. *carolinianus*, basing the distinction, however, on a different set of characters, and considering var. *canadensis* to range south to VA (at least). Further study is needed; it seems we may have in our area two taxa worthy of distinction at the varietal level. **Syn:** = Ar, K1, K3, K4, NE, NY, SE3, Va, Barneby (1964), Isely (1998); < *Astragalus canadensis* – C, GrPl, Il, Mi, NcTx, Pa, RAB, Tn, Tx, Tx, W; > *Astragalus canadensis* Linnaeus var. *canadensis* – F, G; > *Astragalus canadensis* var. *carolinianus* (Linnaeus) M.E. Jones – F, G; > *Astragalus carolinianus* Linnaeus – S.

Astragalus nuttallianus A.P. de Candolle *var*. ***nuttallianus***. NUTTALL'S MILKVETCH. **Hab:** Blackland prairies. **Dist:** W. AR, s. KS, and n. TX south to sw. LA, s. TX, and Mexico; disjunct in w. AL (Keener 2013). **Phen:** Apr-Jun. **Syn:** = Ar, K3, K4, NcTx, SE3, Tx, Barneby (1964), Isely (1998). NatureServe G5TNR (Not Yet Ranked).

Astragalus obcordatus Elliott. FLORIDA MILK-VETCH. **Hab:** Longleaf pine sandhills. **Dist:** S. MS south to c. peninsular FL. **Comm:** Reported for s. GA, but no specimen documentation is known (Barneby 1964). **Syn:** = Fl3, K1, K3, K4, SE3, WH3, Barneby (1964), Isely (1998); = *Phaca obcordata* (Elliott) Rydberg ex Small – S. NatureServe G3G4 (Vulnerable).

Astragalus tennesseensis A. Gray ex Chapman. TENNESSEE GROUND-PLUM. **Hab:** Calcareous glades. **Dist:** N, n. AL, n. IL (and formerly c. IN, and possibly MO). **Phen:** May-Jun. **Syn:** = Il, K1, K3, K4, SE3, Tn, Barneby (1964), Isely (1998); >< *Astragalus plattensis* Nuttall – F; >< *Astragalus tennessensis* – F; >< *Geoprumnon plattense* (Nuttall) Rydberg – S; > *Geoprumnon tennesseense* (A. Gray ex Chapman) Rydberg – S.

Astragalus villosus Michaux. BEARDED MILKVETCH, SOUTHERN MILKVETCH. **Hab:** Longleaf pine sandhills and other dry, sandy places. **Dist:** A Southeastern Coastal Plain endemic: s. SC south to Panhandle FL, west to s. MS. **Phen:** May-Jun; Jun-Aug. **Comm:** Barneby (1964) describes this species as "a lowly but delightful little astragalus". **Syn:** = Fl3, K1, K3, K4, RAB, SE3, WH3, Barneby (1964), Isely (1998); = *Phaca intonsa* (E. Sheldon) Rydberg ex Small – S. NatureServe G4 (Apparently Secure).



Baptisia Ventenat 1808 (WILD INDIGO)

A genus of about 20 species, perennial herbs, of temperate e. and c. North America. References: Isely (1981); Isely (1998); Larisey (1940a); Mendenhall (1994a); Mendenhall (1994b); Turner (2006a); Weakley (2018) in Weakley et al (2018a); Woods & Diamond (2014).

Identification Notes: Many of our species hybridize when they grow in proximity. They are generally recognizable (especially in context with their parents) by their intermediate morphology. Additional hybrids have been created by plant breeders and may be found in cultivation.

1 Leaves 1-foliolate, sessile or perfoliate.
.....***Baptisia perfoliata***
1 Leaves 3-foliolate, petiolate or sessile.
4 Flowering or fruiting pedicels bracteolate; corolla 11-14 mm long
.....***Baptisia hirsuta***
4 Flowering or fruiting pedicels lacking bracteoles; corolla larger (except *B. tinctoria*).
7 Plants in flower.....***Key A***
7 Plants in fruit.....***Key B***

Key A - flowering *Baptisia*

1 Flowers lavender or blue.
.....***Baptisia aberrans***
1 Flowers yellow, cream-white, or white.
4 Flowers white or cream-white.
5 Flowering pedicels 10-18 (-30) mm long, subtended by persistent bracts 10-25 mm long and 7-10 mm wide; flowers cream-white (to pale-yellow).
.....***Baptisia bracteata***
5 Flowering pedicels 3-10 mm long, subtended by caducous bracts 4-7 mm long and 1-2 mm wide; flowers white.
8 Calyx 4.5-6.5 mm long; corolla 13-16 (-18) mm long; petioles 5-10 (-20) mm long.....***Baptisia albescens***
8 Calyx 7-8 mm long; corolla 20-25 mm long; petioles (of the lower leaves at least) 10-20 mm long.

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

9 Legume usually 15-20 (-30) mm in diameter, thin-walled and brittle; [of NC south through GA to FL, AL, and MS] ..... ***Baptisia alba***
9 Legume usually 10-12 (-15) mm in diameter, rigid and tough; [of c. TN, c. KY, AL, and MS westward] ..... ***Baptisia lactea***
4 Flowers yellow.
10 Flowering pedicels 14-18 (-30) mm long, subtended by persistent bracts 10-25 mm long and 7-10 mm wide; flowers pale-yellow (to cream-white). ..... ***Baptisia bracteata***
10 Flowering pedicels 2-10 mm long, subtended by caducous bracts 2-10 mm long and 1-2 mm wide; flowers bright yellow. ..... ***Baptisia lanceolata var. tomentosa***

Key B - fruiting *Baptisia*

1 Legume 5-11 mm in diameter.
2 Legume cylindric, 20-30 (-35) mm long, 7-9 mm in diameter, yellow-brown, leathery in texture ..... ***Baptisia albescens***
2 Legume globose or subspheroidal, 7-25 mm long, 5-11 mm in diameter, black, woody in texture. ..... ***Baptisia lanceolata var. tomentosa***
1 Legume 8-25 mm in diameter.
5 Pod drying tan, thin-walled and brittle ..... ***Baptisia megacarpa***
5 Pod drying black to blackish-brown, leathery or tough.
6 Stems puberulent (sometimes inconspicuously so) or villous. ..... ***Baptisia bracteata***
6 Stems glabrous and generally glaucous as well {B. alba, B. leucantha, B. leucophaea var. laevicaulis, B. australis var. aberrans, B. australis var. australis}

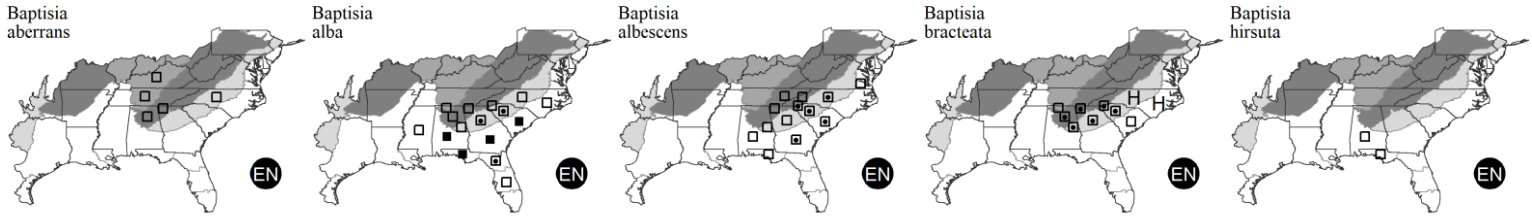
Baptisia aberrans (Larisey) Weakley. EASTERN PRAIRIE BLUE WILD INDIGO, GLADE BLUE WILD INDIGO, GLADE BLUE BAPTISIA. **Hab:** Glades, barrens, and open woodlands over limestone (or other calcareous rocks) and diabase (or other mafic rocks), in areas that were formerly prairies, barrens, glades, or oak savannas. **Dist:** Sw. KY, c. and se. TN, nw. GA, and c. NC. **Phen:** Apr-May; Jun-Aug. **Tax:** See Weakley et al. (2018a) for detailed discussion. **Syn:** = K4, Weakley (2018) in Weakley et al (2018a); = *Baptisia australis* (Linnaeus) R. Brown var. *aberrans* (Larisey) M. Mendenhall – K1, K3, Mendenhall (1994a), Mendenhall (1994b); = *Baptisia minor* Lehmann var. *aberrans* Larisey – Larisey (1940a); < *Baptisia australis* (Linnaeus) R. Brown – RAB, S, Tn; < *Baptisia australis* (Linnaeus) R. Brown var. *australis* – SE3, Isely (1981), Isely (1998), Turner (2006a).

Baptisia alba (Linnaeus) Ventenat. THICK-POD WHITE WILD INDIGO. **Hab:** Dry woodlands, pine flatwoods, roadsides. **Dist:** NC south to n. peninsular FL, west to AL and MS. **Phen:** May-Jul; Jun-Oct. **Tax:** *B. leucantha* (see below) is a western sibling, treated as either a species or a variety. In fruit, it is easily separated from *B. albescens* and most other *Baptisia* by its nearly spheroidal legume. *B. alba* and *B. albescens* have been nomenclaturally confused; Isely (1986a) corrects the application of the epithet '*alba*'. **Syn:** = Fl3, S, WH3; = *Baptisia alba* var. *alba* – K1, K3, K4, SE3, Isely (1998); = *Baptisia lactea* (Rafinesque) Thieret var. *obovata* (Larisey) Isely – C, Isely (1981), Mendenhall (1994a), Mendenhall (1994b), (by implication); = *Baptisia lactea* var. *pendula* (Larisey) B.L. Turner – Turner (2006a); = *Baptisia pendula* Larisey – RAB; > *Baptisia pendula* var. *obovata* Larisey – Larisey (1940a). NatureServe G5T3T5 (Apparently Secure).

Baptisia albescens Small. NARROW-POD WHITE WILD INDIGO, SPIKED WILD INDIGO. **Hab:** Dry woodlands, pine flatwoods, roadsides. **Dist:** Se. VA south through NC, SC, and GA to n. FL, e. AL and e. TN. **Phen:** May-Jul; Jun-Oct. **ID Notes:** The fruits are unlike any of our other species in being cylindric, about 3× as long as the diameter, and yellowish-brown (rather than black) when mature. **Syn:** = Fl3, K1, K3, K4, S, SE3, Tn, Va, WH3, Isely (1998); = *Baptisia alba* (Linnaeus) Ventenat – C, F, G, RAB, W, Isely (1981), Mendenhall (1994a), Mendenhall (1994b), Turner (2006a), misapplied; > *Baptisia alba* (Linnaeus) Ventenat – Larisey (1940a); > *Baptisia albescens* Small – Larisey (1940a).

Baptisia bracteata Elliott. CREAMY WILD INDIGO. **Hab:** Dry ridgetop woodlands and forests, longleaf pine sandhills, other dry woodlands. **Dist:** Ne. AL northwest through n. GA and n. SC to w. NC. **Phen:** Mar-Apr; May-Jun. **Comm:** The more western *B. leucophaea* Nuttall is better treated as a species than as *B. bracteata* var. *leucophaea* (Nuttall) Kartesz & Gandhi (Mendenhall 1994b). **Syn:** = RAB, S, W, Larisey (1940a), Mendenhall (1994a), Mendenhall (1994b), Turner (2006a); = *Baptisia bracteata* var. *bracteata* – C, Il, K1, K3, K4, SE3, Isely (1981), Isely (1998). NatureServe G4G5T4? (Apparently Secure).

Baptisia hirsuta Small. HAIRY WILD INDIGO, PANHANDLE WILD INDIGO. **Hab:** Hammocks, dry pine flatwoods and longleaf pine sandhills. **Dist:** Endemic to FL Panhandle (Escambia, Holmes, Okaloosa, Santa Rosa, and Walton counties) and adjacent AL (Covington County). **Phen:** May; Jun-Sep. **Comm:** {synonymy incomplete: X}. **Syn:** = S, Larisey (1940a), Turner (2006a); = *Baptisia calycosa* Canby var. *villosa* Canby – Fl3, K1, K3, K4, SE3, WH3, Isely (1981), Isely (1998). NatureServe G3T3 (Vulnerable).



Baptisia lactea (Rafinesque) Thieret. **Hab:** Woodlands, prairies, roadsides. **Dist:** W. NY, MI, WI, MN, and e. NE, south to AL, nw. GA (R. Ware, pers.comm., 2022), MS, LA, e. TX, and sw. OK; alleged by S to occur in NC, presumably based on misinterpreted material of *B. alba*. **Phen:** May-Jun; Jul-Aug. **Syn:** = GrPl, Mi, NY; = *Baptisia alba* (Linnaeus) Ventenat var. *macrophylla* (Larisey) Isely – Ar, Il, K1, K3, K4, SE3, Tn, Isely (1998); = *Baptisia lactea* (Rafinesque) Thieret var. *lactea* – C, Isely (1981), Turner (2006a); = *Baptisia leucantha* Torrey & A. Gray – S, Tx, Mendenhall (1994a), Mendenhall (1994b); > *Baptisia pendula* Larisey var. *macrophylla* Larisey – Larisey (1940a).

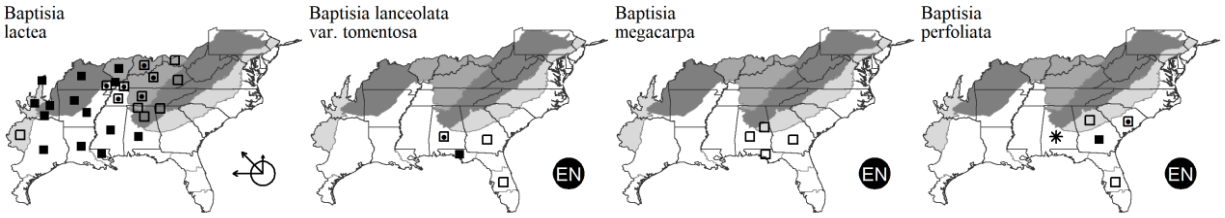
Baptisia lanceolata (Walter) Elliott *var.* ***tomentosa*** (Larisey) Isely. **Hab:** Longleaf pine sandhills. **Dist:** Panhandle FL and adjacent s. AL; disjunct in c. peninsular FL. **Tax:** Two forms have been recognized, the "narrow-leaved form", endemic to the Apalachicola Lowlands portion of the FL Panhandle, and the "typical form", occupying the FL Panhandle, s. AL, and disjunct in c. peninsular FL (Isely 1981). Mendenhall (1994b) included broad-leaved and narrow-leaved forms of var. *tomentosa* in her study, which provided some support for the taxonomic recognition of these unnamed entities. **Syn:** = K1, SE3, Isely (1981), Isely (1998); = *Baptisia elliptica* Small – S; = *Baptisia lanceolata* var. *elliptica* (Small) B.L. Turner – K3, K4,

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Turner (2006a); > *Baptisia elliptica* var. *elliptica* – Larisey (1940a); > *Baptisia elliptica* var. *tomentosa* Larisey – Larisey (1940a); < *Baptisia lanceolata* – Fl3, WH3. NatureServe G4T3T4 (Vulnerable).

Baptisia megacarpa Chapman ex Torrey & A. Gray. APALACHICOLA WILD INDIGO, BIGPOD WILD INDIGO. **Hab:** Moist forests of floodplains and lower slopes. **Dist:** E. Panhandle FL and sw. GA west to se. AL. **Phen:** Late Apr-early Jun; Jun-Jul. **Syn:** = Larisey (1940a); < *Baptisia megacarpa* Chapman ex Torrey & A. Gray – Fl3, K1, K3, K4, S, SE3, WH3, Isely (1981), Isely (1998), Mendenhall (1994a), Mendenhall (1994b), Turner (2006a); > *Baptisia megacarpa* Chapman ex Torrey & A. Gray – Larisey (1940a).

Baptisia perfoliata (Linnaeus) R. Brown ex W.T. Aiton. CATBELLS, GOPHERWEED. **Hab:** Longleaf pine sandhills. **Dist:** S. SC to e. GA; disjunct in c. peninsular FL (Orange and Osceola counties); disjunct in wc. AL (Sumter County) (Keener 2007; Woods & Diamond 2014), where believed to be introduced. **Phen:** Apr-May; May-Jul. **Syn:** = Fl3, K1, K3, K4, RAB, S, SE3, WH3, Isely (1981), Isely (1998), Larisey (1940a), Mendenhall (1994a), Mendenhall (1994b), Turner (2006a). NatureServe G4? (Apparently Secure).



Canavalia Adanson 1763

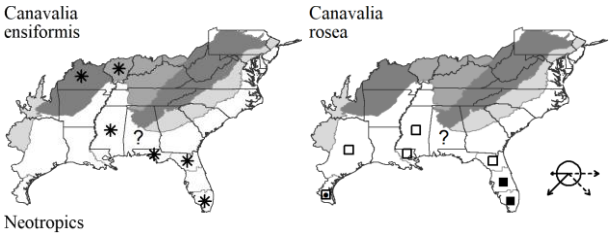
A genus of about 50 species, perennial or annual herbs or vines, pantropical. References: Isely (1998); Sauer (1964).

1 Leaflets coriaceous, 1.0-1.4× as long as wide, rounded (or obtuse) at the apex; seeds 1.5-2.0 cm long, mottled lighter and darker brown; [native, of beaches and coastal strands] ..... ***Canavalia rosea***

1 Leaflets herbaceous, 1.5-2× as long as wide, acute to obtuse at the apex; seeds 1.5-3.0 cm long, not mottled, either white to off-white or brown to dark olive; [rare alien, of disturbed areas]. ..... ***Canavalia ensiformis***

* ***Canavalia ensiformis*** (Linnaeus) A.P. de Candolle. JACKBEAN, WONDERBEAN. **Hab:** Disturbed areas. **Dist:** Native of tropical America. **Phen:** Jun. **Tax:** Sauer (1964) describes this species as "a prehistoric American Indian domesticate, found archaeologically at various sites in the southwestern United States, most abundantly since 1300 A.D." and additionally states that "all available collections with habitat data are either from cultivation or apparently feral escapes in artificial habitats". This suggests the possibility that *C. ensiformis* is a cultigen selected for large seeds, presumably from stock of *C. brasiliensis*. **Syn:** = Fl3, Il, K3, K4, SE3, WH3, Isely (1998), Sauer (1964). NatureServe GNR (Not Yet Ranked).

Canavalia rosea (Swartz) A.P. de Candolle. BAYBEAN, SEASIDE JACKBEAN. **Hab:** Ocean beaches, coastal strands. **Dist:** Pantropical, north to Dixie County on the west coast and Volusia County on the east coast of FL. **Phen:** Jan-Dec. **Syn:** = Fl3, K1, K3, K4, SE3, WH3, Isely (1998); = *Canavalia maritima* – Tx, Sauer (1964); ? *Canavali lineata* (Thunberg) A.P. de Candolle – S, misapplied.



Centrosema (A.P. de Candolle) Bentham 1837 (SPURRED BUTTERFLY PEA)

A genus of about 40 species, perennial vining herbs, of tropical and warm temperate regions of the Western Hemisphere. References: Fantz (2002a); Isely (1998).

Identification Notes: *Centrosema* and *Clitoria* are unique among our legumes in having resupinate flowers, the pedicel twisted 180 degrees so that the large "standard" is lowermost. They are often confused; the following key includes both genera for easier differentiation. The two widespread Southeastern United States species *Clitoria mariana* and *Centrosema virginianum* are especially often confused when vegetative (see key for easy distinctions when in flower or fruit). *Clitoria mariana* has the upper leaf surface glabrous (vs. uncinulate, and thus tacky to the touch, sticking lightly to skin or fabric, in *Centrosema virginianum*), the terminal leaflet broadest 0.3-0.5× of the distance from the leaflet base to leaflet apex (vs. *Centrosema virginianum* broadest at 0.1-0.4×), terminal leaflet with 4-5 or fewer main veins on each side of the midvein (vs. 5-7, or more in *Centrosema virginianum* var. *angustifolium*), the apex blunter (vs. more acute), the venation less raised and reticulated on the lower leaflet surface (vs. more obviously raised-reticulated), and the color of the leaf bluer (vs. greener).

3 Calyx tube (of chasmogamous flowers) 4-5 mm long, shorter than or about as long as the lobes; bracteoles 5-12 mm long, partly enclosing the calyx tube; legume 6-12.5 cm long, 3-6 mm broad; standard 2.5-3.5 cm long, spurred near the base.

5 Terminal leaflets > 8× as long as wide; main lateral veins of terminal leaflets 10-20+; [s. GA, s. AL, south to s. FL] ..... ***Centrosema virginianum var. angustifolium***

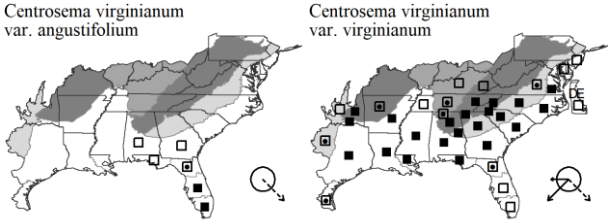
Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

5 Terminal leaflets < 6× as long as wide; main lateral veins of terminal leaflets 5-7; [widespread in our area, south to s. FL]..... ***Centrosema virginianum var. virginianum***

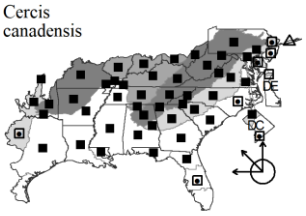
3 Calyx tube (of chasmogamous flowers) 7-13 mm long, much longer than the lobes; bracteoles 3-7 mm long, not enclosing the calyx tube; legume 3-5 cm long, 5-7 mm broad; standard 4-6 cm long, not spurred. ..... ***Clitoria mariana var. mariana***

Centrosema virginianum (Linnaeus) Bentham *var*. ***angustifolium*** (A.P. de Candolle) Grisebach. **Hab:** Dunes, shell mounds, pine rocklands, other dry forests and woodlands. **Dist:** S. GA, s. AL, and FL south to s. FL; Bahamas; Central America and n. South America. **Phen:** Jun-Aug; Jul-Oct. **Tax:** *Centrosema virginianum* s.l. in the deep South and the West Indies has leaflets that are characteristically very narrow, (L:W ratios of 8:1 or greater). These are here accorded taxonomic recognition at varietal rank, but need additional study. Broad-leaved *C. virginianum* var. *virginianum* co-occurs throughout the distribution of *C. virginianum* var. *angustifolium*. **Syn:** = *Centrosema virginianum* (Linnaeus) Bentham – Bah; < *Bradburya virginiana* (Linnaeus) Kuntze – S; < *Centrosema angustifolium* (Kunth) Bentham – WH3; < *Centrosema virginianum* (Linnaeus) Bentham – Fl3, K1, K3, K4.

Centrosema virginianum (Linnaeus) Bentham *var*. ***virginianum***. SPURRED BUTTERFLY PEA. **Hab:** Dry woodlands and openings. **Dist:** S. NJ south to s. FL, west to KY, sc. MO, AR, and TX; West Indies; Mexico, Central America, and South America. **Phen:** Jun-Aug; Jul-Oct. **Tax:** *Centrosema virginianum* s.l. is very variable in leaflet length:width ratio, with forms with very narrow leaflets prevalent southwards (10:1 or greater), especially in peninsular FL (and in the West Indies). These are here accorded taxonomic recognition as *C. virginianum* var. *angustifolium* (A.P. de Candolle) Grisebach. Further study is needed. **Syn:** = *Centrosema virginianum* (Linnaeus) Bentham – Bah; < *Bradburya virginiana* (Linnaeus) Kuntze – S; < *Centrosema virginianum* (Linnaeus) Bentham – Ar, C, Fl3, G, K1, K3, K4, NcTx, RAB, SE3, Tn, Tx, Va, W, WH3, WI, Isely (1998); > *Centrosema virginianum* var. *ellipticum* Fernald – F; > *Centrosema virginianum* (Linnaeus) Bentham var. *virginianum* – F.



Cercis Linnaeus 1753 (REDBUD)



A genus of about 6-10 species, trees of north temperate areas. Apparently the basalmost (evolutionarily the earliest diverging) extant genus in the Fabaceae (Lewis et al. 2005). References: Greene (1912a); Isely (1975); SE3; Isely (1998); Robertson & Lee (1976).

Cercis canadensis Linnaeus. EASTERN REDBUD. **Hab:** Moist to dry forests and woodlands, especially over calcareous or mafic rocks, also commonly planted as an ornamental. **Dist:** MA, WI, and NE south to c. peninsular FL and e. TX. **Phen:** (Jan-) Late Feb-May; Jun-Nov (and persistent later). **Tax:** Other taxa (here treated at specific rank) occur in OK, TX, and Mexico. **Comm:** This spectacular small tree is showy in bud or flower. The smooth, medium gray bark is distinctive in winter. **Syn:** = *Cercis canadensis* Linnaeus var. *canadensis* – Ar, C, G, K1, K3, K4, NcTx, NE, SE3, Tx, Va, Isely (1975), Isely (1998), Robertson & Lee (1976); < *Cercis canadensis* Linnaeus – F, Fl3, GrPl, Il, Mi, Pa, RAB, S, Tn, W, WH3; > *Cercis canadensis* Linnaeus – Greene (1912a); > *Cercis dilatata* Greene – Greene (1912a); > *Cercis georgiana* Greene – Greene (1912a). NatureServe G5T5 (Secure).

Chamaecrista Moench 1794 (PARTRIDGE-PEA)

A genus of about 250-350 species, shrubs and herbs, of primarily tropical and subtropical areas, extending into temperate areas in North America, South America, and e. Asia. References: Franck (2021a) in Weakley et al (2021); Irwin & Barneby (1982); Isely (1975); SE3; Isely (1998); Robertson & Lee (1976).

7 Corolla 0.8-1.0 cm in diameter, the larger petals 4-7 (-8) mm long; functional stamens 4-8; fruits (15-) 18-32 (-36) mm long.
  8 Petiole pilose with yellowish hairs 1-2 (-3) mm long; petiolar gland cylindric or clavate; functional stamens 5-8; leaflets 5-6× as long as wide ..... ***Chamaecrista nictitans var. aspera***
  8 Petiole incurved-puberulent with hairs 0-0.8 mm long; petiolar gland stalked-cupuliform or stalked-discoid; functional stamens 4-5; leaflets 3-5× as long as wide. ..... ***Chamaecrista nictitans var. nictitans***
7 Corolla 2.0-3.5 cm in diameter, the larger petals 12-20 mm long; functional stamens 10; fruits 25-75 (-85) mm long.
  9 Perennial from a horizontal woody root or crown; stems usually clustered, and variously prostrate, decumbent, ascending, or erect; peduncles axillary, or supra-axillary by adnation 0-10 (-15) mm above the node. ..... ***Chamaecrista horizontalis***
  9 Annual from a taproot; stems solitary (rarely several), ascending to erect; peduncles adnate to the stem 1-26 mm above the node (appearing to diverge from the stem in the internode); [series *Chamaecrista*].
    14 Surface of leaflets pubescent; [from w. Panhandle FL and s. AL westward] ..... ***Chamaecrista fasciculata var. 1***
    14 Surface of leaflets glabrous; [collectively widespread in our area].
      15 Petiolar gland depressed, 1.5-2.5 mm wide, raised at both ends; pods 6-10 cm long; plant usually glabrous or glabrescent, to 24 dm tall ..... ***Chamaecrista fasciculata var. brachiata***
      15 Petiolar gland not depressed, <1.5 mm wide; pods 4-6 cm long; plant usually pubescent, to 10 dm tall ..... ***Chamaecrista fasciculata var. fasciculata***

Key to Map Symbology: □⊡■ └native┘ ◇◈◆ └maybe exotic┘ △◬▲ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated

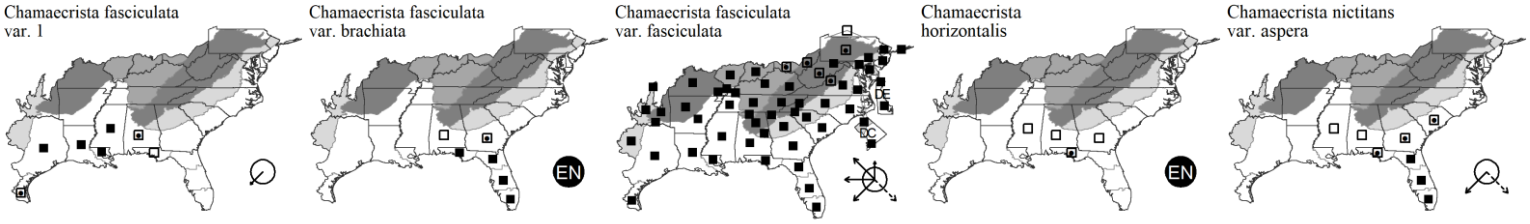
Chamaecrista fasciculata (Michaux) Greene *var.* ***1***. **Hab:** Dunes, sandy disturbed areas. **Dist:** Panhandle FL and s. AL west to e. and se. TX. **Comm:** {synonymy incomplete}. **Syn:** = *Cassia fasciculata* var. *puberula* (Greene) J.F. Macbride – Isely (1975); < *Chamaecrista fasciculata* (Michaux) Greene – Fl3, SE3, WH3, Irwin & Barneby (1982); < *Chamaecrista fasciculata* (Michaux) Greene var. *fasciculata* – K1, K3, K4, Isely (1998); > *Chamaecrista littoralis* Pollard – S; > *Chamaecrista mississippiensis* (Pollard) Pollard ex Heller – S.

Chamaecrista fasciculata (Michaux) Greene *var.* ***brachiata*** (Pollard) Isely. **Hab:** Fields, disturbed areas. **Dist:** E. GA south to s. FL, west to w. Panhandle FL. **Syn:** = SE3, Isely (1998); = *Cassia fasciculata* var. *brachiata* (Pollard) Pullen ex Isely – Isely (1975), Robertson & Lee (1976); = *Chamaecrista brachiata* Pollard – S; < *Chamaecrista fasciculata* (Michaux) Greene – Fl3, WH3, Irwin & Barneby (1982); < *Chamaecrista fasciculata* (Michaux) Greene var. *fasciculata* – K1, K3, K4.

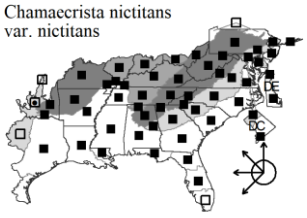
Chamaecrista fasciculata (Michaux) Greene *var.* ***fasciculata***. COMMON PARTRIDGE-PEA. **Hab:** Fields, disturbed areas, fencerows, and a wide range of other habitats. **Dist:** MA west to MN, south to s. FL and Mexico. **Phen:** Jun-Sep; Jul-Nov. **Tax:** See discussion of the *Chamaecrista fasciculata* complex under var. *macrosperma*. **Syn:** = NY, Va; = *Chamaecrista fasciculata* var. *fasciculata* (variant 1, variant 2, and typical variant) – Isely (1975); > *Cassia chamaecrista* var. *robusta* Pollard – GrPl; > *Cassia chamaecrista* var. *rostrata* – GrPl, not published; < *Cassia fasciculata* Michaux – RAB, W; > *Cassia fasciculata* var. *fasciculata* – F, G, Tx, Robertson & Lee (1976); > *Cassia fasciculata* var. *ferrisiae* – Tx; > *Cassia fasciculata* var. *littoralis* (Pollard) J.F. MacBride – Robertson & Lee (1976); > *Cassia fasciculata* var. *puberula* (Greene) J.F. Macbride – Tx; > *Cassia fasciculata* var. *robusta* (Pollard) J.F. Macbride – F, G, Tx, Robertson & Lee (1976); > *Chamaechrista fasciculata* var. *fasciculata* – Il, misspelling; > *Chamaechrista fasciculata* var. *robusta* – Il, misspelling; < *Chamaecrista fasciculata* (Michaux) Greene – C, Fl3, Mi, NcTx, NE, Pa, Tn, WH3, Irwin & Barneby (1982); > *Chamaecrista fasciculata* (Michaux) Greene – S; < *Chamaecrista fasciculata* (Michaux) Greene var. *fasciculata* – Ar, K1, K3, K4, SE3, Isely (1998), (also see var. macrosperma); > *Chamaecrista robusta* Pollard – S.

Chamaecrista horizontalis A.R. Franck. **Hab:** Longleaf pine sandhills, other dry longleaf pine woodlands, disturbed sandy areas. **Dist:** Sw. and wc. GA (Jones & Coile 1988) south to s. peninsular FL, Panhandle FL, and west to s. MS (Sorrie & Leonard 1999). **Phen:** Late Mat-early Aug. **Tax:** See Franck in Weakley et al. (2021). **Syn:** = Franck (2021a) in Weakley et al (2021); < *Chamaecrista deeringiana* Small & Pennell – K1, K3, K4, SE3, Irwin & Barneby (1982), Isely (1975), Isely (1998); < *Chamaecrista fasciculata* (Michaux) Greene – Fl3, WH3.

Chamaecrista nictitans (Linnaeus) Moench *var.* ***aspera*** (Muhlenberg ex Elliott) Torrey & A. Gray ex H.S. Irwin & Barneby. SOUTHERN SENSITIVE-PLANT. **Hab:** Pine savannas, pinelands, disturbed sandy soils. **Dist:** Se. SC south to s. FL. **Phen:** Jun-Oct; Jul-Nov. **Syn:** = Bah, Fl3, WH3, Isely (1998); = *Cassia aspera* Muhlenberg ex Elliott – RAB, Isely (1975), Robertson & Lee (1976); = *Chamaecrista aspera* (Muhlenberg ex Elliott) Greene – S; = *Chamaecrista nictitans* ssp. *nictitans* var. *aspera* (Muhlenberg ex Elliott) Irwin & Barneby – K1, K3, K4, SE3, Irwin & Barneby (1982). NatureServe G5T5? (Secure).



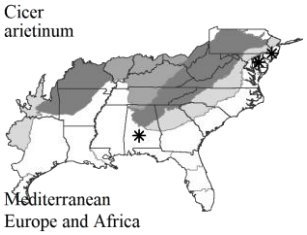
Chamaecrista nictitans (Linnaeus) Moench *var.* ***nictitans***. COMMON SENSITIVE-PLANT. **Hab:** Forests, woodlands, disturbed areas, pine savannas, and a wide variety of other habitats. **Dist:** *C. nictitans* is widely distributed in e. North America, and (depending on the scope of what is included in it) south into South America. Var. *nictitans* ranges throughout se. United States, north to MA, NY, OH, and KA. **Phen:** Jun-Oct; Jul-Nov. **Syn:** = Ar, Fl3, NY, Va, WH3, Isely (1998); = *Chamaecrista nictitans* ssp. *nictitans* var. *nictitans* – K1, K3, K4, NE, SE3, Irwin & Barneby (1982); < *Cassia nictitans* Linnaeus – GrPl, RAB, W, Isely (1975), Robertson & Lee (1976); > *Cassia nictitans* var. *hebecarpa* Fernald – F, G; > *Cassia nictitans* var. *nictitans* – F, G, Tx; < *Chamaechrista nictitans* – Il, misspelling; > *Chamaecrista multipinnata* Pollard – S; < *Chamaecrista nictitans* – C, Mi, NcTx, Pa, Tn; > *Chamaecrista procumbens* (Linnaeus) Greene – S. NatureServe G5T5 (Secure).



Cicer Linnaeus 1753 (CHICK PEA, GARBANZO)

A monotypic genus, of Mediterranean Europe, w. Asia. References: Isely (1998).

* ***Cicer arietinum*** Linnaeus. CHICK PEA, GARBANZO. **Hab:** Disturbed areas. **Dist:** Native of Mediterranean Europe and w. Asia. **Comm:** Described by Isely (1998) as "an occasional recurrent waif". **Syn:** = K3, K4, NE, NY, SE3, Isely (1998). NatureServe GNR (Not Yet Ranked).

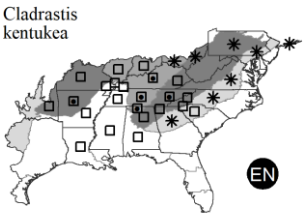


Cladrastis Rafinesque 1824 (YELLOW-WOOD)

A genus of about 6 species, trees, of the se. United States and montane regions of Japan and China. References: Duley & Vincent (2003); Isely (1981); Isely (1998); Rudd (1972).

Cladrastis kentukea (Dumont de Courset) Rudd. YELLOW-WOOD. **Hab:** Mountain forests, Piedmont bluffs, especially on calcareous or mafic rocks (introduced only in the Piedmont of NC). **Dist:** This small to large tree has a native range primarily in the Southern Appalachians (mostly on the west side), the Ozarks, and limestone regions in-between (such as c. TN), ranging from s. OH, s. IN, s. IL, and s. MO south to sw. NC, sc. SC, n. GA, AL, c. AR, and e. OK, but is cultivated and (at least sparsely) naturalized more widely. **Phen:** Apr-May; Jul-Aug. **Comm:** As discussed by Wyatt (1985), the SC occurrence on Fall Line bluffs of the Savannah River is an interesting disjunction, apparently relictual. Yellow-wood is a distinctive tree, distinguished by its smooth silvery-gray bark, peculiar leaves with alternate leaflets, and pendent panicles of white flowers. Increasingly planted as an ornamental, and likely to start escaping more widely, as reported for Fairfax County, VA (Steury 2011). **Syn:** = Ar, Il, K1,

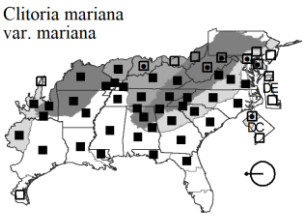
K3, K4, NE, NY, W, Duley & Vincent (2003), Rudd (1972); = *Cladrastis lutea* (Michaux f.) K. Koch – C, F, G, RAB, S, SE3, Isely (1981), Isely (1998). NatureServe G4 (Apparently Secure).



Clitoria Linnaeus 1753 (BUTTERFLY PEA, PIGEONWINGS)

A genus of about 60 species, of tropical and warm temperate regions of the New and Old World. References: Fantz (2000); Fantz (2002b); Isely (1998).

Identification Notes: *Centrosema* and *Clitoria* are unique among our legumes in having resupinate flowers, the pedicel twisted 180 degrees so that the large 'standard' is lowermost. They are often confused; see key and identification comments under *Centrosema*.



Clitoria mariana Linnaeus *var*. ***mariana***. BUTTERFLY PEA, SHE-PEA. **Hab:** Dry woodlands and openings, roadsides. **Dist:** NY (Long Island), NJ west to s. OH, s. IL, MO, and OK, south to c. peninsular FL, TX, and South America; disjunct in s. AZ. **Phen:** Jun-Aug; Jul-Oct. **Tax:** Var. *pubescentia* Fantz is endemic in c. and s. peninsular FL (see below); a third variety, var. *orientalis* Fantz, is endemic in se. Asia. **Syn:** = K4, NY, Va, Fantz (2000), Fantz (2002b); < *Clitoria mariana* – Ar, C, F, G, GrPl, Il, K1, K3, NcTx, Pa, RAB, SE3, Tn, Tx, W, WH3, Isely (1998); < *Clitoria mariana* Linnaeus var. *mariana* – Fl3; < *Martiusia mariana* (Linnaeus) Small – S.

Crotalaria Linnaeus 1753 (RATTLEBOX)

A genus of about 600 species, annual and perennial herbs, nearly cosmopolitan in tropical and temperate regions (especially diverse in Africa). References: Isely (1986b); Isely (1998); Leverett & Woods (2012); Ward (2009a); Ward (2010b); Windler (1974).

1 Leaves trifoliolate; either a decumbent or ascending perennial herb to 1 m tall, or an erect annual herb, typically 1-2 m tall.
  3 Leaflets lanceolate, often narrowly so, 3-15× as long as wide; legume straight or nearly so (or upcurved at the tip).
    4 Corolla 8-10 mm long; legume 4-6 mm in diameter, upcurved at tip ..... ***Crotalaria lanceolata***
    4 Corolla 18-20 mm long; legume 15 mm in diameter, not upcurved ..... ***Crotalaria ochroleuca***
  3 Leaflets obovate to elliptic-oblong, 1.5-3.5× as long as wide; legume either straight or conspicuously curved.
    5 Legume straight, 10-15 mm in diameter, pilose; stem pubescence spreading ..... ***Crotalaria incana***
    5 Legume conspicuously curved or straight, 5-12 mm in diameter, minutely puberulent; stem pubescence appressed ..... ***Crotalaria pallida var. obovata***
1 Leaves unifoliolate; plants of various habits, mostly either perennial, smaller, or both.
  7 Corolla 1.7-3.0 cm long; leaflets 4-15 cm long; stipules not decurrent on the stem and not conspicuously foliose; [exotic annual herbs, in disturbed habitats].
    8 Legume pubescent ..... ***Crotalaria juncea***
    8 Legume glabrous. ..... ***Crotalaria spectabilis***
  7 Corolla 0.7-1.4 cm long; leaflets 1-8 cm long; stipules of at least the upper leaves conspicuously decurrent on the stem, giving the impression of a downward-pointing arrowhead (this feature sometimes inconspicuous or essentially absent in *C. maritima*, *C. rotundifolia*, and *C. avonensis*); [native perennial or annual herbs, in natural or disturbed habitats].
    10 Plant an erect annual; stems with spreading pubescence, the longer hairs 1-2 mm long; leaflets of the upper portion of the plant (4-) avg. 6 (-8)× as long as wide; [mostly of the Piedmont and Mountains (and Coastal Plain of VA)] ..... ***Crotalaria sagittalis***
    10 Plant a decumbent, sprawling, or erect perennial; stems with appressed or spreading pubescence, the longer hairs < 1.2 mm long; leaflets of the upper portion of the plant averaging either (1-) avg. 1-2 (-4)× or (5-) avg. 8-10 (-15)× as long as wide; [mostly of the Coastal Plain].
      11 Leaflets glabrous above; leaflets of the upper portion of the plant usually (5-) 10 (-15)× as long as wide; plant erect or ascending ..... ***Crotalaria purshii***
      11 Leaflets pubescent above with strigose hairs (the hairs sometimes sparse – check with hand lens); leaflets of the upper portion of the plant usually (1-) 2-10× as long as wide; plant erect, decumbent, or low-ascending.
        13 Stem pubescence of an overstory of spreading or ascending hairs 1.5-3 mm long (and longer than the stem diameter) and an understory of appressed hairs; leaf texture thin, herbaceous, fresh leaves flexible; leaf surfaces bicolored, the upper medium green, the lower distinctly paler, whitish-green; [pinelands and other dry sandy habitats, MD south to c. peninsular FL (Hernando, Lake, Volusia counties), west to e. LA] ..... ***Crotalaria rotundifolia***
        13 Stem pubescence appressed-strigose, the hairs shorter than the stem diameter; leaf texture somewhat succulent, fresh leaves fragile, easily broken if bent; leaf surfaces unicolored, medium green. ..... ***Crotalaria maritima***

* ***Crotalaria incana*** Linnaeus. SHAKE-SHAKE, VELVETY RATTLEBOX. **Hab:** Disturbed areas. **Dist:** Native of the tropics, variously interpreted as pantropical or only Paleotropical. Also in peninsular FL, from Alachua County southward. **Syn:** = Bah, Fl3, K1, K3, K4, S, SE3, Tx, WH3, Isely (1998), Ward (2009, 2010). NatureServe GNR (Not Yet Ranked).

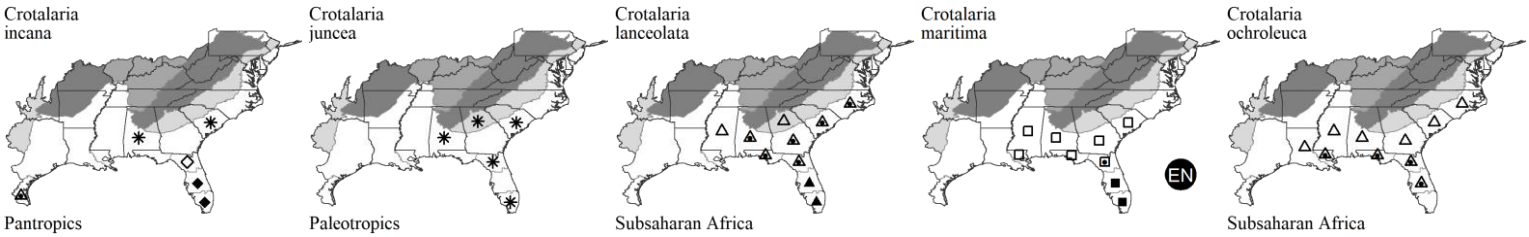
* ***Crotalaria juncea*** Linnaeus. SUNN HEMP. **Hab:** Roadsides, also grown as a crop, and occurring as a waif in field edges (W. Barger, pers. comm., 2012; Zomlefer et al. 2018). **Syn:** = Fl3, K3, K4, SE3, WH3, Isely (1998). NatureServe GNR (Not Yet Ranked).

* ***Crotalaria lanceolata*** E. Meyer. LANCELEAF RATTLEBOX. **Hab:** Sandy fields, roadsides, other disturbed areas. **Dist:** Native of Africa. **Phen:** Jul-Oct; Aug-Nov. **Syn:** = Fl3, K1, K3, K4, RAB, SE3, WH3, Isely (1998), Leverett & Woods (2012), Ward (2009, 2010). NatureServe GNR (Not Yet Ranked).

Crotalaria maritima Chapman. LOW RATTLEBOX, RABBITBELLS. **Hab:** Sandy forests and woodlands, roadsides. **Dist:** E. SC south to s. FL, and west to e. LA, endemic to the Southeastern Coastal Plain. **Syn:** = S, Ward (2009, 2010); = *Crotalaria rotundifolia* Walter ex J.F. Gmelin var. *rotundifolia* – Windler (1974); < *Crotalaria angulata* – F, G, RAB, misapplied; < *Crotalaria rotundifolia* Walter ex J.F. Gmelin – C, Fl3, K1, K3, K4, SE3, WH3, Isely (1986b), Isely (1998).

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

* ***Crotalaria ochroleuca*** G. Don. SLENDERLEAF RATTLEBOX. **Hab:** Roadsides and sandy fields. **Dist:** Native of Africa. **Phen:** Jul-Aug; Aug-Oct. **Tax:** All naturalized southeastern US material appears to be *C. ochroleuca*, not *C. brevidens* var. *intermedia* (M. Woods, pers. comm., 2011). **Syn:** = Fl3, K1, K3, K4, SE3, WH3, Isely (1998), Leverett & Woods (2012), Ward (2009, 2010); ? *Crotalaria intermedia* – RAB, misapplied.



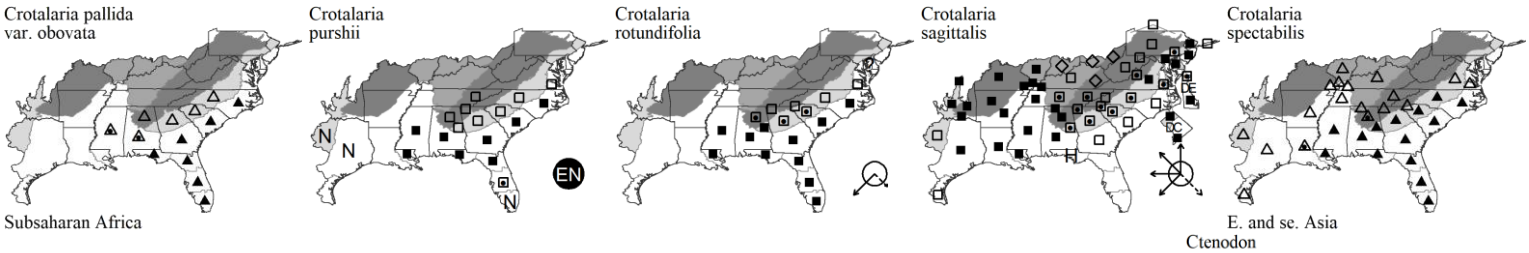
* ***Crotalaria pallida*** Aiton *var*. ***obovata*** (G. Don) Polhill. SMOOTH RATTLEBOX. **Hab:** Roadsides and fields. **Dist:** Native of Africa. **Phen:** Jul-Sep; Aug-Oct. **Syn:** = Fl3, K1, K3, K4, SE3, WH3, Isely (1998), Leverett & Woods (2012), Ward (2009, 2010); ? *Crotalaria mucronata* – RAB, misapplied; ? *Crotalaria striata* A.P. de Candolle – S, misapplied. NatureServe GNRTNR (Not Yet Ranked).

Crotalaria purshii A.P. de Candolle. COASTAL PLAIN RATTLEBOX, PURSH'S RATTLEBOX. **Hab:** Mesic to dry pinelands, sandy openings, roadsides. **Dist:** A Southeastern Coastal Plain endemic: se. VA south to n. FL, c. peninsular FL, and west to e. LA, with scattered locations inland. **Phen:** May-Jul; Jul-Sep. **Syn:** = C, Fl3, G, K1, K3, K4, NcTx, RAB, S, SE3, Tn, Va, W, WH3, Isely (1998), Leverett & Woods (2012), Ward (2009, 2010); > *Crotalaria purshii* var. *bracteolifera* Fernald – F; > *Crotalaria purshii* var. *purshii* – F. NatureServe G5 (Secure).

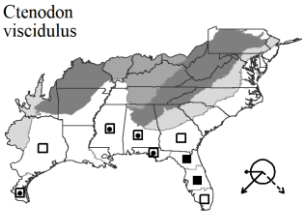
Crotalaria rotundifolia Walter ex J.F. Gmelin. LOW RATTLEBOX, RABBITBELLS. **Hab:** Sandy forests and woodlands, roadsides. **Dist:** Se. VA south to c. peninsular FL, west to se. LA; also widespread in Mexico. **Syn:** = S, Leverett & Woods (2012), Ward (2009, 2010); = *Crotalaria rotundifolia* Walter ex J.F. Gmelin var. *vulgaris* Windler – Va, Windler (1974); < *Crotalaria angulata* – F, G, RAB, misapplied; < *Crotalaria rotundifolia* Walter ex J.F. Gmelin – C, Fl3, K1, K3, K4, SE3, WH3, Isely (1986b), Isely (1998).

Crotalaria sagittalis Linnaeus. COMMON RATTLEBOX. **Hab:** Woodlands, woodland edges, barrens, prairies, openings, fields. **Dist:** MA and VT west to s. MI, s. WI, and c. MN, south to c. SC, s. AL, s. MS, TX, Mexico and Central America; West Indies. **Phen:** Jun-Aug; Jul-Sep. **Syn:** = Ar, C, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, SE3, Tn, Tx, Va, W, WV, Isely (1998), Leverett & Woods (2012); > *Crotalaria sagittalis* var. *oblonga* Michaux – F; > *Crotalaria sagittalis* var. *sagittalis* – F. NatureServe G5 (Secure).

* ***Crotalaria spectabilis*** Roth. SHOWY RATTLEBOX. **Hab:** Fields, roadsides, disturbed areas. **Dist:** Native of s. Asia. **Phen:** Jul-Sep; Aug-Oct. **Syn:** = Bah, C, F, Fl3, G, Il, K1, K3, K4, NcTx, RAB, SE3, Tn, Tx, Va, WH3, Isely (1998), Leverett & Woods (2012), Ward (2009, 2010); ? *Crotalaria retzii* A.S. Hitchcock – S. NatureServe GNR (Not Yet Ranked).



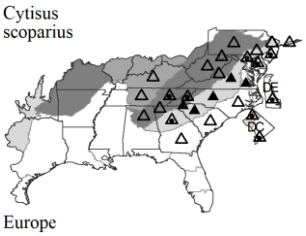
Ctenodon Baillon 1870



A genus of 66 or perhaps 120 species, herbs, subshrubs, shrubs, treelets or small trees, of s. North America, Central America, South America, and the West Indies. The genus has often been treated as *Aeschynomene* sect. *Ochopodium*, but is more closely related to *Dalbergia* and *Machaerium* than to *Aeschynomene* sensu stricto. It may be expanded to include taxa in the Old World tropics (Cardoso et al. 2020). References: Cardoso et al (2019); Cardoso et al (2020).

Ctenodon viscidulus (Michaux) D.B.O.S. Cardoso & A. Delgado. STICKY JOINTVETCH. **Hab:** Dry sandy areas, such as longleaf pine sandhills, other dry pinelands, sandy coastal prairies, and barrier islands. **Dist:** From s. GA (Jones & Coile 1988; Carter, Baker, & Morris 2009; SE), panhandle FL, s. AL, s. MS, and s. TX south to s. FL; Mexico south through Central America to South America; West Indies. **Syn:** = Cardoso et al (2020); = *Aeschynomene viscidula* Michaux – K1, K3, K4, SE3, Tx, WH3, Isely (1998), Rudd (1955), Vanni (2016); = *Secula viscidula* (Michaux) Small – S. NatureServe G5? (Secure).

Cytisus Desfontaines 1798 (BROOM)



A genus of about 65 species, shrubs and herbs, of Eurasia. References: Isely (1998).

* ***Cytisus scoparius*** (Linnaeus) Link. BROOM, SCOTCH BROOM, BESOM, GINSTER. **Hab:** Roadbanks, woodland borders, disturbed areas. **Dist:** Native of Europe. **Phen:** Apr-Jun; May-Jul. **Syn:** = C, F, G, K3, K4, Mi, NY, Pa, RAB, S, SE3, Tn, Va, W, WV, Isely (1998); > *Cytisus scoparius* var. *scoparius* – K1, NE. NatureServe GNRTNR (Not Yet Ranked).

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Dalea Linnaeus 1758 (PRAIRIE-CLOVER)

A genus of about 165 species, herbs and shrubs, of temperate and tropical America, especially of dry habitats and most diverse in Mexico. References: Barneby (1977); Diggs & Weakley (2017) in Weakley et al (2017); Isely (1998); Turner (2006b); Turner (2010); Turner (2013); Ward (2004c); Woods (2013).

Identification Notes: In our region, *Dalea* may be recognized by its odd-pinnately compound leaves with 3-many leaflets, the aggregation of smallish flowers into spikes, racemes or heads, the modification of the flower to a lesser or greater degree from the standard papilionaceous "pea flower bauplan", and being mainly small to medium-sized herbs (except for three shrub species, restricted to s. FL, OK, and TX). Flowers of *Dalea* in our region are diverse. Dalea Type A has the corolla bilaterally symmetrical and papilionaceous, the 9-10 stamens enclosed in a keel, the wings and keel of standard papilionaceous conformation, arising laterally from the stamen column. Dalea Type B has the corolla nearly symmetrical, the petals arising laterally from the stamen column, the 9-10 stamens or staminodes exposed. Dalea Type C has the corolla nearly symmetrical, the epistemonous petals arising from the summit of the stamen column, the 5 stamens exposed.

12 Corollas of Dalea Type B (the corolla nearly symmetrical, the petals arising laterally from the stamen column, the 9-10 stamens or staminodes exposed); stamens either 9-10, or 5 with alternating staminodes; [IL, w. MO, AR, and w. LA westward, and also rarely introduced eastwards].
..... ***Dalea leporina***

12 Dalea Type C (the corolla nearly symmetrical, the epistemonous petals arising from the summit of the stamen column, the 5 stamens exposed); [collectively widespread]; [subgenus *Dalea*, section *Kuhnistera*].

16 Spikes arrayed in a compound corymb; spike capitate, surrounded by an involucre of 3-4 series of sterile bracts.
..... ***Dalea pinnata var. trifoliata***

16 Spikes not corymbosely disposed, ovoid to cylindric; spikes not capitate, with or without a few subtending, sterile bracts.

19 Leaflets 11-41.
..... ***Dalea foliosa***

19 Leaflets 3-11.

25 Calyx glabrous (puberulent in *D. oligophylla*); bracteoles present, 0.5-1.5 mm long, bristle-like and tending to be persistent; stems glabrous.

28 Calyx tube split on the upper side; calyx tube ribs not prominent, the intervals eglandular or nearly so; leaflets 5; [GA, AL, FL].

29 Leaves closely spaced and generally with axillary fascicle shoots; bract tips not recurved in bud..... ***Dalea albida***

29 Leaves widely spaced and generally lacking axillary fascicle shoots; bract tips recurved in bud..... ***Dalea mountjoyae***

28 Calyx not split on the upper side; calyx tube ribs prominent (sometimes even flange-like), the intervals with 1 (-3) prominent gland(s); leaflets 5-11; [IN, c. KY, e. TN, c. AL westward].
..... ***Dalea candida***

25 Calyx variously and obviously hairy; bracteoles absent; stems glabrate to variously hairy.

33 Spikes 20-70 mm long, loosening with age, the rachis becoming partly visible.
..... ***Dalea gattingeri***

33 Spikes 5-40 mm long (or to 70 mm long in *D. purpurea*), remaining compact.

39 Interfloral bracts with pubescence along the keel and margins; plants decumbent to ascending, stems normally branching only below the middle .....
..... ***Dalea cahaba***

39 Interfloral bracts with pubescence in a transverse band only; plants ascending to erect, the stems branching above the middle.....
..... ***Dalea purpurea***

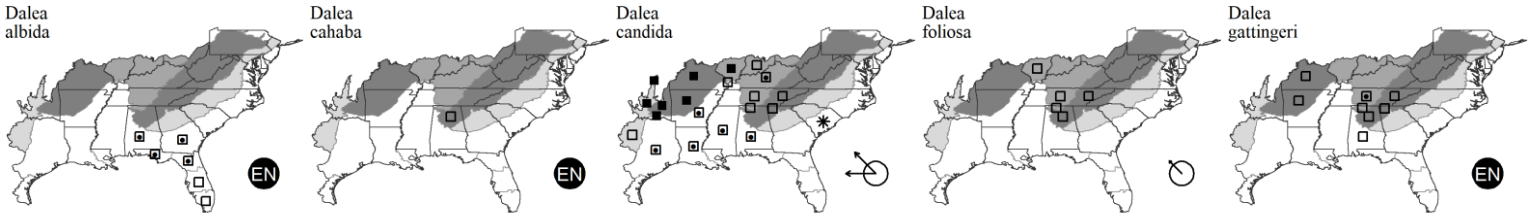
Dalea albida (Torrey & A. Gray) D.B. Ward. WHITE-TASSELS. **Hab:** Longleaf pine sandhills. **Dist:** E. GA (near the SC border) west to se. AL, south to ne. FL, n. peninsular FL, and e. FL Panhandle. **Phen:** Jul-Nov. **Syn:** = K3, K4, Ward (2004c); = *Dalea carnea* (Michaux) Poiret var. *albida* (Torrey & A. Gray) Barneby – Fl3, K1, SE3, WH3, Barneby (1977), Isely (1998); = *Petalostemon albidus* (Torrey & A. Gray) Small – S. NatureServe G5T4 (Apparently Secure).

Dalea cahaba J. Allison. CAHABA PRAIRIE-CLOVER. **Hab:** Dolomitic Ketona glades. **Dist:** Endemic to c. AL (Bibb County). **Phen:** May-Jun; Jun-Sep. **Tax:** See Allison & Stevens (2001) for detailed information. **Syn:** = K3, K4. NatureServe G2 (Imperiled).

Dalea candida Michaux ex Willdenow. WHITE PRAIRIE-CLOVER. **Hab:** Calcareous glades and barrens, prairies. **Dist:** WV, KY, IN, WI, MN, and SK south to nw. GA, e. TN, w. AL, sc. MS, s. LA, and ne. TX. **Phen:** Late May-Sep. **Syn:** = Il, NE, SE3, Tn, Isely (1998); = *Dalea candida* var. *candida* – Ar, C, GrPl, K1, K3, K4, NcTx, Barneby (1977); = *Petalostemon candidus* (Michaux ex Willdenow) Michaux – S; = *Petalostemum candidum* (Michaux ex Willdenow) Michaux – F, G; = *Petalostemum candidum* var. *candidum* – Tx. NatureServe G5T5 (Secure).

Dalea foliosa (A. Gray) Barneby. CEDAR GLADE PRAIRIE-CLOVER, LEAFY PRAIRIE-CLOVER. **Hab:** Calcareous glades. **Dist:** C. TN, n. AL, IL, and OH (?). **Phen:** Late Jun-Sep. **Syn:** = C, Il, K1, K3, K4, SE3, Tn, Barneby (1977), Isely (1998); = *Petalostemon foliosus* A. Gray – S; = *Petalostemum foliosum* A. Gray – F, G. NatureServe G2G3 (Imperiled); USESA E.

Dalea gattingeri (A. Heller) Barneby. GATTINGER'S PRAIRIE-CLOVER. **Hab:** Calcareous glades and barrens. **Dist:** C. TN, nw. GA, n. AL, s. MO, and n. AR (Sundell et al. 1999). **Phen:** May-Aug. **Syn:** = Ar, K1, K3, K4, SE3, Tn, Isely (1998); = *Petalostemon gattingeri* (A. Heller) A. Heller – S. NatureServe G3G4 (Vulnerable).



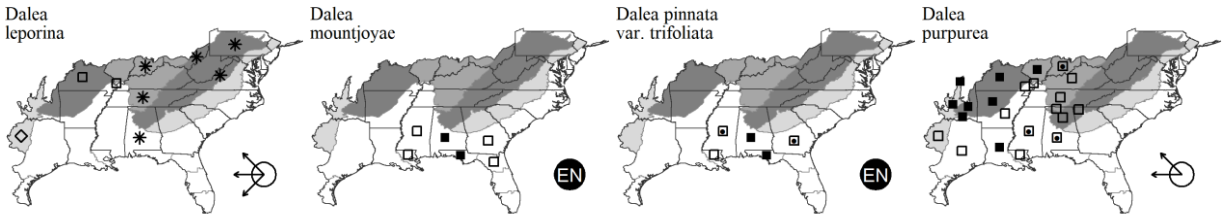
Dalea leporina (Aiton) Bullock. HARE'S-FOOT DALEA, FOXTAIL DALEA. **Hab:** Prairies and woodlands, disturbed areas. **Dist:** WI, MN, and ND south to s. IL, se. MO, s. KS, w. TX, NM, AZ, and Mexico. **Phen:** Jul-Sep. **Syn:** = GrPl, Il, K1, K3, K4, Mi, NE, NY, SE3, Tn, Tx, Barneby (1977), Isely (1998); ? *Parosela alopecuroides* (Willdenow) Rydberg – S. NatureServe G5 (Secure).

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

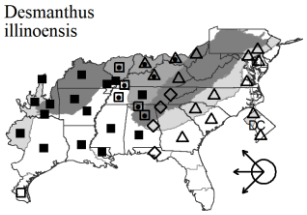
Dalea mountjoyae M. Woods. SPRAWLING WHITE-TASSELS. **Hab:** Wet pine savannas. **Dist:** Sc. and sw. GA west to se. LA. **Phen:** Aug-Sep. **Comm:** The combination at the specific level in *Dalea* using the epithet '*gracilis*' is preoccupied; the replacement name is supplied by Woods (2013). **Syn:** = K3, K4, Woods (2013); = *Dalea carnea* (Michaux) Poiret var. *gracilis* (Nuttall) Barneby – Fl3, K1, SE3, WH3, Barneby (1977), Isely (1998); = *Dalea gracilis* (Nuttall) D.B. Ward – Ward (2004c); = *Petalostemon gracilis* Nuttall – S. NatureServe G5T3 (Vulnerable).

Dalea pinnata (J.F. Gmelin) Barneby *var*. ***trifoliata*** (Chapman) Barneby. **Hab:** Longleaf pine sandhills, dry to moist longleaf pine flatwoods. **Dist:** E. GA (near the Savannah River) south and west to w. Panhandle FL, s. AL, and s. MS. **Phen:** Sep-Nov. **Tax:** Under study by Diggs & Fuller. **Syn:** = Fl3, K1, K3, K4, SE3, WH3, Barneby (1977), Isely (1998); < *Kuhnistera pinnata* (J.F. Gmelin) Kuntze – S. NatureServe G5T3T4 (Vulnerable).

Dalea purpurea Ventenat. PURPLE PRAIRIE-CLOVER. **Hab:** Prairies, glades, and open woodlands. **Dist:** ON west to BC, south to KY, TN, n. AL, c. MS, TX, and NM. **Phen:** Jun-Sep. **Syn:** = Il, K3, K4, Mi, NcTx, Tn; = *Dalea purpurea* var. *purpurea* – C, GrPl, K1, NY, SE3, Barneby (1977), Isely (1998); = *Petalostemon purpureus* (Ventenat) Rydberg – S; = *Petalostemum purpureum* (Ventenat) Rydberg – F, G, Tx. NatureServe G5T5 (Secure).



Desmanthus Willdenow 1806 (BUNDLEFLOWER)



A genus of about 25 species, herbs and shrubs, of warm temperate and subtropical America. References: Isely (1973); Isely (1998); Luckow (1993); MacRoberts & MacRoberts (2011b).

Desmanthus illinoensis (Michaux) MacMillan ex B.L. Robinson & Fernald. COMMON BUNDLEFLOWER, PRAIRIE MIMOSA. **Hab:** Prairies, open woodlands, barrens, marsh edges, disturbed areas. **Dist:** OH, MN, and ND south to Panhandle FL, TX, and NM; with scattered adventive occurrences east and west of the native distribution. **Phen:** Jun-Jul; Aug-Nov. **Syn:** = Ar, C, F, Fl3, G, GrPl, Il, K1, K3, K4, Mi, NcTx, RAB, SE3, Tn, Tx, W, WH3, Isely (1973), Isely (1998), Luckow (1993); = *Acuan illinoense* (Michaux) Kuntze – S. NatureServe G5 (Secure).

Desmodium Desvaux 1813 (TICK-TREFOIL, TICK-CLOVER, BEGGAR'S-TICKS, STICK-TIGHTS)

A genus of about 275-300 species, annual herbs, perennial herbs, and shrubs, nearly cosmopolitan (but lacking from Europe). In our area, *Desmodium* is a complex genus. Some of the species in our area are confusing and can be identified only with difficulty. References: Isely (1998); Krings (2004); Ohashi & Ohashi (2018); Ohashi (2013); Ohashi et al (2018); Ohashi in FNA () (in prep); Raveill (2002); Thomas (2020).

Identification Notes: In fruit, *Desmodium* is easy to recognize, as one of only four genera of Fabaceae in our region with loments (legumes which separate into one-seeded segments along sutures). *Aeschynomene* has pinnately compound leaves with many leaflets, in contrast to the trifoliolate (exceptionally unifoliolate) leaves of *Desmodium*. The other two genera have both often been treated as components of Desmodium. *Grona* is represented in our flora by a single naturalized species, *Grona triflora*, in the Coastal Plain of FL, GA, AL, and e. LA (and to be expected in MS and perhaps other nearby areas); it has flowers in axillary clusters rather than axillary or terminal racemes or panicles. *Hylodesmum* consists of three species occurring in mainly shady, forested settings, separable from *Desmodium* by many characters (see key).

2 Longest calyx lobes shorter than the calyx tube; stipe of the loment 4-20 mm long, about 3× or more as long as the calyx; mature leaves without stipels at the base of the petiolules of the leaflets; leaves subverticillate at the top of the stem (alternate in *D. pauciflorum*); stamens monadelphous; lower margin of the loment incised to the upper suture ..... ***Hylodesmum***

2 Longest calyx lobes longer than the calyx tube; stipe of the loment absent or nearly so, included within the calyx; mature leaves retaining stipels at the base of the petiolules of the leaflets; leaves alternate; stamens diadelphous; lower margin of the loment not incised to the upper suture.

3 Leaflets narrow, the terminal leaflet < 14 mm wide, and also 4-12× as long as wide, typically thick and strongly reticulate; petioles of midstem leaves 1-10 (-15) mm long; [primarily of the Coastal Plain and lower Piedmont (rarely Mountains) in our area] ..... ***Key A***

3 Leaflets broader, the terminal leaflet > 15 mm wide, or < 4× as long as wide, typically thin and not reticulate; petioles of midstem leaves various, but > 15 mm long if leaflet proportions are narrow; [collectively widespread in our area].

4 Stems trailing vinelike along the ground, and/or the plants stoloniferous or rhizomatous ..... ***Key B***

4 Stems erect or ascending, not vinelike.

5 Stipules (5-) 7-20 mm long, > 1 mm wide at the base, clasping or truncate at the base, persistent (most or all of the stipules persisting through the year), 4-20 mm long; leaflets 1.5-3× as long as wide ..... ***Key C***

5 Stipules 2-6 (-9.5) mm long, < 1 mm wide at the base, narrowed or parallel-sided to the base, caducous (most or all of the stipules falling soon after expansion of the leaves); leaflets 1-8 (-10)× as long as wide ..... ***Key D***

Key A - : *Desmodium* with very narrow leaflets

1 Petioles (0-) 1-3 (-4) mm long, the leaves thus subsessile; leaflets 5-10 mm wide, strongly pubescent on the lower surface ..... ***Desmodium sessilifolium***

1 Petioles 3-15 mm long, the leaves thus obviously petiolate; leaflets 2-5 (-8) mm wide, glabrate or inconspicuously puberulent on the lower surface.

2 Loment segments flat to distinctly concave along the upper (suture) margin; [of dry to mesic habitats] ..... ***Desmodium strictum***

2 Loment segments slightly convex along the upper (suture) margin; [of boggy, wet, or mesic habitats] ..... ***Desmodium tenuifolium***

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Key B - : *Desmodium* with trailing stems or stoloniferous-rhizomatous habit

1 Flowers in axillary clusters; leaflets broadly obovate, 0.5-1 cm long ..... ***Grona triflora***
1 Flowers in axillary or terminal racemes; leaflets rotund, broadly ovate, broadly elliptic, or narrowly elliptic, the larger > 1 cm long.
3 Flowers in simple terminal racemes; leaflets mostly > 2.5× as long as wide ..... ***Desmodium incanum***
3 Flowers either in axillary racemes or in terminal panicles; leaflets mostly 0.9-2.0× as long as wide.
4 Stipules ovate, persistent, slightly to strongly clasping at the base, 6-12 mm long.
5 Leaflets ovate, 1.2-1.9× as long as wide; flowers white to yellowish; loment uncinate-puberulent only along the sutures ..... ***Desmodium ochroleucum***
5 Leaflets ovate, 0.8-1.1× as long as wide; flowers blue-purple; loment uncinate-puberulent over the surface ..... ***Desmodium rotundifolium***
4 Stipules lanceolate to linear (or deltate in *D. humifusum*), usually quickly deciduous, not clasping at the base, 2-8 mm long.
..... ***Desmodium lineatum***

Key C

1 Loment segments 3-5.5 mm long, nearly symmetrical along the axis of the loment (the isthmi more or less equal above and below, thus each segment diamond-shaped, rounded-diamond-shaped, or essentially elliptical).
..... ***Desmodium tortuosum***
1 Loment segments 5-11 mm long, asymmetrical along the axis of the loment (the isthmi deeper below than above, thus each segment triangular, rounded-triangular, or semi-circular).
4 Corolla 6-7 mm long; loment with 2-4 segments, each 5-7 mm long; lower leaves often 1-foliolate; [of se. SC and southward] ..... ***Desmodium floridanum***
4 Corolla 8-13 mm long; loment with 4-6 segments, each 6.5-11 mm long; lower leaves usually 3-foliolate; [collectively widespread in our area].
5 Stem densely spreading pilose (at least the upper stem) and also uncinate-puberulent; loment segments 6.5-10 mm long ..... ***Desmodium canescens***
5 Stem glabrous or uncinate-puberulent; loment segments 9-11 mm long ..... ***Desmodium cuspidatum***

Key D

2 Loment with 1-3 segments, rounded below.
3 Leaflets cinereous on the lower surface; corolla 6-7 mm long; loment with 3 (-4) segments ..... ***Desmodium nuttallii***
3 Leaflets not cinereous on the lower surface; corolla 3.5-6 mm long; loment with 1-2 (-3) segments; ["*Desmodium ciliare* group"].
4 Leaflets 3-5.5× as long as wide ..... ***Desmodium ciliare***
4 Leaflets 1.2-3.5× as long as wide.
5 Terminal leaflet usually distinctly longer and narrower than the lateral leaflets; stem (near the middle) sparsely to densely uncinate-pubescent .....
..... ***Desmodium obtusum***
5 Terminal leaflet similar to the lateral leaflets; stem (near the middle) glabrous to pilose, or also with some uncinate-pubescence.
6 Petioles 1-3 (-5) mm long; pedicels 3-8 mm long; stem usually pilose; leaflets sub-appressed pubescent (to glabrate) ..... ***Desmodium ciliare***
6 Petioles 10-25 mm long; pedicels 8-15 mm long; stem glabrous (to sparsely uncinate-puberulent); leaflets glabrous or with only a few scattered hairs ....
..... ***Desmodium marilandicum***
2 Loment with 2-5 segments, mostly obtusely angled below.
7 Leaves densely villous on the lower surface; stem densely pubescent with uncinate or non-uncinate hairs.
8 Leaflets 1.5-2.0 (-2.2)× as long as wide; loment usually curved (the upper margin convex); loment with 2-4 segments; loment segments 4-7 mm long .....
..... ***Desmodium nuttallii***
8 Leaflets 1.0-1.5 (-1.9)× as long as wide; loment straight; loment with (3-) 4-5 (-6) segments; loment segments 5-8 (-9) mm long .....
..... ***Desmodium viridiflorum***
7 Leaves glabrous to moderately appressed-villous on the lower surface; stem glabrate, pilose or uncinate pubescent.
9 Bracts (subtending clusters of 2-3 flowers) usually villous; plants moderately to densely villous; loment usually incurved (the upper margin convex); loment with 2-4 segments, each segment 4-5 mm long ..... ***Desmodium nuttallii***
9 Bracts (subtending clusters of 2-3 flowers) not villous; plants glabrous or slightly to moderately villous or pilose; loment usually nearly straight; loment with 3-5 segments, each segment 4-8.5 mm long.
10 Corolla 8-10 mm long; pedicels usually 10-15 (-20) mm long; stems and leaves glabrous; leaflets distinctly pale on the lower surface .....
..... ***Desmodium laevigatum***
10 Corolla 6-8 (-9) mm long; pedicels 3-12 mm long; stems and leaves pubescent or glabrate (but pubescent at least on the leaves); leaflets green or slightly pale on the lower surface; ["*Desmodium paniculatum* group"].
11 Leaflet lower surface glabrous, except for the conspicuous uncinate puberulence on the veins; stems and petioles glabrous or uncinate-puberulent; [plant of the Coastal Plain and possibly lower Piedmont] ..... ***Desmodium fernaldii***
11 Leaflet lower surface strigose to conspicuously sub-appressed-villous, and sometimes also uncinate-puberulent; stems and petioles glabrate to conspicuously pilose or uncinate-puberulent; [plants collectively widespread in our area].
12 Leaflets (2.5-) 3-8 (-10)× as long as wide; leaflet pubescence usually sparse, of straight, appressed hairs < 0.5 mm long (or sometimes of longer spreading hairs); leaflets usually lacking uncinate pubescence on either surface; mid-stems glabrous or glabrate, the pubescence usually uncinate puberulence.
..... ***Desmodium paniculatum var. paniculatum***
12 Leaflets 1.5-3 (-4)× as long as wide; leaflet pubescence usually evident, of spreading hairs > 0.5 mm long; leaflets usually with uncinate pubescence on the veins of the upper surface; mid-stems pubescent, either pilose or with uncinate pubescence (if not, evidently pubescent on the petioles).
14 Each side (from the isthmus on one side of the article to the broadest point) of the ventral margin of most articles straight to slightly convex; leaves gradually but noticeably reduced in size and petiole length distally along the stem, often with small leaves extending well onto the flowering branches; terminal leaflets lanceolate to broadly ovate (most specimens, especially of full sun habitats, are on the narrow end of this range), broadest nearer the base than the middle ..... ***Desmodium glabellum***
14 Each side (from the isthmus on one side of the article to the broadest point) of the ventral margin of most articles concave; leaves mostly all the same size and not or little extending onto the flowering branches (the few leaves that do extend into the inflorescence branches will also be reduced in size but more abruptly so); terminal leaflets narrowly ovate to broadly elliptic-ovate (most specimens are on the wider end of this range), broadest nearer the middle than the base ..... ***Desmodium perplexum***

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

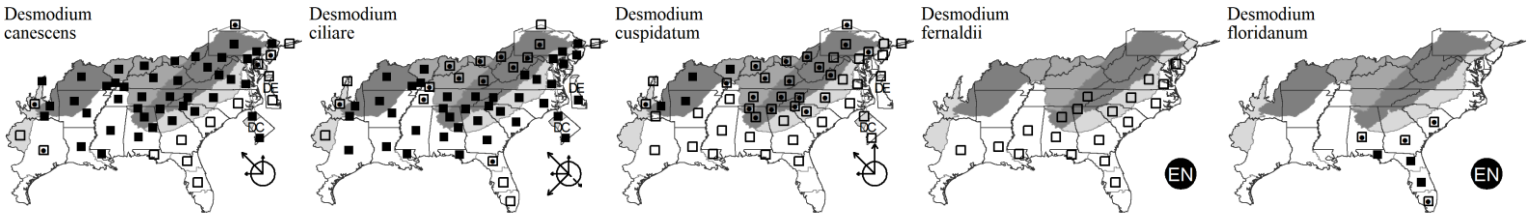
Desmodium canescens (Linnaeus) A.P. de Candolle. HOARY TICK-TREFOIL. **Hab:** Fields, woodland borders, disturbed areas. **Dist:** MA west to WI and NE, south to n. peninsular FL and TX. **Phen:** Jun-Oct; Aug-Nov. **Syn:** = Ar, C, F, Fl3, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, SE3, Tn, Tx, Va, W, WH3, WV, Isely (1998); = *Meibomia canescens* (Linnaeus) Kuntze – S. NatureServe G5 (Secure).

Desmodium ciliare (Muhlenberg ex Willdenow) A.P. de Candolle. **Hab:** Fields, woodland borders, disturbed areas. **Dist:** MA west to IN, MO, and se. KS, south to s. FL and TX; also in Cuba. **Phen:** Jun-Oct; Aug-Nov. **Syn:** = Ar, Bah, C, Fl3, G, GrPl, Il, K3, Mi, NcTx, NE, NY, Pa, RAB, SE3, Tn, Tx, Va, W, WH3, WV, Isely (1998); = *Desmodium marilandicum* (Linnaeus) A.P. de Candolle var. *ciliare* (Muhlenberg ex Willdenow) H. Ohashi – K4, Ohashi (2013); = *Meibomia ciliaris* (Muhlenberg ex Willdenow) Blake – S; > *Desmodium ciliare* var. *ciliare* – F, K1; > *Desmodium ciliare* var. *lancifolium* Fernald – F, K1.

Desmodium cuspidatum (Muhlenberg ex Willdenow) A.P. de Candolle ex Loudon. LARGE-BRACTED TICK-TREFOIL. **Hab:** Fields, woodlands, woodland borders, disturbed areas. **Dist:** VT and MA west to MN, south to FL Panhandle and e. TX. **Phen:** Jun-Aug; Aug-Oct. **Syn:** = Ar, Fl3, Mi, NE, Pa, RAB, Tn, Tx, W, WH3, WV, Isely (1998); > *Desmodium cuspidatum* (Muhlenberg ex Willdenow) A.P. de Candolle ex Loudon var. *cuspidatum* – C, F, G, GrPl, Il, K1, K3, SE3, Va; > *Desmodium cuspidatum* (Muhlenberg ex Willdenow) A.P. de Candolle ex Loudon var. *longifolium* (Torrey & A. Gray) Schubert – C, F, G, GrPl, Il, K1, K3, SE3.

Desmodium fernaldii B.G. Schubert. FERNALD'S TICK-TREFOIL. **Hab:** Longleaf pine sandhills and dry flatwoods, other dry sandy habitats, woodland borders. **Dist:** Se. VA south to s. SC (and maybe e. GA and n. FL); Isely (1998) states that reports from the Gulf Coast are based on "glabrate forms of *D. glabellum*", and also suggests that *D. fernaldii* is only weakly differentiated from *D. glabellum*. **Phen:** Jun-Sep; Aug-Oct. **Syn:** = C, F, Fl3, G, Il, K1, K3, RAB, SE3, Tx, Va, W, WH3, Isely (1998); = *Desmodium paniculatum* var. *fernaldii* – K4, Ohashi (2013); < *Meibomia rhombifolia* Vail – S. NatureServe G4 (Apparently Secure).

Desmodium floridanum Chapman. FLORIDA TICK-TREFOIL. **Hab:** Longleaf pine sandhills, other dry sandy habitats. **Dist:** Se. SC south to s. FL. **Phen:** Jun-Sep; Aug-Oct. **Syn:** = Fl3, K1, K3, K4, RAB, SE3, WH3, Isely (1998); < *Meibomia rhombifolia* Vail – S. NatureServe G4 (Apparently Secure).



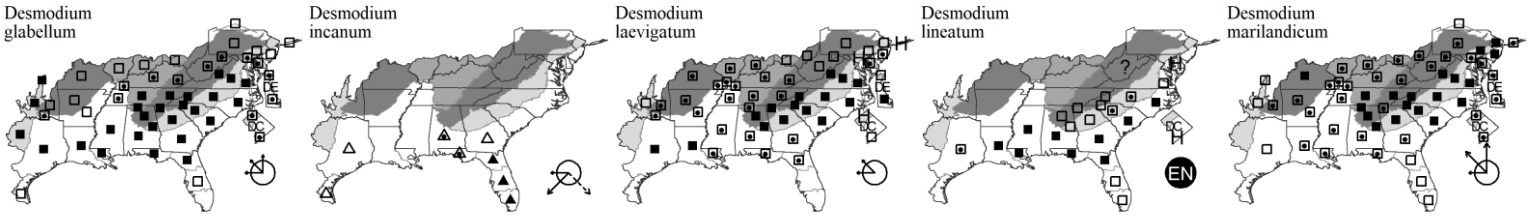
Desmodium glabellum (Michaux) A.P. de Candolle. TALL TICK-TREFOIL. **Hab:** Fields, woodland borders, disturbed areas. **Dist:** ME west to WI and NE, south to n. peninsular FL and TX. **Phen:** Jun-Sep; Aug-Oct. **Tax:** See Thomas (2020) for a detailed discussion and reinterpretation of the taxonomy of *Desmodium glabellum* and *D. perplexum*. **Syn:** = Ar, F, Fl3, Il, K1, K3, Mi, NE, Pa, RAB, SE3, Tn, Tx, Va, WH3, WV, Isely (1998), Thomas (2020); < *Desmodium glabellum* (Michaux) A.P. de Candolle – C; < *Desmodium paniculatum* var. *dillenii* (Darlington) Isely – W; < *Desmodium paniculatum* (Linnaeus) A.P. de Candolle var. *paniculatum* – K4; ? *Meibomia paniculata* (Linnaeus) Kuntze – S; ? *Meibomia pubens* (Torrey & A. Gray) Rydberg – S.

* ***Desmodium incanum*** (Swartz) A.P. de Candolle. ZARZABACOA TICK-TREFOIL, ZARZABACOA COMÚN. **Hab:** Lawns, disturbed areas; presumably introduced or adventive from tropical America. **Dist:** A pantropical weedy species. Becoming common in s. AL (Dauphin Island (Barger et al. 2012). **Phen:** (Jan-) Mar-Oct (-Dec). **Syn:** = Fl3, K4, SE3, WH3, Isely (1998); = *Desmodium canum* (J.F. Gmelin) Schinz & Thellung – Bah, Tx, illegitimate basionym; = *Meibomia cana* (J.F. Gmelin) Blake – S, illegitimate basionym; > *Desmodium incanum* var. *incanum* – K1, K3. NatureServe G5T5 (Secure).

Desmodium laevigatum (Nuttall) A.P. de Candolle. SMOOTH TICK-TREFOIL. **Hab:** Dry oak and pine forests, fields, woodland borders, disturbed areas. **Dist:** S. NY west to IN and MO, south to n. FL, Panhandle FL, and TX. **Phen:** Jun-Sep; Aug-Oct. **Syn:** = Ar, C, F, Fl3, G, Il, K1, K3, K4, NY, Pa, RAB, SE3, Tn, Tx, Va, W, WH3, WV, Isely (1998); = *Meibomia laevigata* (Nuttall) Kuntze – S. NatureServe G5 (Secure).

Desmodium lineatum A.P. de Candolle. MATTED TICK-TREFOIL. **Hab:** Longleaf pine sandhills and other dry forests and woodlands. **Dist:** Se. MD south to n. peninsular FL, west to TX, rarely inland. **Phen:** Jun-Sep; Aug-Oct. **Syn:** = C, F, Fl3, G, K1, K3, K4, RAB, SE3, Tx, Va, W, WH3, WV, Isely (1998); > *Meibomia arenicola* Vail – S; > *Meibomia polymorpha* (A. Gray) Small – S. NatureServe G5 (Secure).

Desmodium marilandicum (Linnaeus) A.P. de Candolle. MARYLAND TICK-TREFOIL. **Hab:** Fields, woodland borders, disturbed areas. **Dist:** MA west to MI and MO, south to n. peninsular FL and TX. **Phen:** Jun-Sep; Aug-Oct. **Syn:** = Ar, C, F, Fl3, G, GrPl, Il, K1, K3, Mi, NcTx, NE, NY, Pa, RAB, SE3, Tn, Tx, Va, W, WH3, WV, Isely (1998); = *Desmodium marilandicum* var. *marilandicum* – K4, Ohashi (2013), Zhang, Zhang, & Endress (2003); = *Meibomia marilandica* (Linnaeus) Kuntze – S.



Desmodium nuttallii (Schindler) B.G. Schubert. NUTTALL'S TICK-TREFOIL. **Hab:** Fields, woodland borders, disturbed areas. **Dist:** NY west to IN, south to n. peninsular FL, FL Panhandle, AL, and AR. **Phen:** Jul-Sep; Aug-Oct. **Syn:** = Ar, F, Fl3, Il, K1, K3, K4, NcTx, NY, Pa, RAB, SE3, Tn, Tx, Va, W, WH3, WV, Isely (1998); < *Desmodium viridiflorum* (Linnaeus) A.P. de Candolle – C, G; < *Meibomia viridiflora* (Linnaeus) Kuntze – S.

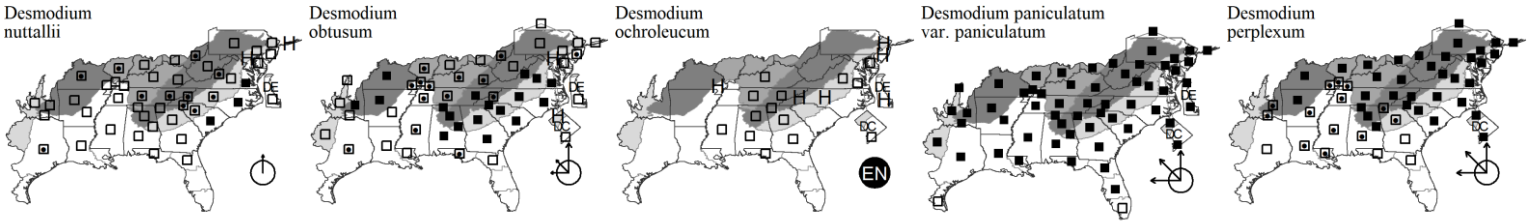
Desmodium obtusum (Muhlenberg ex Willdenow) A.P. de Candolle. STIFF TICK-TREFOIL. **Hab:** Longleaf pine sandhills and dry pine flatwoods, other dry pine woodlands, fields, woodland borders, disturbed areas. **Dist:** MA west to s. MI, south to Panhandle FL and TX. **Phen:** Jun-Sep; Aug-Oct. **Syn:** = Ar, Fl3, GrPl, Il, K1, K3, Mi, NcTx, NE, NY, Pa, RAB, SE3, Tn, Tx, Va, W, WH3, Isely (1998); = *Desmodium marilandicum* (Linnaeus) A.P. de Candolle var. *lancifolium* (Fernald & B.G. Schubert) H. Ohashi – K4, Ohashi (2013); = *Desmodium rigidum* (Elliott) A.P. de Candolle – C, F, G, WV; = *Meibomia rigida* (Elliott) Kuntze – S.

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Desmodium ochroleucum M.A. Curtis ex Canby. WHITE TICK-TREFOIL, CREAMFLOWER TICK-TREFOIL. **Hab:** Dry woodlands and barrens, especially over calcareous substrates. **Dist:** NJ, DE, and MD south to sc. and sw. NC, GA, TN, AL, Panhandle FL, MS, and MO. **Phen:** Jun-Aug; Aug-Oct. **Syn:** = C, F, Fl3, G, K1, K3, K4, RAB, SE3, Tn, Va, W, WH3, Isely (1998); = *Meibomia ochroleuca* (M.A. Curtis ex Canby) Kuntze – S. NatureServe G2G3 (Imperiled).

Desmodium paniculatum (Linnaeus) A.P. de Candolle *var*. ***paniculatum***. PANICLED TICK-TREFOIL. **Hab:** Fields, woodland borders, disturbed areas. **Dist:** S. ME west to s. ON, MI, and NE, south to s. FL and TX. **Phen:** Jun-Sep; Aug-Oct. **Syn:** = F, K1, SE3, Tx, Va, Isely (1998); = *Desmodium paniculatum* var. *pubens* Torrey & A. Gray – G; < *Desmodium paniculatum* – Ar, C, Fl3, Il, K3, Mi, Mo1, NcTx, NE, NY, Pa, RAB, Tn, WH3, WV; > *Desmodium paniculatum* var. *dillenii* (Darlington) Isely – GrPl; < *Desmodium paniculatum* (Linnaeus) A.P. de Candolle var. *paniculatum* – K4, W, Ohashi (2013); > *Desmodium paniculatum* (Linnaeus) A.P. de Candolle var. *paniculatum* – GrPl; > *Meibomia chapmanii* (Britton) Small – S; > *Meibomia paniculata* (Linnaeus) Kuntze – S; >< *Meibomia pubens* (Torrey & A. Gray) Rydberg – S.

Desmodium perplexum Schubert. PERPLEXING TICK-TREFOIL. **Hab:** Fields, woodland borders, hammocks, disturbed areas. **Phen:** Jul-Sep; Aug-Oct. **Tax:** See Thomas (2020) for a detailed discussion and reinterpretation of the taxonomy of *Desmodium glabellum* and *D. perplexum*. **Syn:** = Ar, F, Fl3, Il, K1, K3, Mi, NE, NY, Pa, RAB, SE3, Tn, Va, WH3, WV, Isely (1998), Thomas (2020); = *Meibomia dillenii* (Darlington) Kuntze – S; < *Desmodium glabellum* (Michaux) A.P. de Candolle – C; < *Desmodium paniculatum* var. *dillenii* (Darlington) Isely – W; < *Desmodium paniculatum* (Linnaeus) A.P. de Candolle var. *paniculatum* – K4.



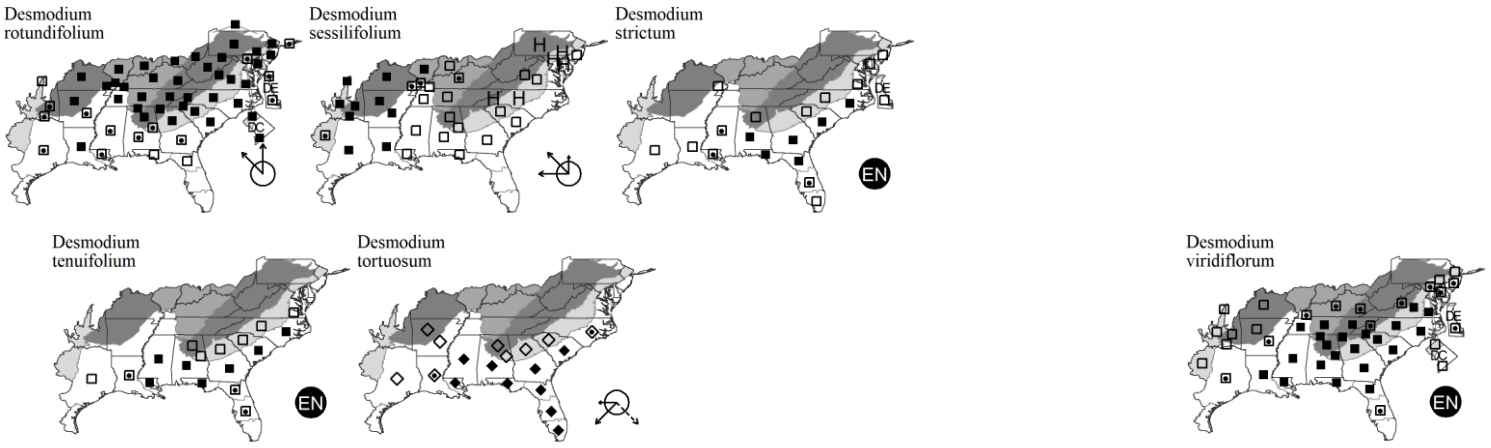
Desmodium rotundifolium A.P. de Candolle. ROUNDLEAF TICK-TREFOIL. **Hab:** Dry forests and woodlands. **Dist:** VT and MA west to s. MI, south to ne. FL, Panhandle FL, LA, and MO. **Phen:** Jun-Aug; Aug-Oct. **Syn:** = Ar, C, F, Fl3, G, GrPl, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, SE3, Tn, Tx, Va, W, WH3, WV, Isely (1998); ? *Meibomia michauxii* Vail – S. NatureServe G5 (Secure).

Desmodium sessilifolium (Torrey) Torrey & A. Gray. SESSILE-LEAF TICK-TREFOIL. **Hab:** Dry woodlands. **Dist:** RI west to s. MI and KS, south to NC, Panhandle FL, MS, and TX. **Phen:** Jul-Aug; Aug-Oct. **Syn:** = C, F, Fl3, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, Pa, RAB, SE3, Tn, Tx, Va, W, WH3, Isely (1998); = *Meibomia sessilifolia* (Torrey) Kuntze – S. NatureServe G5 (Secure).

Desmodium strictum (Pursh) A.P. de Candolle. PINELAND TICK-TREFOIL, PINEBARREN TICK-TREFOIL. **Hab:** Longleaf pine sandhills, other dry woodlands. **Dist:** S. NJ south to s. FL, west to w. LA and ne. TX. **Phen:** Jul-Aug; Aug-Oct. **Syn:** = C, F, Fl3, G, K1, K3, K4, RAB, SE3, Tx, Va, W, WH3, Isely (1998); = *Meibomia stricta* (Pursh) Kuntze – S. NatureServe G4 (Apparently Secure).

Desmodium tenuifolium Torrey & A. Gray. SLIMLEAF TICK-TREFOIL. **Hab:** Pine savannas, wet pine flatwoods. **Dist:** Se. VA south to c. peninsular FL, west to w. LA. **Phen:** Jul-Aug; Aug-Oct. **Syn:** = C, F, Fl3, G, K1, K3, K4, RAB, SE3, Va, WH3, Isely (1998); = *Meibomia tenuifolia* (Torrey & A. Gray) Kuntze – S. NatureServe G4 (Apparently Secure).

* ***Desmodium tortuosum*** (Swartz) A.P. de Candolle. **Hab:** Fields, woodland borders, disturbed areas. **Dist:** E. NC south to s. FL, west to AR and TX; Mexico, Central America, n. South America, West Indies; perhaps only introduced in the more eastern parts of the southeastern United States. **Phen:** Jul-Aug; Aug-Oct. **Syn:** = Ar, Fl3, K1, K3, K4, RAB, SE3, Tx, WH3, Isely (1998); = *Meibomia purpurea* (P. Miller) Vail – S. NatureServe G5 (Secure).

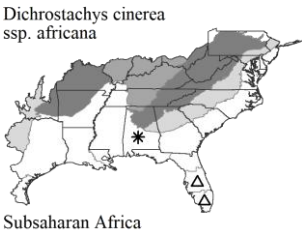


Desmodium viridiflorum (Linnaeus) A.P. de Candolle. VELVETY TICK-TREFOIL. **Hab:** Fields, woodland borders, disturbed areas. **Dist:** NJ and DE south to c. peninsular FL, west to TX, and inland to w. VA, w. NC, n. TN, and AR. **Phen:** Jun-Sep; Aug-Oct. **ID Notes:** This robust species is strongly uncinate-puberulent on the upper leaf surfaces, stems, and inflorescence axes. **Syn:** = Ar, F, Fl3, Il, K1, K3, K4, NcTx, Pa, RAB, SE3, Tn, Tx, Va, W, WH3, Isely (1998); < *Desmodium viridiflorum* (Linnaeus) A.P. de Candolle – C, G; < *Meibomia viridiflora* (Linnaeus) Kuntze – S.

Dichrostachys (A.P. de Candolle) Wight & Arnott 1834 (SICKLE BUSH)

A genus of about 6-14 species, shrubs and trees, of Africa and tropical Asia. References: Isely (1998); Lewis et al (2005).

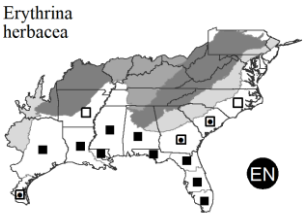
Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated



* ***Dichrostachys cinerea*** (Linnaeus) Wight & Arnott *ssp.* ***africana*** Brenan & Brummitt. AFRICAN SICKLE BUSH, KALAHARI CHRISTMAS TREE, AROMA. **Hab:** Coastal dunes, disturbed areas over limestone. **Dist:** Native of Africa. See Barger et al. (2012) for additional information about the AL occurrence. **Syn:** = Fl3, K3, K4, WH3; < *Dichrostachys cinerea* – SE3, Isely (1998). NatureServe GNRTNR (Not Yet Ranked).

Erythrina Linnaeus 1753 (CORAL BEAN)

A genus of about 120 species, trees, shrubs, and perennial herbs, of tropical and subtropical regions of the Old and New World. References: Isely (1998); Nesom (2016e).



Erythrina herbacea Linnaeus. CORAL BEAN, CARDINAL-SPEAR, COLORÍN. **Hab:** Maritime forests, dry sandy woodlands, hammocks, longleaf pine sandhills. **Dist:** Se. NC south to FL, west to se. TX. **Phen:** May-Jul; Jul-Sep. **Tax:** Populations in e. Mexico (Tamaulipas, San Luis Potosi) previously ascribed to this species have been separated as a species (Nesom 2016). **Syn:** = Nesom (2016e); > *Erythrina arborea* (Chapman) Small – S; < *Erythrina herbacea* Linnaeus – Ar, Fl3, K1, K3, K4, NcTx, RAB, SE3, Tx, WH3, Isely (1998); >< *Erythrina herbacea* Linnaeus – S. NatureServe G5 (Secure).

Galactia P. Browne 1756 (MILKPEA)

A genus of about 111 species, perennial herbs, of tropical and warm temperate regions, primarily American. References: Duncan (1979); Franck (2017); Isely (1998); Nesom (2015a); Nesom in FNA () (in prep); Ward & Hall (2004).

4 Stems erect (not prostrate, trailing, or twining), with 4-6 (-8) leaves, usually alternately bent at nodes; inflorescence subsessile, 1-6-flowered ..... ***Galactia erecta***

4 Stems prostrate, trailing, or twining, with numerous leaves (except in depauperate plants), not bent at nodes; inflorescence pedunculate, 1-flowered if sessile or subsessile.

5 Stems climbing or sprawling, twining.

11 Leaflets mostly elliptic to broadly elliptic, (5-) 10-21 (-25) mm wide, usually widest at the midpoint; stems moderately to densely hirsute to hirsute-villous with spreading-deflexed hairs; corollas 7-10 mm; leaflets thick in texture, not glaucous below ..... ***Galactia regularis***

11 Leaflets mostly ovate to lanceolate, 5-15 (-17) mm wide, widest below the midpoint; stems moderately to sparsely strigose with tightly to loosely appressed, retrorse hairs, sometimes glabrate; corollas 9-14 mm; leaflets thin in texture, usually glaucous below ..... ***Galactia volubilis***

5 Stems procumbent at least proximally and variously twining, weakly twining, or not twining towards the tip.

13 Calyx lobes brown to reddish brown on inner surface when dry; corollas distinctly dark reddish when dry, persisting after withering, sometimes still present when fruit is mature ..... ***Galactia mollis***

13 Calyx lobes greenish-yellow to tan on inner surface when dry; corollas light whitish to blue, pinkish, or purplish when dry, not persisting after anthesis.

14 Leaflets subcoriaceous to coriaceous, venation raised on both surfaces. ..... ***Galactia minor***

14 Leaflets herbaceous, venation not raised.

17 Leaflets (14-) 20-55 × (10-) 15-35 mm; flowers 5-12 (-25) ..... ***Galactia floridana***

17 Leaflets 8-30 × 5-20 mm; flowers solitary and axillary or 2-6. ..... ***Galactia microphylla***

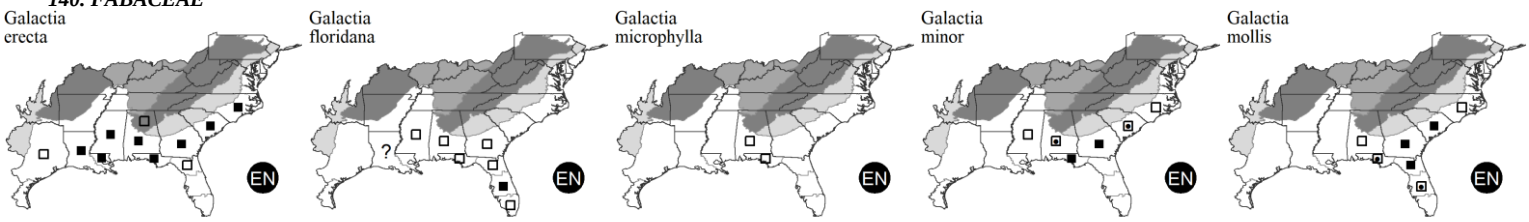
Galactia erecta (Walter) Vail. ERECT MILKPEA. **Hab:** Longleaf pine sandhills. **Dist:** Se. NC south to Panhandle FL, west to e. TX. **Phen:** Apr-Jul; Jul-Sep. **ID Notes:** "*Galactia erecta* is distinct in its erect habit, slender rhizomes, subsessile leaflets, and flowers in axillary-sessile clusters" (Nesom 2015). **Syn:** = Fl3, K1, K3, K4, RAB, S, SE3, Tx, WH3, Duncan (1979), Franck (2017), Isely (1998), Nesom (2015a), Ward & Hall (2004). NatureServe G4 (Apparently Secure).

Galactia floridana Torrey & A. Gray. FLORIDA MILKPEA. **Hab:** Longleaf pine sandhills and other xeric sands. **Dist:** S. GA south to s. FL, west to s. MS. **Phen:** Mar-Aug (-Sep). **Comm:** "The species is recognized by its procumbent, densely short-tomentose to hirsute-villous stems, relatively large, thick leaves (compare *G. microphylla*), and large flowers" (Nesom 2015). **Syn:** = K4, Nesom (2015a), Ward & Hall (2004); = *Galactia floridana* var. *floridana* – S; < *Galactia floridana* Torrey & A. Gray – K1, K3, SE3, Duncan (1979), Franck (2017), Isely (1998), (also see G. volubilis var. fasciculata); < *Galactia volubilis* (Linnaeus) Britton – WH3.

Galactia microphylla (Chapman) Hall & Ward ex Isely. **Hab:** Dunes, longleaf pine sandhills, Florida scrub. **Dist:** S. AL and adjacent w. Panhandle FL. **Phen:** Apr-Sep (-Oct). **Tax:** {reconcile against *G. minor*; add synonymy}. **ID Notes:** "Compared to *Galactia floridana*, *G. microphylla* has shorter internodes, smaller and thinner leaves light green on both surfaces and glaucous beneath, shorter inflorescences with fewer flowers, and minutely and closely strigulose calyces" (Nesom 2015). **Syn:** = K4, Franck (2017), Nesom (2015a).

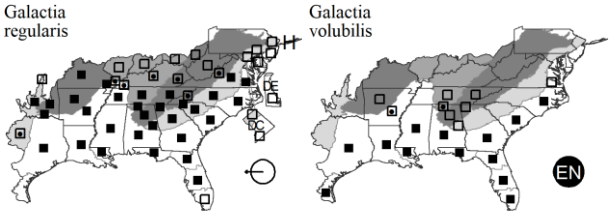
Galactia minor W.H. Duncan. LITTLE MILKPEA. **Hab:** Longleaf pine sandhills. **Dist:** Sc. NC south to Panhandle FL, west to s. MS. **Phen:** Jun-Aug (-Oct); Jul-Oct. **Tax:** "*Galactia minor* is a distinct species with procumbent, antrorsely strigulose stems, small, congested leaves with glabrous adaxial surfaces and raised venation, few flowers on a short inflorescence axis, and relatively large corollas" (Nesom 2015). **Syn:** = K4, Duncan (1979), Franck (2017), Nesom (2015a), Ward & Hall (2004); = *Galactia floridana* Torrey & A. Gray var. *microphylla* Chapman – S; = *Galactia microphylla* (Chapman) Hall & Ward ex Isely – K1, SE3, Isely (1998); < *Galactia regularis* (Linnaeus) Britton, Sterns, & Poggenburg – RAB, misapplied; < *Galactia volubilis* (Linnaeus) Britton – WH3.

Galactia mollis Michaux. SOFT SANDHILL MILK-PEA. **Hab:** Longleaf pine sandhills. **Dist:** Se. NC south to c. peninsular FL, west to Panhandle FL and se. AL. **Phen:** May-Jul; Jul-Sep. **Syn:** = K1, K3, K4, RAB, S, SE3, WH3, Duncan (1979), Franck (2017), Isely (1998), Nesom (2015a), Ward & Hall (2004). NatureServe G4G5 (Apparently Secure).



Galactia regularis (Linnaeus) Britton, Sterns, & Poggenburg. **Hab:** Dry forests and woodlands. **Dist:** Se. NY west to MO and OK, south to s. FL and se. TX. **Phen:** Jul-Sep; Aug-Oct. **Comm:** *Galactia regularis* refers to the species widespread in the eastern USA, with leaflets mostly elliptic to broadly elliptic, relatively small flowers, and twining stems hirsute-villous with deflexed hairs" (Nesom 2015). **Syn:** = Fl3, GrPl, K4, NY, WH3, Duncan (1979), Franck (2017), Nesom (2015a), Ward & Hall (2004); = *Galactia volubilis* (Linnaeus) Britton – K1, S, SE3, Tn, Isely (1998), misapplied; > *Galactia macreei* M.A. Curtis – C, F, G, RAB, Tx; < *Galactia volubilis* (Linnaeus) Britton – Ar, NcTx, WV, (misapplied); > *Galactia volubilis* (Linnaeus) Britton – C, F, G, Pa, RAB, Tx.

Galactia volubilis (Linnaeus) Britton. **Hab:** Longleaf pine sandhills, other dry forests and openings. **Dist:** Se. VA south to s. FL, west to c. AR and e. TX. **Phen:** (Apr-) May-Aug (-Sep). **Syn:** = K4, Nesom (2015a); = *Galactia volubilis* var. *volubilis* – Ward & Hall (2004); > *Galactia brachypoda* Torrey & A. Gray – S; > *Galactia brevipes* Small – S; < *Galactia regularis* (Linnaeus) Britton, Sterns, & Poggenburg – C, F, G, K1, Pa, RAB, SE3, Tx, Isely (1998), (misapplied); > *Galactia regularis* (Linnaeus) Britton, Sterns, & Poggenburg – S, misapplied; < *Galactia volubilis* (Linnaeus) Britton – Ar, WH3.



Gleditsia Linnaeus 1753 (HONEY LOCUST, WATER LOCUST)

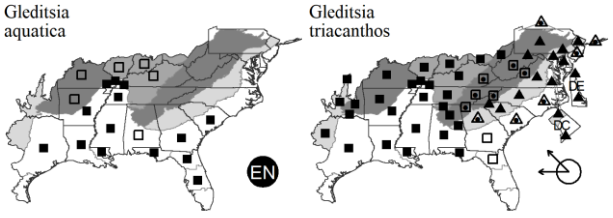
A genus of 13-16 species, trees (and a shrub), scattered relictually in the Old and New Worlds, related to *Gymnocladus*. References: Isely (1975); SE3; Isely (1998); Robertson & Lee (1976); Schnabel & Wendel (1998).

Identification Notes: The hybrid *Gleditsia ×texana* Sargent (pro sp.) [*G. aquatica* × *triacanthos*] occurs occasionally in the area of range overlap of its parents. It is intermediate (but variably so) between its parents.

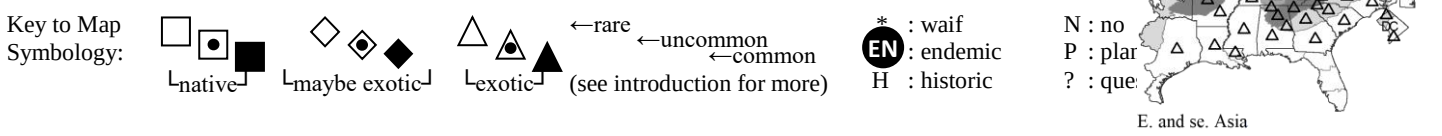
1 Legume ovate, 3-5 (-8) cm long and 1-3-seeded; foliage glabrous (or slightly puberulent when young); [trees of frequently flooded swamps, often with *Taxodium*, rarely planted and escaped]**.....*Gleditsia aquatica***
1 Legume elongate, 20-40 cm long and multi-seeded; foliage puberulent (even in age); [trees of moist to dry forests, frequently planted and escaped in disturbed areas] **..... *Gleditsia triacanthos***

Gleditsia aquatica Marshall. WATER LOCUST. **Hab:** Swamp forests, marshes. **Dist:** E. SC south to c. peninsular FL, west to TX, and north in the interior to IN, IL, and MO (as a native species almost completely restricted to the Coastal Plain); occasionally cultivated north of its native range. **Phen:** Apr-May (-Jun); Jul-Nov. **Syn:** = Ar, C, F, Fl3, G, GW2, Il, K1, K3, K4, Mo2, NcTx, RAB, S, SE3, Tn, Tx, WH3, Isely (1975), Isely (1998), Robertson & Lee (1976). NatureServe G5 (Secure).

Gleditsia triacanthos Linnaeus. HONEY LOCUST, HONEYSHUCK. **Hab:** Woodlands, forests (generally bottomland), fencerows, often planted as a street tree. **Dist:** Native distribution is believed to be from w. NY (?) west to se. SD, south to Panhandle FL and TX (in and west of the Blue Ridge); its occurrence in the more eastern portions of our region (east of the Blue Ridge) appears to be as an adventive. Kimball, Whyte, & Crites (2010) found remains in an archeological site near Asheville NC (Blue Ridge) dated at ca. 500 A.D. **Phen:** Apr-early Jun; Jul-Nov. **Comm:** The trunks are normally beset with lengthy, branched thorns, but thornless trees (forma *inermis* Zabel) are encountered (and are usually favored for horticultural planting). **Syn:** = Ar, C, F, Fl3, G, GrPl, GW2, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, SE3, Tn, Tx, Va, W, WH3, WV, Isely (1975), Isely (1998), Robertson & Lee (1976). NatureServe G5 (Secure).



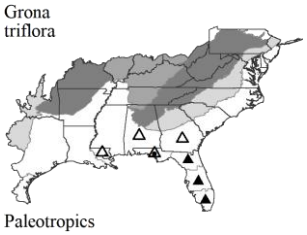
Glycine Willdenow 1802 (SOYBEAN, SOYA)



140. FABACEAE

A genus of about 10-20 species, annual and perennial herbs, of Asia and Australia. References: Isely (1998).

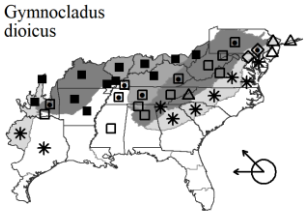
* ***Glycine max*** (Linnaeus) Merrill. SOYBEAN. **Hab:** Abundantly cultivated as a crop, rarely persisting as a waif. **Dist:** Native of e. Asia. **Phen:** Jul-Oct. **Comm:** One of the most important legume crops in the world. **Syn:** = Ar, F, Il, K1, K3, K4, Mi, NcTx, NE, NY, RAB, SE3, Isely (1998). NatureServe GNR (Not Yet Ranked).



Grona Loureiro 1790

A genus of ca. 45 species, annual to perennial herbs (ours) and shrubs, native to Asia and Africa. Separated from *Desmodium* in order to make monophyletic genera (Ohashi & Ohashi 2018; Ohashi et al. 2018). References: Ohashi & Ohashi (2018); Ohashi et al (2018).

* ***Grona triflora*** (Linnaeus) H. Ohashi & K. Ohashi. **Hab:** Lawns, roadsides. **Dist:** Native of the Old World tropics. Reported for Escambia County, FL Panhandle (Kunzer et al. 2009), and widespread in the FL peninsula; also in GA, AL, and e. LA and to be expected in MS. **Syn:** = Ohashi & Ohashi (2018), Ohashi et al (2018); = *Desmodium triflorum* (Linnaeus) de Candolle – Fl3, K1, K3, K4, SE3, WH3, Isely (1998); = *Sagotia triflora* (Linnaeus) Duchassaing & Walpers – S. NatureServe G5 (Secure).



Gymnocladus Lamarck 1785 (KENTUCKY COFFEE-TREE)

A genus of 6 species, all trees, ours in e. North America and 5 species in e. Asia, related to *Gleditsia*. References: Isely (1975); SE3; Isely (1998); Lee (1976); Robertson & Lee (1976).

Gymnocladus dioicus (Linnaeus) K. Koch. KENTUCKY COFFEE-TREE, KENTUCKY MAHOGANY. **Hab:** Native in bottomland and riparian forests, mesic upland forests and woodlands, stream banks, swamp margins, often along rivers; also in disturbed areas, persistent and weakly spreading from horticultural plantings. **Dist:** The original native range has been obscured, perhaps PA west to se. SD, south to w. VA, TN, n. AL, and OK. **Phen:** Apr-Jun; Aug-Nov (and persistent). **Syn:** = C, F, G, GrPl, Il, K1, K3, K4, Mi, Mo2, NcTx, NE, NY, Pa, RAB, S, SE3, Tn, Tx, Va, WV, Isely (1975), Isely (1998), Lee (1976), Robertson & Lee (1976). NatureServe G5 (Secure).

Hylodesmum H. Ohashi & R.R. Mill 2000 (FOREST TICK-TREFOIL)

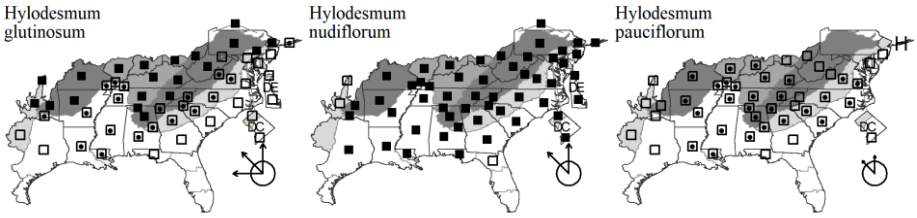
A genus of ca. 15 species, perennial herbs, mainly of e. Asia and e. North America. This group has often been included in *Desmodium* as a section or subgenus, but is now shown to be amply distinct in morphology and also to form a monophyletic group based on molecular analysis. References: Ohashi & Mill (2000); Raveill (2006).

1 Stems dimorphic, the flowering stem normally lacking leaves (rarely with leaves), the sterile stem with a subverticillate cluster of 3-7 leaves near the top; pedicels 10-20 mm long ..... ***Hylodesmum nudiflorum***
1 Stems monomorphic, bearing both leaves and flowers, the leaves either subverticillate or not; pedicels 2-10 mm long.
  2 Leaves subverticillate, clustered; leaflets conspicuously and strongly acuminate, 5-10 cm long; flowers usually distinctly pink or pink-purple; inflorescence 3-8 dm long, elongate, large, and conspicuous, much exceeding the leaves ..... ***Hylodesmum glutinosum***
  2 Leaves alternate, scattered; leaflets acute to slightly acuminate, 3-7 cm long; flowers white; inflorescence 1-2 dm long, small and inconspicuous, often partly obscured by the leaves ..... ***Hylodesmum pauciflorum***

Hylodesmum glutinosum (Muhlenberg ex Willdenow) H. Ohashi & R.R. Mill. HEARTLEAF TICK-TREFOIL, CLUSTERLEAF TICK-TREFOIL. **Hab:** Moist forests, especially nutrient-rich. **Dist:** NS west to SK, south to Panhandle FL and Mexico. **Phen:** Jun-Aug; Aug-Oct. **Syn:** = Fl3, K3, K4, Mi, NE, NY, Va, WH3, Ohashi & Mill (2000); = *Desmodium glutinosum* (Muhlenberg ex Willdenow) Alph. Wood – Ar, C, F, G, GrPl, Il, K1, NcTx, Pa, RAB, SE3, Tn, Tx, W, WV, Isely (1998); = *Meibomia acuminata* (Michaux) Blake – S. NatureServe G5 (Secure).

Hylodesmum nudiflorum (Linnaeus) H. Ohashi & R.R. Mill. NAKED TICK-TREFOIL. **Hab:** Moist to dry forests. **Dist:** ME west to MN, south to Panhandle FL, n. peninsular FL, and TX. **Phen:** Jul-Aug (-Sep); Aug-Oct. **Syn:** = Fl3, K3, K4, Mi, NE, NY, Va, WH3, Ohashi & Mill (2000); = *Desmodium nudiflorum* (Linnaeus) A.P. de Candolle – Ar, C, F, G, GrPl, Il, K1, Pa, RAB, SE3, Tn, Tx, W, WV, Isely (1998); = *Meibomia nudiflora* (Linnaeus) Kuntze – S. NatureServe G5 (Secure).

Hylodesmum pauciflorum (Nuttall) H. Ohashi & R.R. Mill. FEW-FLOWERED TICK-TREFOIL. **Hab:** Moist forests. **Dist:** NY west to OH and IA, south to Panhandle FL and TX. **Phen:** Jun-Aug; Aug-Oct. **Syn:** = Fl3, K3, K4, NY, Va, WH3, Ohashi & Mill (2000); = *Desmodium pauciflorum* (Nuttall) A.P. de Candolle – Ar, C, F, G, GrPl, Il, K1, NcTx, RAB, SE3, Tn, Tx, W, WV, Isely (1998); = *Meibomia pauciflora* (Nuttall) Kuntze – S. NatureServe G5 (Secure).



Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Indigofera Linnaeus 1753 (INDIGO)

A genus of about 700-750 species, annual herbs, perennial herbs, and shrubs, nearly cosmopolitan in tropical and warm temperate regions. References: Franck (2018b) in Weakley et al (2018a); Isely (1998); Lievens & Vincent in FNA () (in prep).

1 Leaflets borne alternate or irregularly on the rachis.
  2 Stipules subulate, < 1.5 mm wide; legumes divergent to deflexed, spaced on the rachis; flowers 6-10 per inflorescence ..... ***Indigofera miniata***
  2 Stipules deltate to lanceolate, 2-3 mm wide; legumes deflexed, crowded on the rachis; flowers many per inflorescence. ..... ***Indigofera spicata***
1 Leaflets borne opposite on the rachis.
  4 Stem pubescence hirsute or pilose with long brownish hairs ..... ***Indigofera hirsuta***
  4 Stem pubescence strigose-appressed.
    5 Legume 7-9 mm long, ovoid, not falcate, indehiscent, with 2-3 seeds; corolla 6-9 mm long; [native species] ..... ***Indigofera caroliniana***
    5 Legume 15-36 mm long, linear-cylindric, slightly to strongly falcate (or straight in *I. decora*), dehiscent, with 3-12 or more seeds; corolla either 5-6 mm long or 15-18 mm long; [introduced species]. ..... ***Indigofera tinctoria***

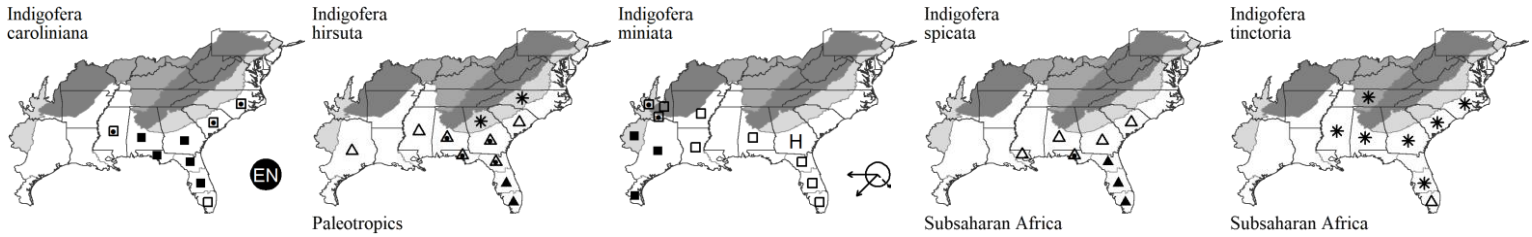
Indigofera caroliniana P. Miller. CAROLINA INDIGO. **Hab:** Longleaf pine sandhills, Florida scrub, maritime forests, other sandy forests and woodlands. **Dist:** E. NC south to s. FL, west to se. LA, a Southeastern Coastal Plain endemic. **Phen:** Jun-Aug; Jul-Oct. **Syn:** = Fl3, K1, K3, K4, RAB, S, SE3, WH3, Isely (1998). NatureServe G4 (Apparently Secure).

* ***Indigofera hirsuta*** Linnaeus. HAIRY INDIGO. **Hab:** Sandy disturbed areas, such as wildlife 'food fields'. **Dist:** Native of the Old World tropics. First reported for SC by Nelson & Kelly (1997). **Phen:** Jan-Dec. **Comm:** Also known from other scattered locations in the Southeast, such as s. MS (S.W. Leonard, 2006, pers.comm.) and AL (Diamond & Woods 2009). **Syn:** = Fl3, K1, K3, K4, SE3, WH3, Isely (1998). NatureServe GNR (Not Yet Ranked).

Indigofera miniata Ortega. COASTAL INDIGO, SCARLET-PEA. **Hab:** Dunes, dry disturbed areas. **Dist:** S. KS south to s. TX, disjunct eastward in FL and (?) GA (where reported by Chapman 1883). **Phen:** Jan-Oct. **Syn:** = Fl3, K1, K3, K4, Isely (1998); > *Indigofera leptosepala* Nuttall ex Torrey & A. Gray – S; > *Indigofera miniata* var. *leptosepala* (Nuttall ex Torrey & A. Gray) B.L. Turner – GrPl, NcTx, SE3, Tx, WH3; > *Indigofera miniata* var. *miniata* – NcTx, Tx; > *Indigofera miniata* Ortega var. *texana* (Buckley) B.L. Turner – Tx.

* ***Indigofera spicata*** Forsskål. TRAILING INDIGO, CREEPING INDIGO. **Hab:** Dry, disturbed areas, hammocks, dunes. **Dist:** Native of Africa. Reported for Camden County, GA (Carter, Baker, & Morris 2009) and Mobile County, AL (Barger et al. 2012). **Phen:** Jan-Dec. **Tax:** Plants referred to *I. hendecaphylla* in the southeastern United States are all (as far as is known) actually *I. spicata*; see Du Puy et al. (1993) and Franck (2018b) for explanation that there are two distinct species and the morphological differences separating them. **Syn:** = K4, Franck (2018b) in Weakley et al (2018a); >< *Indigofera hendecaphylla* Jacquin – K3; < *Indigofera spicata* Forsskål – K1, SE3, WI, Isely (1998); > *Indigofera spicata* Forsskål – K3. NatureServe G5? (Secure).

* ***Indigofera tinctoria*** Linnaeus. AFRICAN INDIGO. **Hab:** Formerly commonly cultivated, locally established as a weed at that time, perhaps no longer present in northern parts of our area, but persistent as a weed in southern Florida. **Dist:** Native of Africa. Both this species and *I. suffruticosa* were cultivated as an important export crop in the Coastal Plain of GA, SC, and (less so) NC in the seventeenth and eighteenth centuries. **Phen:** Jan-Dec. **Syn:** = Bah, Fl3, K1, K3, K4, S, SE3, WH3, Isely (1998). NatureServe GNR (Not Yet Ranked).



Kummerowia Schindler 1912 (KOREAN-CLOVER, JAPANESE-CLOVER)

A genus of 2 species, annual herbs, native to temperate e. Asia. *Kummerowia* differs from *Lespedeza* in its annual habit (vs. perennial), conspicuous stipules (vs. not conspicuous), inflorescence branching pattern (see Akiyama & Ohba 1985), and leaflets with striate, parallel, lateral veins (vs. with reticulate lateral veins). It is now generally regarded as distinct from *Lespedeza* at the generic level, though they are closely related. References: Akiyama & Ohba (1985); Isely (1998).

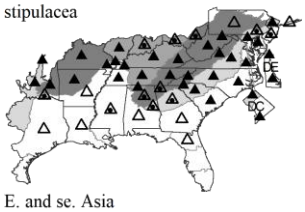
1 Mid-stem leaves with petioles 4-10 mm long; leaflets emarginate at the apex; leaflets conspicuously spreading-ciliate; stems antrorsely appressed-strigose; calyx covering 1/3-1/2 of the legume ..... ***Kummerowia stipulacea***
1 Mid-stem leaves with petioles 1-2 (-4) mm long; leaflets not emarginate at the apex; leaflets inconspicuously appressed-ciliate; stems retrorsely appressed-strigose; calyx covering 1/2-4/5 of the legume ..... ***Kummerowia striata***

* ***Kummerowia stipulacea*** (Maximowicz) Makino. KOREAN LESPEDEZA, KOREAN-CLOVER. **Hab:** Fields, roadsides, disturbed areas. **Dist:** Native of e. Asia. **Phen:** Jul-Sep; Aug-Nov. **Syn:** = Ar, Il, K1, K3, K4, Mi, NcTx, NY, Pa, SE3, Tn, Va, Akiyama & Ohba (1985), Isely (1998); = *Lespedeza stipulacea* Maximowicz – C, F, G, GrPl, RAB, Tx, W, WV. NatureServe GNR (Not Yet Ranked).

* ***Kummerowia striata*** (Thunberg) Schindler. JAPANESE-CLOVER, COMMON LESPEDEZA. **Hab:** Fields, roadsides, disturbed areas. **Dist:** Native of e. Asia. **Phen:** Jul-Sep; Aug-Nov. **Syn:** = Ar, Fl3, Il, K1, K3, NcTx, NE, NY, Pa, SE3, Tn, Va, WH3, Akiyama & Ohba (1985), Isely (1998); = *Lespedeza striata* (Thunberg) Hooker & Arnott – C, F, G, GrPl, RAB, S, Tx, W, WV. NatureServe GNR (Not Yet Ranked).

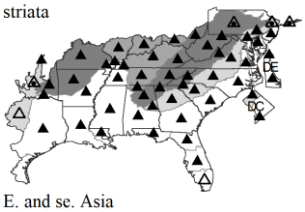
Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Kummerowia stipulacea



E. and se. Asia

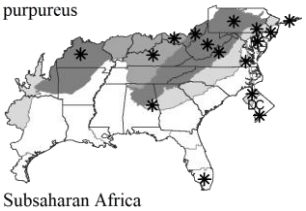
Kummerowia striata



E. and se. Asia

Lablab Adanson 1763 (HYACINTH-BEAN)

Lablab purpureus

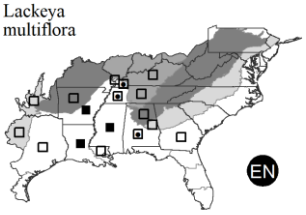


Subsaharan Africa

A genus of a single species, an annual to perennial herb, native of the Old World tropics (but widely introduced elsewhere). References: Delgado-Salinas in FNA () (in prep); Isely (1998).

* ***Lablab purpureus*** (Linnaeus) Sweet. HYACINTH-BEAN, BONAVIST. **Hab:** Disturbed areas. **Dist:** Native of Africa. Cultivated and rarely may escape or persist as a waif in disturbed areas; it is reported from se. PA (Rhoads & Klein 1993) and other scattered localities in our region. **Syn:** = Fl3, K1, K3, K4, NY, SE3, WH3, Isely (1998); = *Dolichos lablab* Linnaeus – Bah. NatureServe GNR (Not Yet Ranked).

Lackeya multiflora



Lackeya Fortunato, L.P. Queiroz, & G.P. Lewis 1996

A monotypic genus, a perennial woody or semi-woody vine, of the Southeastern United States. References: Fortunato, de Queiroz, & Lewis (1996); Isely (1998); Lewis et al (2005); Maxwell (1979).

Lackeya multiflora (Torrey & A. Gray) Fortunato, L.P. Queiroz, & G.P. Lewis. **Hab:** Alluvial forests, streambanks, prairies. **Dist:** GA west to e. TX, north in the interior to w. TN, w. KY, and AR (sometimes attributed to FL, but excluded by Wunderlin & Hansen 2008, 2011). **Phen:** Jun-Jul. **Syn:** = K3, K4, Fortunato, de Queiroz, & Lewis (1996), Lewis et al (2005); = *Dioclea multiflora* (Torrey & A. Gray) C. Mohr – Ar, C, G, K1, Ky, S, SE3, Tn, Tx, Isely (1998); > *Galactia mohlenbrockii* var. *halei* (Alph. Wood) R.H. Maxwell – Maxwell (1979); > *Galactia mohlenbrockii* R.H. Maxwell var. *mohlenbrockii* – Il, Maxwell (1979). NatureServe G4 (Apparently Secure).

Lathyrus Linnaeus 1753 (WILD-PEA, VETCHLING)

A genus of about 150-160 species, annual and perennial herbs, of nearly cosmopolitan distribution. References: Isely (1998).

1 Leaflets > 2, generally 4-12; [native species of various habitats].
  3 Leaflets (8-) 10-14 per leaf, generally irregular arrayed; [plants of dry to mesic forests] ..... ***Lathyrus venosus***
  3 Leaflets (4-) 6 (-8) per leaf, generally paired; [plants of various dry or wet habitats].
    ..... ***Lathyrus palustris***
1 Leaflets 0-2; [alien species, except *L. pusillus*].
  5 Leaflets absent (but with foliaceous stipules) ..... ***Lathyrus aphaca***
  5 Leaflets 2.
    8 Stems with wings 0-1 (-2) mm wide; corolla 6-14 mm long; flowers 1-3 (-4) per raceme.
      9 Legume (in fruit) and ovary (in flower) hirsute with swollen-based hairs; corolla 9-14 mm long ..... ***Lathyrus hirsutus***
      9 Legume (in fruit) and ovary (in flower) glabrous; corolla 6-9 mm long ..... ***Lathyrus pusillus***
    8 Stems with wings 1-3 mm wide; corolla 13-30 mm long; flowers 2-12 per raceme.
      10 Stems hirsute with swollen-based hairs; plant an annual; flowers 2-4 per raceme ..... ***Lathyrus odoratus***
      10 Stems glabrate; plant a perennial; flowers (3-) 4-12 per raceme.
        ..... ***Lathyrus latifolius***

* ***Lathyrus aphaca*** Linnaeus. YELLOW VETCHLING. **Hab:** Disturbed areas. **Dist:** Native of Eurasia. Scattered in occurrence in the Southeast, including AL, TN, and KY (Kartesz 1999). **Phen:** May-Aug. **Syn:** = Ar, G, K1, K3, K4, NcTx, NE, SE3, Isely (1998). NatureServe GNR (Not Yet Ranked).

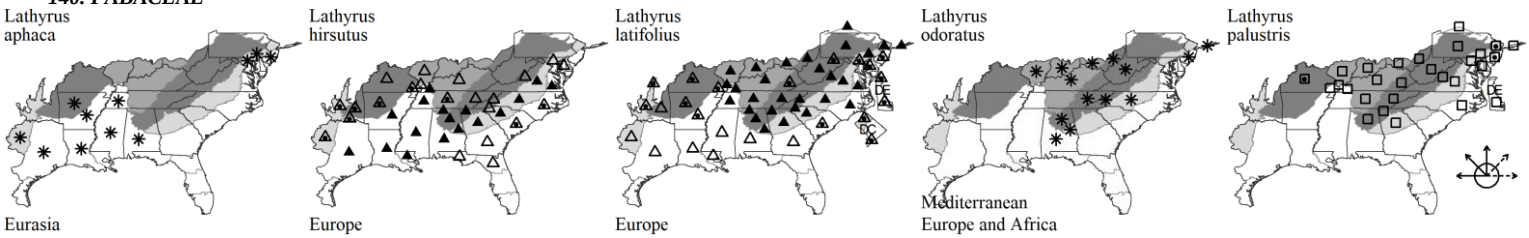
* ***Lathyrus hirsutus*** Linnaeus. CALEY PEA, SINGLETARY PEA, ROUGH PEA. **Hab:** Roadsides, fields, disturbed areas. **Dist:** Native of Europe. **Phen:** Apr-Jul. **Syn:** = Ar, C, F, Fl3, G, Il, K1, K3, K4, Mi, NcTx, RAB, S, SE3, Tn, Tx, Va, W, WH3, Isely (1998). NatureServe GNR (Not Yet Ranked).

* ***Lathyrus latifolius*** Linnaeus. EVERLASTING PEA, PERENNIAL SWEET PEA. **Hab:** Roadsides, fencerows, disturbed areas. **Dist:** Native of Europe. **Phen:** May-Oct. **Syn:** = C, F, G, Il, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, SE3, Tn, Tx, Va, W, WV, Isely (1998). NatureServe GNR (Not Yet Ranked).

* ***Lathyrus odoratus*** Linnaeus. SWEET PEA. **Hab:** Cultivated, and occasionally persisting. **Dist:** Native of s. Europe. **Syn:** = C, F, G, Il, K1, K3, K4, Mi, NE, SE3, WV, Isely (1998). NatureServe GNR (Not Yet Ranked).

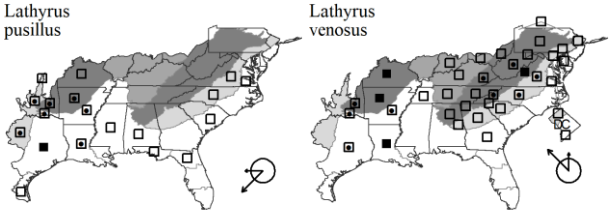
Lathyrus palustris Linnaeus. MARSH PEA, MARSH VETCHLING. **Hab:** Freshwater marshes, calcareous fens, bottomland forests, marshes, streambanks. **Dist:** Circumboreal, ranging in North America south to DE, VA, ne. NC, ec. GA, OH, IN, MO, CO, and CA. **Phen:** May-Aug; Jul-Sep. **Syn:** = K1, K3, K4, Mi, NE, NY, Pa, RAB, SE3, Tn, Va, Isely (1998); > *Lathyrus myrtifolius* Muhlenberg ex Willdenow – S; > *Lathyrus palustris* var. *linearifolius* Seringe – G; > *Lathyrus palustris* var. *myrtifolius* (Muhlenberg ex Willdenow) A. Gray – F, G, Il, WV; > *Lathyrus palustris* var. *palustris* – C, F, G, Il, WV.

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



Lathyrus pusillus Elliott. TINY PEA. **Hab:** Open areas in bottomlands, disturbed areas. **Dist:** E. VA, MO and KS, south to FL Panhandle and TX; disjunct in s. South America. The more eastern populations are scattered and curious. **Phen:** Apr-Jul. **Syn:** = Ar, F, Fl3, G, GrPl, K1, K3, K4, NcTx, RAB, S, SE3, Tx, Va, WH3, Isely (1998). NatureServe G5? (Secure).

Lathyrus venosus Muhlenberg ex Willdenow. FOREST PEA, BUSH VETCH, VEINY PEA. **Hab:** Dry to mesic slope and bottomlands forests and woodlands, rocky bars and outcrops along rivers, somewhat (but not at all strictly) associated with base-rich soils. **Dist:** S. ON west to MN and SK, south to c. NC, wc. GA, LA, and TX. **Phen:** May-Sep. **Syn:** = Ar, K1, K3, K4, Mi, NcTx, NY, Pa, RAB, S, SE3, Tn, Va, W, Isely (1998); > *Lathyrus palustris* var. *meridionalis* – WV; > *Lathyrus venosus* var. *intonsus* Butters & St. John – C, F, G, GrPl, Il, Tx, WV; > *Lathyrus venosus* var. *meridionalis* Butters & St. John – F; > *Lathyrus venosus* var. *venosus* – C, F, G, WV.



Lespedeza Michaux 1803 (LESPEDEZA)

A genus of about 40 species, perennial herbs and shrubs, of temperate regions of e. Asia and e. North America. References: Akiyama (1988); Clewell & Stickell (1990); Clewell (1966a); Clewell (1966b); Isely (1986b); Isely (1998).

Identification Notes: Many species of *Lespedeza* hybridize, and most combinations may occur in our area. Some of the hybrids have been named in the past as varieties or species. Hybrids generally occur in mixed populations with both parents and can usually be identified by their intermediate morphology (identification much easier in the field where context is apparent than in the herbarium). See Isely (1990) and Clewell (1966a) for additional suggestions for the identification of hybrids.

1 Leaflets distinctly widest toward the tip, 3-5× as long as wide, the base and apex very differently shaped (the base narrowly cuneate, the tip rounded, truncate or even retuse); racemes reduced, with 2-3 flowers, shorter than the subtending leaves; [plants alien] ..... ***Lespedeza cuneata***
1 Leaflets generally widest near the middle, 1-8 (-10)× as long as wide, the base and apex shaped similarly (i.e., both rounded, or both cuneate); racemes with 3-many flowers, shorter or longer than the subtending leaves; [plants native, except *L. virgata* and *L. daurica*].
4 Plants trailing at maturity (young stems erect to arching-ascending up to 2 dm tall, then lopping over); stems slender, wiry; corolla pink to purple.
6 Pubescence of the stem spreading (pilose), the hairs at more-or-less 90 degree angles to the stem..... ***Lespedeza procumbens***
6 Pubescence of the stem appressed (strigose).
7 Plant trailing, typically mat-forming (after initial ascending growth); calyx of legumes produced from cleistogamous flowers 1/4-1/3 as long as the pod (cleistogamous flowers are clustered and sessile in leaf axils, in contrast to the chasmogamous flowers borne in groups on long, axillary, ascending peduncles); stems usually lacking axillary leaves; keel subequal to the wings, or shorter; stipules 2-4 (-5) mm long ..... ***Lespedeza repens***
7 Plant ascending (keyed here for rare sprawling individuals); calyx of legumes produced from cleistogamous flowers ca. 1/5 as long as the pod; stems often with axillary leaves distinctly smaller than the primary leaves; keel usually longer than the wings; stipules 3-5 (-6) mm long ..... ***Lespedeza frutescens***
4 Plants erect at maturity; stems generally stout, stiff; corolla pink, purple, white, cream, or mixed.
8 Plants in flower.
9 Corolla primarily white or cream (often with a purplish throat).
10 Raceme peduncles short (shorter than the subtending leaf), the inflorescence itself barely if at all exceeding the subtending leaf; calyx lobes 6-10 mm long; leaflets (2-) 2.5-5 (-8)× as long as wide ..... ***Lespedeza capitata***
10 Raceme peduncles elongate (often longer than the subtending leaf), the inflorescence itself well-exserted beyond the subtending leaf; calyx lobes 3-7 mm long; leaflets either narrower or wider (see below).
11 Leaflets 4-8 (-10)× as long as wide, the margins essentially straight and parallel for most of the leaflet length; petioles of midstem and upper stem leaves 1-3 mm long ..... ***Lespedeza angustifolia***
11 Leaflets 1.3-1.8× as long as wide, the margins obviously and strongly curving from base to apex; petioles of midstem and upper stem leaves mainly 10-15 mm long.
12 Leaves closely strigose on both surfaces with hairs 0.2-0.5 mm long, silvery when fresh; leaflets 1-2 cm long; petiole of midstem leaves not generally > 1 cm long, about the same length as the rachis; [plants of the Coastal Plain and, in NC and SC, the lower Piedmont] ..... ***Lespedeza hirta var. curtissii***
12 Leaves glabrate, or strigose above only, at least some of the hairs (especially those on the veins below) > 0.5 mm long, green or grey (to somewhat silvery) when fresh; leaflets 1.5-4 (-5) cm long; petiole of midstem leaves 1-1.5 (-2) cm long, much exceeding the rachis; [plants widespread in our area] ..... ***Lespedeza hirta var. hirta***
9 Corolla primarily pink or purple.

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

13 Peduncles of the racemes of chasmogamous (petaliferous) flowers longer than the subtending leaves; keel > 1 mm longer than the wings.
14 Stems to 7 dm long, herbaceous, not bushy-branched; petioles of medial leaves 0.5-2 cm long; chasmogamous panicles with 4-7 flowers; corolla 6-8 mm long; legumes of the chasmogamous flowers glabrate or inconspicuously strigulose, 5-7 mm long; [native] ..... ***Lespedeza frutescens***
14 Stems 10-30 dm long, woody or suffrutescent, bushy-branched; petioles of medial leaves 2-4 cm long; chasmogamous panicles with 5-15 flowers; corolla 8-15 mm long; legumes of the chasmogamous flowers strigose, 7-8 mm long; [plants alien, planted in 'wildlife food plots' and persisting or spreading]; [section *Macrolespedeza*].
16 Calyx lobes equal to or shorter than the calyx tube; corolla 8-11 mm long; leaflets 1.5-2× as long as wide; racemes erect or strongly ascending; stems 1-several per crown, brown when young ..... ***Lespedeza bicolor***
16 Calyx lobes longer than the calyx tube (at least the lowest lobe); corolla (10-) 12-15 mm long; leaflets 2-3× as long as wide; racemes lax and drooping; stems many per crown, purplish when young ..... ***Lespedeza thunbergii***
13 Peduncles of the racemes of chasmogamous (petaliferous) flowers absent or shorter than the subtending leaves; keel about as long as or shorter than the wings.
18 Upper surface of the leaflets glabrous (sometimes strigose along the midrib only); pubescence of the stem appressed; leaflets 1.5-3× as long as wide ..... ***Lespedeza violacea***
18 Upper surface of the leaflets pubescent; pubescence of the stem appressed or spreading; leaflets 1.3-7× as long as wide.
19 Leaflets 1.3-3 (-3.5)× as long as wide ..... ***Lespedeza stuevei***
19 Leaflets (4-) 5-7× as long as wide ..... ***Lespedeza virginica***

8 Plants not in flower.
20 Leaflets of average, mid-stem leaves > 4× as long as wide (*L. capitata* keyed here and below).
21 Petioles of mid-stem leaves ca. 10 mm long ..... ***Lespedeza virginica***
21 Petioles of mid-stem leaves 1-3 mm long.
22 Leaflets 4-8(-10)× as long as wide ..... ***Lespedeza angustifolia***
22 Leaflets (2-) 2.5-5 (-8)× as long as wide ..... ***Lespedeza capitata***
20 Leaflets of average, mid-stem leaves < 3.5× as long as wide (*L. capitata* keyed here and above).
23 Leaflets (2-) 2.5-5 (-8)× as long as wide; leaf rachis (not including the petiolule of the terminal leaflet) longer than the petiole ..... ***Lespedeza capitata***
23 Leaflets 1-3 (-3.5)× as long as wide; leaf rachis shorter than the petiole (or about equal in *L. hirta* var. *curtissii*).
24 Central axis not strongly dominant, branches divaricate, irregular; stems slender, wiry ..... ***Lespedeza frutescens***
24 Central axis strongly dominant, branches ascending, mostly on the upper stem; stems stout, stiff.
25 Stems 10-30 dm tall, woody or suffrutescent, 1-many from the base; median leaf petiole 2-4 cm long; [plants alien, planted in 'wildlife food plots' and persisting and naturalizing]; [section *Macrolespedeza*].
27 Calyx lobes equal to or shorter than the calyx tube; leaflets 1.5-2 × as long as wide; racemes erect or strongly ascending; stems 1-several per crown, brown when young ..... ***Lespedeza bicolor***
27 Calyx lobes longer than the calyx tube (at least the lowest lobe); leaflets 2-3 × as long as wide; racemes lax and drooping; stems many per crown, purplish when young ..... ***Lespedeza thunbergii***
25 Stems 3-15 (-20) dm tall, herbaceous, 1-few from the base; median leaf petiole 0.7-2.5 cm long; [native].
28 Leaflets (1.3-) 1.8-3 (-3.5)× as long as wide.
29 Upper surface of the leaflets pubescent; pubescence of the stem appressed or spreading ..... ***Lespedeza stuevei***
29 Upper surface of the leaflets glabrous (sometimes strigose along the midrib only); pubescence of the stem appressed ..... ***Lespedeza violacea***
28 Leaflets 1.3-1.8× as long as wide.
30 Leaves closely strigose on both surfaces with hairs 0.2-0.5 mm long, silvery when fresh; leaflets 1-2 cm long; petiole of midstem leaves not generally > 1 cm long, about the same length as the rachis; [plants of the Coastal Plain and, in NC and SC, the lower Piedmont] ..... ***Lespedeza hirta var. curtissii***
30 Leaves glabrate, or strigose above only, at least some of the hairs (especially those on the veins below) > 0.5 mm long, green or grey (to somewhat silvery) when fresh; leaflets 1.5-4 (-5) cm long; petiole of midstem leaves 1-1.5 (-2) cm long, much exceeding the rachis; [plants widespread in our area] ..... ***Lespedeza hirta var. hirta***

Lespedeza angustifolia (Pursh) Elliott. NARROW-LEAVED LESPEDEZA. **Hab:** Longleaf pine sandhill-pocosin ecotones and dry to moist pine savannas, mountain bogs, in the Piedmont especially in barrens with hardpan soils. **Dist:** MA south to c. peninsular FL, west to s. MS, essentially a Southeastern Coastal Plain endemic, rarely disjunct inland to w. NC, c. GA, ec. TN (Chester, Wofford, & Kral 1997; Tennessee Flora Committee 2015), and sc. KY (T. Littlefield, pers.comm., 2020). **Phen:** Aug-Oct; Sep-Nov. **Syn:** = C, Fl3, G, K1, K3, K4, NE, NY, Pa, RAB, S, SE3, Tn, Va, W, WH3, Clewell (1966a), Clewell (1966b), Isely (1998); > *Lespedeza angustifolia* (Pursh) Elliott – F; > *Lespedeza hirta* var. *intercursa* Fernald – F. NatureServe G5 (Secure).

* ***Lespedeza bicolor*** Turczaninow. BICOLOR LESPEDEZA, SHRUBBY LESPEDEZA. **Hab:** 'Wildlife food plots', roadsides, forests, woodlands. **Dist:** Native of e. Asia. **Phen:** Jun-Sep; Aug-Nov. **Syn:** = Ar, C, Fl3, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, SE3, Tn, Va, W, WH3, WV, Akiyama (1988), Isely (1998). NatureServe GNR (Not Yet Ranked).

Lespedeza capitata Michaux. BUSH-CLOVER, ROUND-HEADED LESPEDEZA. **Hab:** Woodlands and woodland borders, wet meadows, fens, prairies, barrens. **Dist:** ME and s. ON west to MN, SD, and NE, south to FL Panhandle and TX. **Phen:** Aug-Oct; Sep-Nov. **Syn:** = Ar, C, Fl3, GrPl, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, SE3, Tn, Tx, Va, W, WH3, Clewell (1966a), Clewell (1966b), Isely (1998); > *Lespedeza capitata* var. *capitata* – F, G, Il, WV; > *Lespedeza capitata* var. *stenophylla* Bissell & Fernald – F, G, Il, WV; > *Lespedeza capitata* var. *velutina* (E.P. Bicknell) Fernald – F, G; > *Lespedeza capitata* var. *vulgaris* Torrey & A. Gray – F, Il, WV.

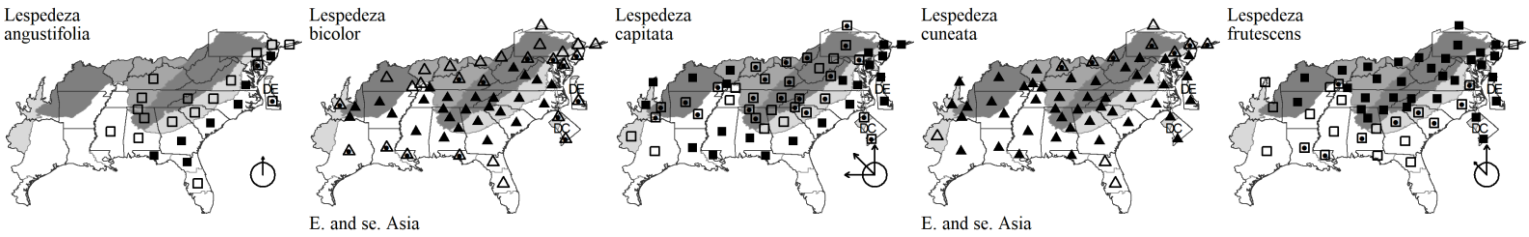
* ***Lespedeza cuneata*** (Dumont de Courset) G. Don. SERICEA LESPEDEZA, CHINESE LESPEDEZA, SERICEA. **Hab:** Roadbanks, 'wildlife food plots', disturbed areas, floodplains, creekbanks, and invading other natural habitats. **Dist:** Native of e. Asia. **Phen:** Jul-Oct; Oct-Dec. **Comm:** Extensively used as a soil stabilizer. Now invasive across most of our region. **Syn:** = Ar, C, F, Fl3, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, SE3, Tn, Tx, Va, W, WH3, WV, Isely (1998). NatureServe GNR (Not Yet Ranked).

Lespedeza frutescens (Linnaeus) Hornemann. VIOLET LESPEDEZA. **Hab:** Woodlands and woodland borders. **Dist:** MA and NY west to MI, WI, IA, and KS, south to ne. FL, FL Panhandle, AL, MS, AR, and TX. **Phen:** Jul-Sep; Oct-Nov. **Comm:** Known in many floras as *L. violacea* (see synonymy), that name actually is the correct name for the species traditionally known as *L. intermedia*. **Syn:** = Ar, K1, K3, K4, Mi, NE, NY, S, Va; = *Lespedeza violacea* (Linnaeus) Persoon – C, F, G, GrPl, Il, NcTx, Pa, RAB, SE3, Tn, Tx, W, WV, Clewell (1966a), Clewell (1966b), Isely (1998), misapplied; < *Lespedeza violacea* (Linnaeus) Persoon – WH3.

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more)

* : waif EN : endemic H : historic

N : no P : planted ? : questionable X : extirpated



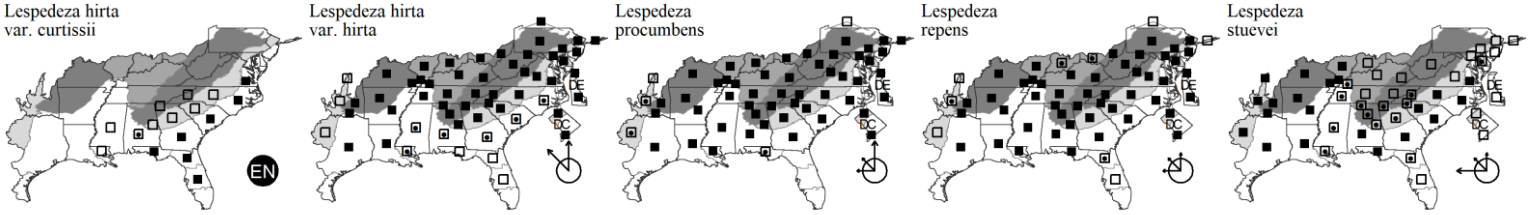
Lespedeza hirta (Linnaeus) Hornemann *var*. ***curtissii*** (Clewell) Isely. SILVERY LESPEDEZA. **Hab:** Longleaf pine sandhills and dry to moist savannas. **Dist:** Se. VA south to s. FL, west to Panhandle FL and se. AL, barely extending onto the Piedmont in NC, SC, and GA. **Phen:** Aug-Oct; Sep-Nov. **Comm:** Clewell (1966a) discusses apparent intergrades between the two varieties in s. NJ. **Syn:** = C, SE3, Va, Isely (1986b), Isely (1998); = *Lespedeza hirta* ssp. *curtissii* Clewell – K1, K3, K4, Clewell (1966a), Clewell (1966b); = *Lespedeza hirta* var. *appressipilis* Blake – F, as to intent; < *Lespedeza hirta* – Fl3, G, RAB, S, WH3. NatureServe G5TNR (Not Yet Ranked).

Lespedeza hirta (Linnaeus) Hornemann *var*. ***hirta***. HAIRY LESPEDEZA. **Hab:** Woodlands and woodland borders. **Dist:** S. ME and s. ON west to MI, n. IL, c. MO, and OK, south to c. peninsular FL and TX. **Phen:** Aug-Oct; Sep-Nov. **Syn:** = Ar, C, SE3, Va, Isely (1986b), Isely (1998); = *Lespedeza hirta* ssp. *hirta* – K1, K3, K4, NE, NY, Clewell (1966a), Clewell (1966b); > *Lespedeza capitata* var. *calycina* (Schindler) Fernald – F; < *Lespedeza hirta* – Fl3, G, GrPl, Il, Mi, NcTx, Pa, RAB, S, Tn, Tx, W, WH3, WV; > *Lespedeza hirta* (Linnaeus) Hornemann var. *hirta* – F. NatureServe G5T5? (Secure).

Lespedeza procumbens Michaux. DOWNY TRAILING LESPEDEZA. **Hab:** Woodlands and woodland borders, hammocks. **Dist:** MA, NH, and NY west to IL, MO, and KS, south to Panhandle FL and TX. **Phen:** Jul-Sep; Aug-Nov. **Syn:** = Ar, C, Fl3, G, GrPl, K1, K3, K4, Mi, Mi, NcTx, NE, NY, Pa, RAB, S, SE3, Tn, Tx, Va, W, WH3, WV, Clewell (1966a), Clewell (1966b), Isely (1998); > *Lespedeza procumbens* var. *elliptica* Blake – F, Il; > *Lespedeza procumbens* var. *procumbens* – F, Il. NatureServe G5 (Secure).

Lespedeza repens (Linnaeus) W.P.C. Barton. SMOOTH TRAILING LESPEDEZA, CREEPING LESPEDEZA. **Hab:** Woodlands and woodland borders. **Dist:** CT and NY west to n. OH, s. WI, MO, and KS, south to n. peninsular FL, Panhandle FL, and c. TX. **Phen:** May-Sep; Aug-Nov. **Syn:** = Ar, C, F, Fl3, G, GrPl, Il, K1, K3, K4, NcTx, NE, NY, Pa, RAB, S, SE3, Tn, Tx, Va, W, WH3, WV, Clewell (1966a), Clewell (1966b), Isely (1998). NatureServe G5 (Secure).

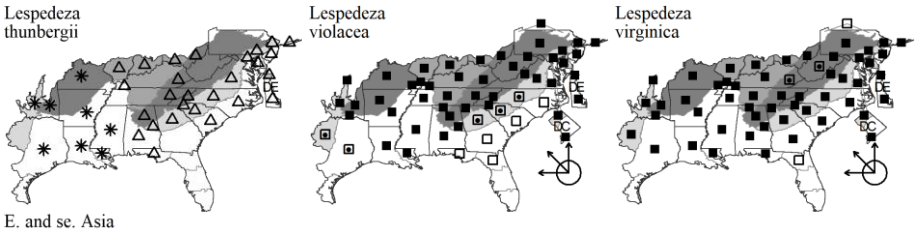
Lespedeza stuevei Nuttall. VELVETY LESPEDEZA. **Hab:** Longleaf pine sandhills, other dry woodlands and woodland borders. **Dist:** MA south to n. peninsular FL, west to c. and n. TX, north in the interior to. NC, TN, s. IN, s. IL, c. MO, and nc. KS. **Phen:** Jul-Sep; Aug-Nov. **Syn:** = Ar, C, F, Fl3, G, GrPl, Il, K1, K3, K4, NcTx, NE, NY, Pa, RAB, SE3, Tn, Tx, Va, W, WH3, WV, Clewell (1966a), Clewell (1966b), Isely (1998); = *Lespedeza stuvei* – S, orthographic variant. NatureServe G4? (Apparently Secure).



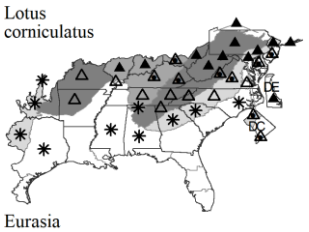
* ***Lespedeza thunbergii*** (A.P. de Candolle) Nakai. THUNBERG'S BUSH-CLOVER. **Hab:** 'Wildlife food plots', roadbanks. **Dist:** Native of e. Asia. Reported for Macon County, NC by Pittillo & Brown (1988). **Syn:** = Ar, C, F, Fl3, G, Il, K1, K3, K4, Mi, NE, NY, Pa, SE3, WH3, Akiyama (1988), Isely (1998). NatureServe GNR (Not Yet Ranked).

Lespedeza violacea (Linnaeus) Persoon. WAND LESPEDEZA. **Hab:** Woodlands and woodland borders. **Dist:** S. ME and s. ON west to MI and se. MN, south to ne. FL, Panhandle FL, and e. TX. **Phen:** Jul-Sep; Aug-Nov. **Tax:** Known in many floras as *L. intermedia*, this species is actually correctly named *L. violacea*. **Syn:** = Ar, K1, K3, K4, Mi, NE, NY, S, Va; = *Lespedeza intermedia* (S. Watson) Britton – C, F, G, Il, Pa, RAB, SE3, Tn, Tx, W, WV, Clewell (1966a), Clewell (1966b), Isely (1998); < *Lespedeza violacea* (Linnaeus) Persoon – Fl3, WH3.

Lespedeza virginica (Linnaeus) Britton. VIRGINIA LESPEDEZA, SLENDER BUSH-CLOVER. **Hab:** Longleaf pine sandhills, woodlands, and woodland borders. **Dist:** MA and NH west to MI, WI, IA, and KS, south to Panhandle FL and c. TX. **Phen:** Jul-Sep; Aug-Nov. **Syn:** = Ar, C, F, Fl3, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, SE3, Tn, Tx, Va, W, WH3, WV, Clewell (1966a), Clewell (1966b), Isely (1998). NatureServe G5 (Secure).



Lotus Linnaeus 1753 (BIRDSFOOT-TREFOIL)



A genus of about 120-130 species, annual and perennial herbs and shrubs, of temperate Eurasia. New World taxa often referred to *Lotus* are not closely related to *Lotus*, and should be segregated (Degtjareva et al 2006; Allan &

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Porter 2000). References: Allan & Porter (2000); Degtjareva et al (2006); Grant & Small (1996); Isely (1981); Isely (1998); Kramina et al (2018).

1 Leaves 3-foliolate, the upper commonly 1-foliolate; flowers solitary in leaf axils; [native or alien annual herbs]..... ***Acmispon***
1 Leaves 5-foliolate; flowers in umbels; [alien perennial herbs].
..... ***Lotus corniculatus***

* ***Lotus corniculatus*** Linnaeus. BIRDSFOOT-TREFOIL, EGGS-AND-BACON. **Hab:** Fields, roadsides, and waste places. **Dist:** Native of Eurasia. First reported for GA (Rabun County) by Stiles & Howel (1998). **Phen:** Jun-Sep. **Syn:** = Ar, C, F, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, SE3, Tn, Tx, Va, W, WV, Isely (1981), Kramina et al (2018); < *Lotus corniculatus* Linnaeus – Isely (1998).

Lupinus Linnaeus 1753 (LUPINE)

A genus of about 200-250 species, annual herbs, perennial herbs, and shrubs, of temperate and tropical regions in North America, Mediterranean Europe, South America, and Africa (especially diverse in w. North America and South America). References: Isely (1998).

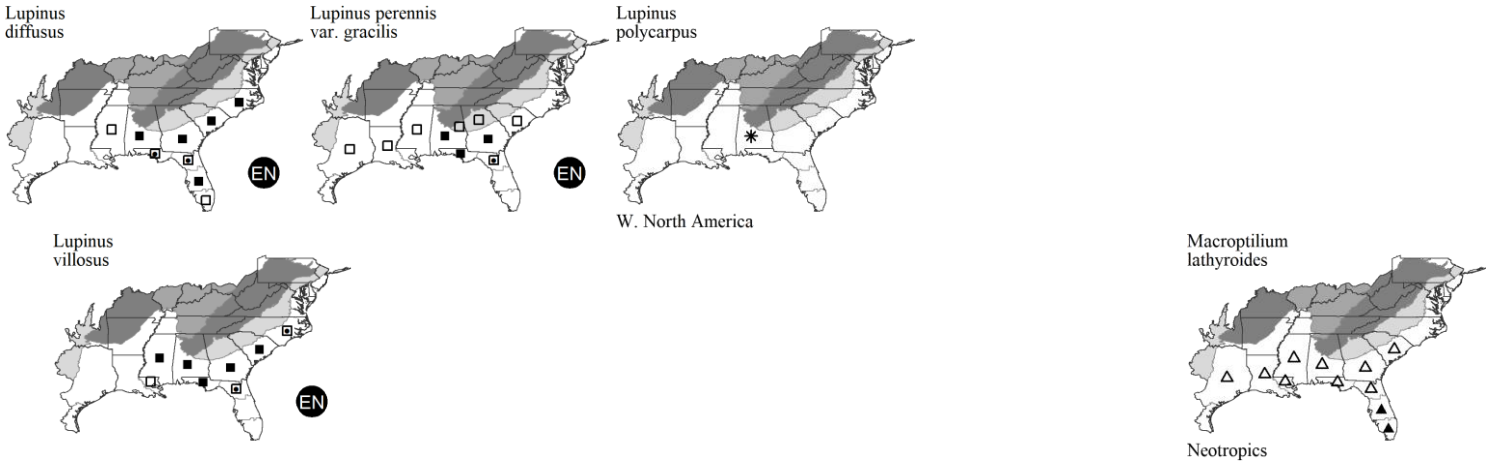
Unkeyed waifs: *Lupinus polycarpus*
1 Leaves unifoliolate; leaves and stems evergreen, overwintering (absent in midsummer); plant conspicuously pubescent.
2 Standard with a white to creamy eyespot; hairs of the legume 1.5-3 mm long, villous or sericeous.
..... ***Lupinus diffusus***
2 Standard with a red or deep purple eyespot; hairs of the legume 3-5 mm long, villous.
..... ***Lupinus villosus***
1 Leaves palmately compound; leaves and stems deciduous, dying back in winter; plant inconspicuously pubescent.
..... ***Lupinus perennis var. gracilis***

Lupinus diffusus Nuttall. BLUE SANDHILL LUPINE. **Hab:** Longleaf pine sandhills, sandy roadsides. **Dist:** Se. NC south to s. FL, west to s. MS. **Phen:** Mar-May; Jun-Jul. **Comm:** I concur with Duncan & McCartney (1992) in recognizing *L. cumulicola* Small of peninsular FL as distinct from *L. diffusus*. Moreover, Atchison et al. (2014) showed that at least one additional taxon (here listed as *Lupinus species 1*) should be segregated from *L. diffusus s.l.* **Syn:** < *Lupinus diffusus* Nuttall – Fl3, K1, K3, K4, RAB, S, SE3, WH3, Isely (1998).

Lupinus perennis Linnaeus *var.* ***gracilis*** (Nuttall) Chapman. SOUTHERN SUNDIAL LUPINE. **Hab:** Longleaf pine sandhills and sandy or dry rocky roadsides. **Dist:** E. GA (immediately across the Savannah River from SC), south to n. FL and west to s. AL. **Comm:** The validity of this taxon is uncertain; the differences may be only clinal. **Syn:** = Isely (1998); = *Lupinus nuttallii* S. Watson – S; = *Lupinus perennis* Linnaeus ssp. *gracilis* (Nuttall) Dunn – K1, K3, K4, SE3; < *Lupinus perennis* – C, G, Pa, RAB, WH3. NatureServe G5TNR (Not Yet Ranked).

* ***Lupinus polycarpus*** Greene. SMALL-FLOWERED LUPINE. **Hab:** Roadside bank. **Dist:** Native of w. North America. **Comm:** Reported for AL (Diamond 2016). **Syn:** = K3, K4, Mi; < *Lupinus micranthus* Douglas ex Lindley – Isely (1998). NatureServe G5 (Secure).

Lupinus villosus Willdenow. PINK SANDHILL LUPINE. **Hab:** Longleaf pine sandhills, sandy roadsides. **Dist:** Se. NC south to n. FL, west to se. LA. **Phen:** Apr-May; Jun-Aug. **Syn:** = Fl3, K1, K3, K4, RAB, S, SE3, WH3, Isely (1998). NatureServe G5 (Secure).



Macroptilium (Bentham) Urban 1928

A genus of about 20 species, annual and perennial herbs, of tropical and subtropical America. References: Isely (1998).

* ***Macroptilium lathyroides*** (Linnaeus) Urban. PHASEY BEAN, WILD BUSHBEAN. **Hab:** Disturbed areas. **Dist:** Native of tropical America. **Phen:** Jan-Dec. **Syn:** = Bah, Fl3, K1, K3, K4, SE3, WH3, Isely (1998). NatureServe G5? (Secure).

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Medicago Linnaeus 1753 (MEDICK, BUR-CLOVER)

A genus of about 80 species, annual and perennial herbs, of Eurasia and Africa. References: Isely (1998); Woods & Orcutt (2017).

1 Legume 1-seeded, reniform, black at maturity; corolla 2-3 mm long ..... ***Medicago lupulina***
1 Legume several-seeded, spirally coiled or falcate, tan to dark brown; corolla 3-11 mm long.
  2 Plants perennial, mostly erect or ascending, 2-8 (-10) dm tall; corolla 6-11 mm long, violet, yellow, or varicolored; legumes spineless ..... ***Medicago sativa***
  2 Plants annual, mostly prostrate or ascending, 1-6 dm tall; corolla 3-6 mm long, yellow; legumes spiny (except lacking spines in *M. orbicularis*).
    3 Stipules entire or slightly dentate (*M. minima*) or the base only of the stipule lacerate (*M. laciniata*); plants pilose (*M. minima*) or glabrous (*M. laciniata*). ..... ***Medicago minima***
    3 Stipules lacerate; plants glabrous or sparsely pubescent.
      5 Legume lacking spines; stipules deeply lacerate, the sinuses extending nearly to the base ..... ***Medicago orbicularis***
      5 Legume spiny; stipules shallowly to deeply lacerate.
        6 Leaflets appressed lanate below; calyces 4-6 mm long, appressed lanate ..... ***Medicago littoralis***
        6 Leaflets glabrous beneath; calyces 2-3.5 mm long, glabrous or strigose.
          7 Leaflets 0.7-1.1× as long as wide, usually marked with a central dark spot; leaflet tip usually strongly notched; stipules shallowly lacerate, the sinuses extending < ½ way to the base ..... ***Medicago arabica***
          7 Leaflets 1-2× as long as wide, not marked with a central dark spot; leaflet tip not strongly notched; stipules deeply lacerate, the sinuses extending > ½ way to the base ..... ***Medicago polymorpha***

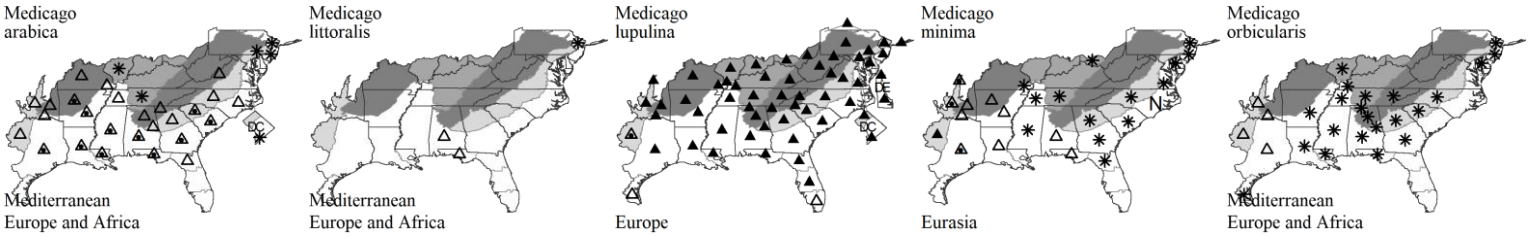
* ***Medicago arabica*** (Linnaeus) Hudson. SPOTTED MEDICK, SPOTTED BUR-CLOVER. **Hab:** Fields, roadsides, disturbed areas. **Dist:** Native of Mediterranean Europe. **Phen:** Apr-Aug. **Syn:** = Ar, F, G, Il, K1, K3, K4, NcTx, NE, NY, RAB, S, SE3, Tx, WH3, Isely (1998), Woods & Orcutt (2017). NatureServe GNR (Not Yet Ranked).

* ***Medicago littoralis*** Rohde ex Loiseleur-Deslongchamps. SHORE MEDICK, WATER MEDICK. **Hab:** Beaches and dunes, disturbed sands. **Dist:** Native of Mediterranean Europe. Reported for s. AL (H. Horne, 2013, pers.comm.; Woods & Orcutt 2017) and Panhandle FL (L. Anderson, 2013, pers.comm.). **Comm:** {add to synonymy}. **Syn:** = K3, K4, Woods & Orcutt (2017). NatureServe GNR (Not Yet Ranked).

* ***Medicago lupulina*** Linnaeus. BLACK MEDICK, YELLOW TREFOIL. **Hab:** Fields, roadsides, disturbed areas, vacant lots. **Dist:** Native of Europe. **Phen:** Mar-Dec. **Syn:** = Ar, Bah, C, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, SE3, Tn, Tx, Va, W, WH3, WV, Isely (1998), Woods & Orcutt (2017); > *Medicago lupulina* var. *glandulosa* Neilreich – F; > *Medicago lupulina* var. *lupulina* – F. NatureServe GNR (Not Yet Ranked).

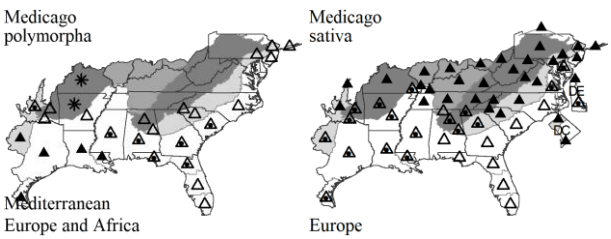
* ***Medicago minima*** (Linnaeus) Linnaeus. DOWNY BUR-CLOVER, BUR MEDICK. **Hab:** Fields, roadsides, disturbed areas, on ballast. **Dist:** Native of Eurasia. **Phen:** Apr-Aug. **Syn:** = Ar, C, G, GrPl, Il, K1, K3, K4, NcTx, NE, NY, RAB, S, SE3, Tx, Va, WH3, Isely (1998), Woods & Orcutt (2017); > *Medicago minima* var. *compacta* Neyraut – F; > *Medicago minima* var. *longiseta* A.P. de Candolle – F; > *Medicago minima* var. *minima* – F. NatureServe GNR (Not Yet Ranked).

* ***Medicago orbicularis*** (Linnaeus) Bartalini. BUTTON MEDICK. **Hab:** Lawns, disturbed areas, limestone glades. **Dist:** Native of Mediterranean Europe and n. Africa. Reported for Calloway County, KY (Abbott & Thompson 2019). **Phen:** Apr-Jul. **Syn:** = Ar, G, Il, K1, K3, K4, NcTx, RAB, SE3, Tn, Tx, WH3, Isely (1998), Woods & Orcutt (2017). NatureServe GNR (Not Yet Ranked).



* ***Medicago polymorpha*** Linnaeus. SMOOTH BUR-CLOVER, TOOTHED MEDICK. **Hab:** Fields, roadsides, lawns, disturbed areas, vacant lots. **Dist:** Native of Mediterranean Europe. **Phen:** Mar-Apr. **Syn:** = Ar, C, Fl3, K1, K3, K4, Mi, NcTx, NE, NY, RAB, SE3, Tx, WH3, Isely (1998), Woods & Orcutt (2017); = *Medicago hispida* Gaertner – F, G, S. NatureServe GNR (Not Yet Ranked).

* ***Medicago sativa*** Linnaeus. ALFALFA, LUCERNE, BLUE ALFALFA, YELLOW ALFALFA, SICKLE MEDICK. **Hab:** Roadsides, fields, disturbed areas. **Dist:** Native of Europe and sw. Asia. **Phen:** Apr-Jul. **Tax:** Havananda et al. (2010) explain the complex evolution of the *M. sativa* complex, including its selection for human uses. Small & Jomphe (1989) recognize various subspecies and varieties within the complex. Given the complex human-influenced set of morphotypes, of diploid, allotetraploid, and autotetraploid origin, their interfertility, and the difficulties of associating American material with European wild taxa, I reluctantly take the same approach as Yatskievych (2013) in treating *M. sativa* as a practical unit without taxonomic subdivisions. **Syn:** = Ar, Bah, NcTx; > *Medicago* ×*varia* – Mi; > *Medicago falcata* – F, G, Il, Mi, NE, NY, S, SE3, Isely (1998); > *Medicago falcata* × *sativa* – NY; > *Medicago sativa* Linnaeus – F, Fl3, G, Il, Mi, NE, NY, Pa, RAB, S, SE3, Tn, Tx, Va, W, WH3, WV, Isely (1998), Woods & Orcutt (2017); > *Medicago sativa* Linnaeus ssp. *falcata* (Linnaeus) Arcangeli – C, GrPl, K1, K3, K4; > *Medicago sativa* Linnaeus ssp. *sativa* – C, GrPl, K1, K3, K4.



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* : waif
EN : endemic
H : historic
N : no
P : planted
? : questionable
X : extirpated

Melilotus P. Miller 1754 (MELILOT, SWEETCLOVER, SOURCLOVER)

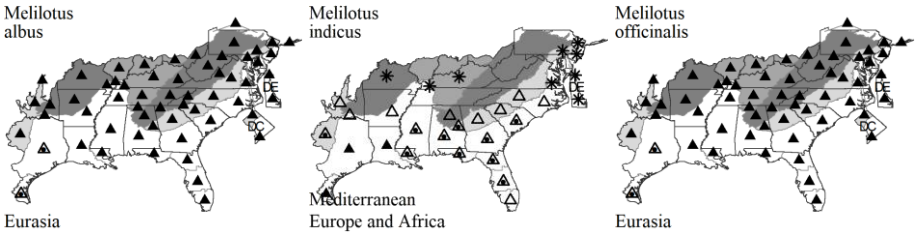
A genus of about 20 species, annual and perennial herbs, of temperate Eurasia and Africa. References: Isely (1998); Stace (2010).

1 Corolla white ..... ***Melilotus albus***
1 Corolla yellow.
2 Corolla 2-3.5 mm long; fruits < 3 mm long ..... ***Melilotus indicus***
2 Corolla 5-7 mm long; fruits > 3 mm long ..... ***Melilotus officinalis***

* ***Melilotus albus*** Medikus. WHITE MELILOT, WHITE SWEETCLOVER. **Hab:** Fields, roadsides, disturbed areas. **Dist:** Native of Eurasia. **Phen:** Apr-Oct. **Tax:** The similar *M. albus* and *M. officinalis* are apparently incompatible (Isely 1998) and differ in less obvious ways than flower color; they should not be synonymized, as was done by Kartesz (1999, 2010). Other differences useful in the determination of faded herbarium specimens are given by Isely (1998) and Yatskievych (2013): corolla 3.5-5 mm long, the wing petals about as long as the keel, ovaries narrowed at base, mature fruits with a network of raised nerves (*M. albus*) vs. corolla 5-7 mm long, the wing petals generally longer than the keel, ovaries noticeably stalked at base, mature fruits with a pattern of cross-nerves or merely with irregular cross-wrinkles (*M. officinalis*). **Syn:** = Ar, Il, Mi, NcTx, NE, NY, Tx, Va, WH3, Isely (1998), Stace (2010); = *Melilotus alba* – Bah, C, F, G, GrPl, Pa, RAB, S, SE3, Tn, W, WV, orthographic variant; < *Melilotus officinalis* (Linnaeus) Pallas – K1, K3, K4.

* ***Melilotus indicus*** (Linnaeus) Allioni. SMALL MELILOT, SOURCLOVER, ALFALFILLA. **Hab:** Roadsides, disturbed areas. **Dist:** Native of Mediterranean Europe. **Phen:** Apr-Oct. **Syn:** = Ar, K1, K3, K4, NcTx, NE, NY, Tx, WH3, Isely (1998), Stace (2010); = *Melilotus indica* – Bah, C, F, G, RAB, S, SE3, orthographic variant. NatureServe GNR (Not Yet Ranked).

* ***Melilotus officinalis*** (Linnaeus) Pallas. YELLOW MELILOT, YELLOW SWEETCLOVER, RIBBED MELILOT. **Hab:** Fields, roadsides, disturbed areas. **Dist:** Native of Eurasia. **Phen:** Apr-Oct. **Syn:** = Ar, C, F, G, GrPl, Il, Mi, NcTx, NE, NY, Pa, RAB, S, SE3, Tn, Tx, Va, W, WH3, WV, Isely (1998), Stace (2010); < *Melilotus officinalis* (Linnaeus) Pallas – K1, K3, K4. NatureServe GNR (Not Yet Ranked).



Mimosa Linnaeus 1753 (MIMOSA)

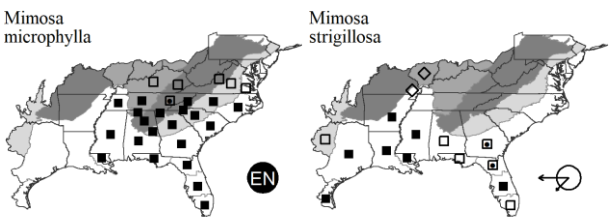
A genus of about 500 species, herbs, shrubs, trees, and vines, of tropical, subtropical, and warm temperate areas, especially America. Barneby (1991) and Beard (1963) argue that there are no characters which serve to separate *Schrankia* from *Mimosa*. References: Barneby (1991); Grether & Simon (2018); Isely (1973); Isely (1973); Isely (1998); Weakley & Flores-Cruz (2017) in Weakley et al (2017).

Identification Notes: Unmistakable in our flora for its bipinnate leaves, with tiny (2-4 mm long) leaflets, responding to touch by closing.

5 Plant unarmed (rarely with widely scattered prickles), the stem with strigose hairs with bulbous bases, 0.5-3 mm long; capitula 1.5-3× as long as the diameter, 9-25 mm long ..... ***Mimosa strigillosa***
5 Plant well-armed with recurved, catclaw prickles; capitula spherical or nearly so, 1-1.2× as long as wide, 3.5-14 mm long. ..... ***Mimosa microphylla***

Mimosa microphylla Dryander. EASTERN SENSITIVE-BRIAR. **Hab:** Longleaf pine sandhills, other dry woodlands and forests, dry disturbed areas. **Dist:** DE, WV, and KY south to s. FL and e. TX. **Phen:** Jun-Sep; Aug-Nov. **Tax:** A form with smaller fruits (3-5 cm long vs. 5-12 cm long) has been variously treated as a species [*Leptoglottis chapmanii*, *Schrankia chapmanii*] or a "recurrent fruit-form genotype" [phase *brachycarpa* of Isely (1973)]. This needs additional investigation. **Syn:** = K1, K3, K4, Tn, Va, Weakley & Flores-Cruz (2017) in Weakley et al (2017); = *Mimosa quadrivalvis* Linnaeus var. *angustata* (Torrey & A. Gray) Barneby – C, Fl3, WH3, Barneby (1991), Isely (1998); = *Schrankia microphylla* (Dryander) J.F. Macbride – F, G, RAB, Tx, W; = *Schrankia microphylla* (Dryander) J.F. Macbride var. *microphylla* – SE3; > *Leptoglottis chapmanii* Small ex Britton & Rose – S; > *Leptoglottis microphylla* (Dryander) Britton & Rose – S; > *Schrankia microphylla* – Isely (1973), Isely (1973). NatureServe G5T5 (Secure).

Mimosa strigillosa Torrey & A. Gray. POWDERPUFF MIMOSA, VERGONZOSA. **Hab:** Floodplain forests, open wet areas, also cultivated. **Dist:** A Southeastern Coastal Plain endemic: e. GA south to FL, west to TX. It might be expected in se. SC. **Phen:** May-Oct. **Syn:** = Ar, Fl3, Il, K1, K3, K4, NcTx, S, SE3, Tx, WH3, Barneby (1991), Isely (1973), Isely (1973), Isely (1998). NatureServe G4G5 (Apparently Secure).



Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more)

* : waif
EN : endemic
H : historic
N : no
P : planted
? : questionable
X : extirpated

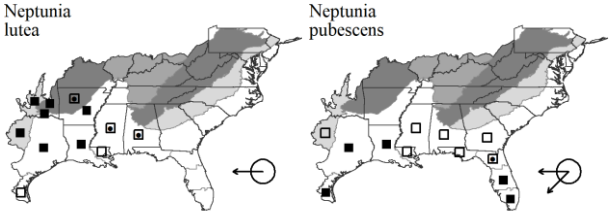
Neptunia Loureiro 1790 (NEPTUNIA)

A genus of about 12 species, herbs, of the tropics and subtropics of America and Eurasia. References: Isely (1973); Isely (1998); Turner (1951); Windler (1966).

3 Leaflets 9-15 pairs per pinna; stipules 2-4 mm long; all flowers perfect, with functional stamens; stipe of fruit 4-15 mm long..... ***Neptunia lutea***
3 Leaflets (12-) 15-25 (-35) pairs per pinna; stipules 4-10 mm long; flowers in the lower part of the inflorescence with flattened staminodes; stipe of fruit 2-5 mm long. ..... ***Neptunia pubescens***

Neptunia lutea (Leavenworth) Bentham. YELLOW NEPTUNIA. **Hab:** Longleaf pine savannas, prairies, roadsides. **Dist:** AL west to OK and TX. **Phen:** Apr-Sep. **Syn:** = Ar, GrPl, K1, K3, K4, NcTx, S, SE3, Tx, Isely (1973), Isely (1998), Windler (1966); > *Neptunia lutea* var. *lutea* – Turner (1951); > *Neptunia lutea* var. *multipinnata* B.L. Turner – Turner (1951). NatureServe G5 (Secure).

Neptunia pubescens Bentham. TROPICAL NEPTUNIA. **Hab:** Pine savannas, longleaf pine sandhills, Florida scrub, prairies, coastal prairies, roadsides. **Dist:** S. GA, AL, and FL west to s. TX, and south to Argentina. **Phen:** Apr-Nov. **Tax:** Turner (1951) treated *N. pubescens* in our area with two varieties differing from the typic (the type is from Lima, Peru); this distinction has not been followed by later authors. A modern reassessment is needed. Var. *floridana* has "leaflets glabrous or sparsely ciliate, the cilia scarcely 0.2 mm long, the under-surface completely glabrous or ciliate along the margin only; fruiting peduncles 6-11 cm long; calyx glabrous or with but 4-5 hairs along the lobes; petals glabrous" and ranges from s. FL along the Gulf Coast to s. FL. Var. lindheimeri has "leaflets conspicuously ciliate, most of the cilia 0.2-0.7 mm long, the undersurface near apex conspicuously so; stipules covered with a scattered short pubescence; fruiting peduncles 2.5-7 cm long; calyx lobes pubescent (10-20 cilia on each lobe); petals ciliate" and is distributed in se. and s. TX. **Syn:** = Fl3, K3, K4, WH3; = *Neptunia pubescens* Bentham var. *pubescens* – K1, SE3, Tx, Isely (1973), Isely (1998), Windler (1966); > *Neptunia floridana* Small – S; > *Neptunia pubescens* var. *floridana* (Small) B.L.Turner – Turner (1951); > *Neptunia pubescens* var. *lindheimeri* (B.L. Robinson) B.L. Turner – Turner (1951). NatureServe G5?TNR (Not Yet Ranked).



Orbexilum Rafinesque 1832 (SCURFPEA, SAMPSON'S-SNAKEROOT)

A genus of about 11 species, perennial herbs, of s. North America and Mexico (south to Chiapas). References: Grimes (1988); Grimes (1990); Isely (1998); Turner (2008); Vincent (2014).

2 Leaves palmately (3-) 5-7 foliolate, the leaflets linear to very narrowly oblanceolate, 2-7 cm long, 0.5-2.0 (-3.5) mm wide, > 10× as long as wide; [subgenus *Orbexilum*]..... ***Orbexilum lupinellus***
2 Leaves pinnately 3 (-5) foliolate, the leaflets orbicular, ovate, elliptic or lanceolate, > 8 mm wide, 1-8× as long as wide.
  3 Leaflets 1.5-7 cm wide, 1-2.5× as long as wide; [subgenus *Orbexilum*]. ..... ***Orbexilum onobrychis***
  3 Leaflets 0.8-2 cm wide, 2.5-7.5× as long as wide; [subgenus *Poikadenia*].
    6 Flowers 8-10 mm long; [of s. AL westward]..... ***Orbexilum simplex***
    6 Flowers 5-7 mm long; [collectively widespread in our area]. ..... ***Orbexilum pedunculatum***

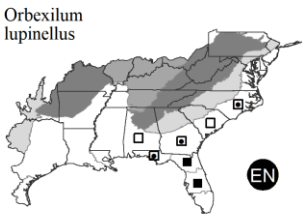
Orbexilum lupinellus (Michaux) Isely. LUPINE SCURFPEA, LUPINE LEATHERROOT. **Hab:** Longleaf pine sandhills. **Dist:** A Southeastern Coastal Plain endemic, ranging from sc. and se. NC, south to c. peninsular FL, s. AL, and e. GA. **Phen:** May-Jul; Jul-Oct. **Tax:** The epithet '*lupinellus*' is a noun in apposition and is therefore not declined according to the genus's gender; '*lupinellus*' is the correct epithet and spelling in any genus. **Comm:** The very peculiar leaves, palmately 5-7-foliolate with "oblinear" leaflets, make the species unmistakable. First reported for SC by McMillan et al. (2002). **Syn:** = K4, SE3, WH3, Grimes (1988), Grimes (1990), Isely (1998), Turner (2008); = *Orbexilum lupinellum* (Michaux) Isely – K1, K3, orthographic variant; = *Psoralea lupinellus* Michaux – RAB; = *Rhytidomene lupinellus* (Michaux) Rydberg – S. NatureServe G3G4 (Vulnerable).

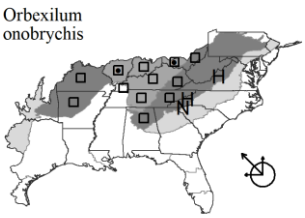
Orbexilum onobrychis (Nuttall) Rydberg. LANCELEAF SCURFPEA. **Hab:** Calcareous or mafic woodlands and barrens, prairies. **Dist:** Primarily a species of prairies and prairie-like areas of OH and KY west to se. IA and e. MO, *O. onobrychis* also occurs (at least formerly) as rare disjunct populations south to the Mountains and Interior Low Plateau of w. NC (1891), nw. SC, w. VA, e. TN, nw. AL, c. TN, and n. AR. No basis can be found for the alleged occurrence of this species in Spartanburg County, SC. **Phen:** Jun-Aug; Aug-Oct. **Syn:** = Ar, C, Il, K1, K3, K4, S, SE3, Tn, Va, Grimes (1988), Grimes (1990), Isely (1998), Turner (2008); = *Psoralea onobrychis* Nuttall – F, G, RAB, W. NatureServe G5 (Secure).

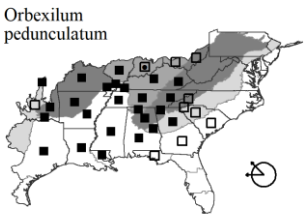
Orbexilum pedunculatum (P. Miller) Rydberg. WESTERN SAMPSON'S-SNAKEROOT. **Hab:** Open woodlands, bluffs, prairies. **Dist:** S. OH, s. IN, s. IL, c. MO, and se. KS, south to sw. NC, sc. SC, sw. GA, w. Panhandle FL, s. AL, s. LA, and e. TX. **Phen:** May-Jul; Jul-Sep. **Syn:** = K4, Mi, NcTx, S, Tn, Turner (2008), Vincent (2014); = *Orbexilum pedunculatum* (P. Miller) Rydberg var. *pedunculatum* – Ar, C, K1, K3, SE3, Grimes (1988), Grimes (1990), Isely (1998); = *Psoralea psoralioides* (Walter) Cory var. *eglandulosa* (Elliott) F.L. Freeman – F, G, GrPl, GW2, RAB, Tx, W; > *Orbexilum pedunculatum* var. *gracile* (Torrey & A. Gray) Grimes – Il, misapplied. NatureServe G5T5? (Secure).

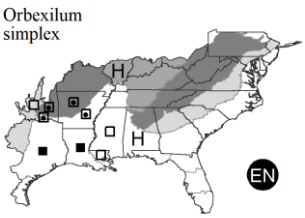
Orbexilum simplex (Nuttall ex Torrey & A. Gray) Rydberg. LEATHER-ROOT. **Hab:** Prairies, open woodlands. **Dist:** AR and OK south to s. AL, MS, e. and w. LA, and e. TX; perhaps disjunct in IL. **Phen:** May-Jun. **Syn:** = Ar, Il, K1, K3, NcTx, S, SE3, Grimes (1988), Grimes (1990), Isely (1998), Turner (2008); = *Psoralea simplex* Nuttall ex Torrey & A. Gray – Tx. NatureServe G4G5 (Apparently Secure).

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

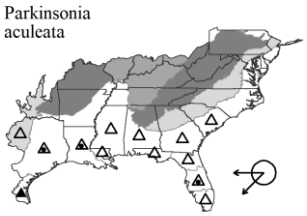








Parkinsonia Linnaeus 1753 (JERUSALEM THORN)



A genus of about 10-30 species (if circumscribed, as here, to include *Cercidium*), shrubs and trees of sw. North America, Central America, and Africa. References: Isely (1975); Isely (1998); Robertson & Lee (1976).

* ***Parkinsonia aculeata*** Linnaeus. JERUSALEM THORN, RETAMA, HORSE-BEAN, MEXICAN PALOVERDE. **Hab:** Sandy or gravelly areas along washes, disturbed areas. **Dist:** Native of sc. and sw. North America, rarely established or spread from cultivation in the eastern portions of our area, though somewhat more commonly so in much of FL. **Phen:** May. **Syn:** = Bah, K1, K3, K4, NcTx, S, SE3, Tx, WH3, Isely (1975), Isely (1998), Robertson & Lee (1976). NatureServe G5 (Secure).

Pediomelum Rydberg 1919 (BUCKROOT, PRAIRIE-TURNIP)

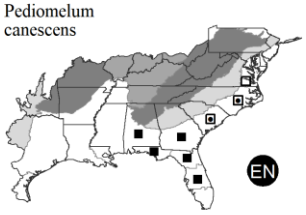
A genus of about 22 species, perennial herbs, of North America. References: Allison, Morris, & Egan (2006); Egan & Crandall (2008); Grimes (1988); Grimes (1990); Isely (1998).

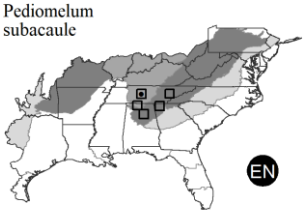
2 Plants acaulescent or nearly so, the aboveground stem 0-2 cm long; leaves (3-) 5-7-foliolate; corollas 11-18 mm long. ..... ***Pediomelum subacaule***

2 Plants caulescent, 3-10 dm tall; leaves (1-) 3-7-foliolate; corollas 5-25 mm long. ..... ***Pediomelum canescens***

Pediomelum canescens (Michaux) Rydberg. BUCKROOT, PINELAND-TURNIP, EASTERN PRAIRIE-TURNIP, HOARY SCURFPEA. **Hab:** Longleaf pine sandhills, pine flatwoods. **Dist:** A Southeastern Coastal Plain endemic: se. VA south to c. peninsular FL, Panhandle FL, and s. AL. **Phen:** May-Jul; Jul-Oct. **Comm:** This species tends to occur as very widely scattered individuals in sandhill habitats, rarely with more than a few seen at a time. It is related to *P. esculentum* (Pursh) Rydberg, the "prairie potato," prized by early travelers across the prairies for its edible tubers. An interesting collection label (by R.E. Wicker, collected in 1942, the specimen at NCU) mentions both the edible tubers and the characteristically sparse population structure of the species. "Not uncommon near Pinehurst in … open places in sandy pine woods…, but usually only one plant at a time. Tuber hard, dark brown, about size of a medium-sized Irish potato, somewhat ventral-elongated with roots coming from pointed base. Internal pure white, apparently almost entirely starch… Mr. Wicker says that he rather likes to take a bit of it and chew when fresh, has a rather condiment taste, but does not think it well to eat…" Because of its rarity, *P. canescens* should not (of course) be eaten. Because of its habit, that of a very bushy, tumbleweed-like plant, it superficially most closely resembles various *Baptisia* species, but it is easily separated by its rather dense and soft pubescence (our *Baptisia* are all glabrous or rather inconspicuously puberulent, except the very unifoliolate *B. arachnifera*). **Syn:** = C, K1, K3, K4, S, SE3, Va, WH3, Grimes (1988), Grimes (1990), Isely (1998); = *Psoralea canescens* Michaux – F, G, RAB. NatureServe G4 (Apparently Secure).

Pediomelum subacaule (Torrey & A. Gray) Rydberg. NASHVILLE BREADROOT. **Hab:** Limestone glades. **Dist:** E. TN and nw. GA west to c. TN and nw. AL. **Phen:** Apr. **Syn:** = K1, K3, K4, SE3, Tn, Grimes (1988), Grimes (1990), Isely (1998); = *Pediomelum subacaulis* – S, orthographic variant. NatureServe G4 (Apparently Secure).



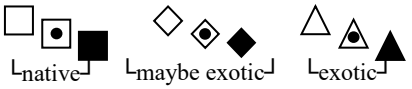


Phaseolus Linnaeus 1753 (BEAN)

A genus of about 80-85 species, annual and perennial herbs, of tropical and warm temperate America (now widely distributed worldwide in cultivation). References: Debouck (2021); Freytag & Debouck (2002); Isely (1998); Maréchal, Mascherpa, & Stainier (1978).

1 Raceme axes slender, flexuous; [native perennials]; [section *Paniculati*; subsection *Volubili*].

2 Stems trailing; leaflets 1-4 cm long, strongly 3-lobed, suborbicular; leaflet surfaces strongly reticulate-veined; [longleaf pine sandhill habitats, NC to FL west to MS] ..... ***Phaseolus sinuatus***

Key to Map Symbology: 

* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable

X : extirpated

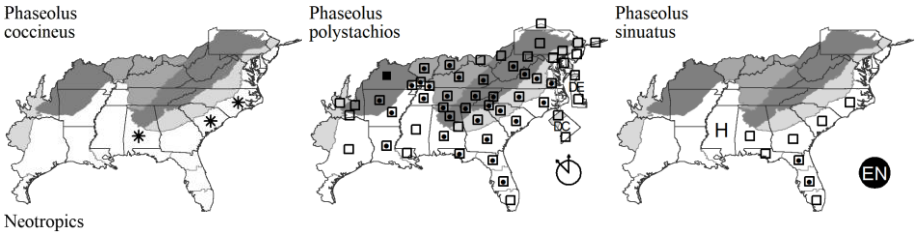
2 Stems climbing and twining on other vegetation (or trailing); leaflets 3-10 cm long, 3-lobed or not, ovate; leaflet surfaces only slightly reticulate; [various habitats; collectively widespread
.....***Phaseolus polystachios***

1 Raceme axes stout, stiff; [alien annuals, only weakly naturalized].
..... ***Phaseolus coccineus***

* ***Phaseolus coccineus*** Linnaeus. SCARLET RUNNER BEAN. **Hab:** Infrequently cultivated, mostly as an ornamental in home gardens, rarely found as a waif. **Dist:** Native of tropical America. **Syn:** = C, F, G, K1, K3, K4, NE, SE3, Debouck (2021), Isely (1998); > *Phaseolus coccineus* Linnaeus ssp. *coccineus* – Maréchal, Mascherpa, & Stainier (1978); > *Phaseolus coccineus* ssp. *coccineus* var. *coccineus* – Freytag & Debouck (2002). NatureServe GNR (Not Yet Ranked).

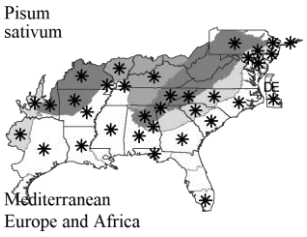
Phaseolus polystachios (Linnaeus) Britton, Sterns, & Poggenburg. WILD BEAN, WILD KIDNEY BEAN. **Hab:** Thickets, woodlands, seemingly declining. **Dist:** S. ME west to OH, IL, and MO, south to s. FL and TX. **Phen:** Jul-Sep; Aug-Oct. **Syn:** = Ar, C, G, Il, Mi, NE, NY, Pa, RAB, SE3, Tn, Tx, Va, W, WV, Isely (1998); = *Phaseolus polystachios* var. *polystachios* – K1, K3, Mo1, WH3; = *Phaseolus polystachyus* – S, Debouck (2021), orthographic variant; = *Phaseolus polystachyus* ssp. *polystachyus* – K4, Freytag & Debouck (2002); = *Phaseolus polystachyus* var. *polystachyus* – Maréchal, Mascherpa, & Stainier (1978); > *Phaseolus polystachios* var. *aquilonius* Fernald – F; > *Phaseolus polystachios* var. *polystachios* – F.

Phaseolus sinuatus (Nuttall) Torrey & A. Gray. SANDHILL BEAN. **Hab:** Longleaf pine sandhills, especially in loamier, more mesic swales. **Dist:** Sc. NC south to s. FL, west to s. MS, a Southeastern Coastal Plain endemic. **Phen:** Jul-Sep; Aug-Oct. **Tax:** Freytag & DeBouck (2002) describes *P. sinuatus* and *P. polystachios* as being "very distinct and there seems to be no intergradation", yet treated them as only subspecifically distinct; I choose to recognize them as species. Debouck (2021) concurred with species rank. **ID Notes:** *Phaseolus sinuatus* is not always easy to distinguish in sterile condition from *Strophostyles*. *Phaseolus sinuatus* has notable variegation of the leaflets, with irregular bands or spots of lighter green along the midvein and especially at the junctions of the midvein of each leaflet with the primary lateral veins. **Syn:** = RAB, S, SE3, W, Debouck (2021), Isely (1998); = *Phaseolus polystachios* (Linnaeus) Britton, Sterns, & Poggenburg var. *sinuatus* (Nuttall) R. Marechal, J.M. Mascherpa, & F. Stainier – K1, K3, WH3; = *Phaseolus polystachyus* ssp. *sinuatus* (Nuttall) Freytag – K4, Freytag & Debouck (2002); = *Phaseolus polystachyus* var. *sinuatus* (Nuttall) R. Marechal, J.M. Mascherpa, & F. Stainier – Maréchal, Mascherpa, & Stainier (1978). NatureServe G5T3? (Vulnerable).



Pisum Linnaeus 1753 (PEA)

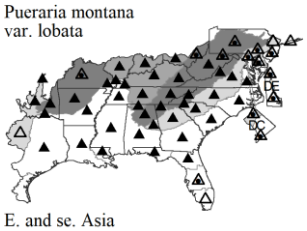
A genus of 2-5 species, annual herbs, native to w. Asia and the Mediterranean region. References: Isely (1998).



* ***Pisum sativum*** Linnaeus. PEA, GARDEN PEA, ENGLISH PEA. **Hab:** Commonly cultivated in home gardens, rarely found as a waif. **Dist:** Native of w. Asia and Mediterranean Europe. **Phen:** Mar-May. **Syn:** = Ar, Il, K1, K3, K4, Mi, NE, NY, SE3, WH3, Isely (1998); > *Pisum sativum* var. *arvense* (Linnaeus) Poiret – F, RAB; > *Pisum sativum* var. *sativum* – F.

Pueraria A.P. de Candolle 1825 (KUDZU)

A genus of about 15 species, perennial vining herbs and shrubs, of tropical and subtropical Asia. References: Isely (1998); Ward (1998).



* ***Pueraria montana*** (Loureiro) Merrill *var.* ***lobata*** (Willdenow) Maesen & S.M. Almeida ex Sanjappa & Predeep. KUDZU. **Hab:** Roadsides, waste areas. **Dist:** Native of e. Asia. **Phen:** Jul-Oct. **Comm:** Kudzu was strongly promoted in the 1920's and 1930's in the Southeastern United States as a stabilizer of eroded areas. Hundreds of Kudzu Clubs formed, and Kudzu Songbooks were published. It is now notorious as a weed and symbol of the South. Despite its notoriety in the popular press, kudzu is an ecologically relatively trivial (though conspicuous) weed, since it rarely produces viable seeds in our area, and generally does not invade high quality natural areas. The thickened rhizome can weigh as much as 150 kg, and is the source of a high quality cooking starch prized in the Orient. The purple flowers smell like artificial grape flavoring. The leaves are very frost-sensitive. **Syn:** = Ar, K1, K3, K4, Mi, NcTx, NE, NY, Tn, Va, WH3, Isely (1998), Ward (1998); = *Pueraria lobata* (Willdenow) Ohwi – C, F, G, GrPl, Pa, RAB, SE3, Tx, W, WV; = *Pueraria thunbergiana* (Siebold & Zuccarini) Bentham – S; < *Pueraria montana* – Il. NatureServe GNRTNR (Not Yet Ranked).

Rhynchosia Loureiro 1790 (SNOUTBEAN)

A genus of about 200-230 species, perennial herbs, of tropical and warm temperate regions, nearly cosmopolitan. References: Grear (1978); Isely (1998); Woods & Key (2009).

1 Leaves unifoliolate (rarely with a few upper leaves trifoliolate).
.....***Rhynchosia reniformis***

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

140. FABACEAE

1 Leaves trifoliolate (rarely with a few lowermost leaves unifoliolate, these generally withering before flowering and fruiting).
  3 Plant erect; pubescence of the lower leaf surface not restricted to the veins (except in the rare upright forms of *R. difformis* keyed below).
    4 Terminal leaflet suborbicular, 1.0-1.3× as long as wide; plants ascending to erect (or more usually twining [keyed elsewhere]) ..... ***Rhynchosia difformis***
    4 Terminal leaflet elliptic1.6-2.5× as long as wide; plants erect.
      5 Plant lavishly branched, bushy (with something of the aspect of a *Baptisia*); terminal leaflets 0.5-2.0 cm long; pubescence of the lower leaf surface sparse, not velvety to the touch; flowers solitary (-3) in leaf axils ..... ***Rhynchosia cytisoides***
      5 Plant unbranched or with few well-developed branches in its upper portion; terminal leaflets (2.0-) 2.5-5 cm long; pubescence of the lower leaf surface grayish tomentose and velvety to the touch; flowers many, in racemes. ..... ***Rhynchosia tomentosa***
  3 Plant trailing or twining; pubescence of the lower leaf surface mostly restricted to the veins.
    7 Calyx 8-14 mm long, about as long as the corolla; [plants collectively widespread in our area]. ..... ***Rhynchosia difformis***
    7 Calyx 2.5-7 mm long, clearly shorter than the corolla; [plants of e. GA southward and westward]. ..... ***Rhynchosia minima***

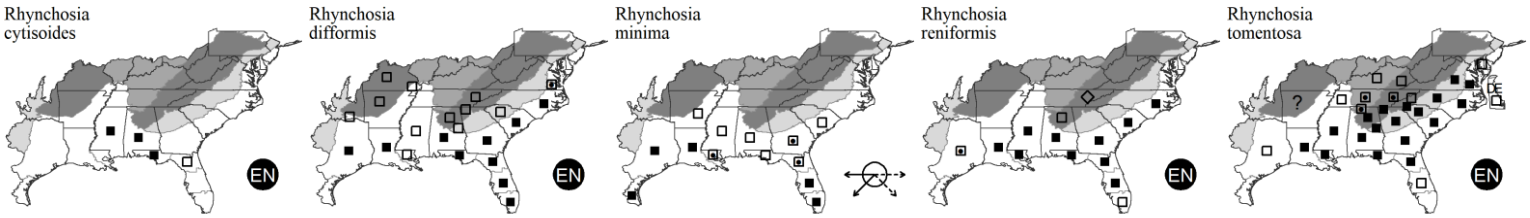
Rhynchosia cytisoides (Bertoloni) Wilbur. ROYAL SNOUTBEAN, BROOM SNOUTBEAN. **Hab:** Longleaf pine sandhills. **Dist:** Panhandle FL and s. AL west to MS. **Phen:** May-Jun. **Syn:** = Fl3, K1, K3, K4, SE3, WH3, Isely (1998), Woods & Key (2009); = *Pitcheria galactioides* Nuttall – S. NatureServe G3G5 (Apparently Secure).

Rhynchosia difformis (Elliott) A.P. de Candolle. **Hab:** Longleaf pine sandhills, other dry woodlands. **Dist:** Se. VA south to c. peninsular FL, west to e. TX. **Phen:** Jun-Aug; Jul-Oct. **Syn:** = C, F, Fl3, G, K1, K3, K4, RAB, SE3, Tn, Tx, Va, WH3, Isely (1998), Woods & Key (2009); = *Rhynchosia tomentosa* (Linnaeus) Hooker & Arnott – S, misapplied.

Rhynchosia minima (Linnaeus) A.P. de Candolle. LITTLE SNOUTBEAN. **Hab:** Hammocks, dry pine flatwoods, coastal sands, shelly areas. **Dist:** Se. SC (Beaufort County), e. GA, south to s. FL, west to s. TX; West Indies; Neotropics, Paleotropics. The record from Beaufort County, SC is reported by Bradley et al. [in prep.]. **Phen:** Jan-Dec. **Comm:** The species also occurs in the Old World, and the New World distribution is sometimes considered a result of introduction. Relocated in AL in 2015 (Diamond 2015). **Syn:** = Bah, Fl3, K1, K3, K4, NcTx, SE3, WH3, Isely (1998), Woods & Key (2009); = *Dolicholus minimus* (Linnaeus) Medikus – S; > *Rhynchosia minima* (Linnaeus) A.P. de Candolle var. *diminifolia* Walraven – Tx; > *Rhynchosia minima* var. *minima* – Tx. NatureServe GNR (Not Yet Ranked).

Rhynchosia reniformis A.P. de Candolle. DOLLARWEED, DOLLARLEAF SNOUTBEAN. **Hab:** Longleaf pine sandhills, pine rocklands. **Dist:** Se. NC south to s. FL, west to e. TX; disjunct (introduced?) in e. TN (Chester, Wofford, & Kral 1997). **Phen:** Jun-Sep; Aug-Oct. **Syn:** = Fl3, K1, K3, K4, RAB, SE3, Tn, WH3, Isely (1998), Woods & Key (2009); = *Rhynchosia simplicifolia* (Walter) Wood – S; > *Rhynchosia reniformis* var. *reniformis* – Tx. NatureServe G5? (Secure).

Rhynchosia tomentosa (Linnaeus) Hooker & Arnott. ERECT SNOUTBEAN. **Hab:** Xeric woodlands and forests, longleaf pine sandhills, barrens, edges, open areas. **Dist:** DE south to n. peninsular FL, west to LA, and north in the interior to e. and c. TN. **Phen:** Jun-Aug; Aug-Oct. **Syn:** = *Rhynchosia tomentosa* (Linnaeus) Hooker & Arnott var. *tomentosa* – C, Fl3, K1, K3, K4, SE3, Tx, WH3, Isely (1998), Woods & Key (2009); > *Rhynchosia erecta* (Walter) A.P. de Candolle – S; > *Rhynchosia intermedia* (Torrey & Gray) Small – S; < *Rhynchosia tomentosa* (Linnaeus) Hooker & Arnott – F, G, RAB, Tn, Va, W. NatureServe G5TNR (Not Yet Ranked).



Robinia Linnaeus 1753 (LOCUST)

A genus of 5-8 species, shrubs and trees, of e. and sw. North America. The Southern Appalachians are a center of diversity of *Robinia*, with active hybridization, introgression, and formation of local (sterile) races involved; a fully satisfying taxonomic treatment of such a situation is not possible. Isely & Peabody's (1984) and Peabody's (1984) treatment seems a reasonable approach, and I have largely followed it here, differing in the rank of some of the taxa. References: Ashe (1922); Isely & Peabody (1984); SE3; Isely (1998); Peabody (1984).

Identification Notes: The key is differently structured than that in RAB or SE; it is presented as an alternative. This treatment may be altered substantially prior to publication. A variety of hybrids (including some cultivars) are known, including the following: *Robinia* ×*longiloba* Ashe (pro sp.) [*R. hispida* × *viscosa*], known from NC and SC; *Robinia* ×*margaretiae* Ashe (pro sp.) [*R. hispida* × *pseudoacacia*], known from NC, SC, and GA; *Robinia* ×*ambigua* Poiret (pro sp.) [*R. pseudoacacia* × *viscosa*], known from NC; *Robinia hartwigii* × *hispida*, known from Whiteside Mountain, Jackson County, NC; *Robinia hartwigii* × *viscosa*, known from Whiteside Mountain, Jackson County, NC.

1 Corolla white, 1.5-2.0 cm long; peduncles, pedicels, and calyces velvety-puberulent, the hairs neither glandular nor hispid; plant a small to large tree ..... ***Robinia pseudoacacia***
1 Corolla pink to pink-purple (rarely white or nearly so), (1.5-) 2.0-2.5 cm long; peduncles, pedicels, and calyces glandular-pubescent, hispid, or with short-stalked to sessile glands; plant a shrub to small tree.
  2 Twigs and leafstalks conspicuously hispid with hairs 1-5 mm long, these stiff, thick-based, and typically persistent several years. ..... ***Robinia hispida var. hispida***

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

2 Twigs and leafstalks either viscid with sessile or short-stalked glands, or densely glandular-pubescent (the hairs 0.5-2 mm long), or tomentulose, or sparsely hispid with weak, non-persistent hairs.
4 Leaflets usually 13-21, permanently but inconspicuously appressed-pubescent beneath; bracts (evident only before anthesis) aristate; plants never with long, hispid pubescence.
Robinia viscosa
4 Leaflets usually 9-13, initially appressed-silky but later glabrate beneath; bracts (evident only before anthesis) not aristate; plants with or without sparse, long, hispid pubescence.
7 Shrubs or small trees, 1-3 (-8) m tall, much branched, the stems and branches relatively straight, the nodes usually lacking spines
Robinia hispida var. rosea
7 Shrubs, 0.2-1 m tall, little branched, the stems and branches typically zigzag (bent at each node), the nodes usually with spines ***Robinia nana***

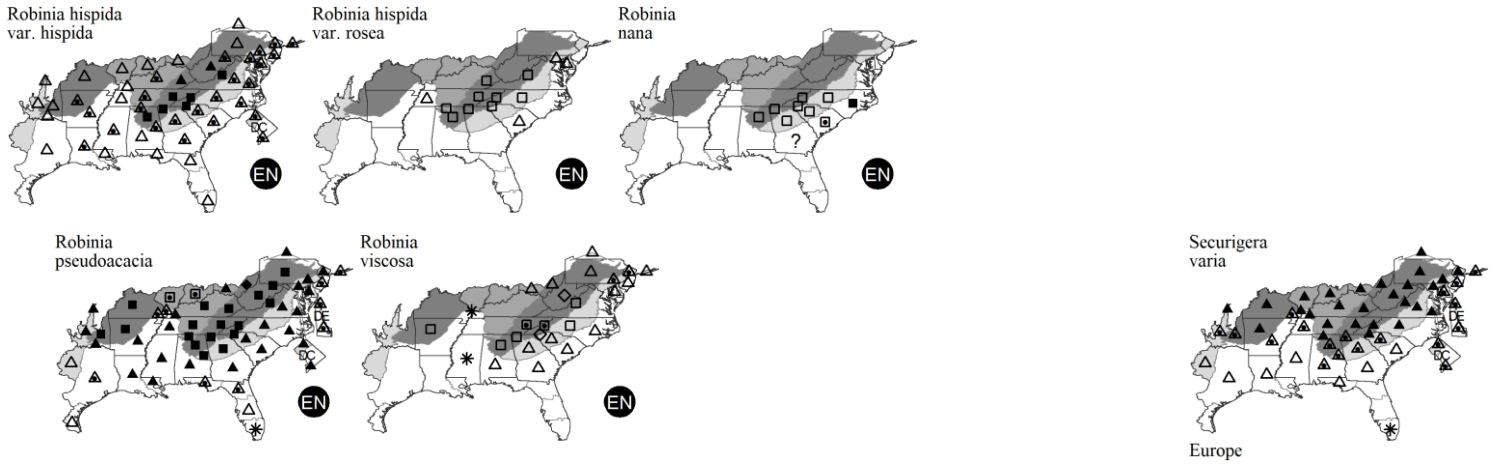
Robinia hispida Linnaeus *var*. ***hispida***. COMMON BRISTLY LOCUST. **Hab:** Woodlands and forests, and as an escape in disturbed areas and roadsides. **Dist:** Probably originally endemic to the Southern Appalachians (and perhaps adjacent provinces) of NC, SC, GA, TN, and VA, now widely distributed in e. North America as an escape from cultivation. **Phen:** May-Jun. **Syn:** = C, F, K1, NE, NY, SE3, Isely & Peabody (1984), Peabody (1984); = *Robinia hispida* – G, S, Ashe (1922); < *Robinia hispida* – Fl3, GrPl, Il, Mi, NcTx, Pa, RAB, Tn, Tx, Va, W, WH3, WV; > *Robinia hispida* – S; < *Robinia hispida* Linnaeus var. *hispida* – K3, K4; > *Robinia pallida* Ashe – S; > *Robinia speciosa* Ashe – S. NatureServe G4T4 (Apparently Secure).

Robinia hispida Linnaeus *var*. ***rosea*** Pursh. BOYNTON'S LOCUST. **Hab:** Pich pine woodlands, other mountain woodlands. **Dist:** Originally distributed from se. KY, s. VA, and e. TN south to nw. SC, n. GA, and ne. AL, now occasionally found outside that range as an escape from cultivation. **Phen:** Apr-Jul. **Syn:** = C, K1, K2, SE3, Isely & Peabody (1984); = *Robinia boyntonii* Ashe – G, RAB, S, Ashe (1922); < *Robinia hispida* – Pa, Tn, W, WH3.

Robinia nana Elliott. SANDHILL BRISTLY LOCUST, DWARF BRISTLY LOCUST. **Hab:** Longleaf pine sandhills, dry rocky forests (especially associated with chestnut oak). **Dist:** Se. and nc. NC south through SC to GA and AL. **Phen:** Apr-Jun; Jul-Oct. **Comm:** This species fruits infrequently. **Syn:** = *Robinia elliottii* (Chapman) Ashe ex Small – F, G; = *Robinia hispida* Linnaeus var. *nana* (Elliott) A.P. de Candolle – K1, K3, K4, SE3, Isely & Peabody (1984); > *Robinia elliottii* (Chapman) Ashe ex Small – RAB, S, Ashe (1922); < *Robinia hispida* – Tn, W; > *Robinia nana* Elliott – RAB, S, Ashe (1922). NatureServe G4T4 (Apparently Secure).

Robinia pseudoacacia Linnaeus. BLACK LOCUST. **Hab:** Forests, woodlands, disturbed areas, roadcuts. **Dist:** Native in the s. and c. Appalachians, from PA south to GA and AL, and the Interior Highlands, now much more widespread, throughout e. and c. North America, also widely cultivated and escaped in Europe. **Phen:** Apr-Jun; Jul-Nov. **Comm:** Often considered a weed tree; Correll & Johnston (1970) state "black locusts are weedy. 'dirty' trees and root-sprout perniciously, therefore they are to be avoided in cultivation, although they are widely touted by unscrupulous nursery-dealers as 'million-dollar shade trees' ".. **Syn:** = Ar, C, Fl3, Il, K1, K3, Mi, NcTx, NE, NY, Pa, SE3, Tx, Va, W, WH3, Isely & Peabody (1984); = *Robinia pseudo-acacia* – F, GrPl, RAB, S, WV, orthographic variant; > *Robinia pseudo-acacia* var. *pseudo-acacia* – G, orthographic variant; > *Robinia pseudo-acacia* var. *rectissima* (Linnaeus) Raber – G. NatureServe G5 (Secure).

Robinia viscosa Ventenat. CLAMMY LOCUST. **Hab:** Mountain forests and woodlands, roadsides, disturbed areas, rare in wild, uncommon as an escape. **Dist:** Originally a Southern and Central Appalachian endemic, ranging from PA south through w. MD, w. VA, e. WV, w. NC, and e. TN, to n. GA and n. AL, now much more widespread as an escape from cultivation. **Phen:** May-Jul; Jul-Aug. **Comm:** Reported for GA Coastal Plain (Marion County) (Carter, Baker, & Morris 2009). **Syn:** = F, G, Il, Mi, Pa, RAB, S, WV; = *Robinia viscosa* var. *viscosa* – C, K1, K3, K4, NE, NY, SE3, Ashe (1922), Isely & Peabody (1984); < *Robinia viscosa* Ventenat – W. NatureServe G3T3 (Vulnerable).



Securigera A.P. de Candolle 1805 (CROWN-VETCH)

A genus of about 12-13 species, annual and perennial herbs, of Eurasia. This genus is sometimes included in *Coronilla*, but is apparently better separated (Isely 1998). References: Isely (1998).

* ***Securigera varia*** (Linnaeus) Lassen. CROWN-VETCH. **Hab:** Roadbanks, woodland borders. **Dist:** Native of Europe. **Phen:** Jun-Sep. **Comm:** This species is widely used to stabilize roadcuts. **Syn:** = Ar, Il, K3, K4, Mi, NE, NY, Tn, Va, Isely (1998); = *Coronilla varia* Linnaeus – C, F, Fl3, G, GrPl, K1, NcTx, Pa, RAB, SE3, W, WH3, WV. NatureServe GNR (Not Yet Ranked).

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Senna P. Miller 1754 (SENNA, SICKLEPOD, WILD COFFEE)

A genus of about 295-350 species, trees, shrubs, and herbs, of tropical and warm temperate areas. References: Irwin & Barneby (1982); Isely (1975); SE3; Isely (1998); Marazzi et al (2006); Robertson & Lee (1976).

Identification Notes: In the key, "gland" refers to the leafstalk glands, which are located on the petiole or associated with the point of attachment of one or more pairs of leaflets to the leaf rachis.

1 Herbs, 0.5-22 dm tall.
  7 Leaves with 3 pairs of leaflets; leaflets obovate, 1.6-2.5× as long as wide, the widest point past the midpoint, the apex broadly rounded to obtuse; gland(s) positioned at the lowest pair of leaflets and sometimes also at the 2nd pair; [section *Chamaefistula*, section *Trigonelloideae*]..... ***Senna obtusifolia***
  7 Leaves with (3-) 4-9 (-10) pairs of leaflets; leaflets ovate, lanceolate, or elliptic, 1.9-7× as long as wide, the widest below or near the midpoint, the apex acuminate, acute, or obtuse; gland(s) positioned variously (see below).
    10 Leaflets 1.5-3.0 cm wide, in 3-6 pairs; racemes with 1-5 flowers; [section *Chamaefistula*, series *Basiglandulosae*]..... ***Senna occidentalis***
    10 Leaflets 0.7-2.0 cm wide, in 6-10 pairs; racemes with 5-10 (-25) flowers; [section *Chamaefistula*, series *Temperatae*].
      11 Legume 5.5-8 mm wide, with broad, nearly square segments, usually pilose initially, the hairs up to 0.8-2 mm long (sometimes glabrate); ovary lanate with hairs to 1 mm long; ovules 10-15 (-18); petiolar gland broadest above the middle..... ***Senna hebecarpa***
      11 Legume 8-11 mm wide, with narrow segments (much shorter than broad), glabrous (or with a few hairs, these < 0.6 mm long); ovary strigulose with hairs to 0.5 mm long; ovules 20-25 (-30); petiolar gland usually broadest at or below the middle.
      ..... ***Senna marilandica***
1 Shrubs and trees, 20-200 dm tall.
  ..... ***Senna corymbosa***

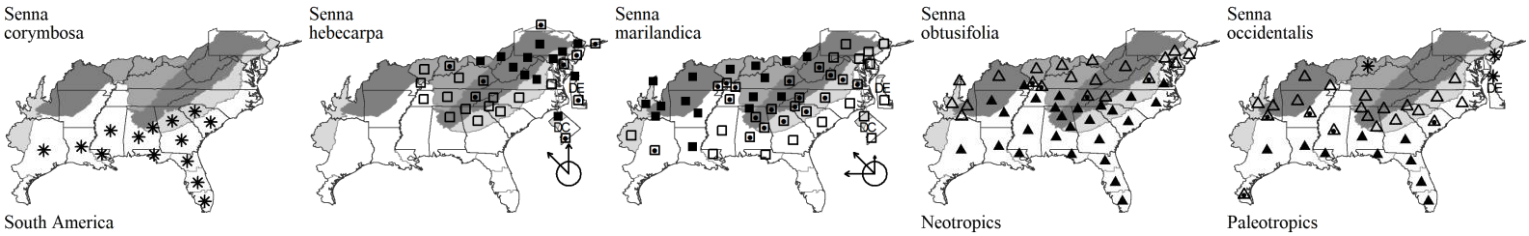
* ***Senna corymbosa*** (Lamarck) H.S. Irwin & Barneby. ARGENTINE SENNA. **Hab:** Cultivated as an ornamental, rarely persistent or spreading to disturbed areas. **Dist:** Native of South America. Reported for AL (Diamond & Woods 2009). **Phen:** Aug-Sep. **Syn:** = K1, K3, NcTx, SE3, WH3, Irwin & Barneby (1982), Isely (1998); = *Adipera corymbosa* (Lamarck) Britton & Rose – S; = *Cassia corymbosa* – Tx, Isely (1975), Robertson & Lee (1976). NatureServe GNR (Not Yet Ranked).

Senna hebecarpa (Fernald) H.S. Irwin & Barneby. NORTHERN WILD SENNA. **Hab:** Open wet habitats, moist forests. **Dist:** MA and s. NH west to s. WI, south to sc. NC, e. TN, s. IN, and c. IL. **Phen:** Jul-Aug; Aug-Nov. **Syn:** = C, Il, K1, K3, K4, Mi, NE, NY, Pa, SE3, Tn, Va, Irwin & Barneby (1982), Isely (1998); = *Cassia hebecarpa* Fernald – G, RAB, W, Isely (1975), Robertson & Lee (1976); = *Ditremexa marylandica* (Linnaeus) Britton & Rose – S, misapplied and orthographic variant; > *Cassia hebecarpa* var. *hebecarpa* – F, WV; > *Cassia hebecarpa* var. *longipila* E.L. Braun – F, WV. NatureServe G5 (Secure).

Senna marilandica (Linnaeus) Link. MARYLAND WILD SENNA. **Hab:** Dry to moist forests, especially on greenstone and diabase barrens and rocky woodlands, thickets, woodland borders, sometimes somewhat weedy. **Dist:** S. MA and s. NY west to e. NE, south to Panhandle FL and c. TX. **Phen:** Jul-Aug; Aug-Nov. **Syn:** = *Ditremexa medsgeri* (Shafer) Britton & Rose – S; < *Cassia marilandica* Linnaeus – F, G, GrPl, RAB, Tx, W, WV, Isely (1975), Robertson & Lee (1976); < *Senna marilandica* (Linnaeus) Link – Ar, C, Il, K1, K3, K4, Mo2, NcTx, Pa, SE3, Tn, Va, WH3, Irwin & Barneby (1982), Isely (1998).

* ***Senna obtusifolia*** (Linnaeus) H.S. Irwin & Barneby. SICKLEPOD, COFFEEWEED. **Hab:** Fields (especially soybean fields), disturbed areas. **Dist:** Probably native of the New World Tropics. The species is now pantropical. **Phen:** Jul-Sep; Aug-Nov. **Syn:** = Ar, C, GrPl, Il, K1, K3, K4, Mo2, NcTx, NE, NY, Pa, SE3, Tn, Va, WH3, Irwin & Barneby (1982), Isely (1998), Robertson & Lee (1976); = *Cassia obtusifolia* Linnaeus – Bah, RAB, Tx, W, Isely (1975); < *Cassia tora* Linnaeus – F, G, misapplied; < *Emelista tora* (Linnaeus) Britton & Rose – S, misapplied.

* ***Senna occidentalis*** (Linnaeus) Link. COFFEE SENNA. **Hab:** Disturbed places. **Dist:** Native of the Old World Tropics. The species is now pantropical. **Phen:** Jul-Aug; Aug-Nov. **Syn:** = Ar, C, GrPl, Il, K1, K3, K4, Mo2, NcTx, SE3, Va, WH3, Irwin & Barneby (1982), Isely (1998); = *Cassia occidentalis* Linnaeus – Bah, F, G, RAB, Isely (1975), Robertson & Lee (1976); = *Ditremexa occidentalis* (Linnaeus) Britton & Rose ex Britton & Wilson – S. NatureServe GNR (Not Yet Ranked).



Sesbania Adanson 1760 (RATTLEBOX, SESBAN)

A genus of about 60-70 species, annual herbs, perennial herbs, shrubs, and trees, of tropical, subtropical, and less commonly warm temperate regions of the Old and New World, here circumscribed to include *Glottidium*, following Lewis et al. (2005). References: Farruggia in FNA () (in prep); Farruggia, Lavin, & Wojciechowski (2018); Isely (1998).

1 Legume 10-40 cm long, 0.3-0.8 cm wide; legume ×-section terete, laterally compressed, or somewhat tetrangular (but not at all flanged or winged); seeds many (> 10) per legume; [sect. *Sesbania*].
  ..... ***Sesbania herbacea***
1 Legume 3-8 cm long, 0.6-1.6 cm wide; legume ×-section laterally compressed or obviously tetrangular (the corners flanged or prominently winged); seeds 1-10 per legume.
  4 Corolla 8-9 mm long; legume flattened; seeds 1-2 (-3) per legume; leaves with 8-13 (-18) pairs of leaflets; [sect. *Glottidium*]..... ***Sesbania vesicaria***
  4 Corolla 9-25 mm long; legume quadrangular or 4-winged; seeds 4-10 per legume; leaves with 10-35 pairs of leaflets; [sect. *Daubentonia*].
    5 Legume quadrangular or slightly flanged, 0.5-0.8 cm wide; corolla 9-12 mm long..... ***Sesbania virgata***

Key to Map Symbology: native, maybe exotic, exotic; ←rare ←uncommon ←common (see introduction for more); * : waif, EN : endemic, H : historic; N : no, P : planted, ? : questionable; X : extirpated

5 Legume conspicuously 4-winged longitudinally, 1-1.5 cm wide; corolla 13-25 mm long.
6 Corolla yellow; pedicels 0.5-1.0 cm long; legume blunt or abruptly acuminate to a beak ..... ***Sesbania drummondii***
6 Corolla orange or red; pedicels 0.5-1.2 (-1.5) cm long; legume acuminate or tapering to a beak..... ***Sesbania punicea***

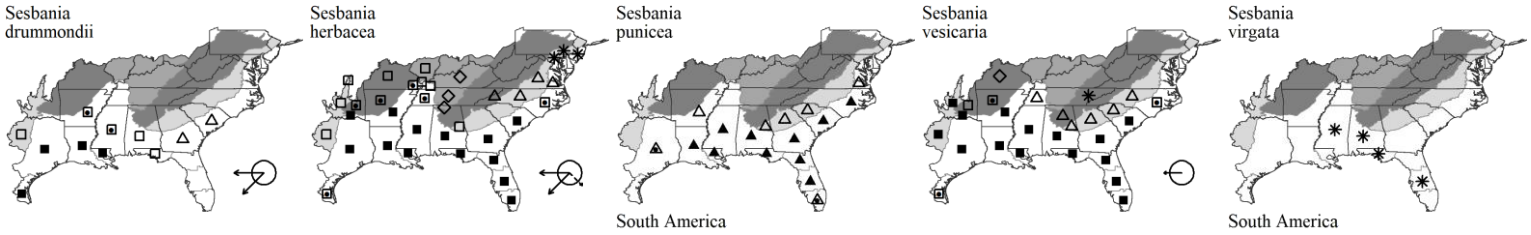
Sesbania drummondii (Rydberg) Cory. RATTLEBOX, POISON-BEAN. **Hab:** Disturbed areas, spoil, marsh edges, ditches. **Dist:** Native on the Gulf Coast west to s. TX and Mexico, the exact eastern edge of the native range uncertain, perhaps w. FL Panhandle. **Phen:** Jun-Sep. **Comm:** First reported for GA and SC by Townsend et al. (2000), where clearly introduced. **Syn:** = Ar, GW2, K1, K3, K4, NcTx, SE3, Tx, WH3, Isely (1998); = *Daubentonia drummondii* Rydberg – S. NatureServe G4G5 (Apparently Secure).

Sesbania herbacea (P. Miller) McVaugh. SESBAN, COFFEE-WEED, INDIGO-WEED, PEATREE, BEQUILLA. **Hab:** Ditches, wet fields, disturbed moist and wet areas, perhaps native only in the deeper South. **Dist:** Native distribution uncertain, perhaps e. NC south to s. FL, west on the Coastal Plain and Mississippi Embayment to TX, south into Mexico. **Phen:** Jul-Sep; Aug-Nov. **Syn:** = Ar, K1, K3, NcTx, NE, WH3; = *Sesban exaltatus* (Rafinesque) Rydberg – S; = *Sesbania exaltata* (Rafinesque) Cory – C, F, G, Il, K4, RAB, SE3, Tn, Isely (1998); = *Sesbania macrocarpa* Muhlenberg ex Rafinesque – GrPl, GW2, Tx. NatureServe G5? (Secure).

* ***Sesbania punicea*** (Cavanilles) Bentham. RATTLEBOX, SCARLET WISTERIA-TREE, RED SESBAN. **Hab:** Ditches, wet fields, marshes, ponded wetlands, wet pinelands. **Dist:** Native of South America. **Phen:** Jun-Oct; Aug-Nov. **Syn:** = Ar, GW2, K1, K3, K4, SE3, Tx, Va, WH3, Isely (1998); = *Daubentonia punicea* (Cavanilles) A.P. de Candolle – RAB, S. NatureServe G4 (Apparently Secure).

Sesbania vesicaria (Jacquin) Elliott. BLADDERPOD, BAGPOD. **Hab:** Ditches, marshes, disturbed wet areas. **Dist:** The original native distribution of *S. vesicaria* is uncertain; its distribution is from ne. NC south to s. FL, west to e. OK and se. TX, and Isely (1998) states that it is unknown from outside the United States; occurrences in provinces inland of the Coastal Plain seem to represent introductions into artificial wetlands (such as ditches). **Phen:** Jul-Sep; Aug-Nov. **Syn:** = GW2, K3, K4, Tx, WH3; = *Glottidium vesicarium* (Jacquin) R.M. Harper – Ar, K1, NcTx, RAB, S, SE3, Isely (1998). NatureServe G5 (Secure).

* ***Sesbania virgata*** (Cavanilles) Poiret. WAND RIVER-HEMP. **Hab:** Disturbed areas. **Dist:** Native of South America. **Phen:** Jun-Oct; Aug-Nov. **Syn:** = K1, K3, K4, SE3, WH3, Isely (1998). NatureServe G4 (Apparently Secure).



Strophostyles Elliott 1823 (SAND BEAN, WOOLLY BEAN, WILD BEAN, FUZZY BEAN)

A genus of 3 species, annual and perennial herbs, of North America. References: Delgado-Salinas in FNA () (in prep); Isely (1998); Pelotto & Del Pero Martínez (1998).

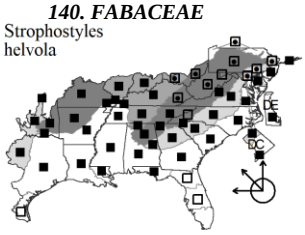
1 Legumes 2-4 cm long, permanently pubescent; corolla 5-8 mm long; leaves permanently pubescent on the upper surface; seeds glabrous..... ***Strophostyles leiosperma***
1 Legumes 3-8 cm long, glabrate at maturity; corolla 8-15 mm long; leaves usually glabrate on the upper surface; seeds pubescent.
2 Bracteoles (immediately subtending the calyx) 2-3 mm long, equaling or exceeding the calyx tube; leaflets usually prominently 3-lobed; terminal leaflet 2.5-3.5 cm wide; plant an annual..... ***Strophostyles helvola***
2 Bracteoles (immediately subtending the calyx) 0.5-1.0 (-1.5) mm long, shorter than the calyx tube; leaflets not lobed; terminal leaflet 0.3-2.0 cm wide; plant a perennial..... ***Strophostyles umbellata***

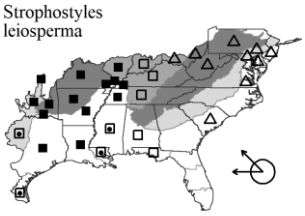
Strophostyles helvola (Linnaeus) Elliott. ANNUAL SAND BEAN, TRAILING FUZZY BEAN, AMBERIQUE BEAN. **Hab:** Coastal dunes, beaches, dry sandy woodlands, disturbed areas. **Dist:** QC west to MN and SD, south to n. peninsular FL and e. TX. **Phen:** Jun-Sep; Aug-Oct. **Tax:** See Isely (1986b) for a discussion of the orthography of the epithet. **Syn:** = C, G, GrPl, K3, K4, NE, NY, Pa, RAB, S, Tx, Va, WH3, WV; = *Strophostyles helvula* (Linnaeus) Elliott – K1, Mi, NcTx, SE3, Tn, W, Pelotto & Del Pero Martínez (1998), orthographic variant; > *Strophostyles helvola* var. *helvola* – F; > *Strophostyles helvola* var. *missouriensis* (S. Watson) Britton – F; > *Strophostyles helvula* var. *helvula* – Il; > *Strophostyles helvula* var. *missouriensis* (S. Watson) Britton – Il.

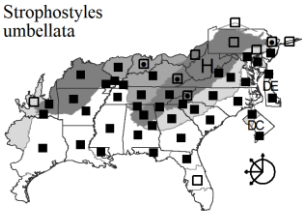
Strophostyles leiosperma (Torrey & A. Gray) Piper. SMALL-FLOWERED SAND BEAN, SLICKSEED FUZZY BEAN. **Hab:** Prairies, glades, barrens, sand bars, disturbed areas. **Dist:** IN, WI, MN, and ND, south to FL Panhandle, AL, MS, LA, TX, NM, and AZ; also scattered eastward presumably as introductions. **Phen:** Jun-Sep; Aug-Oct. **Syn:** = Ar, C, F, G, GrPl, Il, K1, K3, K4, NcTx, NE, Pa, SE3, Tn, Tx, WH3, Pelotto & Del Pero Martínez (1998); = *Strophostyles pauciflora* (Bentham) S. Watson – S. NatureServe G5 (Secure).

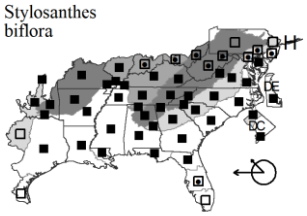
Strophostyles umbellata (Muhlenberg ex Willdenow) Britton. PERENNIAL SAND BEAN, PERENNIAL FUZZY BEAN. **Hab:** Dry sandy or rocky woodlands, disturbed areas. **Dist:** S. NY west to s. IN, s. MO, and KS, south to c. peninsular FL, s. TX, and COA. **Phen:** Jun-Oct; Aug-Oct. **Syn:** = Ar, C, F, G, Il, K1, K3, K4, Mex, NY, Pa, RAB, S, SE3, Tn, Tx, Va, W, WH3, Pelotto & Del Pero Martínez (1998); > *Strophostyles umbellata* var. *paludigena* Fernald – F; > *Strophostyles umbellata* var. *umbellata* – F.

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated









Stylosanthes Swartz 1788 (PENCIL-FLOWER)

A genus of about 25-50 species, annual and perennial herbs, pantropical and less commonly temperate. References: Isely (1998); Mohlenbrock (1957).

Identification Notes: The large, adnate stipules are distinctive. *Stylosanthes* fruits are loments with 2 segments, the terminal almost always fertile, and terminated by the persistent style, the lower often abortive.

Stylosanthes biflora (Linnaeus) Britton, Sterns, & Poggenburg. PENCIL-FLOWER. **Hab:** Longleaf pine sandhills, dry to moist (but not wet) pine savannas and flatwoods, dry forests, woodlands, woodland borders, glades, barrens, rock outcrops. **Dist:** S. NY west to OH, s. IL, and KS, south to c. peninsular FL and e. TX. **Phen:** Jun-Aug; Jul-Oct. **Tax:** Mohlenbrock (1957) studied variation in this species and did not choose to recognize variation taxonomically (see synonymy); a modern re-evaluation is perhaps warranted. **Syn:** = Ar, C, GrPl, Il, K1, K3, K4, NcTx, NY, Pa, RAB, SE3, Tn, Tx, Va, W, WH3, WV, Isely (1998), Mohlenbrock (1957); > *Stylosanthes biflora* (Linnaeus) Britton, Sterns, & Poggenburg – S; > *Stylosanthes biflora* var. *biflora* – F, G; > *Stylosanthes biflora* var. *hispidissima* (Michaux) Pollard & Ball – F, G; > *Stylosanthes riparia* Kearney – G, S; > *Stylosanthes riparia* var. *riparia* – F; > *Stylosanthes riparia* var. *setifera* Fernald – F. NatureServe G5 (Secure).

Tephrosia Persoon 1807 (GOAT'S-RUE)

A genus of about 350-400 species, perennial herbs, of tropical and warm temperate regions of the Old World and New World. References: Isely (1998); Ward (2004c); Wood (1949).

1 Style glabrous; corolla 7-12 mm long; [FL peninsula, or historically on ballast in s. AL].
..... ***Tephrosia cinerea***
1 Style barbellate; corolla 8-20 mm long; [collectively widespread, including FL peninsula].
5 Corolla bicolored, the standard yellow and the wings pink; racemes terminal; stems erect; stamens monadelphous; leaves with (9-) 13-23 (-37) leaflets.
6 Inflorescence reduced, foliose, flowers solitary or in small clusters overtopped by leaves; plants < 25 cm tall; leaflets generally < 10 mm long and < 5 mm wide; [restricted to the West Gulf Coastal Plain of sw. GA, adjacent FL and westward] ..... ***Tephrosia mohrii***
6 Inflorescence terminal, not foliose and overtopped by leaves; plants > 25 cm tall; leaflets generally > 10 mm long and > 5 mm wide; [widespread in our area] .
..... ***Tephrosia virginiana***
5 Corolla unicolored, initially white or pink, darkening in age to a dark maroon or purple; racemes opposite the leaves (the uppermost appearing terminal); stems decumbent or ascending; stamens diadelphous; leaves with (3-) 5-23 (-27) leaflets.
7 Upper stamen fused with the staminal sheath for part or most of its length (submonadelphous); leaves with (9-) 13-23 (-27) leaflets; [plants from s. AL westward]..... ***Tephrosia onobrychoides***
7 Upper stamen completely separate from the staminal sheath (diadelphous); leaves with (3-) 5-17 (-19) leaflets; [plants collectively widespread in our area].
9 Petiole (1-) 2-4× as long as the lowest leaflets of the leaf; peduncle and rachis of inflorescence strongly flattened (2-angled, or rarely, 3-angled) in cross-section; leaflets averaging 25 mm long and 12 mm wide..... ***Tephrosia florida***
9 Petiole 1/3-1× as long as the lowest leaflets of the leaf; peduncle and rachis of inflorescence terete or inconspicuously 2-4-angled in cross-section; leaflets averaging smaller.
10 Stem and fruit finely pubescent with hairs < 0.5 mm long; leaves with (3-) 5-11 (-13) leaflets; petiole 0-5 mm long.
..... ***Tephrosia chrysophylla***
10 Legume and stem coarse pubescent (villous) with hairs 1.0-1.5 mm long; leaves with (7-) 9-17 (-19) leaflets; petiole 2-15 mm long.
12 Inflorescence with 1-3 (-5) nodes; plants inconspicuously pubescent with gray hairs (the hairs appressed or spreading, short to fairly long); leaflets (3-) avg. 5-6 (-7) mm wide, mostly acute; [plants of the Coastal Plain of NC and SC]..... ***Tephrosia hispidula***
12 Inflorescence with 2-20 nodes; plants conspicuously tawny long-pilose with rusty brown hairs; leaflets (6-) avg. 8 (-12) mm wide, mostly obtuse; [plants widespread in our area]..... ***Tephrosia spicata***

Tephrosia chrysophylla Pursh. SPRAWLING GOAT'S-RUE. **Hab:** Longleaf pine sandhills. **Dist:** E. GA s. to s. FL, and west to s. MS. **Phen:** May-Sep. **Comm:** Rather frequent hybrids between *T. chrysophylla* and *T. florida* are intermediate in morphology and have been found in AL, FL, GA, and MS; they have been given a hybrid binomial, *T.* ×*intermedia* (Small) Nesom & Zarucchi, replacing the later name *T.* ×*floridana* (Vail) Isely, which has been in regular use in the southeastern United States (Nesom & Zarucchi 2009). **Syn:** = K1, K3, K4, SE3, WH3, Isely (1998), Wood (1949); > *Cracca carpenteri* Rydberg – S; > *Cracca chapmanii* (Vail) Small – S; > *Cracca chrysophylla* (Pursh) Kuntze – S. NatureServe G4G5 (Apparently Secure).

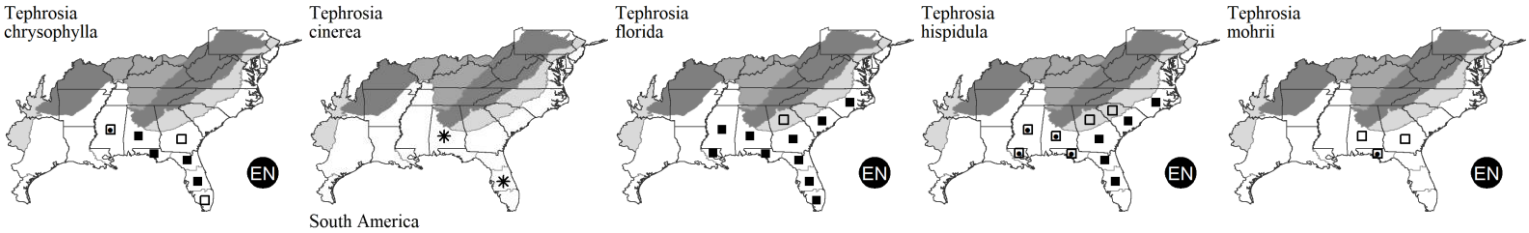
* ***Tephrosia cinerea*** (Linnaeus) Persoon. ASHEN HOARY-PEA. **Hab:** Disturbed areas, presumably only a waif. **Dist:** Native of South America. Reported from an 19th century ballast collection from Mobile, AL. **Syn:** = Bah, K2, K3, K4, SE3, Isely (1998); = *Cracca cinerea* (Linnaeus) Morong – S. NatureServe GNR (Not Yet Ranked).

Tephrosia florida (F.G. Dietrich) C.E. Wood. FLORIDA HOARYPEA, FLORIDA GOAT'S-RUE. **Hab:** Pine savannas and other pinelands. **Dist:** E. NC south to s. FL, west to se. LA, a Southeastern Coastal Plain endemic. **Phen:** May-Jul; Jun-Sep. **Tax:** See *T. chrysophylla* for discussion of hybrids between *T. chrysophylla* and *T. florida*. **Syn:** = K1, K3, K4, RAB, SE3, WH3, Isely (1998), Wood (1949); = *Cracca ambigua* (M.A. Curtis) Kuntze – S. NatureServe G4G5 (Apparently Secure).

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Tephrosia hispidula (Michaux) Persoon. SPRAWLING HOARYPEA. **Hab:** Pine savannas and other pinelands. **Dist:** E. NC (se. VA?) south to c. peninsular FL, west to se. LA, a Southeastern Coastal Plain endemic. **Phen:** May-Aug; Jul-Oct. **Comm:** Fernald (1950) reports this species from se. VA. **Syn:** = F, K1, K3, K4, RAB, SE3, WH3, Isely (1998), Wood (1949); = *Cracca hispidula* (Michaux) Kuntze – S. NatureServe G4G5 (Apparently Secure).

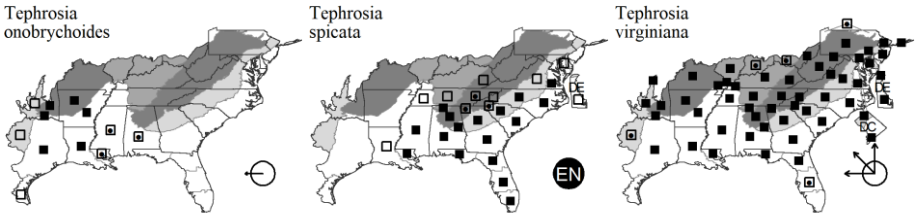
Tephrosia mohrii (Rydberg) Godfrey. DWARF GOAT'S-RUE. **Hab:** Longleaf pine sandhills, dry savannas. **Dist:** GA and westward to s. AL in the East Gulf Coastal Plain. **Comm:** Perhaps not distinct from *T. virginiana*, but not easily dismissed as "little more than a freak" (Wood 1949); see Godfrey & Kral (1958). **Syn:** = K1, K3, K4; = *Cracca mohrii* Rydberg – S; = *Tephrosia virginiana* var. *mohrii* (Rydberg) D.B. Ward – Ward (2004c); < *Tephrosia virginiana* (Linnaeus) Persoon – SE3, WH3, Isely (1998), Wood (1949).



Tephrosia onobrychoides Nuttall. **Hab:** Dry pinelands. **Dist:** S. AL, n. AR, e. OK, south to s. LA, and sc. TX. **Phen:** Jun-Jul (-Sep). **Syn:** = Ar, K1, K3, K4, NcTx, SE3, Tx, Isely (1998), Wood (1949); = *Cracca onobrychoides* (Nuttall) Kuntze – S. NatureServe G4G5 (Apparently Secure).

Tephrosia spicata (Walter) Torrey & A. Gray. SPIKED HOARYPEA. **Hab:** Sandhills, oak and oak-pine woodlands. **Dist:** S. DE south to s. FL, west to w. LA, north in the interior to se., sc., and sw. TN and se. KY. **Phen:** Jun-Aug; Jul-Oct. **Syn:** = C, G, K1, K3, K4, RAB, SE3, Tn, Va, W, WH3, Wood (1949); = *Cracca spicata* (Walter) Kuntze – S; > *Tephrosia spicata* var. *semitonsa* Fernald – F; > *Tephrosia spicata* var. *spicata* – F. NatureServe G4G5 (Apparently Secure).

Tephrosia virginiana (Linnaeus) Persoon. VIRGINIA GOAT'S-RUE, DEVIL'S SHOELACES. **Hab:** Longleaf pine sandhills, other dry or dryish pinelands, xeric and/or rocky oak and oak-pine woodlands and forests, rock outcrops, shale barrens and other barrens, dry roadbanks. **Dist:** S. NH west to WI, se. MN, and c. KS, south to c. peninsular FL, c. TX, and nw. TX. **Phen:** May-Jun; Jul-Oct. **Comm:** "Under grazing the plant soon disappears" (Great Plains Flora Association 1986). **Syn:** = Ar, C, GrPl, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, SE3, Tn, Tx, Va, W, WV, Isely (1998); = *Cracca virginiana* Linnaeus – S; = *Tephrosia virginiana* var. *virginiana* – Ward (2004c); < *Tephrosia virginiana* (Linnaeus) Persoon – SE3, WH3, Isely (1998), Wood (1949); > *Tephrosia virginiana* var. *glabra* Nuttall – F, G; > *Tephrosia virginiana* var. *holosericea* (Nuttall) Torrey & A. Gray – Il; > *Tephrosia virginiana* var. *virginiana* – F, G, Il.



Thermopsis R. Brown ex Aiton & W.T. Aiton 1811 (GOLDEN-BANNER)

A genus of ca. 23 species, perennial herbs, of temperate e. North America, w. North America, and e. Asia. References: Chen, Mendenhall, & Turner (1994); Chen, Mendenhall, & Turner in FNA () (in prep); Isely (1981); Isely (1998); Larisey (1940b).

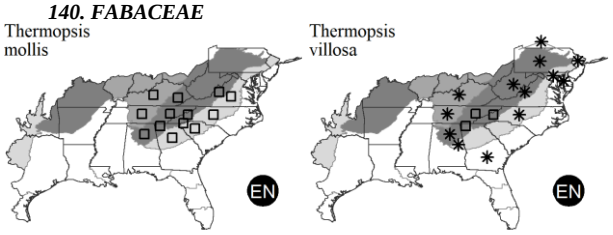
1 Legumes erect or strongly ascending, densely villous; stipules clasping, those of the principal leaves (20-) 35-65 mm long, 10-30 mm wide; pedicels 2-3 mm long; plants mostly 6-20 dm tall, strict or few-branched..... ***Thermopsis villosa***

1 Legumes spreading to ascending, glabrate or pubescent; stipules not clasping, those of the principal leaves 12-25 (-32) mm long, 1-5 mm wide; pedicels 4-20 mm long; plants mostly 3-10 dm tall, branched.
..... ***Thermopsis mollis***

Thermopsis mollis (Michaux) M.A. Curtis. APPALACHIAN GOLDEN-BANNER. **Hab:** Dry slopes and ridges. **Dist:** Centered in the Southern Appalachians, but mostly in the Piedmont and lower elevation periphery of the mountains, ranging from sc. VA south through w. and c. NC and e. TN to nw. SC, n. GA, and ne. AL. **Phen:** Apr-May; Jun-Aug. **Tax:** See comments under *T. fraxinifolia*. **Syn:** = C, F, G, K1, K3, K4, RAB, Tn, Va, W, Chen, Mendenhall, & Turner (1994); = *Thermopsis mollis* var. *mollis* – SE3, Isely (1981), Isely (1998); > *Thermopsis hugeri* Small – S; > *Thermopsis mollis* (Michaux) M.A. Curtis – S. NatureServe G3G4 (Vulnerable).

Thermopsis villosa (Walter) Fernald & Schubert. AARON'S-ROD, BLUE RIDGE GOLDEN-BANNER. **Hab:** Floodplains, mesic disturbed areas, woodland edges, roadbanks. **Dist:** A Southern Blue Ridge endemic: w. NC and e. TN to n. GA, and escaped from cultivation more widely, as in w. VA, s. MD, c. TN, and WV representing escapes from cultivation. **Phen:** May-Jun; Jul-Sep. **Comm:** *T. villosa* is a more erect and unbranched plant than our other two species. It is generally found in disturbed sites, its natural habitat somewhat of a mystery. **Syn:** = C, K1, K3, K4, NE, NY, RAB, SE3, Tn, W, Chen, Mendenhall, & Turner (1994), Isely (1981), Isely (1998); = *Thermopsis caroliniana* M.A. Curtis – S. NatureServe G3? (Vulnerable).

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



Trifolium Linnaeus 1753 (CLOVER)

A genus of about 240-250 species, annual and perennial herbs, nearly cosmopolitan (primarily north temperate). References: Chapel & Vincent (2013); Collins & Wieboldt (1992); Isely (1998); Zohary & Heller (1984).

Identification Notes: Draft key adapted from various published sources, including SE and C.

Unkeyed waifs: *Trifolium angustifolium, Trifolium echinatum, Trifolium scabrum*

1 Flowers bright yellow (fading brown); [section *Chronosemium*].
- 2 Leaves palmately trifoliolate (all leaflets essentially sessile); heads 10-13 mm in diameter; flowers 5-7 mm long..... ***Trifolium aureum***
- 2 Leaves pinnately trifoliolate (the lateral leaflets essentially sessile, the terminal leaflet with a petiolule 0.8-3 mm long); heads 5-13 mm in diameter; flowers 2.5-5 mm long.
  - 3 Standard with 5 obvious diagonal veins (striations); heads 8-13 mm in diameter, generally with 20-30 flowers; flowers 3.5-5 mm long; petiolule of the terminal leaflet 1-3 mm long..... ***Trifolium campestre***
  - 3 Standard inconspicuously veined; heads 5-8 mm in diameter, generally with 5-15 (-20) flowers; flowers 2.5-3.5 mm long; petiolule of the terminal leaflet ca. 1 mm long..... ***Trifolium dubium***

1 Flowers not white, pink, purplish, or red.
- 4 Flowers borne on distinct pedicels, (1-) 2-10 mm long, these often curving or reflexing in age; flowers white, fading pink with age in most species; [native and alien species]; [section *Lotoidea*].
  - 5 Plants stoloniferous, all or some of the leaves alternate from ground level and long petioled. ..... ***Trifolium repens***
  - 5 Plants not stoloniferous, clumped (though sometimes with prostrate or lax stems).
    - 8 Calyx lobes narrowly triangular, about as long as the calyx tube (or longer in *T. hybridum*); stipules scarious-membranaceous; [plants introduced].
      - 9 Calyx lobes not scarious-margined, straight, equal to or longer than the tube..... ***Trifolium hybridum***
      - 9 Calyx lobes scarious-margined, becoming divergent and twisted, about equal to the tube..... ***Trifolium nigrescens***
    - 8 Calyx lobes subulate to lanceolate, distinctly longer than the calyx tube; stipules green, foliaceous; [plants rare natives].
      - 10 Flowers 4-6 mm long; calyx lobes lanceolate, foliaceous, 3-nerved, 0.4-0.8 mm wide..... ***Trifolium carolinianum***
      - 10 Flowers 8-12 mm long; calyx lobes subulate, setaceous, 1-nerved, < 0.4 mm wide. ..... ***Trifolium reflexum***
- 4 Flowers sessile or on very short pedicels (usually < 1 mm long); flowers pink, purplish, white, or scarlet; [alien species].
  - 13 Plants stoloniferous, all or some of the leaves alternate from ground level and long petioled. ..... ***Trifolium subterraneum***
  - 13 Plants not stoloniferous, the leaves clustered at or near ground level and/or produced on aerial stems.
    - 15 Heads subtended by a pseudo-involucre of 2 (-3) enlarged stipules and/or opposite or subopposite leaves; [section *Trifolium*].
      - 16 Flowers white (fading pink), 7-8 mm long; calyx tube both externally glabrous and 20-nerved..... ***Trifolium lappaceum***
      - 16 Flowers red, pink-purple, or bicolored, either 11-20 mm long or 4-6 mm long; calyx tube not both externally glabrous and 20-nerved (externally pubescent, or 10-nerved, or both).
        - 18 Stipules gradually tapering to a long slender tip, longer than the fused part; calyx densely hirsute; stem soft pubescent with deflexed to spreading hairs..... ***Trifolium hirtum***
        - 18 Stipules abruptly narrowed to a short awn; calyx glabrous to pilose; stem appressed pubescent..... ***Trifolium pratense***
    - 15 Heads not subtended by a pseudo-involucre of leaves or expanded stipules.
      - 20 Calyx bladdery-inflated in fruit; corolla resupinate (inverted 180 degrees, such that the standard is lowermost); [section *Vesicaria*]. ..... ***Trifolium resupinatum***
      - 20 Calyx not bladdery-inflated in fruit; corolla orientation normal (standard uppermost).
        - 22 Corolla 3-6 mm long; [section *Trifolium*]..... ***Trifolium arvense***
        - 22 Corolla 10-18 mm long.
          - 23 Corolla crimson, 10-13 (-15) mm long; floral bracts absent; heads 1-1.5 (-2) cm in diameter; [section *Trifolium*] ..... ***Trifolium incarnatum***
          - 23 Corolla white, 15-18 mm long; floral bracts present; heads 2.5-3 cm in diameter; [section *Mistyllus*]..... ***Trifolium vesiculosum***

* ***Trifolium angustifolium*** Linnaeus. NARROWLEAF CLOVER. **Hab:** Waste areas near wool-combing mills, perhaps only a waif. **Dist:** Native of Mediterranean Europe and w. Asia. Reported for SC (Kartesz 1999), based on specimen at NCU. **Comm:** {not yet keyed}. **Syn:** = K1, K2, K4, Isely (1998). NatureServe GNR (Not Yet Ranked).

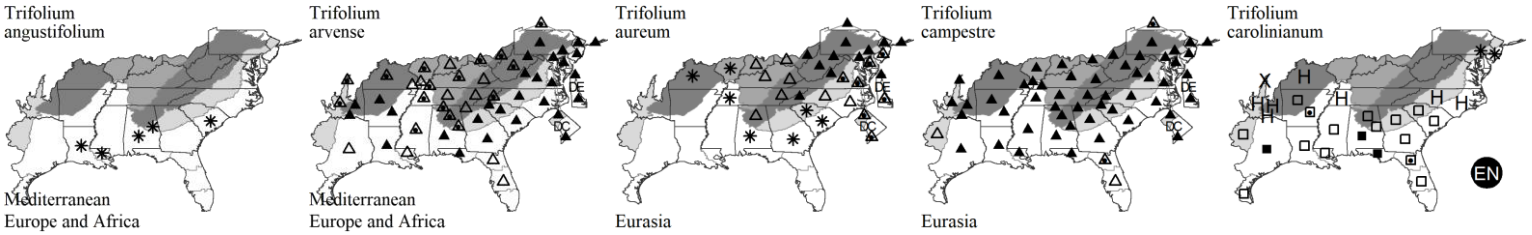
* ***Trifolium arvense*** Linnaeus. RABBITFOOT CLOVER. **Hab:** Disturbed areas, shale barrens. **Dist:** Native of the Mediterranean region. **Phen:** Apr-Oct. **Syn:** = Ar, C, F, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, SE3, Tn, Va, W, WH3, WV, Isely (1998). NatureServe GNR (Not Yet Ranked).

* ***Trifolium aureum*** Pollich. LARGE HOP CLOVER, YELLOW CLOVER. **Hab:** Fields, roadsides, disturbed areas. **Dist:** Native of Eurasia. **Phen:** May-Sep. **Syn:** = C, Il, K1, K3, K4, Mi, NE, NY, Pa, SE3, Va, W, Isely (1998); = *Trifolium agrarium* Linnaeus – F, G, RAB, S, WV, misapplied.

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

* ***Trifolium campestre*** Schreber. HOP CLOVER. **Hab:** Roadsides, fields, lawns, disturbed areas. **Dist:** Native of Eurasia. **Phen:** Feb-Oct. **Syn:** = Ar, C, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, SE3, Tn, Tx, Va, W, WH3, WV, Isely (1998); ? *Trifolium procumbens* Linnaeus – F, G, S, misapplied. NatureServe GNR (Not Yet Ranked).

Trifolium carolinianum Michaux. WILD WHITE CLOVER, CAROLINA CLOVER. **Hab:** Open woodlands, woodland edges, pine savannas, thin soils around rock outcrops, disturbed areas. **Dist:** Se. NC south to n. FL, west to MO, OK, and c. TX. **Phen:** Apr-Jul. **Syn:** = Ar, C, F, G, GrPl, K1, K3, K4, NcTx, RAB, SE3, Tx, W, WH3, Isely (1998); > *Trifolium carolinianum* Michaux – S; > *Trifolium saxicola* Small – S. NatureServe G5 (Secure).



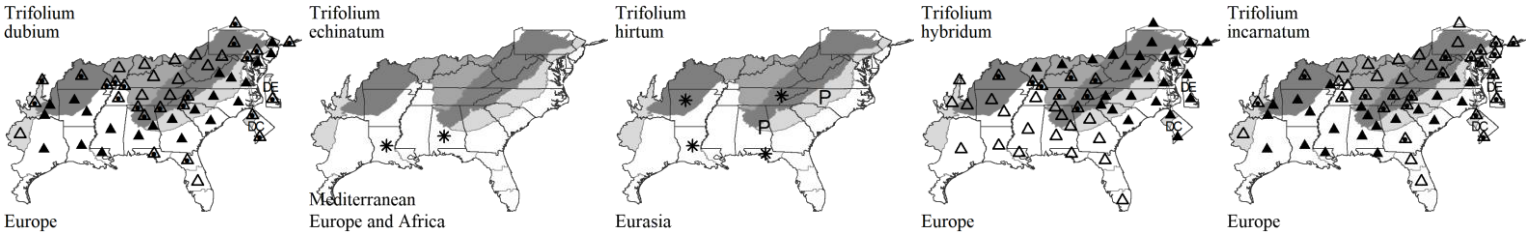
* ***Trifolium dubium*** Sibthorp. LOW HOP CLOVER, LITTLE HOP CLOVER. **Hab:** Roadsides, lawns, disturbed areas. **Dist:** Native of Europe. **Phen:** Feb-Oct. **Syn:** = Ar, C, F, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, SE3, Tn, Tx, Va, W, WH3, WV, Isely (1998). NatureServe GNR (Not Yet Ranked).

* ***Trifolium echinatum*** M. Bieberstein. PRICKLY CLOVER. **Hab:** Disturbed areas. **Dist:** Native of Mediterranean Europe, n. Africa, and w. Asia. **Syn:** = K4. NatureServe GNR (Not Yet Ranked).

* ***Trifolium hirtum*** Allioni. ROSE CLOVER. **Hab:** Roadsides, disturbed areas. **Dist:** Native of Eurasia and n. Africa. A report for VA has no documentation. **Phen:** Apr-Jul. **Syn:** = C, G, K1, K3, K4, RAB, SE3, WH3, Isely (1998). NatureServe GNR (Not Yet Ranked).

* ***Trifolium hybridum*** Linnaeus. ALSIKE CLOVER. **Hab:** Lawns, fields, roadsides, disturbed areas. **Dist:** Native of Europe. **Phen:** Apr-Nov. **Syn:** = Ar, C, G, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, SE3, Tn, Tx, Va, W, WH3, WV, Isely (1998); > *Trifolium hybridum* ssp. *elegans* (Savi) Ascherson & Graebner – GrPl; > *Trifolium hybridum* ssp. *hybridum* – GrPl; > *Trifolium hybridum* var. *elegans* (Savi) Boissier – F; > *Trifolium hybridum* var. *hybridum* – F.

* ***Trifolium incarnatum*** Linnaeus. CRIMSON CLOVER. **Hab:** Fields, disturbed areas. **Dist:** Native of Europe. **Phen:** Apr-Sep; Jun-Oct. **Syn:** = Ar, C, F, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, SE3, Tn, Tx, Va, W, WH3, WV, Isely (1998). NatureServe GNR (Not Yet Ranked).



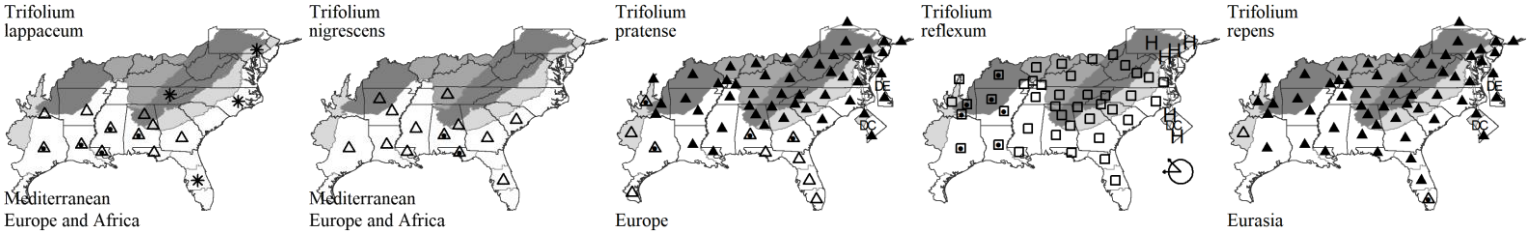
* ***Trifolium lappaceum*** Linnaeus. LAPPA CLOVER, BURDOCK CLOVER. **Hab:** Disturbed areas. **Dist:** Native of Mediterranean Eurasia and Africa. **Phen:** Apr-Aug. **Syn:** = Ar, K1, K3, K4, NcTx, RAB, S, SE3, WH3, Isely (1998). NatureServe GNR (Not Yet Ranked).

* ***Trifolium nigrescens*** Viviani. BALL CLOVER. **Hab:** Disturbed areas. **Dist:** Native of Mediterranean Europe and n. Africa. Introduced in c. TN (Chester, Wofford, & Kral 1997). **Syn:** = Ar, K1, K3, K4, S, SE3, WH3, Isely (1998). NatureServe GNR (Not Yet Ranked).

* ***Trifolium pratense*** Linnaeus. RED CLOVER. **Hab:** Fields, roadsides, disturbed areas. **Dist:** Native of Europe. **Phen:** Apr-Nov. **Syn:** = Ar, Bah, C, G, GrPl, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, SE3, Tn, Tx, Va, W, WH3, WV, Isely (1998); > *Trifolium pratense* var. *pratense* – F, Il; > *Trifolium pratense* var. *sativum* (P. Miller) Schreber – F, Il. NatureServe GNR (Not Yet Ranked).

Trifolium reflexum Linnaeus. BUFFALO CLOVER. **Hab:** Open woodlands, woodland edges, dry shaly places. **Dist:** NJ, PA, OH, IN, IL, IA, and se. NE south to FL, AL, MS, LA, and e. TX. **Phen:** Apr-Jul. **Comm:** This species appears to have declined very significantly in recent decades across most or all of its distribution. **Syn:** = Ar, C, GrPl, K1, K3, K4, Pa, RAB, S, SE3, Tn, Tx, Va, W, WH3, WV, Chapel & Vincent (2013), Collins & Wieboldt (1992), Isely (1998); > *Trifolium reflexum* var. *glabrum* Lojacono – F, G, Il; > *Trifolium reflexum* var. *reflexum* – F, G, Il.

* ***Trifolium repens*** Linnaeus. WHITE CLOVER, DUTCH CLOVER, LADINO CLOVER. **Hab:** Lawns, roadsides, disturbed areas. **Dist:** Native of Eurasia. **Phen:** Jan-Nov. **Syn:** = Ar, Bah, C, F, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, SE3, Tn, Tx, Va, W, WH3, WV, Collins & Wieboldt (1992), Isely (1998). NatureServe GNR (Not Yet Ranked).



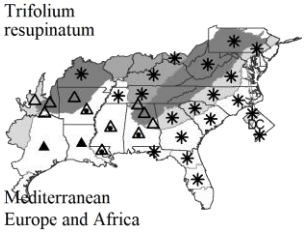
* ***Trifolium resupinatum*** Linnaeus. PERSIAN CLOVER, REVERSED CLOVER. **Hab:** Lawns and disturbed areas. **Dist:** Native of Mediterranean region and w. Asia. **Phen:** Feb-Sep. **Syn:** = Ar, C, F, G, GrPl, Il, K1, K3, K4, NcTx, NE, NY, Pa, RAB, S, SE3, Tx, WH3, Isely (1998). NatureServe GNR (Not Yet Ranked).

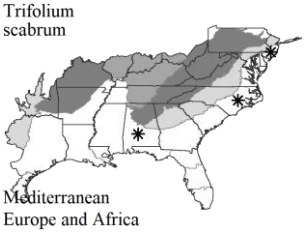
* ***Trifolium scabrum*** Linnaeus. ROUGH CLOVER. **Hab:** Disturbed dunes, railroad tracks, other disturbed areas. **Dist:** Native of Mediterranean Europe. **Comm:** Reported for Cape Hatteras National Seashore in 2018 (Brian Finzel, pers. comm., 2018). **Syn:** = K3, K4. NatureServe GNR (Not Yet Ranked).

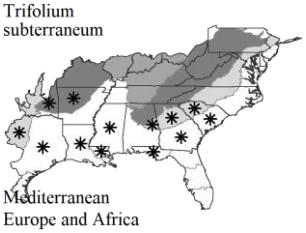
Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

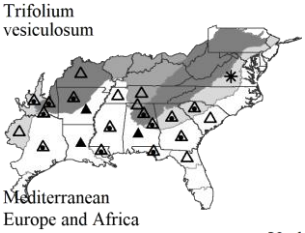
* ***Trifolium subterraneum*** Linnaeus. SUBTERRANEAN CLOVER. **Hab:** Disturbed areas, waste areas near wool-combing mills. **Dist:** Native of Europe, Asia, and n. Africa. Reported for NC and SC by Isely (1990); reported for Piedmont of GA by Jones & Coile (1988), and collected in MS (Stone County) (S.W. Leonard, pers. comm. 2007). **Syn:** = Ar, K1, K3, K4, NE, SE3, Isely (1998). NatureServe GNR (Not Yet Ranked).

* ***Trifolium vesiculosum*** Savi. ARROWLEAF CLOVER. **Hab:** Roadsides, disturbed areas. **Dist:** Native of s. Europe. **Comm:** First reported for South Carolina by Hill & Horn (1997). **Syn:** = Ar, K1, K3, K4, NcTx, SE3, WH3, Isely (1998). NatureServe GNR (Not Yet Ranked).

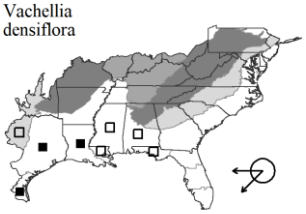








Vachellia Wight & Arnott 1834 (ACACIA)



A genus of about 163 species, trees and shrubs, of tropical and subtropical America, Africa, Asia, and Australia. Formerly considered part of *Acacia*. References: Ebinger & Seigler in FNA () (in prep); Ebinger, Seigler, & Clarke (2002); Isely (1969); Isely (1998); Maslin, Miller, & Seigler (2003); Seigler & Ebinger (2005).

Vachellia densiflora Alexander ex Small. SMALL'S SWEET ACACIA, HUISACHE. **Hab:** Sandy flats on barrier islands, maritime scrub, shell middens, disturbed uplands. **Dist:** FL Panhandle west along the coast to TX and Tamaulipas. **Syn:** = S; = *Acacia smallii* Isely – SE3, Isely (1969), Isely (1998); < *Acacia farnesiana* (Linnaeus) Willdenow – K1, NcTx, Tx, WH3; < *Acacia farnesiana* ssp. *farnesiana* – Ebinger, Seigler, & Clarke (2002); < *Vachellia farnesiana* var. *farnesiana* – K3, K4, Seigler & Ebinger (2005). NatureServe G5 (Secure).

Vicia Linnaeus 1753 (VETCH, TARE)

A genus of about 150-160 species, annual and perennial herbs, of temperate Eurasia and North America. References: Isely (1998); Lassetter (1984); van de Wouw, Maxted, & Ford-Lloyd (2003).

1 Inflorescence nearly sessile, of 1-4 flowers clustered in the leaf axil; [alien species].
  3 Corolla 5-6 mm long; leaves with 4-6 (-8) leaflets ..... ***Vicia lathyroides***
  3 Corolla 10-30 mm long; leaflets 6-16 (-20).
    5 Calyx lobes all shorter than the calyx tube; corolla yellow, often streaked with purple, 25-30 mm long ..... ***Vicia grandiflora***
    5 Calyx lobes (at least the longer) about as long as the calyx tube; corolla pink, purple, lavender, white, or creamy yellow, 10-25 (-30) mm long.
      6 Standard pubescent dorsally; corolla 15-25 (-30) mm long, creamy yellow to purple; legume pubescent, with a basal stipe ..... ***Vicia pannonica***
      6 Standard glabrous; corolla 10-25 (-30) mm long, pink, purple, lavender, or whitish; legume glabrous, sessile.
        7 Calyx 7-11 (-12) mm long; corolla pink-purple to whitish, 10-18 mm long; leaflets 4-10× as long as wide ..... ***Vicia sativa ssp. nigra***
        7 Calyx 10-15 mm long; corolla generally pink-purple, 18-25 (-30) mm long; leaflets 2-5 (-7)× as long as wide ..... ***Vicia sativa ssp. sativa***
1 Inflorescence pedunculate, of 2-many flowers along a well-developed raceme; [alien and native species].
  10 Corolla 10-25 mm long.
    13 Calyx swollen on one side; plant an annual; inflorescence secund.
      14 Plant glabrate or with pubescence of incurved or loosely appressed hairs < 1 mm long; lower calyx lobe lanceolate to linear-lanceolate, 1-2 (-3) mm long; leaflets 2-4 mm wide ..... ***Vicia villosa ssp. varia***
      14 Plant conspicuously villous, the hairs spreading and 1-2 mm long; lower calyx lobe acicular or weak, (2-) 3-4 mm long; leaflets 3-6 mm wide ..... ***Vicia villosa ssp. villosa***
    13 Calyx not swollen on one side; plant a rhizomatous perennial; inflorescence not secund. ..... ***Vicia caroliniana***
  10 Corolla 2.5-8 (-10) mm long.
    16 Plant a rhizomatous perennial.
      17 Leaves with 2-4 (-6) leaflets; [plants of s. SC southward, native, of the Coastal Plain]. ..... ***Vicia acutifolia***
      17 Leaves with 10-25 leaflets; [plants collectively widespread in our area, native or alien]. ..... ***Vicia caroliniana***
    16 Plant an annual.
      20 Legume symmetrically rounded at the apex; inflorescence with 1-2 (-4) flowers ..... ***Vicia tetrasperma***
      20 Legume asymmetrically acute at the apex; inflorescence with 1-15 flowers.
        21 Leaves with 2-4 leaflets; legume glabrous to inconspicuously puberulent ..... ***Vicia minutiflora***
        21 Leaves with (8-) 10-16 leaflets; legume glabrous or finely hirsute.
          22 Legume finely hirsute; calyx 2-2.5 mm long; corolla 2.5-4.5 mm long ..... ***Vicia hirsuta***
          22 Legume glabrous; calyx 2.8-3.7 mm long; corolla 4.5-8 mm long. ..... ***Vicia ludoviciana var. ludoviciana***

Vicia acutifolia Elliott. FOURLEAF VETCH. **Hab:** Pond margins, pine flatwoods, ditches. **Dist:** Se. SC south to s. FL, west to e. Panhandle FL; n. Bahamas. **Phen:** Apr-May; May-Jun. **Syn:** = Bah, GW2, K1, K3, K4, RAB, S, SE3, WH3, Isely (1998). NatureServe G4G5 (Apparently Secure).

Key to Map Symbology:

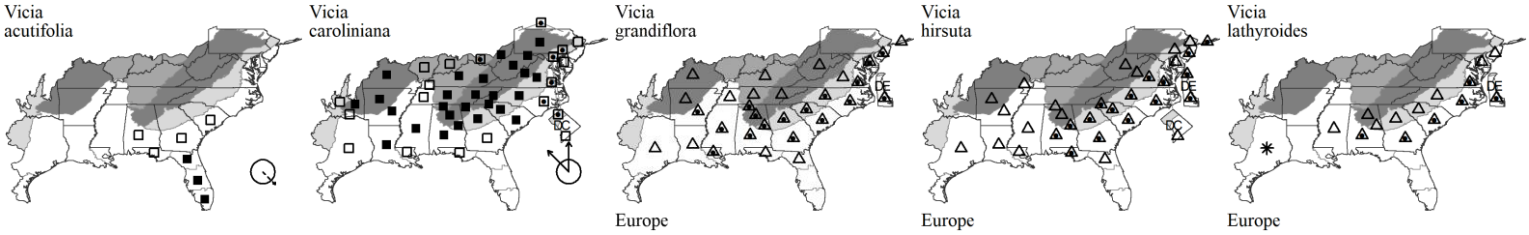
* : waif
EN : endemic
H : historic
N : no
P : planted
? : questionable
X : extirpated

Vicia caroliniana Walter. PALE VETCH, WOOD VETCH, CAROLINA VETCH. **Hab:** Forests, woodlands, and disturbed areas. **Dist:** NY west to WI, south to s. GA, s. MS, and c. TX. **Phen:** Apr-Jun; May-Jul. **Syn:** = Ar, C, F, G, Il, K1, K3, K4, Mi, NY, Pa, SE3, Tn, Tx, Tx, Va, W, WH3, WV, Isely (1998); > *Vicia caroliniana* Walter – RAB, S; > *Vicia hugeri* Small – RAB, S. NatureServe G5 (Secure).

* ***Vicia grandiflora*** Scopoli. LARGE YELLOW VETCH. **Hab:** Disturbed areas. **Dist:** Native of Europe. **Phen:** Apr-Jun; May-Jul. **Syn:** = Ar, C, F, G, K1, K3, K4, Mi, NE, NY, SE3, Tn, Va, W, WH3, Isely (1998); > *Vicia grandiflora* var. *kitaibeliana* W.D.J. Koch – RAB. NatureServe GNR (Not Yet Ranked).

* ***Vicia hirsuta*** (Linnaeus) S.F. Gray. TINY VETCH, HAIRY TARE. **Hab:** Disturbed areas. **Dist:** Native of Europe. **Phen:** Apr-Jun; May-Jul. **Syn:** = C, F, G, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, SE3, Va, WH3, Isely (1998). NatureServe GNR (Not Yet Ranked).

* ***Vicia lathyroides*** Linnaeus. SPRING VETCH. **Hab:** Lawns, disturbed areas. **Dist:** Native of Europe. **Phen:** Apr-Jun; May-Jul. **Syn:** = C, F, G, K1, K3, K4, Mi, NE, RAB, SE3, Va, Isely (1998). NatureServe GNR (Not Yet Ranked).



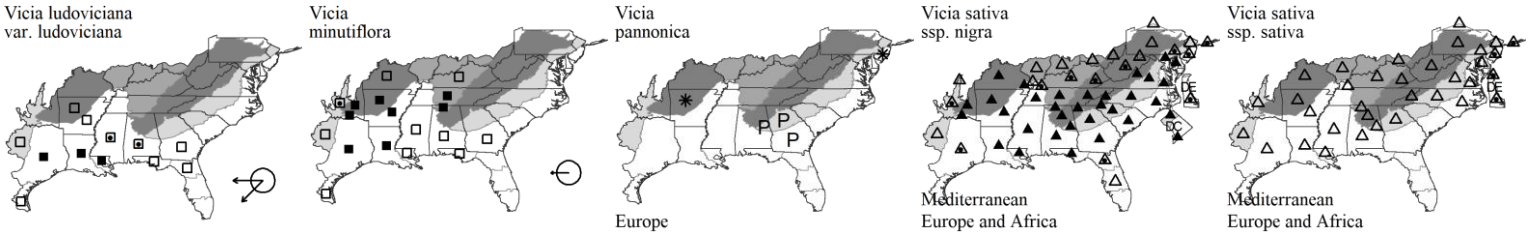
Vicia ludoviciana *var.* ***ludoviciana***. LOUISIANA VETCH. **Hab:** Woodlands, prairies, dunes, disturbed areas. **Dist:** GA, AL, and Panhandle FL west to AR and c. TX. **Phen:** Late Mar-May. **Syn:** = GrPl, Tx; = *Vicia ludoviciana* ssp. *ludoviciana (race 1)* – Lassetter (1984); = *Vicia ludoviciana* ssp. *ludoviciana (Race 1, ludoviciana)* – Isely (1998); < *Vicia ludoviciana* – WH3; < *Vicia ludoviciana* Nuttall ssp. *ludoviciana* – K1, K3, NcTx, SE3. NatureServe G5TNR (Not Yet Ranked).

Vicia minutiflora D. Dietrich. SMALLFLOWER VETCH. **Hab:** Calcareous woodlands, bluffs, and outcrops, dry hammocks. **Dist:** Sw. KY (Trigg County; Brock 2020), TN, Panhandle FL, and sw. GA west to OK and TX. **Phen:** Apr-May. **Syn:** = Ar, GW2, K1, K3, K4, NcTx, SE3, Tn, WH3, Isely (1998), van de Wouw, Maxted, & Ford-Lloyd (2003); = *Vicia micrantha* Nuttall ex Torrey & A. Gray – F, G, S; > *Vicia minutiflora* D. Dietrich – Tx; > *Vicia reverchonii* S. Watson – Tx. NatureServe G5 (Secure).

* ***Vicia pannonica*** Crantz. HUNGARIAN VETCH. **Hab:** Planted in agricultural test plots, perhaps weakly naturalized. **Dist:** Native of Europe. Reported for AL and GA, but all known specimens are from agricultural test plots (Wichmann, pers. comm. 2013). Also reported for NC (Isely 1998). {investigate}. **Syn:** = K1, K3, K4, NE, SE3, Isely (1998). NatureServe GNR (Not Yet Ranked).

* ***Vicia sativa*** Linnaeus *ssp.* ***nigra*** (Linnaeus) Ehrhart. NARROWLEAF VETCH. **Hab:** Disturbed areas. **Dist:** Native of Mediterranean Europe. **Phen:** Feb-Oct; Apr-Oct. **Syn:** = Ar, K1, K3, K4, Mi, NcTx, NE, NY, Pa, SE3, Tn, Va, Isely (1998); = *Vicia angustifolia* Linnaeus – C, Il, RAB, S, Tx, W; = *Vicia sativa* var. *angustifolia* (Linnaeus) Ehrhart – GrPl; > *Vicia angustifolia* var. *angustifolia* – F, G, WV; > *Vicia angustifolia* var. *segetalis* (Thuillier) Seringe – F, G, WV; > *Vicia angustifolia* var. *uncinata* (Desvaux) Rouy – F; < *Vicia sativa* – WH3.

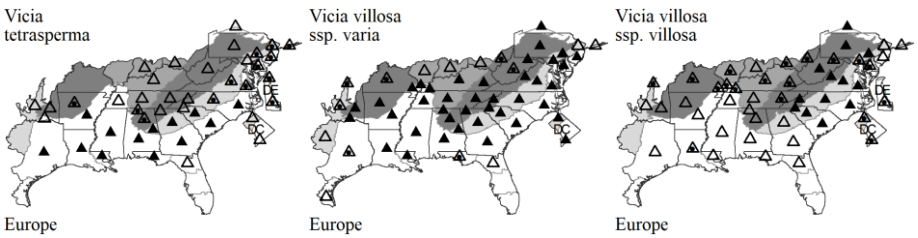
* ***Vicia sativa*** Linnaeus *ssp.* ***sativa***. COMMON VETCH. **Hab:** Disturbed areas. **Dist:** Native of Mediterranean Europe. **Phen:** Apr-Sep; May-Oct. **Syn:** = Ar, K1, K3, K4, NcTx, NE, NY, Pa, SE3, Va, Isely (1998); = *Vicia sativa* – C, G, Il, RAB, S, Tx; = *Vicia sativa* var. *sativa* – GrPl; > *Vicia sativa* var. *linearis* Lange – F; > *Vicia sativa* var. *sativa* – F. NatureServe GNRTNR (Not Yet Ranked).



* ***Vicia tetrasperma*** (Linnaeus) Schreber. SLENDER VETCH, SMOOTH TARE, LENTIL VETCH, SPARROW VETCH. **Hab:** Disturbed areas. **Dist:** Native of Europe. **Phen:** Apr-Sep; May-Oct. **Syn:** = Ar, C, G, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, SE3, Tn, Va, WH3, Isely (1998); > *Vicia tetrasperma* var. *tenuissima* Druce – F; > *Vicia tetrasperma* var. *tetrasperma* – F.

* ***Vicia villosa*** Roth *ssp.* ***varia*** (Host) Corbière. WINTER VETCH. **Hab:** Disturbed areas. **Dist:** Native of Europe. **Phen:** May-Sep. **Syn:** = Ar, K1, K3, K4, Mi, NcTx, NE, NY, Pa, SE3, Tn, Va, Isely (1998); = *Vicia dasycarpa* Tenore – C, F, G, Il, RAB, Tx, W, WV; = *Vicia villosa* var. *glabrescens* K. Koch – GrPl; < *Vicia villosa* – WH3. NatureServe G5T5 (Secure).

* ***Vicia villosa*** Roth *ssp.* ***villosa***. HAIRY VETCH, FODDER VETCH. **Hab:** Disturbed areas. **Dist:** Native of Europe. **Phen:** May-Sep. **Syn:** = Ar, K1, K3, K4, Mi, NcTx, NE, NY, Pa, SE3, Tn, Va, Isely (1998); = *Vicia villosa* – C, F, G, Il, RAB, Tx, W, WV; < *Vicia villosa* – WH3. NatureServe G5TNR (Not Yet Ranked).



Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more)

* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable

X : extirpated

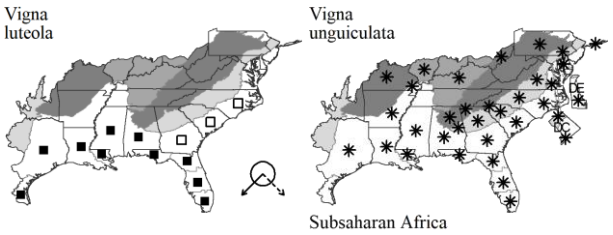
Vigna Savi 1824 (COWPEA)

A genus of about 60-150 species, annual and perennial herbs, pantropical, rarely extending into warm temperate regions. References: Delgado-Salinas in FNA () (in prep); Isely (1998); Maréchal, Mascherpa, & Stainier (1978).

1 Corolla yellow, 1.5-1.7 cm long; leaves somewhat fleshy-thickened; [plant native or introduced in maritime situations]; [section *Vigna*] ..... ***Vigna luteola***
1 Corolla pink to purple, 1.5-2.5 cm long; leaves herbaceous; [plant a cultivated introduction]; [section *Catiang*] ..... ***Vigna unguiculata***

Vigna luteola (Jacquin) Bentham. WILD COWPEA. **Hab:** Edges of freshwater tidal marshes, beaches, hammocks, disturbed areas, railroad embankments, low fields, in the outer Coastal Plain. **Dist:** Se. NC south to s. FL, west to se. TX, and in the New World tropics. **Phen:** Jul-Sep; Aug-Oct. **Comm:** Often weedy in appearance, and its nativity at a particular location difficult to judge. **Syn:** = Bah, GW2, K1, K3, K4, RAB, Tx, WH3, Isely (1998), Maréchal, Mascherpa, & Stainier (1978); ? *Vigna repens* (Linnaeus) Kuntze – S.

* ***Vigna unguiculata*** (Linnaeus) Walpers. BLACK-EYED PEA, FIELD PEA, COWPEA. **Hab:** Cultivated in commercial and home gardens, rarely persistent or occurring as a waif in disturbed areas. **Dist:** Native of tropical Africa. **Phen:** Jun-Aug; Jul-Sep. **Syn:** = Bah, Il, K1, K3, K4, Mi, RAB, Tx, WH3, Isely (1998); = *Vigna unguliculata* – Fl3, misspelling; ? *Vigna sinensis* (Linnaeus) Savi – F, S; > *Vigna unguiculata* var. *unguiculata* – Maréchal, Mascherpa, & Stainier (1978). NatureServe GNR (Not Yet Ranked).



Wisteria Nuttall 1818 (WISTERIA)

A genus of about 6 species, woody vines, shrubs, and small trees, of temperate e. Asia and e. North America. Some research suggests that the Asian species should be placed in a separate genus (see Isely 1998 and Stritch 1984). References: Isely (1998); Stritch (1984); Valder (1995).

Identification Notes: Twining direction can be determined by looking at (or imagining) the vine twining around a branch or pole. Look at the pole or branch from the base (from the direction from which the vine is growing). If the vine is circling the branch or pole in a clockwise direction, that is dextrorse; if counterclockwise, that is sinistrorse. Identification of the two alien species and their hybrids is uncertain. Genetic sorting of morphological characters and horticultural selection mean that morphology is only poorly correlated with genetic origin. Trusty et al. (2007) found that 24 of 25 individuals tested from scattered sites around the Southeast showed genetic admixture (sometimes complicated) between *W. floribunda* and *W. sinensis*. Probably the great majority of material in the Southeast could be called *W.* ×*formosa*; the below key may work poorly or not at all for some material encountered.

1 Legume and ovary glabrous; pedicels 5-10 (-15) mm long; standard reflexed near the middle; seeds reniform; leaflet margins plane; leaflet apices acute to slightly acuminate; [native species of swamps and bottomland forests and thickets]
  2 Upper lip of the calyx <0.5× as long as the tube; inflorescence usually 4-15 cm long; pedicels and calyx with 0-few clavate glands ..... ***Wisteria frutescens var. frutescens***
  2 Upper lip of the calyx 0.7-1.2× as long as the tube; inflorescence usually 15-30 cm long; pedicels and calyx densely clavate-glandular ..... ***Wisteria frutescens var. macrostachya***
1 Legume and ovary velvety pubescent; pedicels 15-20 mm long; standard reflexed at the base; seeds lenticular; leaflet margins undulate; leaflet apices mainly strongly acuminate; [introduced species, naturalized in a wide variety of situations].
  3 Standard 20-23.5 mm long, 21-23 mm wide; leaflets (7-) 9-11 (-13) per leaf; raceme to 33 cm long, with 25-95 flowers opening nearly simultaneously; vine twining clockwise (dextrorse; from lower left ascending to upper right) ..... ***Wisteria sinensis***
  3 Standard 16-18 mm long, 16-18 mm wide; leaflets 7-17 (-19) per leaf; raceme to 132 cm long, with 25-170 flowers opening nearly simultaneously or sequentially; vine twining counter-clockwise (sinistrorse; from lower right ascending to upper left).
    4 Auricles of the standard's callosity 1.1-1.2 mm long; leaflets (11-) 13-17 (-19) per leaf; raceme to 132 cm long, with the 50-170 flowers opening successively from base to the tip of the inflorescence, those at the base withering before those at the tip have opened ..... ***Wisteria floribunda***
    4 Auricles of the standard's callosity 0.7-0.8 mm long; leaflets 7-17 per leaf; racemes to 36 cm long ..... ***Wisteria ×formosa***

* ***Wisteria floribunda*** (Willdenow) A.P. de Candolle. JAPANESE WISTERIA. **Hab:** Commonly cultivated, escaped to urban, suburban, and rural forests and woodlands. **Dist:** Native of Japan. **Phen:** Apr-Jul; Jul-Nov. **Syn:** = Ar, C, F, G, K1, K3, K4, NE, NY, Pa, RAB, SE3, Tn, Tx, Va, WH3, Isely (1998), Valder (1995); = *Kraunhia floribunda* (Willdenow) Taubert – S; = *Rehsonia floribunda* (Willdenow) Stritch – Il, Stritch (1984). NatureServe GNR (Not Yet Ranked).

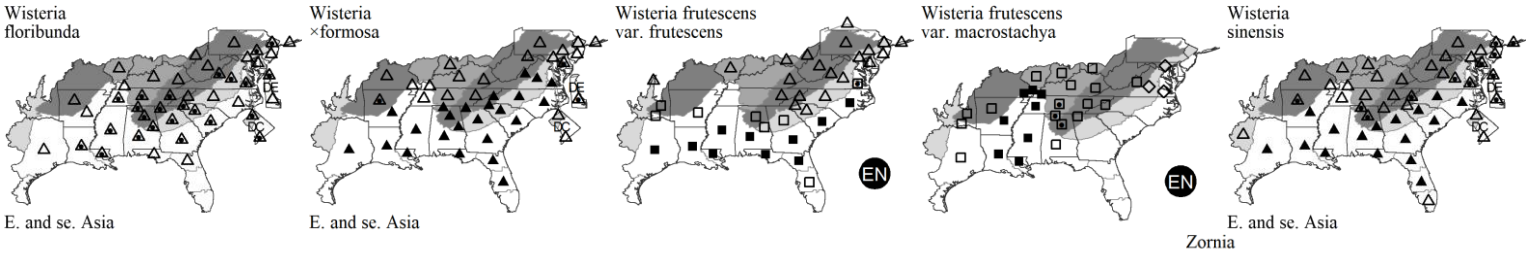
* ***Wisteria ×formosa*** Rehder. HYBRID ASIAN WISTERIA. **Hab:** Cultivated, escaped to urban, suburban, and rural forests and woodlands, commonly cultivated and escaped; a cross of species native to China and Japan. **Dist:** Trusty et al. (2007, 2008) revealed that much of the invasive *Wisteria* in southeastern United States involves complex hybrids and backcrosses involving *W. floribunda* and *W. sinensis*. **Phen:** Apr-Jul; Jul-Nov. **Syn:** = K3, K4, Va, WH3; = *Rehsonia* ×*formosa* (Rehder) Stritch – Stritch (1984).

Wisteria frutescens (Linnaeus) Poiret *var.* ***frutescens***. ATLANTIC WISTERIA, AMERICAN WISTERIA, SWAMP WISTERIA. **Hab:** Swamp forests, wet thickets. **Dist:** E. VA south to n. peninsular FL, west to TX, north in the interior to AR. **Phen:** Apr-May; Jun-Sep. **Syn:** = *Kraunhia frutescens* (Linnaeus) Greene – S; = *Wisteria frutescens* (Linnaeus) Poiret – C, F, G, Valder (1995); < *Wisteria frutescens* (Linnaeus) Poiret – Ar, GW2, Il, K1, K3, K4, NE, NY, Pa, RAB, SE3, Tn, Va, W, WH3, WV, Isely (1998).

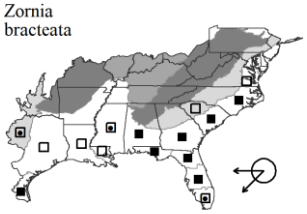
Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated

Wisteria frutescens (Linnaeus) Poiret *var*. ***macrostachya*** Torrey & A. Gray. MISSISSIPPI WISTERIA, AMERICAN WISTERIA, SWAMP WISTERIA. **Hab:** Swamp forests, wet thickets. **Dist:** S. IN and s. MO south to LA, eastwards to w. VA and w. NC. **Phen:** Apr-May; Jun-Sep. **Tax:** This taxon may well warrant recognition as separate from *W. frutescens* at specific rank. **Syn:** = *Kraunhia macrostachya* (Torrey & A. Gray) Small – S; = *Wisteria macrostachya* (Torrey & A. Gray) Nuttall ex B.L. Robinson & Fernald – C, F, G, Tx, Valder (1995); < *Wisteria frutescens* (Linnaeus) Poiret – Ar, GW2, Il, K1, K3, Mi, NY, RAB, SE3, Tn, Va, W, Isely (1998).

* ***Wisteria sinensis*** (Sims) A.P. de Candolle. CHINESE WISTERIA. **Hab:** Commonly cultivated, escaped to a wide diversity of urban, suburban, and rural forests and woodlands. **Dist:** Native of China. **Phen:** Apr-Jul; Jul-Nov. **Syn:** = Ar, C, F, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, SE3, Tn, Tx, Va, WH3, Isely (1998); = *Rehsonia sinensis* (Sims) Stritch – Il, Stritch (1984). NatureServe GNR (Not Yet Ranked).



Zornia J. F. Gmelin 1792 (ZORNIA)



A genus of about 50-90 species, perennial herbs, of tropical and warm temperate regions. References: Carter & Mears (2017); Isely (1998).

Identification Notes: The palmately 4-foliolate leaves of *Z. bracteata* are unique in the flora of our region.

Zornia bracteata Walter ex J.F. Gmelin. VIPERINA. **Hab:** Pine flatwoods, longleaf pine sandhills, pine rocklands, sandy roadsides, rarely disjunct inland in sandy soils. **Dist:** Se. VA south to s. FL, west to TX and e. Mexico; disjunct in w. SC in the uppermost Piedmont in the Blue Ridge Escarpment region. **Phen:** Jun-Aug; Jul-Oct. **Syn:** = C, F, G, K1, K3, K4, NcTx, RAB, S, SE3, Tx, Va, WH3, Isely (1998). NatureServe G5? (Secure).

142. POLYGALACEAE Hoffmannsegg & Link 1809 (MILKWORT FAMILY) [in FABALES]

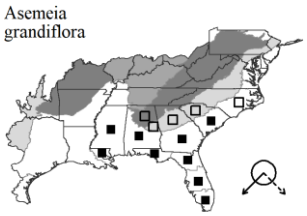
A family of about 29 genera and about 1200 species, trees, shrubs, woody vines, and herbs, nearly cosmopolitan, but most diverse in tropical and subtropical areas. References: Abbott (2011); Abbott (2021) in FNA10 (2021); Eriksen & Persson in Kubitzki, Bayer, & Stevens (2007); Miller (1971b); Pastore & Abbott (2012); Pastore et al (2019).

Identification Notes: The Polygalaceae has a distinctive flower structure which can be confusing. The corolla consists of 3 fused petals, partly fused into a tube, and also fused with the stamens. The lower petal is called the keel; it is usually boatlike, and also lacerate, fringed, or lobed at its tip (in most species). The calyx is 5-lobed, the lobes usually of 3 distinct sizes. The two lateral sepals are called wings; they are generally large and petaloid (colored like petals). The upper sepal is usually the next largest; the two lower sepals are usually the smallest.

1 Corolla keel blunt, lacking a terminal crest or beak.
..... ***Asemeia***

1 Corolla keel appendaged, with a terminal beak, or lobed or tufted crest.
..... ***Polygala***

Asemeia Rafinesque 1833 (MILKWORT)



A genus of ca. 28 species, perennial herbs (sometimes suffrutescent), neotropical north to the se. United States. References: Abbott (2011); Abbott (2021) in FNA10 (2021); Bernardi (2000); Pastore & Abbott (2012).

Asemeia grandiflora (Walter) Small. SHOWY MILKWORT. **Hab:** Longleaf pine sandhills, dry sandy soils of roadsides and fields. **Dist:** S. NC south to s. FL, west to s. MS; West Indies, Mexico to Central America. **Phen:** (Dec-) May-Jul. **Tax:** Sometimes included in the neotropical *P. violacea* Aublet (Nicaragua to Paraguay) (as by Bernardi 2000), or alternatively subdivided into varieties or species (see synonymy); some at least of Small's species merit recognition, but are listed here as synonyms until additional studies are done. At a minimum, separation of *Asemeia grandiflora* from the "*violacea* entity" seems warranted, based on Pastore & Abbott's (2012) rangewide study. **Syn:** = FNA10, K3, Abbott (2011), Pastore & Abbott (2012); = *Polygala grandiflora* – Bah, RAB; > *Asemeia cumulicola* Small – S; > *Asemeia grandiflora* var. *angustifolia* – S; > *Asemeia grandiflora* (Walter) Small var. *grandiflora* – S; > *Asemeia leiodes* (Blake) Small – S; > *Asemeia miamiensis* Small – S; < *Asemeia violacea* (Aublet) J.F.B. Pastore & J.R. Abbott – Fl3, K4; > *Polygala grandiflora* Walter var. *grandiflora* – K1; < *Polygala violacea* Aublet – WH3, WI, Bernardi (2000).

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Polygala Linnaeus 1753 (MILKWORT)

A genus of 300-400 species, trees, shrubs, and herbs, nearly cosmopolitan in distribution. The genus as currently circumscribed is clearly not monophyletic, even after the removal of some elements that are not closely related to the core of *Polygala*, and additional changes in generic circumscriptions are forthcoming (Abbott 2011; Pastore et al. 2019); it is unlikely that any of our species will remain in *Polygala* (which will be restricted to the Old World). Our taxa will likely be transferred to *Senega* (A.P. de Candolle) Spach. References: Eriksen & Persson in Kubitzki, Bayer, & Stevens (2007); Haines (2010); Neubig & Abbott (2020); Pastore (2013); Pastore et al (2019); Smith & Ward (1976); Sorrie & Weakley (2017a); Trauth-Nare & Naczi (1998).

Unkeyed taxa: *Polygala appendiculata*, *Polygala chapmanii*, *Polygala crenata*

1 Fresh flowers orange, yellow, greenish-yellow, or greenish white (if greenish white, then the inflorescence a terminal many-branched cyme); ["North America clade"].
- 2 Inflorescence a dense pom-pom-like raceme, terminating leafy branches.
  - 3 Fresh flowers lemon-yellow or greenish yellow; subulate bracts of the inflorescence 4.5-6.5 mm long; plants 3-10 (-15) cm tall; lobes of lower petal (keel) 1.5-2.5 mm long ..... ***Polygala nana***
  - 3 Fresh flowers bright orange or bright yellow; subulate bracts of the inflorescence 2-4 mm long; plants 5-80 cm tall; lobes of lower petal (keel) 0.5-1.1 mm long. ..... ***Polygala lutea***
- 2 Inflorescence a terminal, many-branched cyme, the many individual branches loosely to densely flowered.
  - 5 Fresh flowers cream-white to greenish-white; [of GA southward]. ..... ***Polygala balduinii***
  - 5 Fresh flowers bright yellow; [collectively widespread in the Coastal Plain of our area].
    - 7 Plants 4.5-12 dm tall, the stem solitary; basal leaves 3.5-14 cm long, linear-lanceolate, about 15-20× as long as wide, persistent as a basal rosette; stem leaves linear-subulate, sharp-tipped, much reduced from the basal leaves, becoming bractlike upward; seeds glabrous, 0.7-0.9 mm long ..... ***Polygala cymosa***
    - 7 Plants 1-4 dm tall, the stems 1-several from the base; basal leaves 3-7 cm long, spatulate, about 10× as long as wide, usually not persistent after flowering; stem leaves narrowly spatulate to linear, blunt-tipped, only slightly reduced from the basal leaves; seeds pubescent, 0.5-0.7 mm long ..... ***Polygala ramosa***

1 Fresh flowers pink, purple, white, or green (if green or white, then the inflorescence a simple raceme, not a many-branched cyme).
- 9 Leaves whorled, at least at the principal lower nodes; annual, from a slender taproot.
  - 10 Racemes 3-8 mm in diameter, pointed in outline; flowers sessile to pedicellate with pedicels < 1 mm long; ["Verticillatae clade"].
    - 11 Wings 2-3 mm long; plant perennial, usually multistemmed from the base and little or not branched above; racemes 30-240 mm long. ..... ***Polygala boykinii var. boykinii***
    - 11 Wings 1-1.75 mm long; plant annual, unbranched or freely branched above.
      - 13 Internodes > 5 cm long, the whorls very distant from one another; seeds glabrous or nearly so; seeds fusiform ..... ***Polygala leptostachys***
      - 13 Internodes (most, at least) < 4 cm long; seeds pubescent; seeds ovoid to narrowly ovoid.
        - 14 Racemes 2-5 cm long, becoming interrupted below through persistence of the fruits on the axis; wings equaling the fruit ..... ***Polygala ambigua***
        - 14 Racemes 0.5-1.5 cm long, the fruits falling promptly, thus the inflorescence compact and truncate below; wings shorter than the fruit.
          - 15 Seeds finely pubescent; pedicels ¼-⅓ as long as the fruit; raceme peduncles 0.5-4 cm long ..... ***Polygala verticillata var. isocycla***
          - 15 Seeds hirsute; pedicels ⅓-½ as long as the fruit; raceme peduncles 2-7 cm long ..... ***Polygala verticillata var. verticillata***
  - 10 Racemes 7-20 mm in diameter, rounded in outline (somewhat rounded to somewhat pointed in *P. hookeri*); flowers pedicellate; ["North America clade"].
    - 16 Racemes loosely flowered, with ca. 10 flowers per cm of length; raceme 7-12 mm in diameter, the tip pointed (obconical) in outline; full raceme (including the portion with dropped fruits) to 6 cm long ..... ***Polygala hookeri***
    - 16 Racemes densely flowered, with ca. 20 flowers per cm of length; raceme 7-20 mm in diameter, the tip rounded to truncate in outline; full raceme (including the portion with dropped fruits) to 4.5 cm long.
      - 17 Bracts of the inflorescence ca. 1 mm long; wings 1.5-2.5 mm wide, acute or short-mucronate at the tip; raceme peduncle (0.8-) 3-5 cm long ..... ***Polygala brevifolia***
      - 17 Bracts of the inflorescence 1.5-3 mm long; wings 3-4 mm wide, acuminate, the tips cuspidate; raceme peduncle 0-0.8 (-4.0) cm long
        - 18 Peduncle + axis length (10-) avg. 16 (-23) mm (in late flower or fruit); raceme (8.5-) avg. 9.9 (-12) mm wide ..... ***Polygala aquilonia***
        - 18 Peduncle + axis length (11-) avg. 35 (-96) mm (in late flower or fruit); raceme (10-) avg. 12 (-15) mm wide ..... ***Polygala cruciata***
- 9 Leaves all alternate; either annual, from a slender taproot, the stems solitary, or biennial to perennial, from a taproot, the stems solitary to several, or perennial, from a thick rhizome, the stems several.
  - 19 Leaves glaucous, somewhat succulent, linear; corolla 7-10 mm long, > 2× as long as the wings; ["North America clade"] ..... ***Polygala incarnata***
  - 19 Leaves green, herbaceous, usually broader than linear; corolla < 5 mm long, roughly equal to or shorter than the wings.
    - 21 Perennial or biennial, usually several stems arising together from a rhizome or taproot.
      - 22 Wings white, 2-3 mm long; flowers sessile or subsessile; plants from a thick crown; ["Linoideae clade"]. ..... ***Polygala senega var. latifolia***
      - 22 Wings pink, 4-7 mm long; flowers pedicelled; plants from a taproot.
        - 24 Corolla keel entire at the tip; wings 5-7 mm long, reniform-orbicular; plants lacking cleistogamous flowers ..... ***Asemeia***
        - 24 Corolla keel fringed at the tip; wings 4-6 mm long, elliptic; plants producing cleistogamous flowers in loose subterranean or surficial racemes; ["North America clade"] ..... ***Polygala polygama***
    - 21 Annual, the stems solitary; ["North America clade"].
      - 25 Corolla about 0.5× as long as the wings ..... ***Polygala sanguinea***
      - 25 Corolla about 1× as long as the wings.
        - 26 Inflorescence bracts dropping from the axis promptly following flowering ..... ***Polygala mariana***
        - 26 Inflorescence bracts persistent.
          - 27 Wings 3-5 mm long; pedicels 1.5-2.5 mm long; racemes 8-13 mm in diameter ..... ***Polygala curtissii***
          - 27 Wings 2-2.5 mm long; pedicels 0.5-1.5 mm long; racemes 5-6 mm in diameter ..... ***Polygala nuttallii***

Polygala ambigua Nuttall. LOOSE MILKWORT. **Hab:** Fields, woodlands, openings. **Dist:** ME west to MI, south to GA, AL, and OK. **Phen:** Jun-Sep. **Tax:** Through most of its range *P. ambigua* has wings 1.3-1.7 mm long; plants from se. VA south to SC and from the Ozarks have wings 2.0-2.6

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

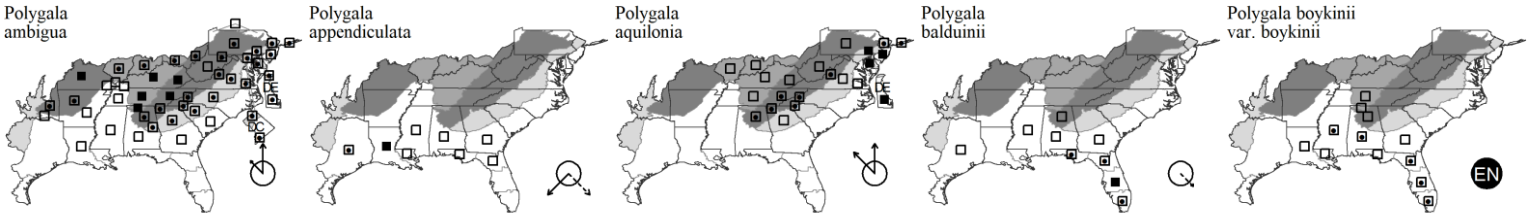
mm long. These plants have been named as a variety of *P. verticillata*, var. *dolichoptera* Fernald. They may warrant taxonomic recognition, but need additional study, including resolution of our Coastal Plain plants and those of the Ozarks. **Syn:** = C, G, Il, K1, K3, K4, NE, S, Tn; = *Polygala verticillata* Linnaeus var. *ambigua* (Nuttall) Wood – GrPl, Pa, RAB, Tx; < *Polygala verticillata* – NY, W; > *Polygala verticillata* Linnaeus var. *ambigua* (Nuttall) Wood – F, WV; > *Polygala verticillata* var. *dolichoptera* Fernald – F, WV.

Polygala appendiculata Vellozo. SWAMP MILKWORT. **Hab:** Bogs and pond margins. **Dist:** Ne. and Panhandle FL west to e. TX; Mexico, Central America, and South America; Cuba. **Tax:** Pastore (2013) established that the correct name for this species is *P. appendiculata*. **Syn:** = Fl3, K3, K4; = *Polygala leptocaulis* Torrey & A. Gray – GW2, S, Tx, WI; = *Polygala tenella* Willdenow – WH3, misapplied. NatureServe G4G5 (Apparently Secure).

Polygala aquilonia (Fernald & Schubert) Sorrie & Weakley. NORTHERN DRUMHEADS. **Hab:** Bogs, damp or wet soil in openings. **Dist:** S. ME, NY, MI, and MN south to e. VA, w. NC, n. GA, n. AL, TN, and IL. **Phen:** Jun-Oct. **Tax:** Sorrie & Weakley (2017) supported species rank for this entity. **Syn:** = K4, Sorrie & Weakley (2017a); = *Polygala cruciata* Linnaeus – S; = *Polygala cruciata* ssp. *aquilonia* (Fernald & Schubert) A. Haines – NE, Haines (2010), nom. Illeg.; = *Polygala cruciata* var. *aquilonia* Fernald & Schubert – F, Il, K1; < *Polygala cruciata* Linnaeus – C, G, K3, Mi, NY, Pa, RAB, Tn, WV. NatureServe G5T4 (Apparently Secure).

Polygala balduinii Nuttall. WHITE MILKWORT, BALDWIN'S MILKWORT. **Hab:** Wet pine savannas, marl prairies. **Dist:** E. GA south to s. FL, west to s. MS; e. TX; Cuba; Bahamas (Andros Island). **Phen:** (Jan-) Mar-Jul (Nov). **Syn:** = *Pilostaxis baldwinii* (Nuttall) Small – S, orthographic variant; = *Polygala balduinii* var. *balduinii* – GW2, Smith & Ward (1976); < *Polygala balduinii* Nuttall – Fl3, K1, K3, K4, WH3; < *Polygala baldwinii* Nuttall – Bah, WI, orthographic variant.

Polygala boykinii Nuttall *var*. ***boykinii***. BOYKIN'S MILKWORT. **Hab:** Longleaf pine flatwoods and savannas, seeps, prairies, calcareous glades. **Dist:** C. TN south through GA, AL, and MS to s. FL and w. LA. **Syn:** = K1, K3, K4; = *Polygala boykinii* – S; < *Polygala boykinii* – Fl3, Tn, WH3. NatureServe G4TNR (Not Yet Ranked).



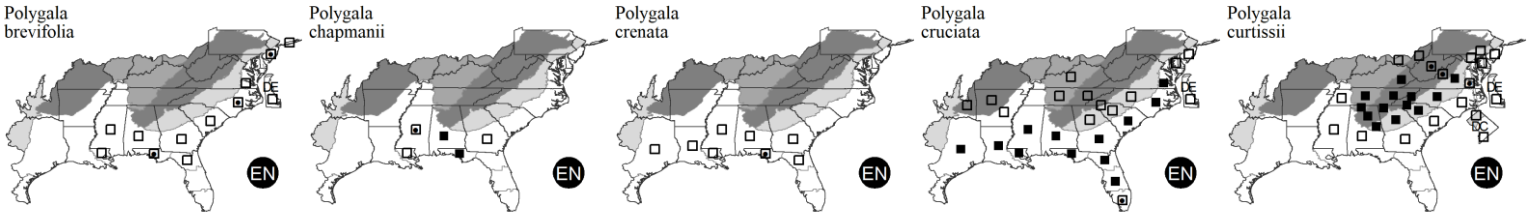
Polygala brevifolia Nuttall. SHORTLEAF MILKWORT, LITTLE-LEAF MILKWORT. **Hab:** Pine savannas, pocosin margins, pocosin interiors after fire. **Dist:** NY (presumably Long Island) and NJ south to Panhandle FL, west to s. MS. **Phen:** Jun-Oct. **Syn:** = C, F, Fl3, G, GW2, K1, K3, K4, NY, RAB, S, WH3. NatureServe G4G5 (Apparently Secure).

Polygala chapmanii Torrey & A. Gray. **Hab:** Pine savannas, seepage bogs. **Dist:** Panhandle FL and sw. GA west to s. MS. **Syn:** = Fl3, GW2, K1, K3, K4, S, WH3. NatureServe G3G5 (Apparently Secure).

Polygala crenata C.W. James. SCALLOPED MILKWORT. **Hab:** Wet pine flatwoods, bogs, bayheads. **Dist:** FL Panhandle and AL west to TX; reported for GA (B.A. Sorrie, pers. comm.). **Phen:** Apr. **Comm:** {not yet keyed; synonymy incomplete}. **Syn:** = Fl3, GW2, K1, K3, K4, WH3. NatureServe G4? (Apparently Secure).

Polygala cruciata Linnaeus. DRUMHEADS. **Hab:** Bogs, damp or wet soil in openings. **Dist:** S. NJ south to s. FL, west to AR, se. OK, and e. TX; disjunct inland in se. TN. **Phen:** Jun-Oct. **Tax:** See Sorrie & Weakley (2017) for a discussion supporting recognition of *P. cruciata* and *P. aquilonia* at species rank. **Syn:** = K4, Sorrie & Weakley (2017a); = *Polygala cruciata* var. *cruciata* – F, K1; = *Polygala ramosior* (Nash) Small – S; < *Polygala cruciata* Linnaeus – Ar, C, Fl3, G, GW2, K3, NcTx, RAB, Tn, Tx, Va, WH3. NatureServe G5T4T5 (Apparently Secure).

Polygala curtissii A. Gray. APPALACHIAN MILKWORT. **Hab:** Mafic barrens, old fields, thickets, openings. **Dist:** DE and se. PA (Rhoads & Block 2007) west to OH, south to SC, GA, and ne. MS. **Phen:** Jun-Oct. **Syn:** = C, F, G, K1, K3, K4, Pa, RAB, S, Tn, Va, W, WV. NatureServe G5 (Secure).



Polygala cymosa Walter. TALL PINEBARREN MILKWORT. **Hab:** Pond-cypress savannas, Coastal Plain depression ponds, clay-based Carolina bays, other sites with seasonally flooded hydrology. **Dist:** E. NC south to s. FL, west to s. MS; disjunct in s. DE. **Phen:** Apr-Aug. **Syn:** = C, F, Fl3, G, GW2, K1, K3, K4, RAB, WH3, Smith & Ward (1976); = *Pilostaxis cymosa* (Walter) Small – S. NatureServe G5 (Secure).

Polygala hookeri Torrey & A. Gray. HOOKER'S MILKWORT. **Hab:** Pine savannas. **Dist:** Panhandle FL (and sw. GA?), west to s. MS and e. LA; disjunct in se. NC and ne. SC; reported for e. TX (Correll & Johnston 1970). **Syn:** = Fl3, GW2, K1, K3, K4, RAB, S, WH3. NatureServe G3 (Vulnerable).

Polygala incarnata Linnaeus. PINK MILKWORT, PROCESSION-FLOWER. **Hab:** Pine savannas, woodlands, glades, upland dry prairies, fields. **Dist:** NY (Long Island) and se. PA (Rhoads & Block 2007) west to MI, WI, and IA, south to s. FL and TX; Mexico; Central America. **Phen:** Late Apr-Nov. **Syn:** = Ar, C, F, Fl3, G, GrPl, GW2, Il, K1, K3, K4, Mi, NcTx, NY, Pa, RAB, Tn, Tx, Va, W, WH3; = *Galypola incarnata* (Linnaeus) Nieuwland – S. NatureServe G5 (Secure).

Polygala leptostachys Shuttleworth ex A. Gray. GEORGIA MILKWORT. **Hab:** Longleaf pine sandhills. **Dist:** Ne. FL south to c. peninsular FL, west to sw. GA (Jones & Coile 1988), s. AL (Sorrie & LeBlond 2008), s. MS (Sorrie & Leonard 1999). **Comm:** {not yet keyed; synonymy incomplete}. **Syn:** = Fl3, K1, K3, K4, S, WH3. NatureServe G3G4 (Vulnerable).

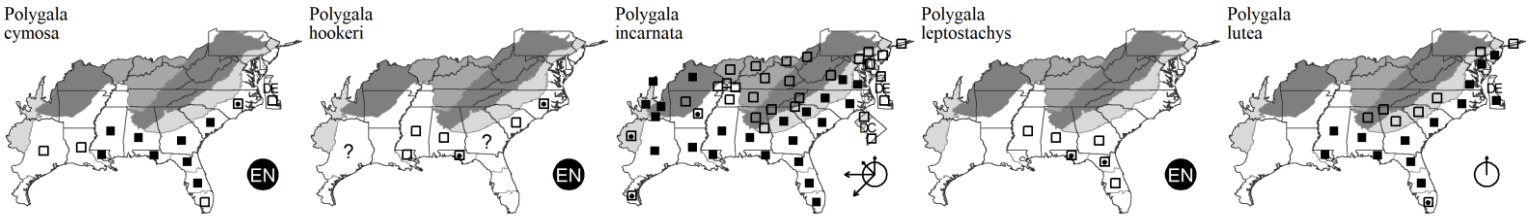
Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more)

* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable
X : extirpated

142. POLYGALACEAE

Polygala lutea Linnaeus. ORANGE MILKWORT, RED-HOT-POKER. **Hab:** Wet pine savannas, ditches, bogs, other wet areas. **Dist:** NY (Long Island), se. PA (Rhoads & Block 2007), and NJ south to s. FL, west to e. LA. **Phen:** Feb-Nov. **Syn:** = C, F, Fl3, G, GW2, K1, K3, K4, NY, Pa, RAB, Va, WH3, Smith & Ward (1976); = *Pilostaxis lutea* (Linnaeus) Small – S. NatureServe G5 (Secure).



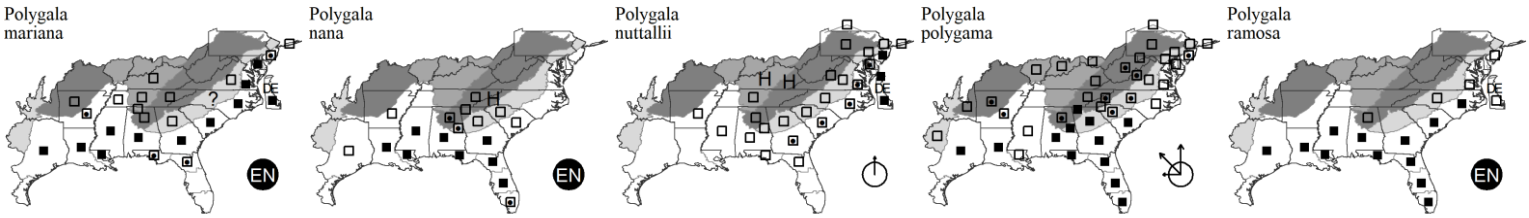
Polygala mariana P. Miller. MARYLAND MILKWORT. **Hab:** Bogs, pine savannas, other open wet habitats. **Dist:** S. NJ south to c. peninsular FL, west to TX; disjunct inland in sw. TN (Chester, Wofford, & Kral 1997). **Phen:** Jun-Oct. **Syn:** = Ar, C, Fl3, G, GW2, K1, K3, K4, NY, RAB, Tn, Tx, Va, WH3; > *Polygala harperi* Small – F, S; > *Polygala mariana* P. Miller – F, S. NatureServe G5 (Secure).

Polygala nana (Michaux) A.P. de Candolle. DWARF MILKWORT, CANDYROOT. **Hab:** Longleaf pine flatwoods, other open moist areas. **Dist:** E. GA south to s. FL, west to e. TX, with scattered populations inland to n. SC, w. NC, nw. GA, n. AL, c. TN (Chester, Wofford, & Kral 1997), and ne. MS. **Phen:** Dec-Jun (-Oct). **Syn:** = Ar, Fl3, GW2, K1, K3, K4, RAB, Tn, Tx, WH3, Smith & Ward (1976); = *Pilostaxis nana* (Michaux) Rafinesque – S. NatureServe G5 (Secure).

Polygala nuttallii Torrey & A. Gray. NUTTALL'S MILKWORT. **Hab:** pocosins, pine savannas, also in depression ponds (in Augusta and Rockingham counties, VA). **Dist:** MA south to ne. FL and e. Panhandle FL; disjunct inland in w. VA, c. TN (Chester, Wofford, & Kral 1997), sc. KY, and allegedly c. AR. **Phen:** Jun-Aug. **Syn:** = C, F, Fl3, G, K1, K3, K4, NE, NY, Pa, RAB, S, Tn, W, WH3. NatureServe G5 (Secure).

Polygala polygama Walter. BITTER MILKWORT, RACEMED MILKWORT. **Hab:** Longleaf pine sandhills, woodlands, woodland borders. **Dist:** NS, ON, and MN south to s. FL and TX. **Phen:** May-Jul; Jun-Jul. **Tax:** Two varieties are sometimes recognized. **Syn:** = Fl3, K1, K3, K4, Mi, NE, Pa, RAB, Tn, Tx, Va, W, WH3; > *Polygala aboriginum* Small – S; > *Polygala polygama* Walter – S; > *Polygala polygama* var. *obtusata* – C, F, G, Il, NcTx, WV; > *Polygala polygama* var. *polygama* – C, F, G.

Polygala ramosa Elliott. SHORT PINEBARREN MILKWORT, LOW PINEBARREN MILKWORT. **Hab:** Wet pine savannas, pocosin margins, bogs. **Dist:** S. NJ south to s. peninsular FL, west to e. TX; rarely disjunct inland. **Phen:** Apr-Oct. **Syn:** = C, F, Fl3, G, GW2, K1, K3, K4, RAB, Tx, Va, WH3, Smith & Ward (1976); = *Pilostaxis ramosa* (Elliott) Small – S. NatureServe G5 (Secure).

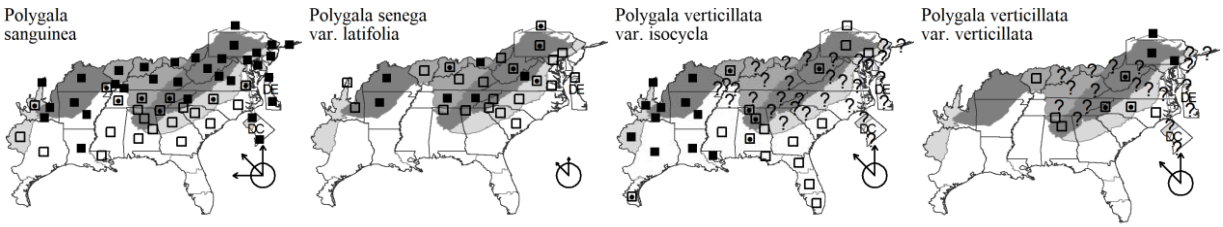


Polygala sanguinea Linnaeus. BLOOD MILKWORT, FIELD MILKWORT. **Hab:** Bogs, fens, seeps, prairies, woodlands, openings, woodland borders. **Dist:** NS and MN, south to nw. SC, n. GA, and e. TX. **Phen:** May-Aug. **Syn:** = Ar, C, F, G, GrPl, GW2, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, W, WV; ? *Polygala viridescens* Linnaeus – S. NatureServe G5 (Secure).

Polygala senega Linnaeus *var.* ***latifolia*** Torrey & A. Gray. SOUTHERN SENEGA SNAKEROOT. **Hab:** Woodlands and openings, especially over calcareous or mafic rocks. **Dist:** NY west to MN, south to n. GA, TN, AR, and SD. **Phen:** May-Jun. **Tax:** Two varieties have often been recognized; Trauth-Nare & Naczi (1998) studied the two named varieties and concluded that the taxa should be recognized at the specific level. Further study is needed and is underway by E. Ungberg. **Syn:** = F, G, GrPl, Il, Pa, WV; < *Polygala senega* Linnaeus – Ar, C, K1, K3, K4, Mi, NE, NY, RAB, S, Va, W. NatureServe G4G5TNR (Not Yet Ranked).

Polygala verticillata Linnaeus *var.* ***isocycla*** Fernald. WHORLED MILKWORT. **Hab:** Dry woodlands, woodland borders, openings, fields. **Dist:** VT west to MB, south to Panhandle FL (Kunzer et al. 2009), s. FL, and TX. **Phen:** Jun-Sep. **Tax:** The validity and relative distributions, habitats, phenology of the two varieties need additional assessment in the herbarium and the field. **Syn:** = C, F, Fl3, G, GrPl, Il, K1, Pa, WH3, WV; = *Polygala verticillata* – S, misapplied; < *Polygala verticillata* – Ar, K3, K4, Mi, NcTx, NE, NY, Tn, Tx, Va, W; < *Polygala verticillata* Linnaeus var. *verticillata* – RAB.

Polygala verticillata Linnaeus *var.* ***verticillata***. WHORLED MILKWORT. **Hab:** Dry woodlands, woodland borders, openings, fields. **Dist:** ME west to MI, south to w. VA, w. NC, and TN. **Phen:** Jun-Sep. **Tax:** The validity and relative distributions, habitats, phenology of the two varieties need additional assessment in the herbarium and the field. **Syn:** = C, F, G, GrPl, Il, K1, Pa, WV; = *Polygala pretzii* Pennell – S; < *Polygala verticillata* – Ar, K3, K4, Mi, NE, NY, Tn, Va, W; < *Polygala verticillata* Linnaeus var. *verticillata* – RAB. NatureServe G5T5? (Secure).



Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

143. ROSACEAE A.L. de Jussieu 1789 (ROSE FAMILY) [in ROSALES]

A family of about 85-95 genera and 2000-3000 species, trees, shrubs, and herbs, nearly cosmopolitan, but mainly boreal and temperate. References: Chen et al (2020); Eriksson et al (2003); Ertter (2007); Kalkman in Kubitzki et al (2004); Phipps (2014a) in FNA9 (2014); Potter et al (2007).

Subfamily Rosoideae
- Tribe Ulmarieae: *Filipendula*
- Tribe Roseae: *Rosa*
- Tribe Rubeae: *Dalibarda, Rubacer, Rubus*
- Tribe Sanguisorbeae: *Agrimonia, Poterium, Poteridium, Sanguisorba*
- Tribe Potentilleae: *Argentina, Potentilla, Aphanes, Dasiphora, Drymocallis, Fragaria, Sibbaldiopsis*
- Tribe Coluriae: *Geum, Waldsteinia*

Subfamily Amygdaloideae
- Tribe Amygdaleae: *Prunus*
- Tribe Neillieae: *Neillia, Physocarpus*
- Tribe Sorbarieae: *Sorbaria*
- Tribe Spiraeeae: *Aruncus, Spiraea*
- Tribe Exochordeae: *Exochorda*
- Tribe Kerrieae: *Kerria, Neviusia, Rhodotypos*
- Tribe Gilleniae: *Gillenia*
- Tribe Maleae: *Amelanchier, Crataegus, Pyracantha, Sorbus, Pyrus, Rhaphiolepis, Eriobotrya, Pseudocydonia, Chaenomeles, Photinia, Pourthiaea, Aronia, Cydonia, Malus*

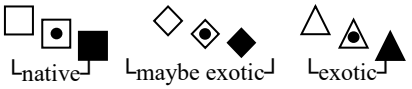
1 Herbs or subshrubs (if woody at base, then < 3 dm tall).
  2 Leaves simple..... ***Key A***
  2 Leaves compound (at least the lower and better developed)..... ***Key B***
1 Trees, shrubs, or woody vines (with arching "canes" or climbing, arching, or scrambling stems).
  3 Leaves simple..... ***Key C***
  3 Leaves compound..... ***Key D***

Key A - Herbs and subshrubs with simple leaves

3 Leaf blades 0.3-1.0 cm long and wide, deeply 3-lobed, each lobe further lobed or deeply toothed; petals 0; stamen 1; [tribe *Potentilleae*]..... ***Aphanes***
3 Leaf blades 3-8 cm long and wide, 3-lobed, each lobe toothed; petals 5; stamens many; [tribe *Colurieae*]..... ***Waldsteinia lobata***

Key B - Herbs and subshrubs with compound leaves

1 Leaves 2- to 3-ternately compound; [tribe *Spiraeeae*]..... ***Aruncus***
1 Leaves 1-compound, either simply pinnately compound or simply palmately compound,
  2 Principal (basalmost) leaves pinnately compound, with (5-) 7-many leaflets (stem leaves sometimes 3-foliolate, especially in *Geum*).
    3 Principal leaves with leaflets of markedly disparate shape and size (large leaflets alternating with much smaller leaflets, or a large terminal leaflet and much smaller lateral leaflets).
      4 Lateral leaflets alternating between small and large, the terminal leaflet similar in size and shape to the larger lateral leaflets; terminal leaflet < 3 cm wide; hypanthium either conical or turbinate, armed with hooked bristles, the pistils 2, or hemispheric, the pistils >5. ..... ***Agrimonia***
      4 Leaflets variable in size and shape, usually the terminal leaflet much larger than any of the lateral leaflets; terminal leaflet 3-20 cm wide; hypanthium either sauce-r-shaped or hemispheric to conical; pistils 5 or more. ..... ***Geum***
    3 Principal leaves with leaflets of generally similar shape and size (the lowest leaflets may be smaller but of similar shape and toothing to the other leaflets). ..... ***Poterium***
  2 Principal (basal-most) leaves palmately compound, with 3-7 (-9) leaflets.
    10 Principal leaves subsessile, 3-foliolate; fruit of follicles; leaves cauline; [tribe *Gillenieae*]..... ***Gillenia***
    10 Principal leaves distinctly petiolate, the petiole often longer than the leaflets, 3-7 (-9)-foliolate; fruit of achenes; leaves basal and cauline.
      11 Principal leaves 5-7 (-9)-foliolate; [tribe *Potentilleae*]..... ***Potentilla***
      11 Principal leaves 3-foliolate.
        12 Plants in flower.
          13 Petals yellow.
            14 Pistils 2-6; [tribe *Colurieae*] ..... ***Waldsteinia***
            14 Pistils (10-) numerous; [tribe *Potentilleae*]..... ***Potentilla***
          13 Petals white (or slightly pinkish). ..... ***Fragaria***

Key to Map Symbology: 

* : waif
EN : endemic
H : historic
N : no
P : planted
? : questionable
X : extirpated

12 Plants in fruit (or sterile).
18 Calyx lobes not subtended by bractlets.
.....***Waldsteinia***
18 Calyx lobes subtended by 5 sepaloid bractlets; [tribe *Potentilleae*].
20 Fruit an aggregate of dry achenes .....***Potentilla***
20 Fruit an accessory fruit of achenes borne on the surface of a fleshy, red receptacle.
21 Fresh fruit reddish inside; leaflets serrate, 2.5-12 cm long; sepaloid bracts narrowing to apex, untoothed.....***Fragaria***
21 Fresh fruit whitish inside; leaflets crenate, 2-4 cm long; sepaloid bracts widest at apex, 3-5-toothed .....***Potentilla indica***

Key C - Shrubs and trees with simple leaves

1 Ovary inferior; fruit indehiscent (pome); [tribe *Pyreae*].
2 Upper surface of leaves bearing dark glandular trichomes along the midrib (most easily seen with a 10× hand lens); shrubs .....***Aronia***
2 Upper surface of leaves lacking dark glandular trichomes along the midrib; shrubs and trees.
3 Ovary and fruit 10-locular; inflorescence a raceme (rarely a fascicle); pome < 1 cm in diameter.....***Amelanchier***
3 Ovary and fruit 5-locular; inflorescence a cyme, umbel, or fascicle (lacking an elongated central axis); pome 0.7-10 cm in diameter.
4 Styles distinct; exocarps (carpels within pericarp) bony and seedlike; trees and shrubs, with thorns.....***Crataegus***
4 Styles usually connate at base; exocarps leather or papery and easily opened to expose seeds; small trees, unarmed, or armed with sharp spur branches.
5 Pome globose to ovoid, lacking stone cells; anthers yellow to white; styles connate at the base; leaves blunt to acuminate; [apples and crabapples].....
.....***Malus***
5 Pome globose or pyriform, with stone cells; anthers reddish; styles distinct; leaves acute to acuminate; [pears].....***Pyrus***
1 Ovary superior; fruit dehiscent (aggregate of follicles, or capsule) or indehiscent (drupe, aggregate of drupelets, aggregate of achenes).
6 Leaves opposite; fruit a drupe; [tribe *Kerrieae*].....***Rhodotypos scandens***
6 Leaves alternate; fruit various (see below).
7 Leaves large, > 10 cm wide, palmately veined, palmately lobed; fruit an aggregate of drupelets; [tribe *Rubeae*].....***Rubacer odoratum***
7 Leaves smaller, < 8 cm wide, pinnately veined, either not lobed or basally pinnately lobed; fruit a drupe, a capsule, an aggregate of follicles, or an aggregate of achenes.
8 Leaves singly serrate or entire, not lobed basally.
9 Gynoecium of separate carpels; fruit an aggregate of follicles; [tribe *Spiraeeae*].....***Spiraea***
9 Gynoecium of fused carpels; fruit either a fleshy drupe or a capsule.
10 Ovary 5-angled in ×-section; fruit a 5-angled capsule; leaves obovate, obviously broadest towards the tip; [tribe *Osmaronieae*].....
.....***Exochorda racemosa***
10 Ovary circular in ×-section; fruit a fleshy spherical drupe; leaves generally broadest near or below the middle; [tribe *Amygdaleae*] .....
.....***Prunus***
8 Leaves doubly serrate, also often lobed towards the base.
11 Corolla yellow; stems arching, green; fruit an aggregate of drupe-like achenes (dry and indehiscent); [tribe *Kerrieae*].....***Kerria japonica***
11 Corolla white to pink or rose; stems not both arching and green; fruit various (see below).
12 Inflorescence a dense, umbel-like corymb; leaf apices rounded to acute; fruit an aggregate of 5 follicles; [tribe *Neillieae*].....***Physocarpus***
12 Inflorescence a raceme or a leafy panicle; leaf apices acuminate.
.....***Neviusia alabamensis***

Key D - Shrubs and trees with compound leaves

4 Fruit a hip, developing from a globose to urceolate hypanthium, enclosing the ovaries and achenes, except for the apical orifice; leaflets usually acute to obtuse at the apex; leaflet margins crenulate or serrulate; [tribe *Roseae*] .....***Rosa***
4 Fruit an aggregate of drupelets, developing from a flattish or hemispheric hypanthium, with the ovaries and drupelets exposed; leaflets usually acuminate at the apex; leaflet margins serrate or doubly serrate; [tribe *Rubeae*].....***Rubus***

Agrimonia Linnaeus 1753 (AGRIMONY)

A genus of about 10-15 species, perennial herbs, mainly north temperate. References: Kalkman in Kubitzki et al (2004); Kline & Sørensen (2008); Kline & Sørensen (2014) in FNA9 (2014); Robertson (1974).

1 Stem and inflorescence axis lacking sessile or short-stalked glistening glands (but with spreading or ascending non-glandular hairs).
2 Stipules deeply incised, half-ovate; hirsute hairs of the stem 3 mm or longer; 0-1 pair of minor leaflets between major; mature fruiting hypanthium as broad as long or broader; hypanthium ridges rarely with eglandular hairs.....***Agrimonia microcarpa***
2 Stipules toothed, not deeply, half-ovate to half-round; hirsute hairs of the stem 3 mm or shorter; 0-3 pair(s) of minor leaflets between major; mature fruiting hypanthium as long as broad or longer; hypanthium ridges usually with hirsute eglandular hairs
.....***Agrimonia pubescens***
1 Stem and inflorescence with glistening glands, these either sessile, or short-stalked, or both (and also with spreading or ascending non-glandular hairs).
4 Glistening glands of the stem and inflorescence axis short stalked, or both short-stalked and sessile.
5 Lower inflorescence rachis with mostly erect hirsute eglandular hairs ca. 2 mm long; minor leaflets rarely only one pair between all major leaflet pairs; roots merely fibrous.....***Agrimonia gryposepala***
5 Lower inflorescence rachis with mostly ascending hirsute eglandular hairs less than 1 mm long; minor leaflets one pair between major leaflet pairs; roots with fusiform tubers.....***Agrimonia rostellata***
4 Glistening glands of the stem and inflorescence axis only sessile.
7 Major leaflets obovate to elliptic, apex obtuse to acute; flowers mostly alternate along inflorescence axis; [Coastal Plain pinelands; e. SC south to c. peninsular FL and west to e. TX].....***Agrimonia incisa***
7 Major leaflets lanceolate to narrowly elliptic, apex acuminate to rarely acute; flowers mostly sub-opposite along inflorescence axis; [bottomlands, marshes; CT west to s. MI and SD, south to FL, TX, the West Indies and Mexico] .....***Agrimonia parviflora***

Key to Map Symbology: □ native; ◇ maybe exotic; △ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

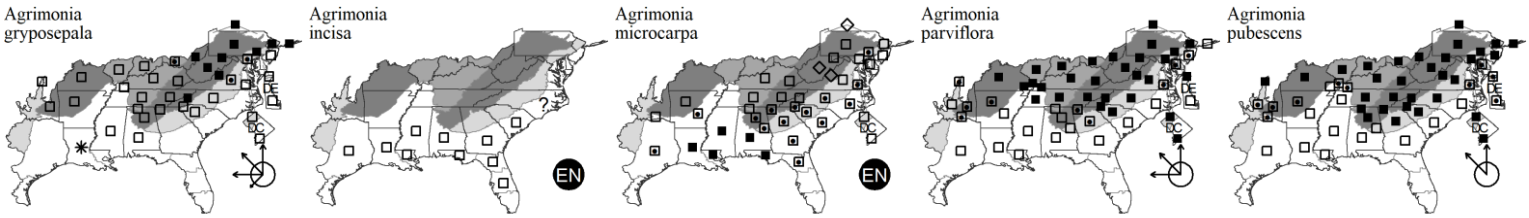
Agrimonia gryposepala Wallroth. COMMON AGRIMONY, SWAMP AGRIMONY. **Hab:** Mesic forests, thickets, marshes, bogs, wet meadows, wet forests, especially in base-rich substrates. **Dist:** ME and ON west to MT, south to NJ, w. NC, e. TN, IN, and KS; also in CA and NM. **Phen:** Jul-Aug; Jul-Oct. **Syn:** = C, F, FNA9, G, GrPl, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Va, W, Kline & Sørensen (2008), Robertson (1974). NatureServe G5 (Secure).

Agrimonia incisa Torrey & A. Gray. PINELAND AGRIMONY. **Hab:** Pinelands, disturbed areas associated with pinelands. **Dist:** E. SC south to c. peninsular FL and west to e. TX (also reported from NC, but no specimen has been seen). **Phen:** Jul-early Sep. **Syn:** = C, FNA9, K1, K3, K4, RAB, S, WH3, Kline & Sørensen (2008), Robertson (1974). NatureServe G3 (Vulnerable).

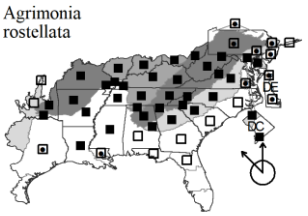
Agrimonia microcarpa Wallroth. LOW AGRIMONY. **Hab:** Dry to moist forests and woodlands. **Dist:** NJ south to n. FL, west to e. TX. **Phen:** Jul-Sep; Aug-Oct. **Syn:** = Ar, C, F, FNA9, G, K1, K3, K4, NcTx, NE, Pa, S, Tn, Tx, Va, W, WH3, Kline & Sørensen (2008), Robertson (1974); = *Agrimonia pubescens* Wallroth var. *microcarpa* (Wallroth) H.E. Ahles – RAB; > *Agrimonia microcarpa* Wallroth – S; > *Agrimonia platycarpa* Wallroth – S. NatureServe G5 (Secure).

Agrimonia parviflora Aiton. SOUTHERN AGRIMONY. **Hab:** Marshes, bottomland forests, wet pastures. **Dist:** CT west to s. MI and SD, south to FL, TX, the West Indies and Mexico. **Phen:** Jul-Sep; Jul-Oct. **Syn:** = Ar, C, F, FNA9, G, GrPl, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, Kline & Sørensen (2008), Robertson (1974). NatureServe G5 (Secure).

Agrimonia pubescens Wallroth. DOWNY AGRIMONY. **Hab:** Dry to moist forests and woodlands, especially in base-rich soils. **Dist:** ME west to MI and SD, south to NC, GA, and OK. **Phen:** Jul-Sep; Aug-Oct. **Syn:** = Ar, C, F, FNA9, G, GrPl, Il, K3, K4, Mi, NE, NY, Pa, Tn, Va, Kline & Sørensen (2008); = *Agrimonia pubescens* var. *pubescens* – RAB; > *Agrimonia bicknellii* (Kearney) Rydberg – K1, S, Robertson (1974); > *Agrimonia pubescens* Wallroth – K1, S, W, Robertson (1974).



Agrimonia rostellata Wallroth. WOODLAND AGRIMONY. **Hab:** Moist to wet forests and woodlands, especially in base-rich soils. **Dist:** CT west to IN and KS, south to SC, GA, Panhandle FL, LA, and OK. **Phen:** Jul-Aug; Jul-Oct. **Syn:** = Ar, C, F, FNA9, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, Kline & Sørensen (2008), Robertson (1974). NatureServe G5 (Secure).



Amelanchier Medikus 1789 (SERVICEBERRY, SARVIS, SHADBUSH, JUNEBERRY, "MAY CHERRY", "CURRANT")

A genus of about 20-40 species, shrubs and trees, north temperate. References: Campbell et al (2014) in FNA9 (2014); Kalkman in Kubitzki et al (2004); Robertson (1974).

4 Ovary summit densely lanuginose; expanding leaves densely tomentose below.
..... ***Amelanchier spicata***

4 Ovary summit glabrous or sparsely pubescent; expanding leaves glabrous to densely tomentose below.
8 Inflorescences erect; petals 6-12 mm.
..... ***Amelanchier canadensis***
8 Inflorescences drooping; petals 10-20 mm long.
10 Young leaves at flowering folded, green or brownish, and densely tomentose below; proximal flowering pedicels 0.8-1.7 cm long; pomes maroon-purple, insipid ..... ***Amelanchier arborea***
10 Young leaves at flowering unfolding, reddish, and glabrous (or nearly so) below; proximal flowering pedicels 1.5-3 cm long; pomes blackish purple, sweet..... ***Amelanchier laevis***

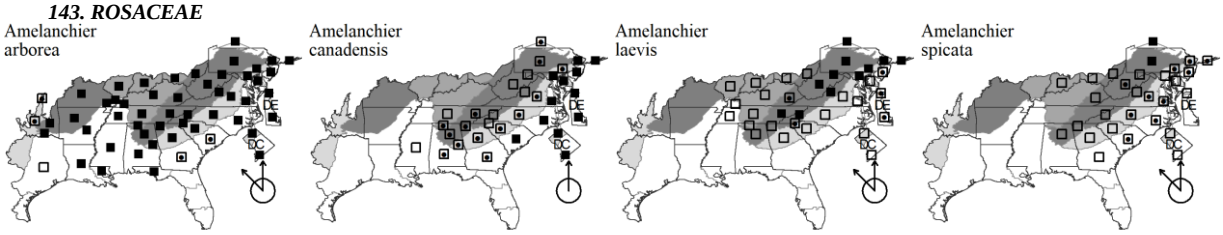
Amelanchier arborea (F. Michaux) Fernald. DOWNY SERVICEBERRY. **Hab:** Dry to moist forests, seepage and depression wetlands. **Dist:** NS west to MN, south to Panhandle FL and e. TX (Holmes, Singhurst, & Loos 2014). **Phen:** Mar-May; May-Aug. **Syn:** = Ar, C, F, FNA9, G, Il, K3, K4, Mi, NcTx, NE, NY, Pa, Tn, Tx, Va, W; > *Amelanchier alabamensis* Britton – S; < *Amelanchier arborea* (F. Michaux) Fernald – GrPl, WH3; > *Amelanchier arborea* var. *alabamensis* (Britton) G.N. Jones – K1, Robertson (1974); > *Amelanchier arborea* var. *arborea* – K1, RAB, Robertson (1974); > *Amelanchier arborea* var. *austromontana* (W.W. Ashe) H.E. Ahles – K1, RAB, Robertson (1974); > *Amelanchier canadensis* (Linnaeus) Medikus – S, misapplied.

Amelanchier canadensis (Linnaeus) Medikus. EASTERN SERVICEBERRY. **Hab:** Pocosins, acidic wetlands, bogs, wet pine flatwoods, maritime forests. **Dist:** NS and NB south to GA, mainly on the Coastal Plain. **Phen:** Mar-Apr; May-Jun. **Syn:** = C, FNA9, GW2, Il, K1, NE, Pa, RAB, Tn, Va, W; = *Amelanchier canadensis* var. *canadensis* Michaux – K3, K4; = *Amelanchier oblongifolia* (Torrey & A. Gray) Roemer – S; < *Amelanchier canadensis* (Linnaeus) Medikus – G; > *Amelanchier canadensis* var. *canadensis* Michaux – F, NY, Robertson (1974); > *Amelanchier canadensis* var. *subintegra* Fernald – F, Robertson (1974).

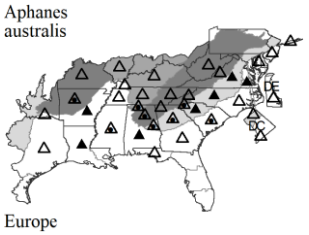
Amelanchier laevis Wiegand. SMOOTH SERVICEBERRY. **Hab:** Mesic to dry forests, high elevation forests, balds. **Dist:** NS west to MN, south to e. VA, w. NC, w. SC, AL, w. TN, and IA. **Phen:** Apr-May; Jun-Jul. **Syn:** = C, FNA9, G, Il, K1, K3, K4, Mi, NE, NY, Pa, S, Tn, Va, W, Robertson (1974); = *Amelanchier arborea* var. *laevis* – RAB; < *Amelanchier arborea* (F. Michaux) Fernald – GrPl; > *Amelanchier laevis* var. *laevis* – F.

Amelanchier spicata (Lamarck) K. Koch. DWARF SERVICEBERRY. **Hab:** Dry, acidic, rocky or sandy sites. **Dist:** NL (Newfoundland) west to ND, south to w. NC, w. SC, GA, AL, WI, and MI. **Phen:** Mar-Apr; May-Jun. **Syn:** = C, FNA9, G, K3, K4, Mi, NE, NY, RAB, Va; = *Amelanchier stolonifera* Wiegand – F, K1, Pa, S, W, Robertson (1974).

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



Aphanes Linnaeus 1753 (PARSLEY-PIERT)



A genus of about 20 species, herbs, of tropical and temperate Old World. *Aphanes* has usually been accepted by Europeans as distinct from *Alchemilla*, but Kalkman (in Kubitzki 2004) retains it (with some doubt) in *Alchemilla*, as a subgenus and Eriksson et al. (2003) and Gehrke et al. (2008) include it in *Alchemilla* based on molecular evidence. *Aphanes* appears to be monophyletic and is morphologically distinctive; Gehrke et al. (2008) prefer a broad circumscription of *Alchemilla* to naming an additional monophyletic clade of African species as a separate genus. References: Eriksson et al (2003); Kalkman in Kubitzki et al (2004); McNeill & Ertter (2014) in FNA9 (2014); Robertson (1974).

* ***Aphanes australis*** Rydberg. PARSLEY-PIERT. **Hab:** Lawns, fields, pastures, roadsides. **Dist:** Native of Europe. **Phen:** Late Mar-May. **Comm:** This plant is inconspicuous and often overlooked. **Syn:** = FNA9, K3, K4, NY, S, Va, WH3; = *Alchemilla microcarpa* Boissier & Reuter – F, G, RAB, Tx, W, Robertson (1974), misapplied; = *Aphanes microcarpa* (Boissier & Reuter) Rothmaler – Ar, C, K1, Tn, misapplied.

Aronia Medikus 1789 (CHOKEBERRY)

A genus of 3 species, of e. North America (south into Central America). In North American floristic literature, *Aronia* has sometimes been treated as a component of *Pyrus*, *Sorbus*, or *Photinia* (see synonymy below). Robertson et al. (1991) included *Aronia* in *Photinia*. Kalkman in Kubitzki (2004) agrees that *Aronia* and *Photinia* should be combined, but points out that *Aronia* is the older name and therefore must be used for the combined genus. Guo et al. (2011) and Lo & Donoghue (2012) separate *Photinia*, *Aronia*, and *Pourthiaea* at generic rank, a decision followed here; while *Aronia* and *Pourthiaea* are closely related (sister), *Photinia* is not closely related to either and is sister to *Pyracantha* (Lo & Donoghue 2012). References: Guo et al (2011); Hardin (1973); Kalkman in Kubitzki et al (2004); Lo & Donoghue (2012); Pankhurst (2014) in FNA9 (2014); Robertson (1974); Robertson et al (1991).

Identification Notes: All our species of *Aronia* can be distinguished from other shrubs in our flora by the presence of several dark (usually purplish-black) glandular trichomes on the upper surface of the midrib, mostly toward the base of the leaf.

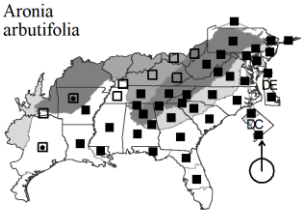
1 Lower surfaces of leaves, twigs, and inflorescence rachis glabrous; fruit black ..... ***Aronia melanocarpa***
1 Lower surfaces of leaves, twigs, and inflorescence rachis pubescent; fruit bright red or dark purple.
  2 Fruit bright red; leaves densely pubescent beneath..... ***Aronia arbutifolia***
  2 Fruit dark purple; leaves sparsely pubescent beneath ..... ***Aronia prunifolia***

Aronia arbutifolia (Linnaeus) Persoon. RED CHOKEBERRY. **Hab:** Bogs, pocosins, wet savannas, swamps, other wet habitats. **Dist:** NL (Newfoundland) south to c. peninsular FL and west to TX, mainly in the Coastal Plain, but extending inland in the south to WV and KY. **Phen:** Late Feb-May; Sep-Nov. **Syn:** = C, FNA9, G, GW2, K3, K4, NE, NY, S, Tn, Va, W, Guo et al (2011); = *Photinia pyrifolia* (Lamarck) K. Robertson & J.B. Phipps – Ar, K1, Pa, WH3, WV, Robertson et al (1991); = *Pyrus arbutifolia* (Linnaeus) Linnaeus f. – F, Tx, Robertson (1974); = *Sorbus arbutifolia* (Linnaeus) Heynhold var. *arbutifolia* – RAB. NatureServe G5 (Secure).

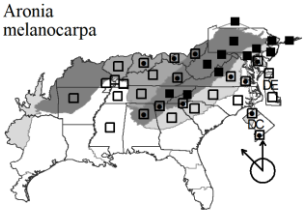
Aronia melanocarpa (Michaux) Elliott. BLACK CHOKEBERRY. **Hab:** Balds, forests, and openings and exposed rock outcrops at high elevations, bogs in the Mountains, seeps and headwater wetlands in the Coastal Plain and lower Piedmont. **Dist:** NL west to ON and MN, extending south to e. VA, ec. NC, n. GA, n. AL, MS, and MO. **Phen:** May-Jun; Aug-Sep. **Syn:** = C, FNA9, G, GW2, K3, K4, NE, NY, S, Tn, Va, Guo et al (2011); = *Photinia melanocarpa* (Michaux) J.B. Phipps – Ar, Il, K1, Pa, Robertson et al (1991); = *Pyrus melanocarpa* (Michaux) Willdenow – F, WV, Robertson (1974); = *Sorbus melanocarpa* (Michaux) Heynhold – RAB; < *Aronia melanocarpa* (Michaux) Elliott – W, (also see A. prunifolia).

Aronia prunifolia (Marshall) Rehder. PURPLE CHOKEBERRY. **Hab:** Balds, bogs, seepages, swamp forests. **Dist:** NL and ON south to NC, KY, IN, and IL. **Phen:** Apr-May; Sep-Oct. **Tax:** While apparently originating as a hybrid between our other two species, *A. prunifolia* exists in populations independent of the two parent species, apparently reproducing successfully. It seems best to treat a now independent lineage such as this as a separate taxon. Some plants, though, may merely represent F1 hybrids occurring with both parents. **Syn:** = C, G, GW2, K3, K4, Mi, NY, Va, Guo et al (2011); = *Aronia* ×*floribunda* (Marshall) Rehder – FNA9; = *Aronia atropurpurea* Britton – S; = *Aronia floribunda* – Pa; = *Photinia floribunda* (Lindley) J.B. Phipps – K1, Robertson et al (1991); = *Photinia prunifolia* (Marshall) Robertson & Phipps – Il; = *Pyrus floribunda* Lindley – F, NE, WV, Robertson (1974); = *Sorbus arbutifolia* var. *atropurpurea* (Britton) Schneider – RAB; < *Aronia melanocarpa* (Michaux) Elliott – W.

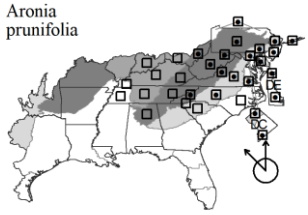
Aronia arbutifolia



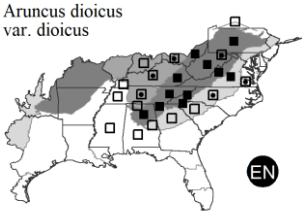
Aronia melanocarpa



Aronia prunifolia



Aruncus dioicus var. dioicus



Aruncus Linnaeus 1758 (GOAT'S-BEARD)

A genus of 2-3 species, perennial herbs, of temperate North America and Europe. References: Kalkman in Kubitzki et al (2004); Mellichamp (2014) in FNA9 (2014); Robertson (1974).

Identification Notes: *Aruncus dioicus* can be distinguished from the superficially closely similar *Astilbe biternata* by the following characteristics: trichomes of foliage not glandular (vs. glandular in *Astilbe*), stamens 20 (vs. 10), carpels 3-4 (vs. 2), seeds < 1.5-2 mm long (vs. ca. 4 mm long), terminal leaflets usually unlobed (vs. terminal leaflets usually trilobed).

Aruncus dioicus (Walter) Fernald *var*. ***dioicus***. EASTERN GOAT'S-BEARD. **Hab:** Moist, nutrient-rich forests and woodland borders. **Dist:** NY (?) and PA west to IN, south to NC, SC, GA, and AL. **Phen:** May-Jun; Jun-Sep. **Syn:** = C, F, FNA9, Il, K1, K3, K4, NE, Robertson (1974); = *Aruncus allegheniensis* Rydberg – S; < *Aruncus dioicus* – Pa, RAB, Tn, Va, W. NatureServe G5T5? (Secure).

Chaenomeles speciosa

Chaenomeles Lindley 1821 (FLOWERING QUINCE)

A genus of 3-4 species, shrubs, of montane, temperate e. Asia. References: Catling & Mitrow (2014b) in FNA9 (2014); Christenhusz, Fay, & Byng (2018); Kalkman in Kubitzki et al (2004).

* ***Chaenomeles speciosa*** (Sweet) Nakai. COMMON FLOWERING QUINCE. **Hab:** Frequently persisting and rarely spreading from horticultural plantings to suburban woodlands. **Dist:** Native of China. **Phen:** Jan-Apr. **Syn:** = Ar, C, FNA9, Il, K1, K3, K4, Mi, NE, NY, Pa; = *Pyrus speciosa* (Sweet) M.F. Fay & Christenhusz – Christenhusz, Fay, & Byng (2018). NatureServe GNR (Not Yet Ranked).

Crataegus Linnaeus 1753 (HAWTHORN, HAW, THORNAPPLE)

Contributed by Ron Lance

A genus of 100-500 species, shrubs and small trees, north temperate and Central America, most in e. North America. References: Ashe (1900a); Ashe (1900b); Ashe (1900c); Ashe (1901); Ashe (1903a); Ashe (1903b); Ashe (1916); Beadle (1913) in S2 (1913a); Chapman (1892); Chen et al (2020); Deam (1940); Eggleston (1913) in Britton & Brown (1913); Eriksson et al (2003); Eugenia, Stefanovič, & Dickinson (2007); Harper (1928); Kalkman in Kubitzki et al (2004); Kalkman in Kubitzki et al (2004); Kruschke (1955); Kruschke (1965); Lance & Phipps (2000); Lance (1995); Lance (2011); Lance (2013); Lance (2014); Palmer (1924); Palmer (1925); Palmer (1926); Palmer (1935); Palmer (1956); Palmer (1960) in Vines (1960); Palmer (1969) in Braun (1969); Phipps & Dvorsky (2006); Phipps & Dvorsky (2007); Phipps & Dvorsky (2008); Phipps & O'Kennon (1997); Phipps (1988a); Phipps (1988b); Phipps (1990); Phipps (1998); Phipps (2006); Phipps (2007); Phipps (2012); Phipps (2014d) in FNA9 (2014); Phipps (2014d) in FNA9 (2014); Phipps (2014e) in FNA9 (2014); Phipps (2016); Phipps, Lance, & Dvorsky (2006); Phipps, O'Kennon, & Lance (2003); Phipps, O'Kennon, & Dvorsky (2006); Phipps, Yatskievych, & Wood (2007); Poindexter & Lance (2011); Potter et al (2007); Sargent (1903); Sargent (1908b); Sargent (1911a); Sargent (1913); Sargent (1920); Sargent (1921a); Sargent (1921b); Sargent (1922a); Tucker (1976).

Identification Notes: All references to leaves and petioles pertain to foliage on short shoots (floreal shoots, or spur shoots), unless otherwise specified. The term "terminal shoots" refers to elongating vegetative twigs, typically at the terminus of branches.

1 Leaf blades mostly ovate or deltate, widest below their midpoint; blade base subcordate, truncate, rounded, or abruptly contracted ..... ***Key A***
1 Leaf blades elliptical, rhomboid, suborbicular, obovate or oblanceolate, widest at midpoint or beyond midpoint; blade base usually cuneate.
  2 Leaves conspicuously glandular on petiole and teeth, especially when young; leading twigs and branchlets geniculate ..... ***Key B***
  2 Leaves eglandular, or if glandular then twigs relatively straight, not conspicuously geniculate ..... ***Key C***

Key A - hawthorns with leaf blades widest below midpoint; blade bases subcordate, truncate, rounded, or abruptly contracted

1 Primary lateral veins of lobed leaves run to sinuses between lobes as well as to points of lobes, in some or most leaves [see also *Crataegus viridis*].
  2 Leaves usually pubescent or villous abaxially or on petiole, especially when young; inflorescence hairy (villous, pubescent or tomentose).
    ..... ***Crataegus marshallii***
  2 Leaves and inflorescence glabrous [commonly cultivated species]
    ..... ***Crataegus phaenopyrum***
1 Primary lateral veins of lobed leaves run only to lobe points, excepting on vigorous sprouts.
  6 Sepals foliaceous, equal or exceeding petal length in flower and persistent on fruit ..... ***Crataegus brittonii***
  6 Sepals not foliaceous, much shorter than petals.

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

7 Leaves abaxially with whitish hair tufts in proximal main vein axils, especially in spring; [*Virides* series and hybrids].
10 Leaves predominately lanceolate ..... ***Crataegus viridis var. lanceolata***
10 Leaves predominately elliptic or rhomboid ..... ***Crataegus viridis var. viridis***
7 Leaves lacking hair tufts; hairs, if present, dispersed over veins or surface of leaves.
17 Leaves abaxially pubescent, veins tomentose; petiole stout, pubescent, eglandular; inflorescence tomentose; [*Molles* series]
..... ***Crataegus mollis var. mollis***
17 Leaves variously pubescent or glabrous; petiole typically glandular, particularly in spring; inflorescence pubescent or glabrous.
27 Petiole distinctly villous or pubescent, particularly early in growing season.
31 Terminal shoot leaves ovate or tending toward oval or suborbicular, unlobed or very shallowly lobed.
..... ***Crataegus triflora***
31 Terminal shoot leaves broadly ovate or deltate, often lobed 20% or more to midrib.
35 Sepals partly glandular-serrate or subentire; leaves often deltate.
..... ***Crataegus iracunda var. iracunda***
35 Sepals deeply gland-toothed or pectinate; most leaves ovate.
..... ***Crataegus intricata var. biltmoreana***
27 Petiole glabrous, or at most only sparsely hairy in spring
40 Calyx sessile on mature fruit.
41 Terminal shoot leaves commonly deltate; petiole length often 50-75% as long as blade
42 Leaves adaxially minutely strigose when young, abaxially glabrous
..... ***Crataegus macrosperma***
42 Leaves adaxially glabrous or remotely pubescent or strigose on veins of both surfaces
..... ***Crataegus iracunda var. iracunda***
41 Terminal shoot leaves mostly ovate or near rhombic; petiole length mostly 30-50 % as long as blade.
50 Petiole distinctly and persistently glandular.
51 Inflorescence scabrous-pubescent; petiolar glands stipitate ..... ***Crataegus frugiferans***
51 Inflorescence sparsely hairy or glabrate; petiolar glands sessile.
52 Stamens usually 20; leaves sharply lobed 10-40 % to midrib ..... ***Crataegus ignava***
52 Stamens 10; leaves unlobed or lobed <25 % to midrib.
..... ***Crataegus alleghaniensis***
50 Petiole eglandular or rarely with 1 or 2 glands in spring.
..... ***Crataegus aemula***
40 Calyx collar elevated on mature fruit
57 Petiole remotely glandular in spring; sepals remotely glandular-serrate or subentire; [*Pruinosae* series]
65 Anthers ca. 0.5mm long; leaves elongate distally ..... ***Crataegus pruinosa var. gattingeri***
65 Anthers ca. 1-2mm long; leaves ovate, not elongate distally ..... ***Crataegus pruinosa var. pruinosa***
57 Petiole distinctly and persistently glandular; sepals distinctly glandular-serrate.
66 Stamens 5 to 10; [*Intricatae* series].
67 Anthers white or yellow.
..... ***Crataegus intricata var. intricata***
67 Anthers pink, rose, or purple.
70 Sepals often partly glandular-pectinate; terminal shoot leaves broadly ovate or deltate.
71 Sepals pectinate near base; leaf lobes obtuse; trunk bark often furrowed ..... ***Crataegus buckleyi***
71 Sepals pectinate near tip; leaf lobes sharp; trunk bark usually scaly ..... ***Crataegus intricata var. neobushii***
70 Sepals glandular-serrate; terminal shoot leaves ovate or less commonly broadly ovate.
72 Anthers purplish; sepals finely glandular-serrate ..... ***Crataegus intricata var. straminea***
72 Anthers pink; sepals deeply glandular-serrate.
..... ***Crataegus intricata var. rubella***
66 Stamens 15-20; [*Pulcherrimae* series].
74 Leaves mostly unlobed and apex obtuse; terminal shoot leaves lobed 5-10% to midrib ..... ***Crataegus mendosa***
74 Leaves shallowly lobed, or if unlobed then apex acute; terminal shoot leaves lobed 10-60% to midrib.
75 Leaves ovate-lanceolate; margin outline nearly straight from about mid-blade to apex.
76 Terminal shoot leaves with 4 or 5 pairs of distinct lobes; often a suckering shrub ..... ***Crataegus incilis***
76 Terminal shoot leaves with 3 to 4 pairs of shallow lobes; usually arborescent ..... ***Crataegus sargentii***
75 Leaves ovate, broadly ovate or near rhombic or suborbicular; margin outline convex.
77 Petioles of smaller leaves winged 1/2 length; fruit often 10-15 mm.
..... ***Crataegus venusta***
77 Petioles of smaller leaves winged 1/3 or less of length; fruit usually <10 mm.
79 Terminal shoot leaf blades often broad as long, lobes rounded ..... ***Crataegus pulcherrima var. opima***
79 Terminal shoot leaf blades longer than broad, lobes obtuse to acute ..... ***Crataegus pulcherrima var. pulcherrima***

Key B - hawthorns with leaf blades widest at midpoint or beyond midpoint; blade bases acute or cuneate; leaves conspicuously glandular on petiole and teeth; twigs and branchlets geniculate

1 Leaf blades usually < 12 mm wide and < 2 cm long (on floreal shoots).
2 Leaf blades often nearly wide as long, blade broadly obovate or suborbicular.
..... ***Crataegus quaesita var. egens***
2 Leaf blades 1.5-2× long as broad, mostly spatulate or oblanceolate.
4 Leaves and flower pedicels glabrate ..... ***Crataegus lacrimata***
4 Leaves and flower pedicels pubescent to tomentose.
5 Leaf blade attenuate along most of petiole, margin subentire, obscurely toothed near apex ..... ***Crataegus lassa var. recurva***
5 Leaf blade cuneate at base, margin distinctly toothed or dentate near apex.

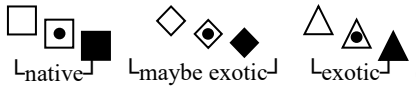
Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

..... ***Crataegus munda***

1 Leaf blades mostly > 12 mm wide and > 2 cm long.
7 Leaf margin mostly subentire; may have glandular-denticulate teeth or 3 lobelike points on distal part of blade.
8 Leaves often with 3 lobelike points near apex.
9 Leaves persistently tomentose; fruit subglobose ..... ***Crataegus lassa var. lanata***
9 Leaves pubescent to glabrate; fruit pyriform ..... ***Crataegus lassa var. lassa***
8 Leaves denticulate or subentire to apex, rarely with any lobelike points.
11 Leaves elliptic-obovate, blade attenuate for about half of petiole ..... ***Crataegus lassa var. integra***
11 Leaves generally spatulate, blade attenuate for most of petiole ..... ***Crataegus lassa var. recurva***
7 Leaf margin toothed along at least half of margin, the teeth fine, acute, obtuse or dentate.
12 Floreal leaves often rhomboid or broadly elliptical; twigs and branches usually not drooping.
13 Leaves distinctly sharply toothed and/or lobed; blades broadly ovate on terminal shoots and > 3.5 cm long ..... ***Crataegus alleghaniensis***
13 Leaves with small or blunt teeth, mostly unlobed; blades rhombic, obovate or orbicular on terminal shoots, < 3.5 cm long.
14 Stamens 10 per flower; terminal shoot leaves broadly rhombic to suborbicular ..... ***Crataegus aprica***
14 Stamens 20 per flower; terminal shoot leaves usually orbicular or broadly obovate ..... ***Crataegus sororia***
12 Floreal leaves mostly obovate or spatulate; leading twigs or branches drooping or pendulous.
15 Leaf apex rounded or with an abrupt short point, margins finely or sharply toothed beyond middle of blade; terminal shoot leaves unlobed to very obscurely lobed.
16 Leaves and inflorescence thinly hairy or glabrate.
17 Leaves and inflorescence sparsely hairy; pyrenes 3-5 per fruit ..... ***Crataegus florens***
17 Leaves and inflorescence essentially glabrous; pyrenes 2 or 3 per fruit ..... ***Crataegus teres***
16 Leaves and inflorescence densely hairy.
19 Leaves persistently pubescent, apex usually rounded ..... ***Crataegus alabamensis***
19 Leaves pubescent when young, later glabrate, apex with a short point ..... ***Crataegus ravenelii***
15 Leaf apex 3-lobed or with 3-5 distinct points or several larger teeth; terminal shoot leaves moderately to deeply lobed.
20 Fruit usually < 10 mm diameter, with calyx collar elevated.
21 Leaf shape often spatulate, lobes and teeth blunt to subacute ..... ***Crataegus quaesita var. floridana***
21 Leaf shape often narrowly obovate, lobes and teeth dentate or sharp ..... ***Crataegus quaesita var. quaesita***
20 Fruit often 10 mm diameter or more, calyx sessile.
22 Terminal shoot leaves ovate, tomentose, sharply serrate and deeply incised ..... ***Crataegus dispar***
22 Terminal shoot leaves mostly obovate, pubescent or glabrate.
23 Leaves partly oblanceolate, usually with 2 pairs of main lateral veins; fruit 10-14mm, flesh dense ..... ***Crataegus lancei***
23 Leaves obovate or sub-rhombic, with 3-5 pairs of main lateral veins; fruit 12-15 mm, flesh soft.
24 Leaf base narrowly cuneate; lobes and teeth obtuse or rounded ..... ***Crataegus furtiva***
24 Leaf base short-cuneate or acute; lobes or teeth acute ..... ***Crataegus visenda***

Key C - hawthorns with leaf blades widest at midpoint or beyond midpoint; blade bases acute or cuneate; leaves eglandular, or if glandular then twigs and branchlets not geniculate

2 Leaves spatulate or oblanceolate, < 13 mm wide; fruit < 6 mm diameter; pyrenes about 3 mm long ..... ***Crataegus spathulata***
2 Leaves variously shaped but most > 13 mm wide; fruit > 6 mm; pyrenes 4 mm long or more.
3 Leaves abaxially with dense hair tufts in proximal main vein axils, especially in spring; [plants typically of wet or floodplain habitats].
4 Inflorescence simple, 1-5-flowered; fruit 10-15 mm diameter, lustrous red, mature in late spring.
5 Leaf blades mostly 5-7 cm long, elliptic, margin wavy or with uneven, blunt teeth ..... ***Crataegus opaca***
5 Leaf blades usually < 5 cm long, most obovate, margin finely toothed.
6 Leaf adaxial surface usually glossy; whitish hair tufts in main vein axils abaxially ..... ***Crataegus aestivalis***
6 Leaf adaxial surface matte; reddish hair tufts in main vein axils abaxially ..... ***Crataegus ×rufula***
4 Inflorescence compound, 5-20-flowered; fruit 5-15 mm diameter, dull red or orange-red, mature in autumn.
7 Petiole 5-10 mm long; terminal shoot leaves < 25 mm broad ..... ***Crataegus crus-galli var. pyracanthifolia***
7 Petiole > 10 mm long; terminal shoot leaves > 25 mm broad; [*Viridies* series and hybrids].
10 Leaves frequently lanceolate ..... ***Crataegus viridis var. lanceolata***
10 Leaves rarely lanceolate, mostly elliptical or rhomboid.
..... ***Crataegus viridis var. viridis***
3 Leaves glabrous or with hairs scattered, not in tufts; [plants typically of upland habitats].
15 Pyrenes channeled or pitted on inner sides.
..... ***Crataegus calpodendron***
15 Pyrenes plane on inner sides.
23 Sepals foliaceous, equaling or exceeding petal length in flower and persistent on fruit; flowers usually 1-5 per inflorescence.
24 Terminal shoot leaves broadly elliptic or ovate, often shallowly lobed ..... ***Crataegus brittonii***
24 Terminal shoot leaves mostly elliptic or obovate, unlobed ..... ***Crataegus uniflora***
23 Sepals not foliaceous, shorter than petals; flowers 5 or more per inflorescence
27 Petioles distinctly glandular, usually with 3 or more glands persistent.
28 Stamens 5-10 (-15) per flower.
29 Fruit flesh usually hard or dense; calyx collar elevated on fruit; leaves moderately lobed on terminal shoots.
30 Anthers white or yellow ..... ***Crataegus intricata var. intricata***
30 Anthers pink or purplish.
31 Sepals deeply glandular-serrate; anthers pink ..... ***Crataegus intricata var. rubella***
31 Sepals finely glandular-serrate; anthers purplish ..... ***Crataegus intricata var. straminea***
29 Fruit flesh dense or soft; calyx collar sessile or nearly so on fruit; leaves shallowly lobed or unlobed on terminal shoots.
32 Terminal shoot leaves suborbicular and 6-8 cm wide; [rare AL endemic] ..... ***Crataegus austromontana***
32 Terminal shoot leaves ovate or obovate, < 6 cm wide; [uncommon but widespread]

Key to Map Symbology: 

..... ***Crataegus alleghaniensis***

28 Stamens usually 20 per flower (often 30 or more in *C. triflora*).
35 Leaves pubescent, at least abaxially; anthers white or yellowish.
36 Sepals remotely glandular-serrate; petiolar glands sessile; fruit usually 8-12 mm diameter ..... ***Crataegus collina***
36 Sepals deeply glandular-serrate; petiolar glands stalked; fruit usually > 12 mm diameter.
37 Leaves thin; inflorescence simple, 3-5-flowered; stamens usually 30 or more ..... ***Crataegus triflora***
37 Leaves firm; inflorescence compound, > 5-flowered; stamens 20.
..... ***Crataegus ashei***
35 Leaves glabrous; anthers pink to purplish, rarely white.
39 Calyx collar sessile on fruit; fruit flesh soft and succulent at maturity.
40 Leaves mostly unlobed; inflorescence scabrous-pubescent; petiolar glands stalked ..... ***Crataegus frugiferans***
40 Leaves acutely lobed; inflorescence glabrate; petiolar glands sessile ..... ***Crataegus ignava***
39 Calyx collar often elevated on fruit; fruit flesh usually dense or dry; [*Pulcherrimae* series].
41 Terminal shoot leaves shallowly lobed or unlobed, apex obtuse, margins crenate-serrate ..... ***Crataegus mendosa***
41 Terminal shoot leaves shallowly to moderately lobed, apex usually acute, margins serrate.
42 Leaf margins often taper in a straight line from midpoint to apex ..... ***Crataegus sargentii***
42 Leaf margins usually convex or bowed from midpoint to apex.
43 Petioles of smaller leaves winged 1/3 or less of length; leaf lobes convex-sided ..... ***Crataegus pulcherrima var. pulcherrima***
43 Petioles of smaller leaves winged 1/2 length; leaf lobes straight on inner/distal side.
..... ***Crataegus venusta***
27 Petioles eglandular, or occasionally with 1 or 2 glands deciduous or obscure after spring. xx
50 Mature leaves pubescent or villous on veins.
51 Terminal shoot leaves usually ovate or rhomboid.
..... ***Crataegus mollis var. meridionalis***
51 Terminal shoot leaves mostly obovate or broadly elliptical.
56 Styles and pyrenes usually 2 or 3; primary leaf veins rather obscure or not impressed; petiole winged to base.
57 Inflorescence tomentose; leaves pubescent abaxially; stamens 20 ..... ***Crataegus berberifolia var. berberifolia***
57 Inflorescence villous or glabrate; leaves usually villous; stamens 10 ..... ***Crataegus berberifolia var. engelmannii***
56 Styles and pyrenes 3-5; primary leaf veins impressed adaxially, conspicuous abaxially; petiole winged near blade.
..... ***Crataegus collina***
50 Mature leaves glabrous or glabrate.
62 Terminal shoot leaves 4.5-7 cm long; 1-3 styles and pyrenes.
..... ***Crataegus crus-galli var. crus-galli***
62 Terminal shoot leaves mostly 2.5-4 cm long; 3-5 styles and pyrenes.
..... ***Crataegus ×mohrii***

Crataegus aemula Beadle. ROME HAWTHORN. **Hab:** Upland hardwood and pine-hardwood forests over sandstone, calcareous rock or circumneutral clay soils, uncommon but sometimes locally abundant. **Dist:** Nw. GA and ne. AL principally, disjunct in McCormick Co, SC. **Phen:** Apr; Sep. **Tax:** Presumed related to *C. iracunda* Beadle, but foliage of *C. aemula* differs in having frequent rounded bases, yellow-green coloration; fruits red, 12-18 mm diameter. *C. aemula* has been shown to be triploid, likely apomictic, producing a high percentage of fertile seed with little seedling variation. The possibility of its being of hybrid origin between *C. iracunda* Beadle and *C. collina* Chapman has been suggested. **Syn:** = FNA9, K1, S2, Lance (2014); < *Crataegus macrosperma* Ashe – S.

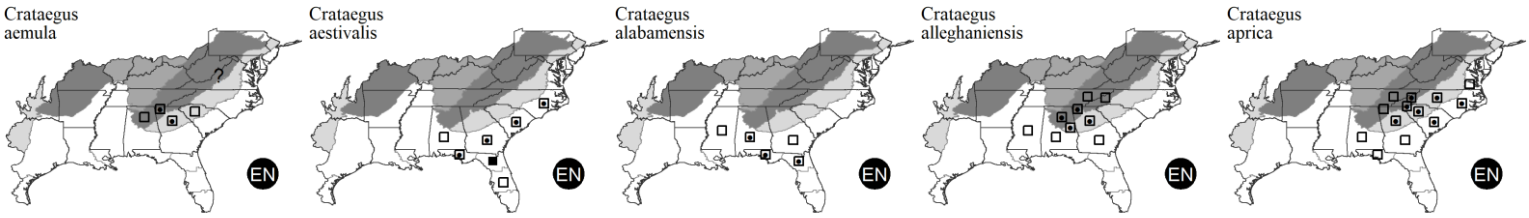
Crataegus aestivalis (Walter) Torrey & A. Gray. EASTERN MAYHAW. **Hab:** Swamp forests, generally where flooded for much of the year, often flowering and fruiting while standing in water, often associated with *Taxodium distichum*, *Nyssa aquatica*, *Nyssa biflora*, and *Planera aquatica*, uncommon but sometimes locally abundant; occasionally growing as groves or stands in 'mayhaw flats'. **Dist:** Se. NC south to n. FL and se. AL. A historic report of *C. aestivalis* in VA appears to be based on a single specimen collected 22 July 1934 by M.L. Fernald & B. Long, in Princess Anne County; this specimen is actually *C. crus-galli*. **Phen:** Mar-Apr; Jun-Jul. **Tax:** A related species, *C. opaca* Hooker & Arnott, occurs west of the range of *C. aestivalis*, in similar habitats. Plants with copious growth of reddish pubescence on the leaf undersides are included under *C. ×rufula*. See Phipps (1988) for extensive additional discussion of *C. aestivalis* and relatives. **Comm:** The fruits of this and the other two species of "mayhaw" (*C. opaca*, *C. rufula*) are traditionally gathered for preserves, pies, and jelly. **Syn:** = FNA9, K1, RAB, Lance (2014), Phipps (1988a); < *Crataegus aestivalis* (Walter) Torrey & A. Gray – K3, S.

Crataegus alabamensis Beadle. ALABAMA HAWTHORN. **Hab:** Upland pine and pine-oak forests over clay soil. **Dist:** S. AL, reported from n. FL. **Phen:** Apr; Aug-Sep. **Tax:** The typical form of *C. alabamensis* has crenate-serrate, pubescent foliage and tomentose inflorescence parts. The similar *C. ravenelii*, *C. florens*, *C. attrita*, and *C. teres* are progressively more glabrate and of wider ranges; these interpreted as varieties of *C. alabamensis* in Lance (2011, 2014) and separate species in Phipps & Dvorsky (2008). **Syn:** = FNA9, Lance (2014), Phipps, O'Kennon, & Lance (2003); > *Crataegus adunca* Beadle – S2; < *Crataegus flava* Aiton – K1, RAB, S.

Crataegus alleghaniensis Beadle. ALLEGHENY HAWTHORN. **Hab:** Upland pine and pine-oak forests with clay soils. **Dist:** E. c. and ne. GA to c. and n. AL; reported from n. MS, e. TN, sw NC. **Phen:** Apr; Aug-Sep. **Tax:** Broadly considered, this species includes a variety of morphological forms; a narrower view might hold some to specific levels. Alternatively, the overall intermediate morphology suggests possible hybrid origin of most or all of these entities, perhaps between members of the *Intricatae* and *Apricae* series. Generally, leaves are sharply serrate and shallowly incised-lobed; stamens 10-20 per flower and anthers pink to purple; fruit 8-12 mm, red, with soft flesh. The stamen counts vary from 10 in typical *C. alleghaniensis* to 12-20 in related forms sharing much of the same range. **Syn:** = FNA9, Tn, Lance (2014), Phipps, Lance, & Dvorsky (2006); > *Crataegus agrestina* Beadle – S2; > *Crataegus allagheniensis* – S2; > *Crataegus alleghaniensis* var. *alleghaniensis* – Lance (2014); > *Crataegus alleghaniensis* var. *mira* (Beadle) R.W. Lance – Lance (2014); > *Crataegus cullasagensis* Ashe – S2, Ashe (1900b); < *Crataegus flava* Aiton – RAB; > *Crataegus rigens* Beadle – S2.

Crataegus aprica Beadle. SUNNY HAWTHORN. **Hab:** Upland pine forests, pine-oak forests, mixed hardwood forests over rocky or sandy substrates, abandoned fields, roadsides. **Dist:** Se. VA and NC south to s. GA and n. FL, west to e. AL. This species is most common in the upper Piedmont and Southern Appalachians of NC and SC, and sporadic in the Coastal Plain. **Phen:** Late Mar-Apr; Sep. **Tax:** The 10 stamens separate this species from the closely related and similar *C. sororia*, and both these taxa have long been included under the collective name of *C. flava* Aiton in

many earlier treatments (see discussion of *C. flava*). **Syn:** = FNA9, Tn, W, Lance (2014), Phipps & Dvorsky (2007); > *Crataegus aprica* Beadle – S2; < *Crataegus flava* Aiton – RAB; > *Crataegus shallotte* Ashe – Ashe (1900c).



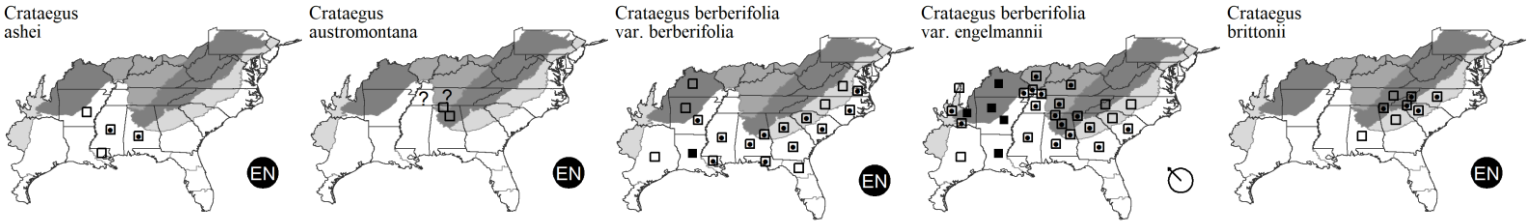
Crataegus ashei Beadle. ASHE HAWTHORN. **Hab:** Prairies, hardwood forests, pine-hardwood flats, especially over calcareous clay soils. **Dist:** Core of range is central MS, where this species is locally common in Scott and Smith counties; sporadic in c. and s. AL, e. LA, se. AR (s. TN ?). **Tax:** Related to *C. triflora* Chapman and *C. harbisonii* Beadle. **Syn:** = FNA9, S2, Lance (2014), Phipps, Lance, & Dvorsky (2006); < *Crataegus harbisonii* Beadle – K1.

Crataegus austromontana Beadle. VALLEY HEAD HAWTHORN, SOUTHERN MOUNTAIN HAWTHORN. **Hab:** Mountain woodlands, over sandstone or calcareous rock. **Dist:** N. AL, c. and se. TN? **Phen:** Apr; Sep-Oct. **Tax:** A rare, possibly extinct taxa described from the Sand Mountain area, closely related to *C. triflora* Chapman but having 10 stamens per flower, large, roundish leaves and a straggling growth habit. Possibly a local variant form of *C. triflora*, or an intermediate; it has remained undocumented by collections for over 100 years. **Syn:** = FNA9, S2, Tn, Phipps, Lance, & Dvorsky (2006).

Crataegus berberifolia Torrey & A. Gray *var.* ***berberifolia***. BARBERRY HAWTHORN. **Hab:** Mixed hardwood and pine forests. **Dist:** C. VA south to n. FL, west to TX, MO; most common in LA, s. AR, e. TX. **Phen:** Apr-May; Aug-Oct. **Comm:** Closely related to and sometimes intergrading with *C. crus-galli*; differing from that species by consistent pubescence on foliage, twigs, floral and fruit parts; 10-stamened forms of the normally 20-stamened *C. berberifolia* have been called *C. engelmannii* Sargent, here treated as *C. berberifolia* var. *engelmannii*. **Syn:** = C, FNA9, K1, S, S2, Lance (2014); < *Crataegus berberifolia* – Ar, K3. NatureServe G5T4 (Apparently Secure).

Crataegus berberifolia Torrey & A. Gray *var.* ***engelmannii*** (Sargent) Eggleston. ENGELMANN'S HAWTHORN. **Hab:** Mixed hardwood and pine forests of uplands, usually in subxeric to xeric habitats, especially over basic to calcareous soils. **Dist:** Appears most common in MO and AR, mixed sporadically with the species eastward to e. TN, c. NC. **Phen:** Apr-May; Aug-Oct. **Tax:** Foliage is similar to typical var. *berberifolia* in most respects, except for a tendency to be more scabrous-pubescent and reticulate-veined; presence of 10 stamens per flower is typical. Occasional intergradation with *C. crus-galli* in mixed populations is evident. **Syn:** = FNA9, Lance (2014); < *Crataegus berberifolia* – Ar, K3, Tn; > *Crataegus engelmannii* Sargent – NcTx, S2; > *Crataegus sinistra* Beadle – S2; > *Crataegus torva* Beadle – S2. NatureServe G5T4 (Apparently Secure).

Crataegus brittonii Eggleston. BRITTON'S HAWTHORN. **Hab:** Thinly forested hills and slopes, bluffs, rock outcrops, disturbed lands, roadsides, streamsides. **Dist:** Range apparently limited to sw. NC and adjacent NC Piedmont to c. SC, e. and n. GA. **Phen:** Apr-May; Sep-Oct. **Tax:** Allied closely to *C. uniflora* Muenchhausen and possibly only a derivative of it. Leaf shape often ovate to elliptic. **Syn:** = FNA9, K1, S; > *Crataegus rhodella* Ashe – S2; >< *Crataegus uniflora* Münchhausen – S2; > *Crataegus uniflora* var. *brittonii* (Eggleston) R.W. Lance – Lance (2014).



Crataegus buckleyi Beadle. BUCKLEY'S HAWTHORN. **Hab:** Upland pine and hardwood forests, rock outcrops. **Dist:** W. NC, w. SC, n. GA west to n. AL. **Phen:** Apr-May; Aug-Oct. **Comm:** Related to *C .intricata* Lange; distinguished primarily by purplish anthers, glandular-serrate calyx lobes, russet fruit and small (3-6 cm long × 2-4 cm wide) leaves with blunt lobes. **Syn:** = FNA9, S2, Lance (2014); < *Crataegus flabellata* (Bosc ex Spach) K. Koch – RAB; < *Crataegus intricata* Palmer – C, K1.

Crataegus calpodendron (Ehrhart) Medikus. PEAR HAWTHORN. **Hab:** Mixed hardwood forests, open slopes, wooded ravines, streamsides, especially over basic or calcareous rocks. **Dist:** NY w. to MN, s. to GA, OK. This species is relatively common in its generally northern range, uncommon in its southern range extensions in uplands from VA to MO, and rare in the Coastal Plain of GA, AL. **Phen:** May-early Jun; Sep-Oct. **Comm:** Often found as a solitary specimen or in small local populations. One of the latest hawthorns in our area to flower. **Syn:** = C, FNA9, GrPl, K1, K3, Mi, Pa, RAB, S, Tn, W, Lance (2014); > *Crataegus calpodendron* var. *calpodendron* – F, G; > *Crataegus calpodendron* var. *globosa* globosa(Sargent) E.J. Palmer – F, G; > *Crataegus calpodendron* var. *microcarpa* (Chapman) E.J. Palmer – F, G; > *Crataegus carrollensis* Sargent – Sargent (1922a); > *Crataegus chapmanii* Beadle – S2.

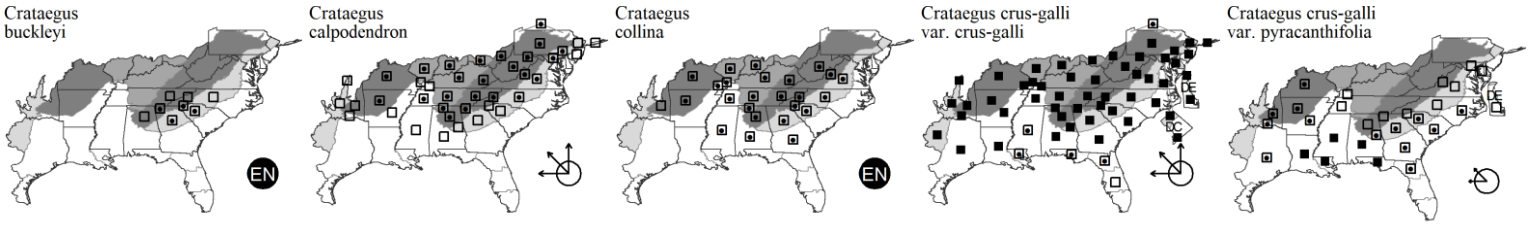
Crataegus collina Chapman. HILLSIDE HAWTHORN. **Hab:** Hardwood and pine-oak forests of hills and valleys, brushy lands. *C. collina* occupies sub-xeric uplands in the Appalachian Region and is tolerant of lowland floodplains in GA, AL, TN. **Dist:** Sw. VA west to KS, south to c. GA, s. AL, c. MS, AR and OK. **Phen:** Mar-Apr; Aug-Oct. **Tax:** Allied to *C. punctata* Jacquin, but more southern in range and at lower elevations. The fruits rarely reach 12 mm in diameter, whereas those of *C. punctata* often range from 12-23 mm. This species is variable in leaf and vestiture, some local genotypes being conspicuously pubescent. Several varieties have been described for the western range of the species, considered in synonymy here. **Comm:** It is one of the earliest hawthorns to flower in spring. **Syn:** = S, Tn, W, Lance (2014); > *Crataegus amnicola* Beadle – S2; > *Crataegus collina* Chapman – S2; > *Crataegus collina* var. *collicola* (W.W. Ashe) – F, G; > *Crataegus collina* var. *collina* – F, FNA9, G; > *Crataegus ingens* Beadle – S2; < *Crataegus punctata* Jacquin – Ar, C, RAB.

Crataegus crus-galli Linnaeus *var.* ***crus-galli***. COCKSPUR HAWTHORN. **Hab:** Pastures, thickets, disturbed woodlands and forests, fencerows. **Dist:** Ranges throughout the eastern US, except c. and s. peninsular FL, sometimes forming extensive colonies. **Phen:** Apr-May; Sep-Oct. **Tax:** *C.*

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

crus-galli is variable in the size and shape of leaves and minor flower and fruit characters, this accounting for an extensive synonymy. Most earlier names in the synonymy were applied by Charles Sargent. Plants having 3 to 5 styles and as many pyrenes are alternatively placed under *C. reverchonii* Sargent, these also exhibiting a tendency to have smaller, suborbiculate leaves on terminal shoots. Typical forms of *C. crus-galli* tend to have 1-2 styles and pyrenes, and with a range of leaf shapes from narrowly oblanceolate to nearly suborbiculate. **Syn:** = C, FNA9, Tn, W, Lance (2014); > *Crataegus algens* Beadle – S2; > *Crataegus arborea* Beadle – K1; ? *Crataegus crus-galli* – S; < *Crataegus crus-galli* – Ar, Mi, NcTx, NE, Pa, RAB; > *Crataegus crus-galli* – K1; > *Crataegus crus-galli* Linnaeus var. *crus-galli* – F, G; > *Crataegus crus-galli* var. *exigua* (Sargent) Eggleston – G; > *Crataegus crus-galli* var. *macra* (Beadle) E.J. Palmer – F, G; > *Crataegus macra* Beadle – S2; > *Crataegus regalis* Beadle var. *regalis* – F.

Crataegus crus-galli Linnaeus *var.* ***pyracanthifolia*** (Aiton) Sargent. NARROWLEAF COCKSPUR HAWTHORN. **Hab:** Bottomland forests, swamp borders, lowlands, sometimes locally abundant. **Dist:** DE south to n. FL, west to MO, e. TX. **Phen:** Apr-May; Oct. **Comm:** The narrow leaves may be glabrous or pubescent on the lower surface, varying as local genotypes. **Syn:** = FNA9, Tn, Lance (2014); > *Crataegus crus-galli* Linnaeus var. *pyracanthifolia* (Aiton) Sargent – F, G; > *Crataegus limnophylla* Sargent – K1; > *Crataegus pyracanthoides* Beadle – S2; > *Crataegus pyracanthoides* Beadle var. *arborea* (Beadle) E.J. Palmer – G. NatureServe G3G5Q (Apparently Secure).



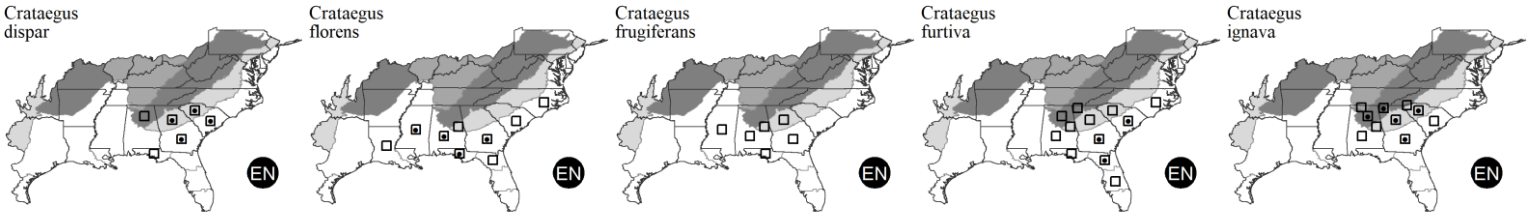
Crataegus dispar Beadle. AIKEN HAWTHORN. **Hab:** Upland pine or pine-oak forests under sub-xeric to xeric conditions, in well-drained clay or sandy soils. **Dist:** Nc. & sc. SC and adjacent e. GA; single sporadic collections known from Panhandle FL and ne. AL. **Phen:** Late Mar-Apr; Sep. **ID Notes:** A distinctive species with deeply incised and serrated, tomentose, pale bluish-green leaves. **Syn:** = FNA9, K1, S2, Lance (2014). NatureServe G3G5Q (Apparently Secure).

Crataegus florens Beadle. MISSISSIPPI HAWTHORN. **Hab:** Pine and pine-oak forests, subxeric to mesic habitats with sandy or clay soils. **Dist:** E. NC south to n. FL, west to LA. **Phen:** Mar-Apr; Aug-Sep. **ID Notes:** Distinctive characters include slightly pilose-pubescent inflorescences, slightly pubescent or glabrate leaves and 3-5 styles. **Syn:** = FNA9, Phipps, O'Kennon, & Lance (2003); < *Crataegus alabamensis* var. *florens* (Beadle) Lance – Lance (2014); > *Crataegus attrita* Beadle – S2, Lance (2014); < *Crataegus flava* Aiton – K1, RAB, S; > *Crataegus florens* Beadle – S2; > *Crataegus fortis* Beadle – S2; > *Crataegus insidiosa* Beadle – S2.

Crataegus frugiferans Beadle. FRUITFUL HAWTHORN. **Hab:** Upland, open woodlands, brushy areas. **Dist:** C. and s. GA, n. FL w. to AL, MS. **Phen:** Late Mar-Apr; Aug-Sep. **Tax:** This taxon is sporadic and may represent interserial hybrid origin of *Crataegus alleghaniensis* with *C. collina* or another taxa. Possibly related or intermediate in some way is *C. mira* Beadle. **ID Notes:** The typically stipitate-glandular petioles and inflorescence stems may vary to sessile-glandular in some plants. **Syn:** = FNA9; = *Crataegus alleghaniensis* var. *mira* (Beadle) R.W. Lance – Lance (2014); > *Crataegus frugiferans* Beadle – S2; > *Crataegus rigens* Beadle – S2.

Crataegus furtiva Beadle. ALBANY HAWTHORN. **Hab:** Upland pine forests, pine-oak scrub, longleaf pine sandhills, disturbed woodlands, abandoned fields. **Dist:** Se. NC to c. AL, s. to peninsular FL. **Phen:** Late Mar-Apr; late Aug-Sep. **ID Notes:** The most definitive morphological traits are the heavily white-pubescent floral and early vegetative parts and obtrullate, 3-lobed leaves. **Syn:** = FNA9, S2, Lance (2014), Phipps, O'Kennon, & Lance (2003). NatureServe G3G5Q (Apparently Secure).

Crataegus ignava Beadle. VALLEY HEAD HAWTHORN. **Hab:** Upland pine and pine-oak forests, clay soils. **Dist:** Ec. SC to sw. GA, north to n. AL and n. GA. **Phen:** Apr; Aug-Sep. **Tax:** Related to *C. alleghaniensis* Beadle, and possibly a form of it, but *C. ignava* is more frequently seen across our area. **ID Notes:** It is most distinct in its glabrate inflorescences and leaves and its 15-20 stamens with pink to rose anthers. **Syn:** = FNA9; > *Crataegus alleghaniensis* var. *extraria* (Beadle) R.W. Lance – Lance (2014); > *Crataegus alleghaniensis* Beadle var. *ignava* (Beadle) R.W. Lance – Lance (2014); > *Crataegus extraria* Beadle – S2; > *Crataegus ignava* Beadle – S2; > *Crataegus impar* Beadle – S2.



Crataegus incilis Beadle. CUTLEAF BEAUTIFUL HAWTHORN. **Hab:** Mixed pine and hardwood forests, wooded hills, rocky woods. **Dist:** Sw. GA and Panhandle FL, west to s. MS, north to ne. AL; locally abundant in the vicinity of lower Little River Canyon, AL and sporadically elsewhere in the known range. **Phen:** Late Mar-Apr; Aug-Sep. **ID Notes:** *C. incilis* is a usually shrubby relative of *C. pulcherrima* Ashe with a strong suckering habit and slender shoots exhibiting thin, distinctly incised leaves. The 4 or 5 pairs of lobes per leaf, cuneate leaf base and 5-8 mm fruit are also characteristic. **Syn:** = FNA9; = *Crataegus pulcherrima* Ahe var. *incilis* (Beadle) R.W. Lance – Lance (2014); > *Crataegus concinna* Beadle – S2.

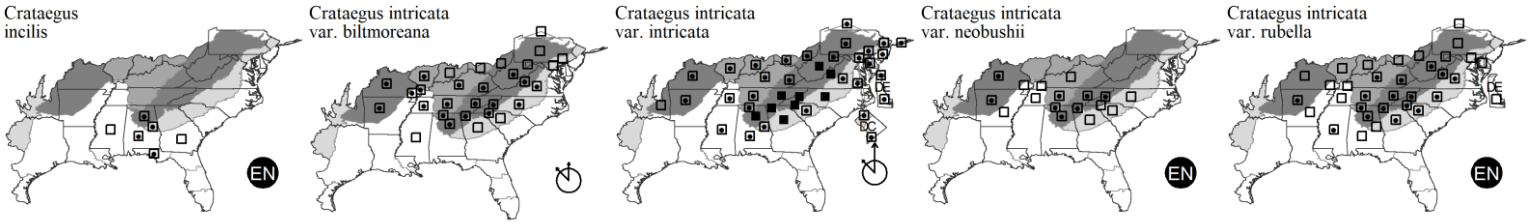
Crataegus intricata Lange *var.* ***biltmoreana*** (Beadle) R.W. Lance. BILTMORE HAWTHORN. **Hab:** Wooded hills, rock outcrops, thickets. **Dist:** VT south to c. GA, west to AR, MO. **Phen:** Late Apr-May; Sep-Oct. **ID Notes:** Distinguished from other varieties of *C. intricata* by the hairiness of its vegetative and floral parts. **Syn:** = Tn, Lance (2014); = *Crataegus biltmoreana* Beadle – FNA9; > *Crataegus biltmoreana* Beadle – F, G, NE, S2; > *Crataegus confusa* Sargent – F; < *Crataegus intricata* Palmer – Ar; > *Crataegus stonei* Sargent – F; > *Crataegus villicarpa* Sargent – F.

Crataegus intricata Lange *var.* ***intricata***. ENTANGLED HAWTHORN. **Hab:** Pastures, wooded hills, rock outcrops, thickets. **Dist:** VT to MI, IL, s. to GA, AR; relatively common in the Appalachian region. **Phen:** Late Apr-May; Aug-Oct. **Tax:** Broadly defined, *C. intricata* is a variable taxon incorporating numerous genotypes and minor local forms. Significant entities are segregated into the several varieties. **ID Notes:** Basic defining

characters are 10 stamens; white or yellowish anthers; hard, greenish or ruddy-blushed fruits with an elevated calyx; glabrous, glandular leaves; slender thorns and frequently shrubby habit. **Syn:** = C, K1, S, Tn, W, Lance (2014); < *Crataegus flabellata* (Bosc ex Spach) K. Koch – RAB; < *Crataegus intricata* Palmer – Ar, FNA9, Mi, Pa; > *Crataegus intricata* Lange var. *intricata* – F, G; > *Crataegus lentula* Ashe – F; > *Crataegus rubescens* Ashe – F; > *Crataegus virgata* Ashe – F.

Crataegus intricata Lange *var.* ***neobushii*** (Sargent) Kruschke. BUSH HAWTHORN. **Hab:** Wooded hills, pastures, thickets. **Dist:** Reported from w. NC and n. GA w. to AR, MO; more common in AR and MO. **Phen:** Late Apr-May; Sep-Oct. **ID Notes:** The sharply toothed and lobed, often obtrullate leaves and pink anthers are distinctive. **Syn:** = Lance (2014); = *Crataegus neobushii* Sargent – FNA9; < *Crataegus intricata* Palmer – Ar.

Crataegus intricata Lange *var.* ***rubella*** (Beadle) Kruschke. LITTLE RED HAWTHORN. **Hab:** Hardwood forests, rock outcrops, thickets. **Dist:** DE, MD, VA w. to MO, s. to GA, AL. **Phen:** Late Apr-May; Sep-Oct. **ID Notes:** Distinguished primarily by shallowly lobed or unlobed leaves, red fruit and purplish anthers. **Syn:** = Va, Lance (2014); > *Crataegus apposita* Sargent – F; < *Crataegus flabellata* (Bosc ex Spach) K. Koch – RAB; < *Crataegus intricata* Palmer – Ar; < *Crataegus rubella* Beadle – FNA9.



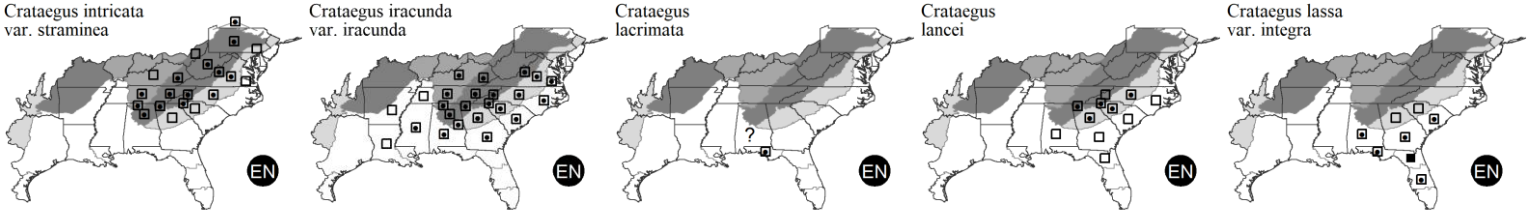
Crataegus intricata Lange *var.* ***straminea*** (Beadle) E.J. Palmer. STRAW-FRUITED HAWTHORN. **Hab:** Wooded hills, thickets, disturbed forests. **Dist:** PA s. to n. GA, w. to OH, c. KY, ne. AL. **Phen:** Late Apr-May; Sep-Oct. **ID Notes:** Related to *C. intricata* var. *rubella* Beadle, but fruit normally yellowish and inflorescences and young leaves frequently slightly pilose. **Syn:** = F, Va, Lance (2014); > *Crataegus communis* Beadle – FNA9; < *Crataegus intricata* Palmer – Ar; >< *Crataegus rubella* Beadle – FNA9; > *Crataegus straminea* Beadle – FNA9.

Crataegus iracunda Beadle *var.* ***iracunda***. FOREST HAWTHORN. **Hab:** Swamps, bottomlands, moist slopes, wooded hills, overall uncommon but sometimes locally abundant. **Dist:** VA to SC, w. to s. AR, n. LA. **Phen:** Mar-late April; Sep-Oct. **Tax:** *C. iracunda* and its associated, allied taxa suggest a complex possibly derived as hybrids involving series *Tenuifoliae* and *Pruinosae*, all formerly included within series *Silvicolae* (F, G). Recent reassignment by Phipps (FNA9) suggests separation of taxa in this complex into series *Populneae* and *Tenuifoliae*. The southern forms of the *iracunda* complex tend to occasionally display sparse hairs or pubescence on the foliage and inflorescence stems, here attributed to the typical var. iracunda; the more glabrous northern forms to var. *populnea*. *C. iracunda* Beadle sensu stricto is morphologically similar to the more widespread species *C. macrosperma* Ashe and separation of sterile and juvenile plants in sympatric ranges can be problematic; a primary distinction of hard fruit flesh in *C. iracunda* and soft fruit flesh in *C. macrosperma* is not always available for comparison. **Syn:** = Lance (2014); = *Crataegus iracunda* Beadle – K1, Tn, Lance (2014); < *Crataegus flabellata* (Bosc ex Spach) K. Koch – C, RAB; > *Crataegus iracunda* Beadle – FNA9, S2; > *Crataegus iracunda* Beadle var. *iracunda* – F, G; > *Crataegus iracunda* var. *silvicola* (Beadle) E.J. Palmer – F, G; > *Crataegus populnea* Ashe – G; > *Crataegus silvicola* Beadle – S2.

Crataegus lacrimata Small. WEEPING HAWTHORN. **Hab:** Xeric, sandy soils, in scrublands and in association with sparse stands of *Pinus clausa* or *Pinus palustris*. **Dist:** Endemic to the western FL Panhandle; perhaps in adjacent sandhill scrub of AL. **Phen:** Late Mar-Apr; Aug-Sep. **ID Notes:** The combination of slender, conspicuously weeping branches, small spatulate leaves, glabrous character, and treelike habit in *C. lacrimata* is unique among a large group of related hawthorns which occupy sandy habitats in the Coastal Plain. **Syn:** = FNA9, S2, Lance (2014); < *Crataegus flava* Aiton – K1.

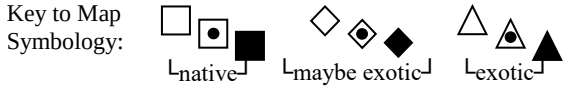
Crataegus lancei J.B. Phipps. LANCE'S HAWTHORN. **Hab:** Upland hills, hardwood-pine forests, scrubland, pastures. **Dist:** S. NC to e. GA, reported from sw. GA, n. peninsular FL and se. AL. Appears to have a core range in w. SC and ne. GA, sporadic elsewhere in a fragmented range that involves broad areas devoid of specimens. **Phen:** Apr-May; Oct-Nov. **Tax:** Possibly equivalent to *Crataegus pentasperma* Ashe, *C. pearsonii* Ashe and *C. yadkinensis* Ashe, but these types are unsettled. **Syn:** = FNA9, Lance (2014), Phipps, O'Kennon, & Lance (2003); < *Crataegus flava* Aiton – K1, RAB, S, W; >? *Crataegus pearsonii* W.W. Ashe? – S2; >? *Crataegus yadkinensis* Beadle – S2.

Crataegus lassa Beadle *var.* ***integra*** (Beadle) R.W. Lance. LAKE ELLA HAWTHORN. **Hab:** Oak-pine scrub and sandy uplands. **Dist:** Central SC south to peninsular FL, west to s. and c. AL; the core range is peninsular FL and n. FL, where this entity is most common. **Phen:** Late Mar-Apr; Aug-Sep. **Tax:** Sometimes unclear separation from other sympatric varieties of *C. lassa* can occur, due to intergradation among mixed populations. **Syn:** = Lance (2014); = *Crataegus integra* – FNA9; >? *Crataegus amica* Beadle – S2; > *Crataegus constans* Beadle – S2; > *Crataegus dolosa* Beadle – S2; < *Crataegus flava* Aiton – RAB; >< *Crataegus flava* Aiton – K1; > *Crataegus integra* – S2; > *Crataegus sodalis* Beadle – S2.



Crataegus lassa Beadle *var.* ***lanata*** (Beadle) R.W. Lance. LANATE HAWTHORN. **Hab:** Oak-pine scrub and sandy uplands. **Dist:** Se. NC to c. peninsular FL, west to n. GA, c. AL. **Phen:** Late Mar-Apr; Aug-Sep. **ID Notes:** The densely white-pubescent leaves (lanate) are morphologically the most significant trait, but intergradation with other forms of *C. lassa* may occur in mixed populations. Often of arborescent habit, with drooping branches and conspicuously floppy leaves. **Syn:** = Lance (2014); = *Crataegus lanata* Beadle – FNA9; >? *Crataegus inops* Beadle – S2; > *Crataegus lanata* Beadle – S2. NatureServe G3G5Q (Apparently Secure).

Crataegus lassa Beadle *var.* ***lassa***. SANDHILL HAWTHORN. **Hab:** Pine forests, oak-pine scrub, upland scrublands, xeric woodlands, especially in deep sand and soils of rapid drainage. **Dist:** Central NC south to n. FL, west to s. AL. **Phen:** Late Mar-Apr; Aug-Sep. **Tax:** *Crataegus lassa* and its

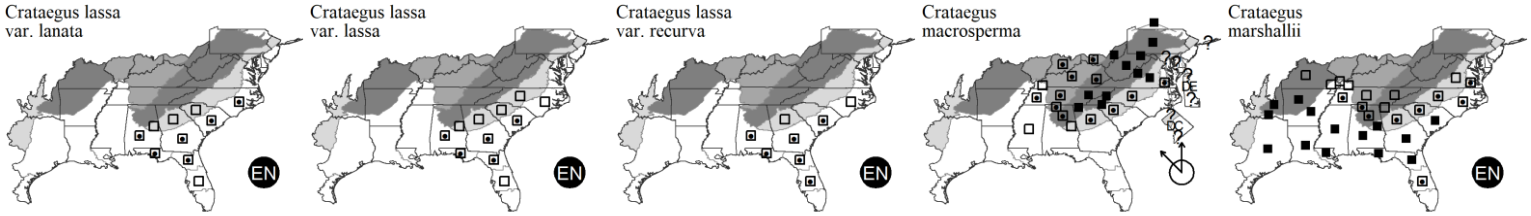


varieties as defined here include a range of minor species described by Beadle; all have been synonymized under the *C. flava* Aiton name in many previous flora treatments. What may represent intermediates are *Crataegus meridiana* Beadle (possibly of mixed origin with *Crataegus ravenelii* Sargent), *Crataegus inopina* Beadle (intermediate of varieties *lassa* and *recurva*), and *Crataegus vicana* Beadle. **Syn:** = Lance (2014); = *Crataegus lassa* – FNA9; > *Crataegus arguta* Beadle – S2; < *Crataegus flava* Aiton – RAB; >< *Crataegus flava* Aiton – K1; > *Crataegus illudens* Beadle – S2; > *Crataegus lassa* – S2; > *Crataegus meridiana* Beadle – S2; > *Crataegus michauxii* Persoon – S, S2; > *Crataegus pearsonii* W.W. Ashe? – K1.

Crataegus lassa Beadle *var*. ***recurva*** (Beadle) R.W. Lance. OCALA HAWTHORN. **Hab:** Oak-pine scrub and sandy uplands. **Dist:** Ec. NC to peninsular FL, west to s. AL; the core range is peninsular FL and n. FL, where this entity is most common. **Phen:** Late Mar-Apr; Aug-Sep. **Tax:** Sometimes poorly differentiated from var. *integra* in mixed populations, likely due to some intergradation. **Syn:** = Lance (2014); = *Crataegus crocea* Beadle – FNA9; > *Crataegus crocea* Beadle – S2; > *Crataegus curva* Beadle – S2; > *Crataegus frugalis* Beadle – S2; > *Crataegus incana* Beadle – S2; > *Crataegus recurva* Beadle – S2; > *Crataegus villaris* Beadle – S2.

Crataegus macrosperma Ashe. EASTERN HAWTHORN. **Hab:** Mesic to subxeric hardwood forests, wooded slopes, rock outcrops, pastures, thickets, mountain balds and rocky summits. **Dist:** ME to MN, south to GA, AL, AR; *C. macrosperma* is widespread, particularly common in the Appalachians. **Phen:** Apr-early May; Sep-Oct. **ID Notes:** *C. macrosperma* is consistent in its adaxially lightly scabrous-pubescent young leaves, 5-10 stamens, and soft-textured mature fruit. The pyrenes are not unusually large (5-8 mm), so the epithet is somewhat a misnomer. **Syn:** = Ar, FNA9, K1, K3, Pa, Tn, W, Lance (2014); > *Crataegus brainerdii* Sargent – C, Pa, misapplied to material in our area; < *Crataegus flabellata* (Bosc ex Spach) K. Koch – RAB; > *Crataegus flabellata* (Bosc ex Spach) K. Koch – C; > *Crataegus fluviatilis* – Mi; < *Crataegus macrosperma* Ashe – S; > *Crataegus macrosperma* Ashe – S2; > *Crataegus macrosperma* var. *macrosperma* – F, G; > *Crataegus macrosperma* var. *roanensis* (Ashe) E.J. Palmer – F, G; > *Crataegus roanensis* Ashe – S2.

Crataegus marshallii Eggleston. PARSLEY HAWTHORN, PARSLEY HAW. **Hab:** Swamps, alluvial forests, mesic to subxeric upland slopes over mafic or calcareous rocks. **Dist:** Se. VA south to c. peninsular FL, west to e. TX, and north in the interior to n. AL, sc. and w. TN, n. MS, s. IL, se. MO, se. OK. **Phen:** Apr-early May; Sep-Oct. **ID Notes:** *Crataegus marshallii* is distinctive and immediately recognizable by its deeply incised, pubescent leaves with slender petioles, small (4-7 mm) fruits and the scaly, mottled trunk bark. **Syn:** = Ar, C, F, FNA9, G, K1, K3, NcTx, RAB, S, Tn, W, Lance (2014), Phipps (1998); = *Crataegus apiifolia* (Marshall) Michaux – S2. NatureServe G5 (Secure).



Crataegus mendosa Beadle. ALBERTVILLE HAWTHORN. **Hab:** Mesic hardwood forests, mixed pine-hardwood forests, upland wooded hills over calcareous substrates and well-drained clays. **Dist:** Lower Piedmont and upper Coastal Plain of sc. SC, wc. GA, ne. and c. AL, and c. and s. MS. **Phen:** Apr; Sep. **Tax:** Allied to *C. pulcherrima* Ashe, and perhaps only a variant of it, *C. mendosa* is distributed northward and eastward beyond the bulk of the range of *C. pulcherrima*, and the only member of the *Pulcherrimae* series known to occur in SC. **ID Notes:** The often-obtuse leaf apex and accompanying obscure, blunt lobes and sub-crenate teeth are characteristic; the glabrous foliage coupled with 20 stamens per flower help separate this species from members of the *Intricatae* series. **Syn:** = FNA9, K1, S, S2, Lance (2014). NatureServe G3Q (Vulnerable).

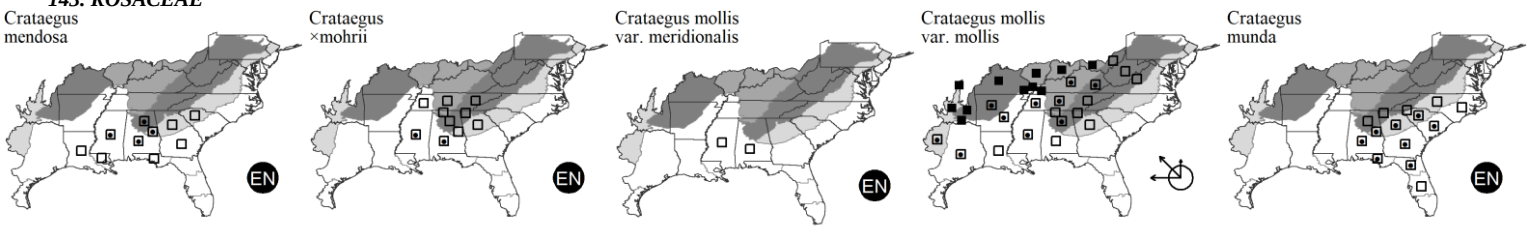
Crataegus ×mohrii Beadle. MOHR'S HAWTHORN. **Hab:** Hardwood and pine-hardwood forest understories. **Dist:** Rare and sporadic from MS to GA, n. to TN. **Phen:** May; Sept.-Oct. **Tax:** The combination of short (2-4 cm), suborbicular terminal shoot leaves and 3-5 styles suggests an affinity to *C. reverchonii* Sargent, as per Phipps (2014d); alternatively, *C. ×mohrii* could be considered an intraserial intermediate of *C. reverchonii* and another member of *Crus-galli*, due to range considerations and its pilose inflorescences and yellow anthers. **Syn:** = *Crataegus mohrii* Beadle – F, K1, S; = *Crataegus reverchonii* var. *mohrii* (Beadle) J.B. Phipps – FNA9, Lance (2014); < *Crataegus reverchonii* Sargent – Tn.

Crataegus mollis (Torrey & A. Gray) Scheele *var*. ***meridionalis*** (Sargent) Lance. SOUTHERN DOWNY HAWTHORN. **Hab:** Prairies, streamsides, scrubland. **Dist:** Rare and sporadic in central and s. AL and MS, primarily distributed in the Black Belt / Jackson Prairie ecoregion. **Phen:** Mar-Apr; Oct-Nov. **ID Notes:** This southern form of *C. mollis* is distinguished by its elliptical, unlobed leaves; the range is east-peripheral to the range of typical *C. mollis*. **Syn:** = FNA9, K1; < *Crataegus mollis* – K3.

Crataegus mollis (Torrey & A. Gray) Scheele *var*. ***mollis***. DOWNY HAWTHORN. **Hab:** Mesic forests, alluvial forests, prairies, streamsides, wooded uplands over basic or calcareous soils. **Dist:** MI to e. ND, s. to AL, TX south to s. TX, e. to nw. GA; an occurrence of this species in the mountains of VA is atypical of the majority of the range, which is mostly Midwestern, west and southwest of the Appalachians. **Phen:** Mar-Apr; Sep-Oct. **ID Notes:** The typical variety of *C. mollis* exhibits ovate to broadly ovate or deltate leaves heavily pubescent or tomentose abaxially, particularly in spring; similar vestiture is seen on the stout, eglandular petioles and inflorescence parts. The fruits of some local genotypes can reach 24 mm diameter, among the largest of the genus in the U.S. C. mollis often reaches treelike dimensions, to 10 m tall and trunk diameters to 30 cm. **Syn:** = C, Pa, S, Lance (2014); ?> *Crataegus albicans* Ashe – S; > *Crataegus cibaria* Beadle – S2; > *Crataegus gravida* Beadle – S2; < *Crataegus mollis* – Ar, GrPl, K1, K3, Mi, Tn; > *Crataegus mollis* – S2; > *Crataegus mollis* (Torrey & A. Gray) Scheele var. *mollis* – F, G.

Crataegus munda Beadle. DWARF HAWTHORN, NEAT HAWTHORN. **Hab:** Longleaf pine sandhills, other xeric or subxeric forests, scrublands, disturbed woodlands. **Dist:** C. NC south to n. FL, west to s. and c. AL. **Phen:** Late Mar-Apr; Sep-Oct. **ID Notes:** *Crataegus munda* is a shrubby taxon (< 2 m tall) with small (1-3 cm long), predominately spatulate leaves, slender geniculate twigs with thorns usually < 3 cm long and inflorescences of 1-3 (-5) flowers. **Syn:** = FNA9, Lance (2014), Phipps, O'Kennon, & Lance (2003); < *Crataegus flava* Aiton – RAB, W; > *Crataegus geniculata* Ashe – S2; > *Crataegus invicta* Beadle – K1, K3, S2; > *Crataegus munda* Beadle – K1, K3, S2; > *Crataegus pexa* Beadle – S2.

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated



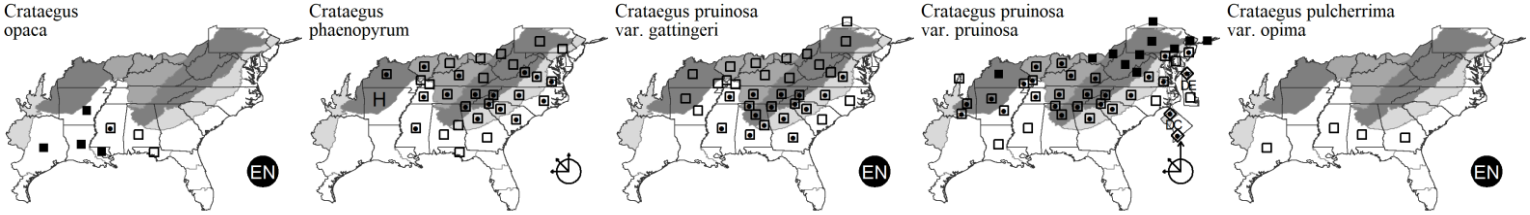
Crataegus opaca Hooker & Arnott. WESTERN MAYHAW. **Hab:** Bottomlands, swampy forests, lowland depressions and wetland soils where flooded for periods of the year. **Dist:** E. TX to Escambia and Santa Rosa counties, FL (Kunzer et al. 2009). **Phen:** Feb-Mar; Apr-May. **Comm:** Occasionally cultivated for its fruit production. **ID Notes:** The leaves of *C. opaca* differ from the eastern *C. aestivalis* in being predominately elliptical, with subentire to obscurely crenate or shallowly sinuate margins. **Syn:** = Ar, FNA9, K1, K3, Lance (2014), Phipps (1988a). NatureServe G5 (Secure).

Crataegus phaenopyrum (Linnaeus f.) Medikus. WASHINGTON HAWTHORN. **Hab:** Mesic upland woodlands, floodplain forests, pastures, thickets, disturbed areas, sometimes locally abundant. **Dist:** Native range presumed to be PA south to SC, west to sw. MO, AR; also c. and s. AL s. to n. FL; naturalized populations originating from widespread cultivation may be involved in parts of this range, with additional expansions becoming evident. **Phen:** May-early Jun; Sep-Oct. **Syn:** = Ar, C, FNA9, G, K1, K3, Mi, NcTx, Pa, RAB, S2, Tn, W, Lance (2014); > *Crataegus phaenopyrum* (Linnaeus f.) Medikus – F, S; > *Crataegus populifolia* – S; > *Crataegus youngii* Sargent – F. NatureServe G4? (Apparently Secure).

Crataegus pruinosa (H.L. Wendland) K. Koch *var.* ***gattingeri*** (Ashe) Lance. GATTINGER'S HAWTHORN. **Hab:** Hardwood and pine-hardwood woodlands, brush, pastures. **Dist:** PA to GA, west to MO, AR; extending south into the Coastal Plain in AL, MS, LA, and AR. **Phen:** Apr-May; Sep-Oct. **Tax:** This taxon bears some resemblance to the northerly *C. compacta* Sargent in its small anthers and elongate terminal lobe of the leaves. The entity *C. georgiana* Sargent may represent an intermediate of var. *gattingeri* and *C. iracunda* Beadle. **Syn:** = *Crataegus gattingeri* Ashe – F, FNA9; < *Crataegus flabellata* (Bosc ex Spach) K. Koch – RAB; > *Crataegus gattingeri* var. *gattingeri* – G; > *Crataegus gattingeri* var. *rigida* E.J. Palmer – G; > *Crataegus georgiana* Sargent – S2; > *Crataegus pruinosa* (H.L. Wendland) K. Koch var. *gattingeri* (Ashe) Lance – Va, Lance (2014).

Crataegus pruinosa (H.L. Wendland) K. Koch *var.* ***pruinosa***. FROSTED HAWTHORN. **Hab:** Upland hardwood forests, pastures, rock outcrops, mountain summits and balds, sometimes colonial or locally abundant. **Dist:** ME to WI, IA, s. to NC, TN, AR. **Phen:** Apr-May; Sep-Oct. **Tax:** The presence of a waxy bloom on the mature fruit (pruinose) is not always evident. Foliage and floral parts are usually entirely glabrous on plants in our area. **Syn:** = C, FNA9, Pa, S, W; > *Crataegus arcana* Beadle – K1, S2; < *Crataegus flabellata* (Bosc ex Spach) K. Koch – RAB; > *Crataegus gattingeri* Ashe – F; > *Crataegus gattingeri* var. *gattingeri* – G; > *Crataegus gattingeri* var. *rigida* E.J. Palmer – G; > *Crataegus georgiana* Sargent – S2; < *Crataegus pruinosa* – Ar, GrPl; >< *Crataegus pruinosa* – K1, Tn; > *Crataegus pruinosa* var. *delawarensis* (Sargent) E.J. Palmer – F, G; > *Crataegus pruinosa* (H.L. Wendland) K. Koch var. *gattingeri* (Ashe) Lance – Lance (2014); > *Crataegus pruinosa* (H.L. Wendland) K. Koch var. *pruinosa* – F, G, Lance (2014); > *Crataegus rugosa* – F, G; > *Crataegus rustica* Beadle – S2; > *Crataegus vicinalis* Beadle – S2.

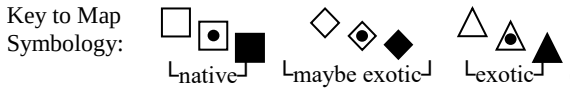
Crataegus pulcherrima Ashe *var.* ***opima*** (Beadle) R.W. Lance. BROAD-LEAVED BEAUTIFUL HAWTHORN. **Hab:** Hardwood and hardwood-pine forests, ravines, mesic slopes. **Dist:** Sw. GA, s. & c. AL, MS, e. TX. **Phen:** Apr; Sep-Oct. **Tax:** Broadly defined, this variety incorporates several marginally distinct species described by Beadle, some of which are upheld as species in Phipps (2014d). **ID Notes:** This variety displays proportionally broader foliage than the typical variety, and usually has shallow, obtuse or rounded lobes. **Syn:** = Lance (2014); = *Crataegus opima* Beadle – FNA9; > *Crataegus abstrusa* Beadle – S2; > *Crataegus illustris* Beadle – S2; > *Crataegus inanis* Beadle – K1, S2; > *Crataegus opima* Beadle – S2, Phipps, O'Kennon, & Dvorsky (2006); < *Crataegus pulcherrima* – K3, S2, Phipps, O'Kennon, & Dvorsky (2006); > *Crataegus pulcherrima* – K1.



Crataegus pulcherrima Ashe *var.* ***pulcherrima***. BEAUTIFUL HAWTHORN. **Hab:** Hardwood and hardwood-pine forests, ravines, mesic slopes, sometimes locally abundant. **Dist:** W. GA and Panhandle FL, w. to LA and extreme e. TX; disjunct populations have been reported from Richmond and Burke Cos, GA and McCormick Co, SC. **Phen:** Apr; Sep-Oct. **Tax:** Defined broadly, var. pulcherrima includes in synonymy a number of species described by Beadle, most of these not clearly distinct and sometimes intergrading in sympatric populations. The entities C. pinetorum Beadle and C. tecta Beadle, synonyms here, are held to species status by Phipps (FNA9). Suspected intraserial and interserial hybrids are occasionally found across the range, two of which may be Crataegus cullasagensis Ashe and Crataegus agrestina Beadle. **ID Notes:** Var. *pulcherrima* generally displays reasonable consistency in evenly incised leaf margins and straight, parallel primary veins, 20-stamened flowers, small (5-10 mm diameter) fruit and brown, furrowed trunk bark. **Syn:** = FNA9, Lance (2014); > *Crataegus abstrusa* Beadle – S2; > *Crataegus ancisa* Beadle – S2; > *Crataegus austrina* – S2, Lance (2014); > *Crataegus concinna* Beadle – S2; > *Crataegus contrita* Beadle – S2; > *Crataegus illustris* Beadle – S2; > *Crataegus incilis* Beadle – S2, Phipps, O'Kennon, & Dvorsky (2006); < *Crataegus intricata* Palmer – S; > *Crataegus lenis* Beadle – S2, S2; > *Crataegus macilenta* Beadle – S2, S2; > *Crataegus pinetorum* – K1, S2; > *Crataegus pulcherrima* – K1, S2, Phipps, O'Kennon, & Dvorsky (2006); > *Crataegus robur* Beadle – S2; > *Crataegus tecta* Beadle – S2.

Crataegus quaesita Beadle *var.* ***egens*** (Beadle) R.W. Lance. SAND BARREN HAWTHORN. **Hab:** Sandy scrublands, pine woodlands. **Dist:** S. SC to s. AL and peninsular FL. **Phen:** Late Mar-Apr; Aug-Sep. **ID Notes:** The small (mostly 1-2 cm), broadly obovate leaves are distinctive in the typical varietal form, but occasional intermediates with quaesita var. floridana is suggested among some mixed populations, such as in the taxon *Crataegus cirrata* Beadle. **Syn:** = Lance (2014); = *Crataegus egens* Beadle – FNA9; < *Crataegus egens* Beadle – S2, Lance (2014).

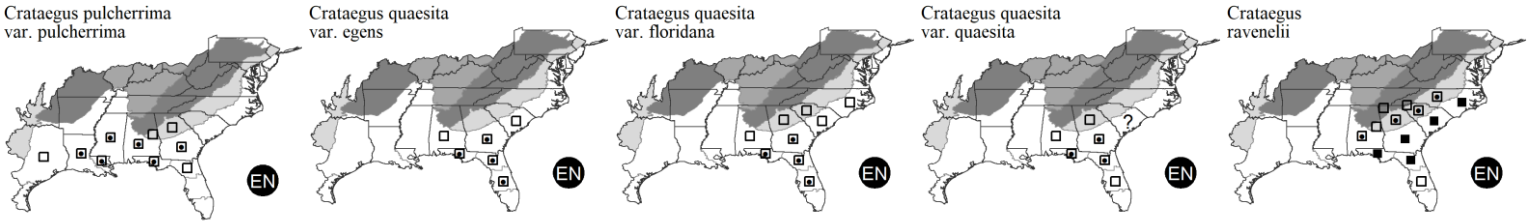
Crataegus quaesita Beadle *var.* ***floridana*** (Sargent) R.W. Lance. JACKSONVILLE HAWTHORN. **Hab:** Oak-pine forests, sandy scrublands. **Dist:** Se. NC to c. GA, s. AL, s. to Panhandle and peninsular FL. **Phen:** Late Mar-Apr; Aug-Sep. **ID Notes:** Characteristic are the frequently spatulate leaves with a bluntly toothed or trilobate apex and small (6-8mm) fruits. *Crataegus laxa* Beadle may represent an intermediate entity with *C.*



ravenelii Sargent. **Syn:** = Lance (2014); = *Crataegus floridana* Sargent – FNA9; > *Crataegus cirrata* Beadle – S2; < *Crataegus floridana* Sargent – S2; *Crataegus versuta* Beadle – S2; > *Crataegus viaria* Beadle – S2. NatureServe G3G5Q (Apparently Secure).

Crataegus quaesita Beadle *var*. ***quaesita***. FLORIDA HAWTHORN. **Hab:** Oak-pine forests, xeric woodlands, especially in sandy soils. **Dist:** S. GA, n. and peninsular FL. **Phen:** Late Mar-Apr; Aug-Sep. **ID Notes:** Purported in the protologue by Beadle to have purple anthers, a trait not confirmed among available herbarium specimens. This variety is more restricted in range than related varieties. **Syn:** = Lance (2014); = *Crataegus quaesita* Beadle – FNA9; < *Crataegus quaesita* Beadle – S2; > *Crataegus resima* Beadle – S2. NatureServe G3G5Q (Apparently Secure).

Crataegus ravenelii Sargent. RAVENEL'S HAWTHORN. **Hab:** Longleaf pine sandhills, upland pine and pine-oak forests, rocky woodlands, xeric or subxeric habitats with sandy or well-drained clay soils. **Dist:** Se. NC s. to n. FL, w. to central AL. **Phen:** Apr; Aug-Sep. **Tax:** Similar to *C. alabamensis* Beadle, which is of a more restricted range. Suspected intermediates of *C. ravenelii* with other members of the Lacrimatae series are *Crataegus rimosa* Beadle, *Crataegus laxa* Beadle, *Crataegus meridiana* Beadle, *Crataegus cuthbertii* Ashe, and *Crataegus condigna* Beadle, the latter being a prioritized name in FNA9. **ID Notes:** Often reaching treelike proportions (4-8 m tall, trunk 10-30 cm diameter); leaves often serrate-dentate, densely pubescent when young, becoming glabrate; inflorescences tomentose. **Syn:** = Lance (2014); = *Crataegus condigna* Beadle – FNA9; > *Crataegus adunca* Beadle – S2; > *Crataegus clara* Beadle – S2; > *Crataegus compitalis* Beadle – S2; > *Crataegus condigna* Beadle – FNA9, S2; < *Crataegus flava* Aiton – K1, RAB, S; > *Crataegus pulla* Beadle – S2; > *Crataegus ravenelii* Sargent – S2.



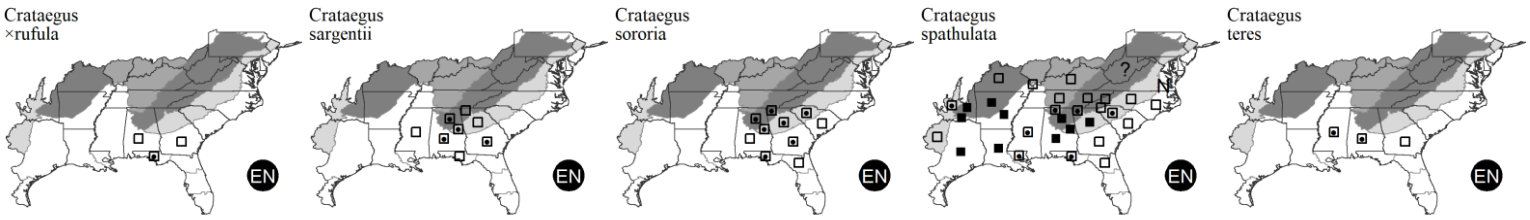
Crataegus ×rufula Sargent (pro species). FLORIDA MAYHAW, RUFOUS MAYHAW. **Hab:** Flatwoods ponds, river swamps. **Dist:** Sw. GA and adjacent Panhandle FL and s. AL. **Phen:** Feb-Mar; Apr-May. **Tax:** Intermediate in morphology between *C. aestivalis* and *C. opaca* and an assumed intraserial hybrid; the range is at the interface of the two presumed parental mayhaw species. This taxon has been shown to be a triploid, while *C. aestivalis* and *C. rufula* are known diploids. **ID Notes:** Reddish pubescence is typical on abaxial surface of leaves, particularly on veins and in vein axils. **Syn:** = FNA9, Lance (2014); = *Crataegus rufula* Sargent – K1, Phipps (1988a); < *Crataegus aestivalis* (Walter) Torrey & A. Gray – K3; > *Crataegus maloides* Sargent – S.

Crataegus sargentii Beadle. SARGENT'S HAWTHORN. **Hab:** Upland forests, rocky woodlands, over calcareous or circumneutral substrates. **Dist:** W. GA, n. and c. AL, reported from c. MS and c. panhandle FL. **Phen:** Apr; Sep-Oct. **Tax:** Allied to *C. pulcherrima* Ashe, and having a core range mostly in the northern limits of the former. The entity *C. gilva* Beadle, morphologically similar and here included in synonymy, has leaves less inclined toward lobing and may warrant at least varietal status. **Syn:** = K1, Lance (2014); > *Crataegus assimilis* Beadle – S2, Phipps, O'Kennon, & Dvorsky (2006); > *Crataegus eximia* Beadle – FNA9, S2, Phipps, O'Kennon, & Dvorsky (2006); > *Crataegus gilva* Beadle – FNA9, S2, Phipps, O'Kennon, & Dvorsky (2006); < *Crataegus intricata* Palmer – S; > *Crataegus sargentii* Beadle – FNA9, S2, Phipps, O'Kennon, & Dvorsky (2006).

Crataegus sororia Beadle. SISTER HAWTHORN. **Hab:** Upland disturbed forests, scrublands, roadsides. **Dist:** C. NC to n. AL, s. to n. FL. **Phen:** Apr; Aug-Sep. **Tax:** A suspect hybrid taxon, *Crataegus exilis* Beadle, may represent intermediacy with *Crataegus quaesita* Beadle. **ID Notes:** Allied to *C. aprica* Beadle, but leaves are more suborbicular and flowers bear 20 stamens. **Syn:** = FNA9; = *Crataegus sororia* Beadle var. *sororia* – Lance (2014), Phipps & Dvorsky (2007); > *Crataegus consanguinea* Beadle – S2; < *Crataegus flava* Aiton – RAB; > *Crataegus orbiculata* Eggleston – Lance (2014).

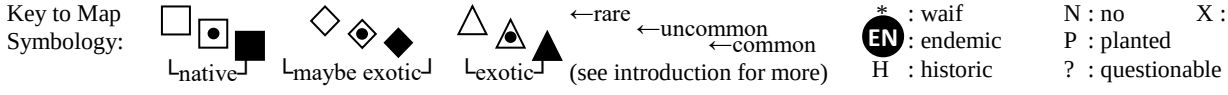
Crataegus spathulata Michaux. LITTLEHIP HAWTHORN. **Hab:** Scrubland, pine-oak woodlands, bottomland forests, rocky uplands over mafic or calcareous substrates. **Dist:** Se. VA and c. NC south to panhandle FL, west to e. TX, north in the interior to c. TN, sw. MO, e. OK; sporadic in TN, sw. NC. **Phen:** Apr-May; Sep-Oct. **ID Notes:** This species is distinctive for its small, spatulate leaves (tending to be trilobed) and thin, flaking bark of the main trunk (multicolored green, brown, gray and yellowish). **Syn:** = Ar, C, F, FNA9, G, K1, K3, NcTx, RAB, S, S2, Tn, W, Lance (2014), Phipps (1998). NatureServe G5 (Secure).

Crataegus teres Beadle. SMOOTH ALABAMA HAWTHORN. **Hab:** Pine-oak forests, sandy woodlands. **Dist:** S. AL, possibly e. to GA. **Phen:** Mar-Apr; Aug-Sep. **Tax:** Similar and assumed closely allied to *C. florens* Beadle, or possibly of intermediate origin. **ID Notes:** *Crataegus teres* is an unusual, glabrate entity of the series *Lacrimatae*, superficially resembling unrelated *C. crus-galli*. **Syn:** = FNA9, S2; = *Crataegus alabamensis* var. *teres* (Beadle) Lance – Lance (2014); < *Crataegus flava* Aiton – K1, S.



Crataegus triflora Chapman. THREEFLOWER HAWTHORN. **Hab:** Wooded ravines, mesic slopes, limestone outcrops, flatwoods, prairies. **Dist:** Nw. GA to n. MS, s. to s. AL, MS; disjunct populations in prairie sites of Houston Co, GA, c. LA, s. AR (possibly in se. TN?). **Phen:** Apr-May; Sep-Oct. **Tax:** The related *C. austromontana* Beadle may be a local genotype or hybrid that appears to be extinct. **ID Notes:** Usually a multi-stemmed shrub 1-3 m tall, rarely to 6 m. *C. triflora* produces some of the largest flowers in the genus (to 3 cm diameter), though frequently only 3 flowers are borne per inflorescence; occasional vigorous plants may bear 4-6 flowers per inflorescence. **Syn:** = K1, W, Lance (2014); > *Crataegus austromontana* Beadle – FNA9, K3, S2, Tn, Phipps, Lance, & Dvorsky (2006); > *Crataegus triflora* Chapman – Ar, FNA9, K3, S2, Tn, Phipps, Lance, & Dvorsky (2006).

Crataegus uniflora Münchhausen. ONEFLOWER HAWTHORN. **Hab:** Thin woodlands, disturbed lands, roadsides, rock outcrops, often in xeric or sub-xeric conditions. **Dist:** NY to peninsular FL, w. to IL, MO, OK, e. TX. **Phen:** Apr-May; Sep-Oct. **ID Notes:** Normally a shrubby species, 0.5-2

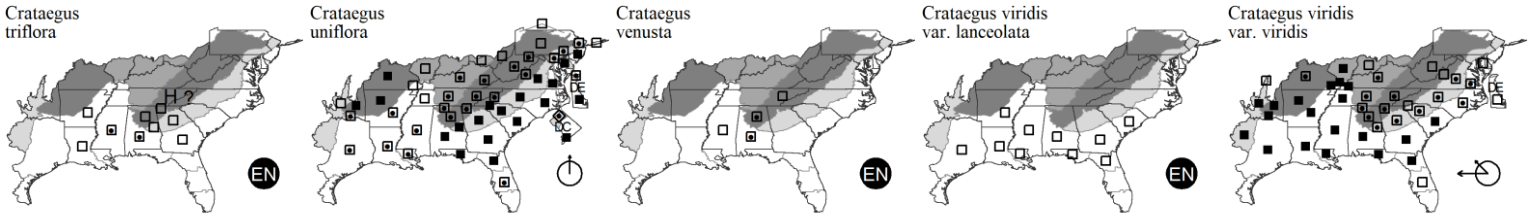


m in height, though local forms may reach 4 m, particularly in n. FL. Minor variation occurs in foliage, but fairly consistent are the slender thorns (2-7 cm long) and foliaceous calyx lobes persistent on the fruit. **Syn:** = Ar, C, F, FNA9, G, K1, K3, Pa, RAB, S, Tn, W, Lance (2014); > *Crataegus gregalis* Beadle – S2; > *Crataegus pentaneura* Ashe – S2; > *Crataegus raleighensis* Ashe – S2; > *Crataegus uniflora* Münchhausen – S2.

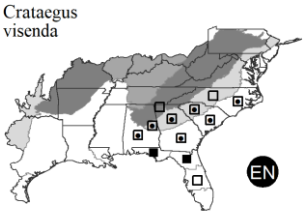
Crataegus venusta Beadle. RED MOUNTAIN HAWTHORN. **Hab:** Rocky woodlands, brush, cutover forests. **Dist:** C. AL and Grundy County, TN. **Phen:** Apr-May; Sep-Oct. **Tax:** A sparsely documented taxa in the *Pulcherrimae* series, *C. venusta* suggests affinity to the more restricted Appalachian taxa *C. pallens* Beadle, but fruits are typically red or ruddy. **Syn:** = FNA9, S2, Tn, Lance (2014), Phipps, O'Kennon, & Dvorsky (2006); < *Crataegus sargentii* Beadle – K1.

Crataegus viridis Linnaeus *var.* ***lanceolata*** (Sargent) E.J. Palmer. LANCELEAF GREEN HAWTHORN. **Hab:** Moist forests and woodlands, streamsides, calcareous uplands. **Dist:** SC to FL, w. to e. TX, AR; range sympatric with much of the typical variety of the species. **Phen:** Late Mar-late Apr; Sep-Nov. **Tax:** Assignment of var. *lanceolata* is sometimes problematic due to intermediacy of leaf shapes seen in the wide variation of var. *viridis*; this taxon perhaps deserving forma status. **Syn:** = FNA9, Lance (2014).

Crataegus viridis Linnaeus *var.* ***viridis***. GREEN HAWTHORN, GREENHAW. **Hab:** Swamps, bottomland forests, alluvial woodlands, streamsides, wet flatwoods, and uplands where soils are often basic to calcareous. **Dist:** MD to n. FL, w. MO, c. TX; absent or rare on Appalachian Plateau. **Phen:** Late Mar-late Apr; Sep-Nov. **Comm:** One of our largest hawthorn species, frequently reaching treelike proportions (5-10 m tall, trunk 10-40 cm diameter). The orange-red fruits often persist on the bare branches into winter, sometimes until the following spring. Bark of the trunk is usually mottled with patterns of gray, reddish-brown, and greenish-gray coloration, due to the dehiscing layers of scales and plates. **Syn:** = F, FNA9, G, K1, K3, Lance (2014); > *Crataegus interior* Beadle – S2; > *Crataegus penita* Beadle – K1, S2; < *Crataegus viridis* Linnaeus – Ar, C, NcTx, RAB, S, Tn, W; > *Crataegus viridis* Linnaeus – S2; > *Crataegus vulsa* Beadle – K1, S2.



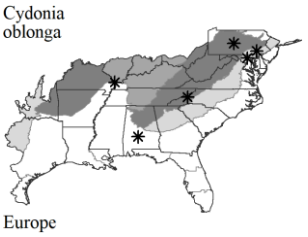
Crataegus visenda Beadle. BRISTOL HAWTHORN. **Hab:** Longleaf pine sandhills, other upland pine and pine-oak forests, disturbed lands, wooded hills with clay or sandy soils, often in xeric or sub-xeric conditions. **Dist:** C. NC and nw. GA south to n. FL and s. AL. **Phen:** Apr; Sep-Oct. **Tax:** Occasional introgression with other members of the *Apricae* and *Lacrimatae* series is suspected, as in the case of *Crataegus calva* Beadle and *Crataegus egregia* Beadle. **ID Notes:** *Crataegus visenda* is allied to *C. sororia* Beadle, differing in having mostly obovate leaves and a tendency for drooping leading twigs and branches. This hawthorn often attains the dimensions of a small tree (4-8 m tall and with a trunk 7-20 cm diameter). **Syn:** = FNA9; = *Crataegus sororia* Beadle var. *visenda* (Beadle) R.W. Lance – Lance (2014); > *Crataegus abdita* Beadle – S2; > *Crataegus annosa* Beadle – S2; > *Crataegus arrogans* Beadle – K1, S2; > *Crataegus calva* Beadle – S2; < *Crataegus flava* Aiton – RAB, S; >< *Crataegus flava* Aiton – K1, K3; > *Crataegus galbana* Beadle – S2; > *Crataegus segnis* Beadle – S2; > *Crataegus sodalis* Beadle – S2; > *Crataegus tristis* Beadle – K1, S2; > *Crataegus visenda* Beadle – S2.



Cydonia P. Miller 1754 (QUINCE)

A monotypic genus, a shrub, probably native of the Caucasus. References: Catling & Mitrow (2014c) in FNA9 (2014); Kalkman in Kubitzki et al (2004).

* ***Cydonia oblonga*** P. Miller. EDIBLE QUINCE, COMMON QUINCE, "FRUITING" QUINCE. **Hab:** Suburban woodlands. **Dist:** Native of Europe. Reported for MD (FNA, Kartesz 1999). **Phen:** May-Jun. **Comm:** Widely cultivated in Europe and formerly in e. North America; in our area it has fallen out of favor, and is now rarely cultivated. **Syn:** = FNA9, Il, K1, K3, K4, NE, NY, Pa, Kalkman in Kubitzki et al (2004). NatureServe GNR (Not Yet Ranked).

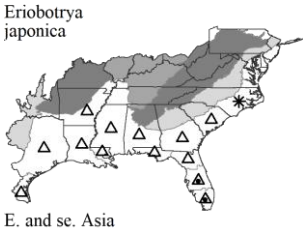


Eriobotrya Lindley 1821 (LOQUAT)

A genus of about 15-30 species, trees and shrubs, native to e. Asia. Liu et al. (2020) propose merging *Eriobotrya* into *Rhaphiolepis*. We here retain Eriobotrya, in part because other, possibly better, taxonomic alternatives are available based on the results of Liu et al. (2020), and also because the name they proposed for the only species in our flora is invalid. References: Christenhusz, Fay, & Byng (2018); Kalkman in Kubitzki et al (2004); Liu et al (2020a); Liu et al (2020b); Phipps (2014c) in FNA9 (2014).

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

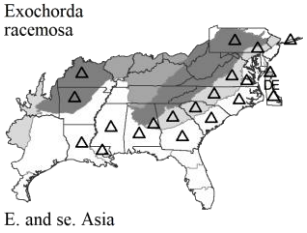
* ***Eriobotrya japonica*** (Thunberg) Lindley. LOQUAT, JAPANESE-MEDLAR. **Hab:** Suburban woodlands, uncommonly cultivated, sometimes naturalizing, and potentially invasive in the deeper South. **Dist:** Native of ec. China. Reported for Lowndes County, GA (Carter, Baker, & Morris 2009). Also reported for LA. Reported for SC (Congaree National Park, Richland County) and appearing in additional locations in SC (Bradley et al. [in prep]). Reported for AR (Serviss & Serviss 2020). **Tax:** We disagree with the regressive proposal to merge *Eriobotrya* (and many other genera) into *Pyrus* (Christenhusz, Fay, & Byng 2018). The less radical proposal to merge *Eriobotrya* into *Rhaphiolepis* (Liu et al. 2020a) needs additional consideration; the name in *Rhaphiolepis* proposed for our single species by Liu et al. (2020) is invalid, corrected in Liu et al. (2020b). **Syn:** = FNA9, K1, K3, K4, WH3; = *Pyrus bibas* (Loureiro) M.F. Fay & Christenhusz – Christenhusz, Fay, & Byng (2018); = *Rhaphiolepis bibas* (Loureiro) Galasso & Banfi – Liu et al (2020b); = *Rhaphiolepis loquata* B.B. Liu & J. Wen – Liu et al (2020a), invalid name. NatureServe GNR (Not Yet Ranked).



Exochorda Lindley 1858 (PEARLBUSH)

A genus of about 4 species, shrubs, of e. Asia. References: Haines (2014) in FNA9 (2014); Kalkman in Kubitzki et al (2004).

* ***Exochorda racemosa*** (Lindley) Rehder. PEARLBUSH. **Hab:** Disturbed areas, woodland borders, suburban woodlands. **Dist:** Native of China. First reported for SC by Hill & Horn (1997) and for AL by Diamond (2014). This species appears to have substantial likelihood of increasingly naturalizing and becoming invasive. **Phen:** Mar-Apr. **Syn:** = Ar, C, FNA9, G, K1, K3, K4, NE, NY. NatureServe G5 (Secure).



Fragaria Linnaeus 1753 (STRAWBERRY)

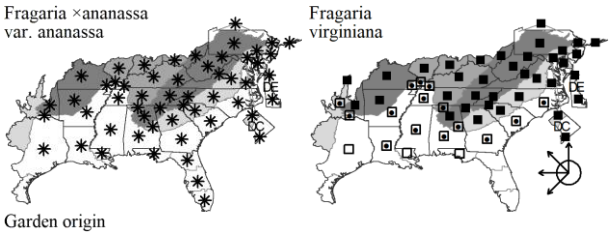
A genus of about 10-24 species, herbs, of temperate Eurasia, North America, and South America. References: Bird et al (2021); NE; Kalkman in Kubitzki et al (2004); Staudt (2014) in FNA9 (2014).

1 Fruit (at least the larger on a plant) usually > 1.5 cm thick; petals 10-15 mm long; leaves evergreen; [cultivated, rarely persistent] ..... ***Fragaria ×ananassa var. ananassa***

1 Fruit 0.5-1.5 cm thick; petals 3-10 mm long; leaves deciduous (at least tardily so); [native]. ..... ***Fragaria virginiana***

* ***Fragaria ×ananassa*** (Weston) Duchesne ex Rozier *var.* ***ananassa*** [*F. chiloensis* × *virginiana*]. GARDEN STRAWBERRY, CULTIVATED STRAWBERRY. **Hab:** Gardens, persistent on garden edges, commonly cultivated. **Phen:** Mar-May. **Tax:** An octoploid garden hybrid of the two octoploid species, *F. chiloensis* and *F. virginiana*. **Syn:** = K1; = *Fragaria ×ananassa* ssp. *ananassa* – FNA9, K3, K4; = *Fragaria ananassa* ssp. *ananassa* – NE; = *Fragaria chiloensis* × *virginiana* – NY; < *Fragaria ×ananassa* – F, GrPl, Il, RAB; < *Fragaria ananassa* – C, WV; < *Fragaria chiloensis* Duchesne var. *ananassa* – G.

Fragaria virginiana P. Miller. WILD STRAWBERRY. **Hab:** Grasslands, roadsides, pastures, woodlands, grassy balds. **Dist:** NL (Newfoundland) west to MB, south to peninsular FL and TX. **Phen:** Apr-Jun. **Syn:** = C, Il, Mi, Pa, RAB, Tn, Va, W, WH3; = *Fragaria virginiana* ssp. *virginiana* – K4; > *Fragaria australis* (Rydberg) Rydberg – S; > *Fragaria grayana* Vilmorin ex J. Gay – S; < *Fragaria virginiana* P. Miller – GrPl; > *Fragaria virginiana* P. Miller – S; > *Fragaria virginiana* ssp. *grayana* (Vilmorin ex J. Gay) Staudt – FNA9, K1, K3, NcTx, NE, NY; > *Fragaria virginiana* ssp. *virginiana* – FNA9, K1, K3, NE, NY; > *Fragaria virginiana* var. *australis* Rydberg – G; > *Fragaria virginiana* var. *illinoensis* (Prince) Gray – F, G, Tx; > *Fragaria virginiana* var. *virginiana* – F, G, Tx.



Geum Linnaeus 1753 (AVENS)

A genus of 40-60 species, herbs, mainly of north temperate areas. Many researchers have advocated breaking *Geum* into varying numbers of segregate genera; even the most conservative of these divisions place *G. radiatum* in a genus separate from our other species (such as *Parageum*; see synonymy) and some would place *G. vernum* in *Stylipus*. Molecular studies (Smedmark 2006; Smedmark & Eriksson 2002) have made a case for a broad circumscription of *Geum*, including *Waldsteinia*, as many of the segregates are complexly and reticulately interrelated; more recent studies have pushed back against including *Waldsteinia* and some other segregates in *Geum* based on more detailed hypotheses of the phylogeny of the *Coluriae*. We here retain *Waldsteinia* at its traditional genus rank. Hough (2018) provides a useful report on various hybrids of our native *Geum*. References: Bolle (1933); Hough (2018); Kalkman in Kubitzki et al (2004); Král (1966); Phipps (2014b) in FNA9 (2014); Robertson (1974); Rohrer (2014a) in FNA9 (2014); Shattelroe et al (2021); Smedmark & Eriksson (2002); Smedmark (2006); Weakley & Gandhi (2008).

1 Style deciduous; leaves 3-foliolate or 3-lobed, lacking small leaflets toward the base; [subgenus or genus *Waldsteinia*] ..... ***Waldsteinia***

1 Style persistent; leaves various (see below).

3 Calyx lobes 2-4 mm long, lacking bractlets between the lobes; head of achenes elevated above the calyx on a 1-2 mm stipe; flowering Apr-May; fruiting May-Jun; [subgenus or genus *Stylipus*] ..... ***Geum vernum***

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

3 Calyx lobes 3-15 mm long, with bractlets between the lobes; head of achenes more-or-less sessile; flowering May-Aug; fruiting late May-Sep; [subgenus or genus *Geum*].

6 Larger stipules > 10 mm wide, coarsely toothed or even lobed; mid-cauline leaves very coarsely toothed, with 1-5 teeth per cm of margin..... ***Geum virginianum***

6 Larger stipules 2-10 (-12) mm wide, entire to toothed; mid-cauline leaves less coarsely toothed, with 3-7 teeth per cm of margin.

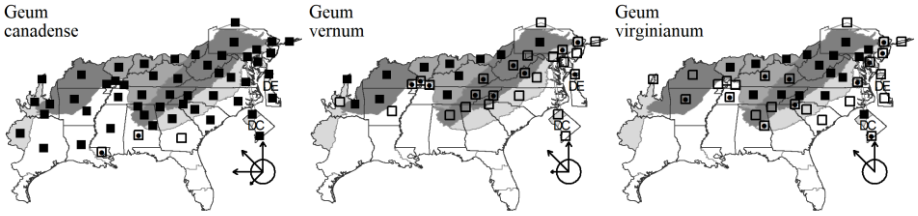
7 Plant in flower. ***Geum canadense***

7 Plant in fruit. ***Geum canadense***

Geum canadense Jacquin. WHITE AVENS. **Hab:** Moist slope forests, bottomland forests, swamp forests, tidal swamps, rarely in submesic forests. **Dist:** NS west to ND, south to c. GA and TX; allegedly disjunct in Mexico (Villaseñor 2016). **Phen:** May-Jul; Jul-Nov. **Tax:** Some authors have recognized a number of varieties in *G. canadense* (see synonymy); some (at least) of these may warrant recognition. **Syn:** = Ar, C, FNA9, G, GrPl, GW2, K4, Mi, NY, Pa, RAB, S, Tn, Va, W, Robertson (1974); > *Geum canadense* var. *brevipes* Fernald – F, Bolle (1933); > *Geum canadense* var. *camporum* (Rydberg) Fernald & Weatherby – F, NcTx, Tx, Bolle (1933); > *Geum canadense* var. *canadense* – F, Il, K1, K3, NE, WV, Bolle (1933); > *Geum canadense* var. *grimesii* Fernald & Weatherby – F, Il, Bolle (1933); > *Geum canadense* var. *texanum* Fernald & Weatherby – K3, NcTx, Tx.

Geum vernum (Rafinesque) Torrey & A. Gray. SPRING AVENS, HEARTLEAF AVENS. **Hab:** Seepages, swamps, roadsides, disturbed areas, probably both native and introduced in our area, the native occurrences now being supplemented by its spread along roads from farther west. **Dist:** VT, ON, MI, WI, IA, and se. NE south to c. NC, w. SC, n. AL, AR, and OK. **Phen:** Apr-May; May-Jun. **Syn:** = Ar, C, F, FNA9, G, GrPl, GW2, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, Tn, Tx, Va, W, WV, Bolle (1933), Robertson (1974); = *Stylypus vernus* Rafinesque – S. NatureServe G5 (Secure).

Geum virginianum Linnaeus. CREAM AVENS. **Hab:** Bottomland forests, moist slope forests, swamp forests, and extending upslope to mesic or even dry sites, especially over mafic rocks. **Dist:** MA and NY west to IN, south to SC and TN. **Phen:** Jun-Aug; Jul-Nov. **Syn:** = Ar, C, F, FNA9, G, GW2, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, Tn, Va, W, WV, Bolle (1933), Robertson (1974); > *Geum hirsutum* Muhlenberg ex Link – S; > *Geum virginianum* Linnaeus – S. NatureServe G5 (Secure).



Gillenia Moench 1802 (INDIAN-PHYSIC, BOWMAN'S-ROOT)

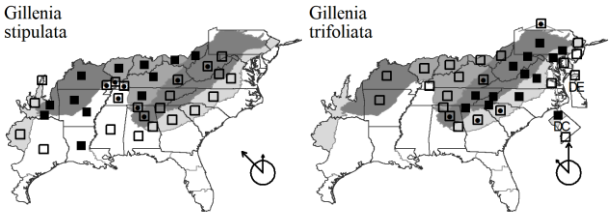
A genus of 2 species, herbs, of e. North America. The contention that *Gillenia* is a later homonym of *Gillena* and must therefore be rejected for the later name *Porteranthus* has been ruled against (Robertson 1974; Brummitt 1988; Parkinson 1988). References: Kalkman in Kubitzki et al (2004); Nesom (2014b) in FNA9 (2014); Robertson (1974).

1 Stipules ovate, 10-20 (125) mm long; lower leaf surface densely glandular; leaves trifoliate, the leaflets of the lower leaves laciniate-toothed to divided..... ***Gillenia stipulata***

1 Stipules linear, 6-8 mm long; lower leaf surface glabrous or sparsely glandular; leaves trifoliate, the leaflets of the lower leaves merely toothed, like the upper leaves ***Gillenia trifoliata***

Gillenia stipulata (Muhlenberg ex Willdenow) Nuttall. MIDWESTERN INDIAN-PHYSIC. **Hab:** Dry to mesic woodlands and forests, especially over circumneutral soils derived from mafic rocks (such as diabase or greenstone) or calcareous rocks. **Dist:** NY to KS, south to nw. GA and TX, and disjunct east of the Blue Ridge in sc. VA, c. NC, sc. SC (Bradley et al. [in prep.]), and c. GA. **Phen:** May-Jun; Jul-Oct. **Syn:** = Ar, F, FNA9, G, K3, K4, Mi, NY, RAB, Tx, Va, WV; = *Porteranthus stipulatus* (Muhlenberg ex Willdenow) Britton – C, GrPl, Il, K1, NcTx, S, Tn, W, Robertson (1974). NatureServe G5 (Secure).

Gillenia trifoliata (Linnaeus) Moench. MOUNTAIN INDIAN-PHYSIC. **Hab:** Moist forests, roadbanks, forest edges. **Dist:** ON west to MI, south to SC, AL, nc. GA, and AR. **Phen:** Apr-Jun; Aug-Oct. **Syn:** = Ar, F, FNA9, G, K3, K4, Mi, NE, NY, Pa, RAB, Va, WV; = *Porteranthus trifoliatus* (Linnaeus) Britton – C, Il, K1, S, Tn, W, Robertson (1974). NatureServe G4G5 (Apparently Secure).



Kerria A.P. de Candolle 1818 (KERRIA)

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : plar; ? : que

143. ROSACEAE

A monotypic genus, a shrub, of China and Japan. References: Henrickson & Weakley (2014) in FNA9 (2014); Kalkman in Kubitzki et al (2004).

* ***Kerria japonica*** (Linnaeus) A.P. de Candolle. KERRIA, JAPANESE-ROSE. **Hab:** Woodland borders, suburban woodlands. **Dist:** Native of China. Reported as escaping in Clark County, AR (Serviss et al. 2017). **Phen:** Apr-Jun. **Tax:** Single, "doubled", and "plenum" forms are cultivated. **Syn:** = C, F, FNA9, G, Il, K1, K3, K4, Mi, NE, NY, Pa, Tn; = n/a – RAB. NatureServe G5 (Secure).

Malus P. Miller 1754 (APPLE, CRABAPPLE)

A genus of 25-55 species, trees and shrubs, north temperate. References: Dickson (2014) in FNA9 (2014); Kalkman in Kubitzki et al (2004); Qian, Liu, & Tang (2010); Robertson (1974).

1 Twigs not thorny; leaves involute or convolute in bud; leaves unlobed; [aliens, cultivated and persistent or escaping]; [section *Malus*]. ..... ***Malus domestica***

1 Twigs thorny; leaves folded (conduplicate) in bud; leaves often lobed; [natives and aliens].

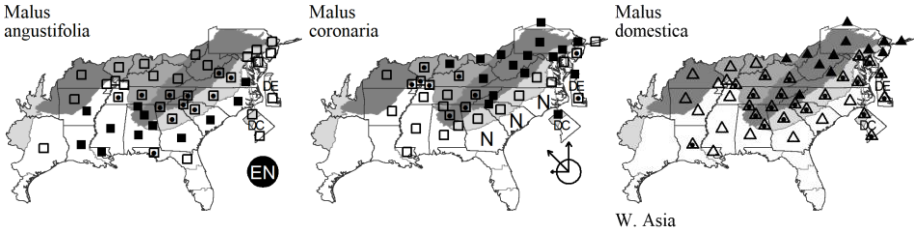
8 Leaves elliptic to elliptic-lanceolate, 2.5-8 cm long, 1-4 cm wide, mostly > 2× as long as wide, subacute to obtuse at the tip ..... ***Malus angustifolia***

8 Leaves ovate to ovate lanceolate, 4-10 cm long, 2-7 cm wide, mostly < 2× as long as wide, acute to acuminate at the tip ..... ***Malus coronaria***

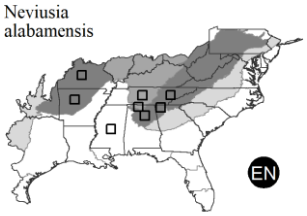
Malus angustifolia (Aiton) Michaux. WILD CRABAPPLE. **Hab:** Forests, woodlands, fence-rows, dry hammocks, occasionally in bottomlands. **Dist:** NJ, PA, OH, s. IL, and se. MO, south to n. peninsular FL, Panhandle FL, and e. TX. **Phen:** Apr-May; Aug-Sep. **Comm:** See Riley, Vincent, & Widrlechner (2020) for the removal of this species from OH's flora. **Syn:** = Ar, FNA9, Il, K4, RAB, S, Tn, Va, W, WH3; = *Pyrus angustifolia* Aiton – C, G, Tx, WV, Robertson (1974); > *Malus angustifolia* var. *angustifolia* – K1, K3; > *Malus angustifolia* var. *puberula* Rehder – K1, K3; > *Pyrus angustifolia* var. *angustifolia* – F; > *Pyrus angustifolia* var. *spinosa* (Rehder) L.H. Bailey – F.

Malus coronaria (Linnaeus) P. Miller. SWEET CRABAPPLE, WILD CRABAPPLE. **Hab:** Forests, woodlands, fencerows, occasionally in bottomlands. **Dist:** NY, ON and WI south to GA, AL, and AR. **Phen:** May; Sep-Oct. **Syn:** = FNA9, K4, Mi, NY, Pa, RAB, Tn, Va, W; = *Pyrus coronaria* Linnaeus – C, Robertson (1974); = *Pyrus lancifolia* L.H. Bailey – G; > *Malus angustifolia* var. *puberula* Rehder – K1, K3; > *Malus bracteata* L.H. Bailey – S; > *Malus coronaria* (Linnaeus) P. Miller – K1, K3, S; > *Malus coronaria* var. *coronaria* – Il; > *Malus coronaria* (Linnaeus) P. Miller var. *dasycalyx* Rehder – Il; > *Malus lancifolia* Rehder – S; > *Pyrus coronaria* Linnaeus var. *coronaria* – F, WV; > *Pyrus coronaria* Linnaeus var. *dasycalyx* (Rehder) Fernald – F; > *Pyrus coronaria* Linnaeus var. *elongata* Rehder – F; > *Pyrus coronaria* Linnaeus var. *lancifolia* (Rehder) Fernald – F, WV.

* ***Malus domestica*** (Suckow) Borkhausen. COMMON APPLE. **Hab:** Commonly cultivated throughout, especially in the Mountains and Piedmont, and long persistent. **Dist:** Native of Asia. **Phen:** Apr-May; Jul-Oct. **Tax:** Qian, Liu, & Tang's (2010) proposal to conserve the name *Malus domestica* (against *M. pumila*, *M. communis*, *M. frutescens*, and *Pyrus dioica*) was approved at the Shenzhen Botanical Congress held in Jul 2017. **Syn:** = Qian, Liu, & Tang (2010); = *Malus malus* (Linnaeus) Britton – S; = *Malus pumila* P. Miller – Ar, FNA9, Il, K1, K3, Mi, NE, NY, Pa, RAB, Tn, Va, W; = *Pyrus malus* Linnaeus – C, F, G, WV, Robertson (1974). NatureServe G5 (Secure).

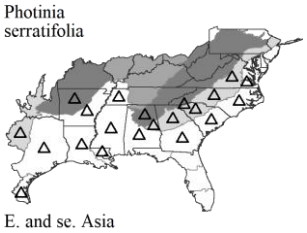


Neviusia A. Gray 1858 (SNOW-WREATH)



A genus of 2 species, shrubs, of se. North America and California. References: Heikens (2014) in FNA9 (2014); Kalkman in Kubitzki et al (2004).

Neviusia alabamensis A. Gray. ALABAMA SNOW-WREATH. **Hab:** Limestone woodlands, bluffs, sinkholes, where there is seasonal moisture. **Dist:** Sc. TN (Chester, Wofford, & Kral 1997), nw. GA (Jones & Coile 1988), n. AL, and ne. MS (Tishomingo County); disjunct in AR and MO. **Phen:** Mar-May; May-Jul. **Syn:** = Ar, FNA9, K1, K3, K4, S, Tn. NatureServe G3 (Vulnerable).



Photinia Lindley 1821 (PHOTINIA, REDTIP)

A genus of about 40 species, trees and shrubs, of Asia and Central America. References: Christenhusz, Fay, & Byng (2018); Guo et al (2011); Kalkman in Kubitzki et al (2004); Nesom (2014c) in FNA9 (2014).

* ***Photinia serratifolia*** (Desfontaines) Kalkman. TAIWANESE REDTIP. **Hab:** Suburban woodlands; uncommonly cultivated and rarely naturalizing. **Dist:** Native of e. Asia. **Phen:** Mar-Apr. **Syn:** = Ar, FNA9, K1, K3, K4, NcTx; = *Pyrus serratifolia* (Desfontaines) M.F. Fay & Christenhusz – Christenhusz, Fay, & Byng (2018). NatureServe GNR (Not Yet Ranked).

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

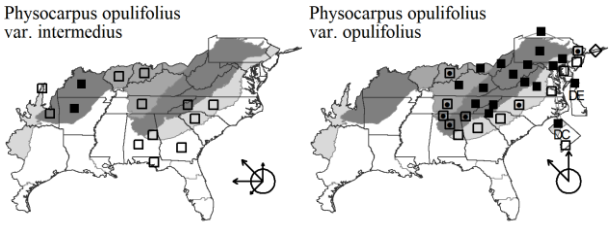
Physocarpus (Cambessèdes) Rafinesque 1838 (NINEBARK)

A genus of 3-5 species, shrubs, of North America and ne. Asia. References: Alexander (2014) in FNA9 (2014); Kalkman in Kubitzki et al (2004); Robertson (1974); Spencer & Bruederle (2020).

1 Follicles (and carpels, in flower) densely stellate-pubescent (sometimes the pubescence restricted or nearly so to the sutures) ..... ***Physocarpus opulifolius var. intermedius***
1 Follicles (and carpels, in flower) glabrous or nearly so..... ***Physocarpus opulifolius var. opulifolius***

Physocarpus opulifolius (Linnaeus) Maximowicz *var*. ***intermedius*** (Rydberg) B.L. Robinson. MIDWESTERN NINEBARK. **Hab:** Limestone river bluffs, mesic hammocks, streambanks, rock outcrops. **Dist:** W. NY west to MN and CO, south to SC, FL, AL, and AR. **Phen:** May-Jun. **Tax:** It is unclear whether the southern species recognized by Small (1933) are best allied with this taxon. Recently collected from limestone bluffs on the Buffalo River, Wayne County, TN (D. Estes, pers. comm., 2012). Additional study is needed. **Syn:** = C, F, G, GrPl, Il, K1, K3, K4, Tn, Robertson (1974); = *Physocarpus intermedius* (Rydberg) C.K. Schneider – FNA9, Spencer & Bruederle (2020); > *Opulaster alabamensis* Rydberg – S; > *Opulaster stellatus* Rydberg – S; < *Physocarpus opulifolius* – Ar, Mi, NY, RAB, W, WH3. NatureServe G5T3T5 (Apparently Secure).

Physocarpus opulifolius (Linnaeus) Maximowicz *var*. ***opulifolius***. EASTERN NINEBARK. **Hab:** Stream banks, riverside thickets and scour prairies, rock outcrops, cliffs, fens, seepage swamps, especially over mafic or calcareous rocks. **Dist:** QC west to WI, south to SC, TN, and n. IL. **Phen:** May-Jul. **Syn:** = C, F, G, Il, K1, K3, K4, Tn, Va, Robertson (1974); = *Physocarpus opulifolius* – FNA9, NE, Spencer & Bruederle (2020); > *Opulaster australis* Rydberg – S; > *Opulaster opulifolius* (Linnaeus) Kuntze – S; < *Physocarpus opulifolius* – Mi, NY, Pa, RAB, W, WV. NatureServe G5T5 (Secure).



Potentilla Linnaeus 1753 (CINQUEFOIL, FIVE-FINGERS, POTENTILLA)

A genus of 350-400 species, depending on the controversial circumscription. *Potentilla* here follows the circumscription recommended by Eriksson, Persson, & Smedmark (2022), excluding *Alchemilla*, *Aphanes*, *Argentina*, *Comarum*, *Dasiphora*, *Drymocallis*, *Fragaria*, and *Sibbaldiopsis* (for our area), but including *Duchesnea*, following studies by Dobeš & Paule (2010), Soják (2010), Eriksson et al. (2003), and Eriksson, Persson, & Smedmark (2022). References: Eriksson et al (2003); Eriksson, Donoghue, & Hibbs (1998); Eriksson, Persson, & Smedmark (2022); Ertter & Reveal (2014a) in FNA9 (2014); Ertter et al. (2014), Elven, Reveal, & Murray in FNA9 (2014); Kalkman in Kubitzki et al (2004); Robertson (1974).

3 Flowers solitary, on naked, axillary pedicels; leaves either palmately 3-5-foliolate or pinnately (5-) 7-21 (-31)-foliolate.
  4 Leaves 3-foliolate; fruit strawberry-like, fleshy and red, consisting of an expanded fleshy receptacle bearing superficial achenes; [formerly genus *Duchesnea*] ..... ***Potentilla indica***
  4 Leaves primarily 5-foliolate on a plant (some poorly developed leaves may be 3-4-foliolate); fruit a head of achenes, dry; [section *Potentilla*].
    7 Terminal leaflet (of well-developed leaves) toothed for < ½ its length, with 2-7 teeth per leaflet side; terminal leaflet usually < 2× as long as wide; lowest flower produced from the axil of the 1st stem leaf above the plant base, typically with only 1 leaf and pedicel at each subsequent node; plants often flowering on short stolons obscured by basal leaves; stem usually prostrate from the beginning, 0.3-0.8 mm in diameter..... ***Potentilla canadensis***
    7 Terminal leaflet (of well-developed leaves) toothed for > ½ its length, with 4-8 (-13) teeth per leflet side; terminal leaflet usually > 2× as long as wide; lowest flower produced from the axil of the 2nd stem leaf above the plant base, typically with 2 leaves and 1 pedicel at each subsequent node; plants only flowering on elongating stolons; stem usually erect initially, 0.9-1.4 mm in diameter..... ***Potentilla simplex***
3 Flowers in terminal cymes; leaves palmately 3-9-foliolate.
  8 Leaves 3-foliolate (sometimes with some leaves 5-foliolate); [section *Rivales*]. ..... ***Potentilla norvegica***
  8 Leaves 5-9-foliolate. ..... ***Potentilla recta***

Potentilla canadensis Linnaeus. RUNNING FIVE-FINGERS. **Hab:** Woodlands, forests, fields, lawns, disturbed areas. **Dist:** NS west to ON, south to GA, MS, and ne. AR. **Phen:** Mar-May; Apr-Jun. **Tax:** Two varieties are sometimes distinguished (see synonymy); their distinctiveness and relative habitats and distributions are obscure. Var. *canadensis* is alleged to have the middle leaflet of the larger leaves 1.5-4 cm long and plants silky-pilose, the pubescence appressed or loosely ascending. Var. *villosissima* Fernald is alleged to have the middle leaflet of the larger leaves 3-6 cm long and plants long-villous, the pubescence loosely spreading to reflexed. **Syn:** = Ar, C, FNA9, K3, K4, Mi, NE, NY, Pa, RAB, Tn, W; = *Potentilla caroliniana* Poiret – S; > *Potentilla canadensis* Linnaeus var. *canadensis* – F, G, K1, Va; > *Potentilla canadensis* var. *villosissima* – F, G, K1; > *Potentilla pumila* Poiret – S.

* ***Potentilla indica*** (Andrews) T. Wolf. SNAKEBERRY, MOCK STRAWBERRY, INDIAN STRAWBERRY. **Hab:** Disturbed areas, lawns, gardens, weedy clearings. **Dist:** Native of Asia. **Phen:** Feb-frost. **Comm:** . **ID Notes:** The strawberry-like fruit is not sweet; it can also be distinguished from *Fragaria* by its whitish interior flesh. The leaves are more coarsely and crenately toothed than *Fragaria*. **Syn:** = K3, K4, Mi, NE, NY, Va; = *Duchesnea indica* (Andrews) Focke – Ar, C, F, G, GrPl, Il, K1, NcTx, Pa, RAB, S, Tn, Tx, W, WH3, WV; > *Duchesnea indica* var. *indica* – FNA9. NatureServe G5TNR (Not Yet Ranked).

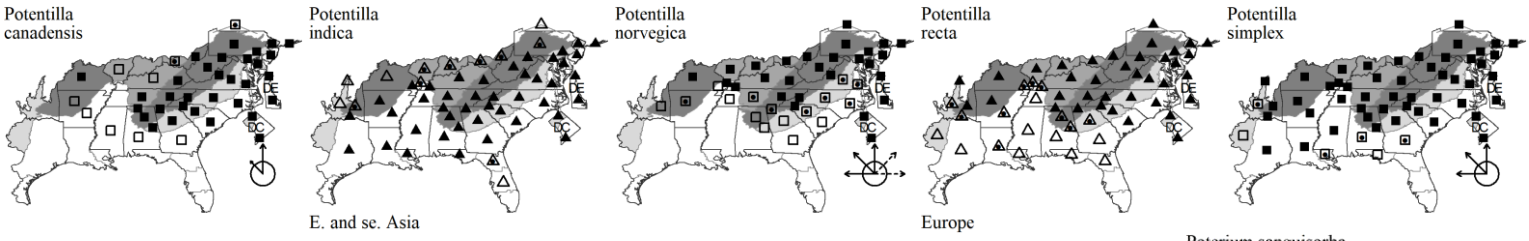
Potentilla norvegica Linnaeus. STRAWBERRY-WEED, ROUGH CINQUEFOIL. **Hab:** Floodplain forests, alluvial openings; sand bars, pastures, fields, disturbed areas, especially where moist. **Dist:** This species is apparently a genetically diverse, circumboreal species complex, with both native and

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated

introduced elements now present in our area. **Phen:** Late May-Dec; Jun-Dec. **Tax:** Entities in this complex have not been adequately worked out. As well-stated by Haines (2011): "Our native North American race (ssp. *monspeliensis*) generally shows obovate leaflets and hirsute-type hairs on the stem (some high-elevation plants have ± glabrous stem, these recognized by some authors as var. *labradorica*). The European form (ssp. *norvegica*), which has been introduced to North America, generally shows oblong leaflets and fine hairs on the stem (Rydberg 1898). However, these differences are not absolute, and many researchers recognize a broadly defined *Potentilla norvegica* instead of multiple taxa." **Syn:** = Ar, C, FNA9, G, GrPl, Il, K3, K4, Mi, NE, NY, RAB, Tn, Tx, Va, W, WV; > *Potentilla monspeliensis* Linnaeus – S; > *Potentilla norvegica* ssp. *monspeliensis* (Linnaeus) Ascherson & Graebner – K1, Pa; > *Potentilla norvegica* var. *norvegica* – F.

* ***Potentilla recta*** Linnaeus. SULPHUR FIVE-FINGERS, SULPHUR CINQUEFOIL. **Hab:** Fields, pastures, roadsides, other disturbed areas. **Dist:** Native of Europe. **Phen:** Apr-Jul; May-Aug. **Syn:** = Ar, C, F, Fl3, FNA9, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, W, WH3, WV. NatureServe GNR (Not Yet Ranked).

Potentilla simplex Michaux. OLD-FIELD FIVE-FINGERS. **Hab:** Woodlands, fields, disturbed areas. **Dist:** NL (Newfoundland) and MN south to Panhandle FL, AL, and TX. **Phen:** Apr-Jun; Apr-Jul. **Syn:** = Ar, C, Fl3, FNA9, G, GrPl, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, Tx, Va, W, WH3, WV; > *Potentilla canadensis* Linnaeus – S, misapplied; > *Potentilla simplex* Michaux – S; > *Potentilla simplex* var. *argyrisma* Fernald – F, Il, Tn; > *Potentilla simplex* var. *calvescens* Fernald – F, Il; > *Potentilla simplex* var. *simplex* – F, Il, Tn.



Poterium Linnaeus 1753 (SALAD BURNET)

A genus of 6 or more species, herbs, of Eurasia, n. Africa, and North America. References: Kalkman in Kubitzki et al (2004); Nordborg (1966); Nordborg (1967); Robertson (1974); Weakley (2014a) in FNA9 (2014).

* ***Poterium sanguisorba*** Linnaeus *var.* ***polygamum*** (Waldstein & Kitaibel) Visiani. SALAD BURNET, GARDEN BURNET, FODDER BURNET. **Hab:** Cultivated as an herb and salad green, escaped to moist, disturbed areas. **Dist:** Native of Europe. Reported for AL (Diamond & Keener 2012). **Phen:** Jun-Jul. **Syn:** = FNA9; = *Poterium sanguisorba* Linnaeus ssp. *muricatum* (Spach) Rouy – K3; = *Sanguisorba minor* Scopoli ssp. *muricata* (Spach) Nordborg – K1, Nordborg (1966), Nordborg (1967), Robertson (1974); < *Poterium sanguisorba* Linnaeus – S; >< *Poterium sanguisorba* Linnaeus ssp. *balearicum* (Nyman) Stace – K4, NY; < *Sanguisorba minor* – C, F, G, Il, Pa, RAB, WV; >< *Sanguisorba minor* ssp. *balearica* (Nyman) Muñoz Garmendia & C. Navarro – NE. NatureServe G5TNR (Not Yet Ranked).

Prunus Linnaeus 1753 (PLUM, CHERRY, SLOE, PEACH, APRICOT)

A genus of about 200 species, trees and shrubs, nearly cosmopolitan, but especially in north temperate regions. Liu et al. (2012) make a strong case for combining subgenus *Laurocerasus* into subgenus *Padus*. References: Catling, McKay-Kuja, & Mitrow (1999); Kalkman in Kubitzki et al (2004); Klooster et al (2018); Liu et al (2012); McVaugh (1951); Robertson (1974); Rohrer (2014b) in FNA9 (2014); Shaw & Small (2004); Yazbek & Oh (2013).

Unkeyed waifs: *Prunus campanulata*

1 Flowers in elongate racemes of (12-) 20-many flowers; [black-cherries, subgenus *Padus*]..... ***Key A***
1 Flowers solitary, in fascicles, in umbellate or corymbose inflorescences, or in short racemes (*P. mahaleb*) of 1-12 flowers.
  2 Fruit glabrous; ovary glabrous or pubescent initially; flowers and fruit pedicellate, the pedicel > 4 mm long (except…)
    3 Stones globose, not 2-edged; sepals hairy or not; inflorescences subtended by leafy bracts arising from the same bud as the flowers (except *P. pensylvanica*, *P. susquehanae*, and *P. pumila*); [cherries, subgenera *Cerasus* and *Lithocerasus*]..... ***Key B***
    3 Stones somewhat to strongly flattened, 2-edged; sepals hairy on the upper surface (except *P. domestica*, *P. insititia*, and *P. cerasifera*); inflorescences without leafy bracts arising from the same bud as the flower; [plums, subgenus *Prunus*]..... ***Key C***
  2 Fruit densely velvety or puberulent; ovary densely velvety or puberulent; flowers and fruits sessile or on pedicel 0-2 mm long.
    ..... ***Prunus persica***

Key A - BLACK-CHERRIES, subgenus *Padus*

1 Leaves evergreen, entire or serrate with few or rather many (but widely spaced) prominent teeth; petioles lacking 2 glands near junction with leaf blade.
  ..... ***Prunus caroliniana***
1 Leaves deciduous, regularly and rather finely toothed; petioles with 2 glands near the junction with the leaf blade.
  6 Leaves mostly 1.5-2× as long as wide, often blunt-tipped (except in shoot leaves); lower leaf surface rather uniformly pubescent, the midrib lacking conspicuous tufts or fringes; branchlets reddish hairy ..... ***Prunus alabamensis***
  6 Leaves mostly 2-2.5× as long as wide, slightly acuminate; lower leaf surface glabrous except for (in var. *serotina*) tufts or fringes along the midrib; branchlets glabrous.
    ..... ***Prunus serotina var. serotina***

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Key B - CHERRIES, subgenera *Cerasus* and *Lithocerasus*

1 Plants shrubs, to 1.5 (-3) m tall; [subgenus *Lithocerasus*; section *Microcerasus*].
..... ***Prunus glandulosa***
1 Plants trees, well over 3 m tall when mature; [subgenus *Cerasus*].
..... ***Prunus yedoensis***

Key C - PLUMS, subgenus *Prunus*

2 Flowers 1-2 (-3) per inflorescence; stone somewhat sculptured; [exotic]; [section *Prunus*].
3 First-year twigs green, shiny, glabrous; fruits 2-3 cm long, yellow to red when ripe; inflorescence of a solitary flower..... ***Prunus cerasifera***
3 First-year twigs brown to gray, dull, often pubescent; fruits either 3-7 cm or 1-2 cm long, blue-black, yellow, or greenish when ripe; inflorescence of 1-3 flowers.
..... ***Prunus domestica***
2 Flowers (3-) 4-6 per inflorescence; stone nearly smooth; [native, though some species also cultivated and/or weedy]; [section *Prunocerasus*].
5 Leaf teeth gland-tipped (or with a scar where the gland has fallen); sepals with marginal glands (except *P. angustifolia*); ripe fruit yellow, orange, or red.
6 Leaves 3-6 cm long, often folded longitudinally; sepals lacking marginal glands..... ***Prunus angustifolia***
6 Leaves (4-) 5-13 cm long, not folded (folded in *P. munsoniana* and *P. rivularis*); sepals with marginal glands.
..... ***Prunus munsoniana***
5 Leaf teeth glandless (or if glandular, then sharp-tipped); sepals without marginal glands; ripe fruit yellow, orange red, purple-red, purple, or black.
10 Petals 10-15 mm long; leaves 6-10 cm long, acuminate; fruit 2-2.5 cm long, red or yellow.
11 Leaves narrowly to broadly cuneate at the base; petiole usually lacking glands near its junction with the leaf blade; sepals glabrous on the lower side.....
..... ***Prunus americana***
11 Leaves broadly rounded at the base; petiole usually with glands near its junction with the leaf blade; sepals pubescent on the lower side.....
..... ***Prunus mexicana***
10 Petals 4-9 mm long; leaves 2-8 cm long, obtuse, acute, or slightly acuminate; fruit 0.9-1.5 cm long, dark purple, black, yellow, orange, or red.
..... ***Prunus umbellata***

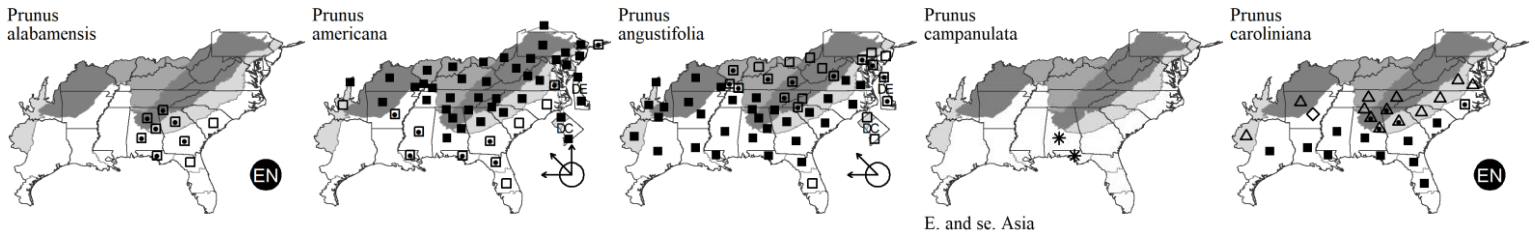
Prunus alabamensis C. Mohr. ALABAMA BLACK CHERRY. **Hab:** Sandhills, other xeric, acidic, sandy or rocky forests and woodlands, often associated with *Pinus palustris* (even in the Piedmont and Mountains). **Dist:** C. SC, nw. GA, n. AL south to Panhandle FL and s. AL; the NC record is based on a misidentified specimen. **Phen:** Apr-May; Jul-Aug. **Syn:** = K1, K3, K4; = *Prunus serotina* ssp. *hirsuta* (Elliott) McVaugh – Robertson (1974); = *Prunus serotina* Ehrhart var. *alabamensis* (C. Mohr) Little – Fl3, FNA9, RAB, WH3; > *Padus alabamensis* (C. Mohr) Small – S; > *Padus australis* Beadle – S; > *Padus cuthbertii* Small – S. NatureServe G4 (Apparently Secure).

Prunus americana Marshall. AMERICAN WILD PLUM. **Hab:** Upland forests, bottomland forests, fencerows, usually in mesic situations. **Dist:** ME to SK, south to n. peninsular FL, AR, OK, NM, and AZ. **Phen:** Mar-Apr; Jul-Aug. **Syn:** = C, Fl3, FNA9, GrPl, K1, K3, K4, Mi, NE, NY, Pa, S, Tn, Va, W, WH3, WV, Robertson (1974); = *Prunus americana* var. *americana* – F, G, RAB; > *Prunus americana* var. *americana* – Il; > *Prunus americana* Marshall var. *lanata* Sudworth – Il. NatureServe G5 (Secure).

Prunus angustifolia Marshall. CHICKASAW PLUM, SANDHILL PLUM. **Hab:** Prairies, sand barrens, river banks, old fields, fencerows, abandoned fields, pastures, roadsides, disturbed areas; often in sandy or rocky soil. **Dist:** NJ, PA, IN, IL, MO, NE, and CO, south to FL, TX, and e. NM. The original native distribution is unclear; much of its more eastern distribution may be the result of early spread by native Americans. **Phen:** (Late Feb-) Mar-Apr; May-early Jul. **Syn:** = Ar, C, Fl3, FNA9, G, Il, K3, K4, Mi, NcTx, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV, Robertson (1974); > *Prunus angustifolia* var. *angustifolia* – F, GrPl, K1.

* ***Prunus campanulata*** Maximowicz. TAIWAN CHERRY, FORMOSAN CHERRY. **Hab:** Suburban woodlands. **Dist:** Native of Taiwan. Reported as naturalized in suburban woodlands in the Tallahassee (Leon Co., FL) area (Clewell & Tobe 2011) and Conecuh County, AL (Diamond 2013). **Comm:** {not yet keyed}. **Syn:** = K3, K4.

Prunus caroliniana (P. Miller) Aiton. CAROLINA LAUREL CHERRY. **Hab:** Maritime forests and sandy hammocks in the Coastal Plain, escaped from cultivation to fencerows and suburban forests and thickets in more inland areas. **Dist:** Se. NC south to sc. Peninsular FL, west to AR and TX; mainly inland occurrences, especially off the Coastal Plain, are the result of naturalization from horticultural use. **Phen:** Feb-Apr; Sep-Oct. **Syn:** = Ar, Fl3, FNA9, K1, K3, K4, NcTx, RAB, Tn, Tx, WH3, Robertson (1974); = *Laurocerasus caroliniana* (P. Miller) M. Roemer – S. NatureServe G5 (Secure).



* ***Prunus cerasifera*** Ehrhart. CHERRY PLUM, FLOWERING PLUM, PURPLELEAF PLUM. **Hab:** Suburban woodlands. **Dist:** Native of Asia. Introduced at scattered locations; reported for TN, PA, NJ (Kartesz 1999). **Phen:** Mar-Apr; Jun-Aug. **Syn:** = F, FNA9, K1, K3, K4, NE, NY. NatureServe GNR (Not Yet Ranked).

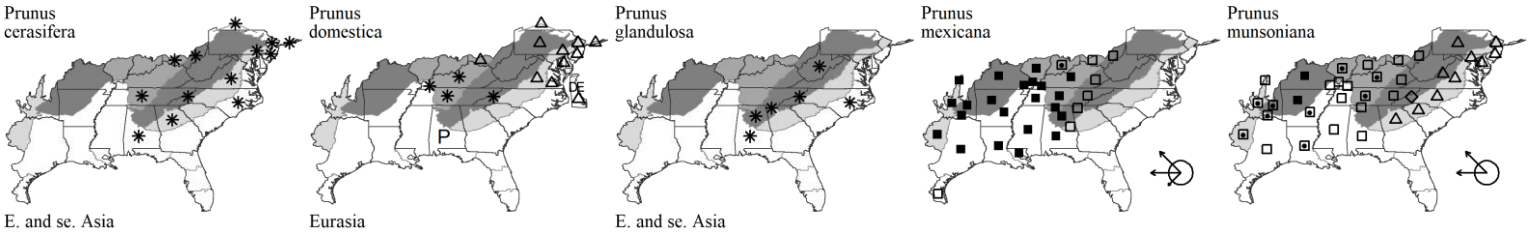
* ***Prunus domestica*** Linnaeus. EUROPEAN PLUM, DAMSON, BULLACE, SKEG. **Hab:** Suburban forests, roadsides. **Dist:** Native of Europe. Introduced at scattered locations; reported for Fairfax and Fauquier counties (Virginia Botanical Associates 2019); also reported for MD, PA, NJ. **Tax:** Depypere et al. (2009) found that *P. domestica* and *P. insititia* were genetically very similar, but generally separable morphologically; they favored combining the two into a single species based on their similarity, variability and likely origin from complicated hybridization and domestication by man. **Syn:** = FNA9, K3, Mi, NY; > *Prunus domestica* Linnaeus – NE; > *Prunus domestica* ssp. *domestica* – C; > *Prunus domestica* ssp. *institia* (Linnaeus) C.K. Schneider – C; > *Prunus domestica* var. *domestica* – K1; > *Prunus domestica* var. *insititia* – K1; > *Prunus insititia* Linnaeus – F, G, NE, Robertson (1974).

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

* ***Prunus glandulosa*** Thunberg. DWARF FLOWERING ALMOND. **Hab:** Persisting at abandoned homesites. **Dist:** Native of c. and n. China and Japan. **Phen:** Mar-May. **Syn:** = FNA9, K1, K4. NatureServe GNR (Not Yet Ranked).

Prunus mexicana S. Watson. BIG-TREE PLUM, MEXICAN PLUM. **Hab:** Streamsides, upland forests, fencerows. **Dist:** IN, IL, and IA, south to AL, MS, LA, TX, and Mexico; reports from farther east are apparently in error and based on pubescent material of *P. americana*. **Phen:** Mar-Apr; Aug-Oct. **Syn:** = Ar, C, FNA9, G, GrPl, Il, K1, K3, K4, NcTx, S, Tn, Tx, Robertson (1974); = *Prunus americana* Marshall var. *lanata* Sudworth – F, Il, misapplied. NatureServe G4G5 (Apparently Secure).

Prunus munsoniana W. Wight & Hedrick. MUNSON PLUM, WILD-GOOSE PLUM, MUNSON'S PLUM. **Hab:** Prairies, stream banks, woodland edges, pond margins, roadsides, old fields, pastures, old homesites. **Dist:** OH, IL, MO, and KS, south to MS and TX; disjunct (introduced?) in GA, NC, VA, and NJ. **Phen:** Apr-May; Jul-Aug. **Syn:** = Ar, C, F, G, GrPl, Il, K1, K3, NcTx, S, Tx, Va, Robertson (1974); < *Prunus rivularis* Scheele – FNA9, K4.

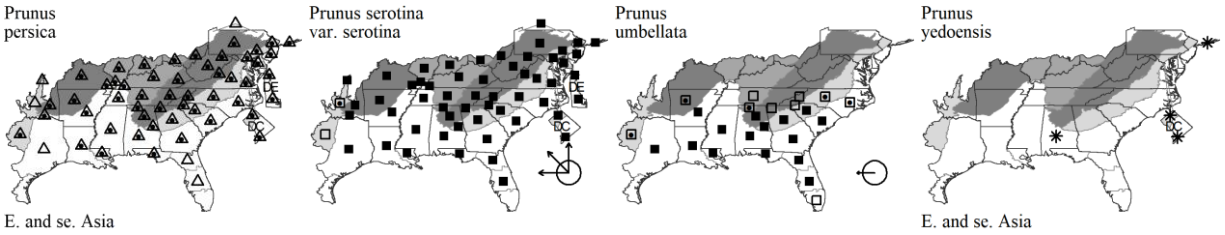


* ***Prunus persica*** (Linnaeus) Batsch. PEACH. **Hab:** Roadsides, trash-heaps, old fields, fencerows, disturbed thickets; commonly cultivated and commonly escaped or persistent. **Dist:** Native of China. **Phen:** Mar-Apr; Jun-Aug. **Syn:** = Ar, C, F, Fl3, FNA9, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, W, WH3, WV, Robertson (1974); = *Amygdalus persica* Linnaeus – S. NatureServe G5 (Secure).

Prunus serotina Ehrhart *var*. ***serotina***. EASTERN WILD BLACK CHERRY, BIRD CHERRY. **Hab:** Rich coves, bottomlands, northern hardwood forests, and in a wide variety of lower elevation habitats from dry to mesic, and weedy in fencerows. **Dist:** NS west to ND, south to c. peninsular FL and e. TX. **Phen:** Apr-May; Jul-Aug. **Tax:** Several other varieties occur in sc. and sw. North America, from c. TX westward. In the Piedmont and Coastal Plain, *P. serotina* is generally a small, scrubby tree of fencerows and an understory tree in forests and woodlands, but in the Mountains reaching large sizes and full canopy stature. **Syn:** = K1, K3, K4, NcTx, NE, NY, Va; = *Prunus serotina* ssp. *serotina* – Robertson (1974); < *Padus virginiana* – S, misapplied; < *Prunus serotina* – Ar, C, F, G, GrPl, Il, Mi, Pa, Tn, W; < *Prunus serotina* Ehrhart var. *serotina* – Fl3, FNA9, RAB, WH3.

Prunus umbellata Elliott. HOG PLUM, FLATWOODS PLUM. **Hab:** Upland, usually xeric, sandy or rocky forests and woodlands. **Dist:** S. NC, TN, and AR south to c. peninsular FL and TX. **Phen:** Mar-Apr; Aug-Sep. **Tax:** Fox, Godfrey, & Blomquist (1952) report *Prunus mitis* for s. NC (Cleveland County). It is presently unclear how best to treat variation in this complex. **Syn:** = Ar, Fl3, FNA9, K3, K4, Mi, NcTx, RAB, Tx, WH3, Robertson (1974); > *Prunus injucunda* Small – S; > *Prunus mitis* Beadle – S; > *Prunus umbellata* Elliott – S; > *Prunus umbellata* Elliott var. *injucunda* (Small) Sargent – K1; > *Prunus umbellata* Elliott var. *umbellata* – K1.

* ***Prunus ×yedoensis*** J. Matsumura. YOSHINO CHERRY. **Hab:** Suburban woodlands. **Dist:** Native of e. Asia. Reported as an escape in the DC area. See Diamond (2021) for discussion of occurrence in Alabama. **Syn:** = FNA9, K3; = *Prunus ×yedoensis* Matsumura (pro. sp.) – K2, K4. NatureServe GNR (Not Yet Ranked).



Pyracantha M.J. Roemer 1847 (FIRETHORN, PYRACANTHA)

A genus of about 10 species, shrubs, of s. Europe east to e. Asia. References: Feng et al (2021); Kalkman in Kubitzki et al (2004); Lance & Zika (2014) in FNA9 (2014); Nesom (2010); Robertson (1974).

1 Leaf margins crenulate to serrulate for at least ½ the length of the blade.
  2 Leaf blades oblanceolate or obovate, the apices obtuse, emarginate, or short-apiculate; hypanthium and pedicels glabrate ..... ***Pyracantha fortuneana***
  2 Leaf blades lanceolate, oblong, oblanceolate, ovate-lanceolate, elliptic, or ovate, the apices usually acute or short-apiculate; hypanthium and pedicels finely hairy ..... ***Pyracantha coccinea***
1 Leaf margins usually entire, rarely remotely serrulate and only towards the leaf apex.
  3 Calyces and leaf undersurfaces persistently gray-tomentose ..... ***Pyracantha angustifolia***
  3 Calyces and leaf undersurfaces brown- or yellowish-puberulent when young, becoming glabrescent. ..... ***Pyracantha koidzumii***

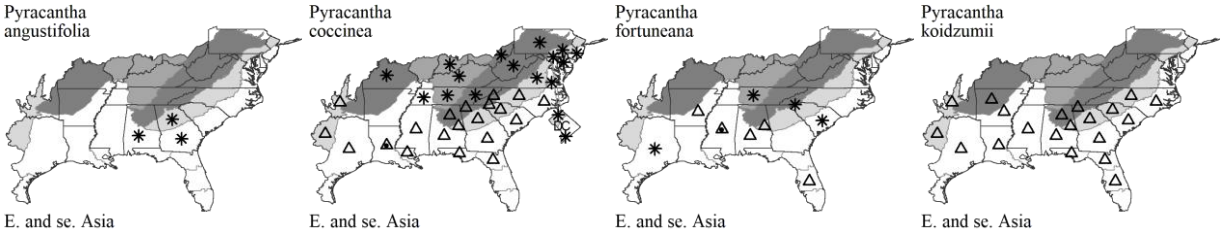
* ***Pyracantha angustifolia*** (Franchet) C.K. Schneider. NARROWLEAF FIRETHORN. **Hab:** Planted, rarely escaped or persistent. **Dist:** Native of China. **Syn:** = FNA9, K4. NatureServe GNR (Not Yet Ranked).

* ***Pyracantha coccinea*** M.J. Roemer. SCARLET FIRETHORN. **Hab:** Planted, persistent around old homesites, and rarely escaped to woodlands. **Dist:** Native of se. Europe and Asia Minor. Reported for AL, LA, OK, SC, TN, and TX (Nesom 2010a). **Syn:** = FNA9, K1, K3, K4, NY, Nesom (2010), Robertson (1974); = *Cotoneaster pyracantha* (Linnaeus) Spach – F, S. NatureServe GNR (Not Yet Ranked).

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

* ***Pyracantha fortuneana*** (Maximowicz) H.L. Li. CHINESE FIRETHORN. **Hab:** Fencerows, invading disturbed calcareous prairies, spreading from horticultural use. **Dist:** Native of China. Reported for AL, SC, and TX (Nesom 2010a). Serviss et al. (2018) discuss its occurrence in AR. **Phen:** May-Jul; Oct-Dec. **Syn:** = FNA9, K1, K3, WH3, Nesom (2010); < *Pyracantha crenulata* (D. Don) Roemer – K4. NatureServe GNR (Not Yet Ranked).

* ***Pyracantha koidzumii*** (Hayata) Rehder. FORMOSAN FIRETHORN. **Hab:** Planted, rarely escaped to woodlands. **Dist:** Native of Taiwan. **Tax:** Reported for AL, AR, FL, GA, LA, MS, OK, SC, TX (Nesom 2010a). See Serviss et al. (2018) for discussion of its occurrence in AR. **Syn:** = Ar, FNA9, K1, K3, K4, NcTx, WH3, Nesom (2010), Robertson (1974). NatureServe GNR (Not Yet Ranked).



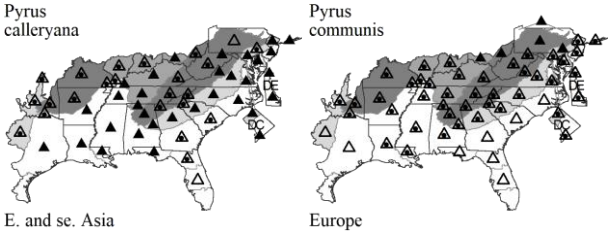
Pyrus Linnaeus 1753 (PEAR)

A genus of 10-20 species, trees and shrubs, of Eurasia and n. Africa. References: Catling & Mitrow (2014a) in FNA9 (2014); Kalkman in Kubitzki et al (2004); Robertson (1974); Zheng et al (2014).

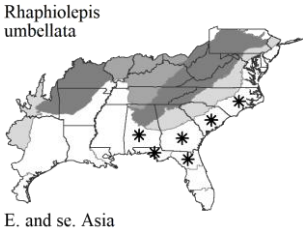
1 Fruit pyriform (pear-shaped!); flowers 2.5-3 cm across; leaves crenate; styles 5.....***Pyrus communis***
1 Fruit subglobose; flowers either 2-2.5 cm or 3-3.5 cm across; leaves serrate; styles 2 or 5 (rarely 3 or 4).
.....***Pyrus calleryana***

* ***Pyrus calleryana*** Decaisne. BRADFORD PEAR, CALLERY PEAR. **Hab:** Commonly planted and persistent, now an aggressive naturalizer in fields, roadsides, and disturbed areas across most of our region. **Dist:** Native of China. **Phen:** Late Feb-Apr; Aug-Oct. **Tax:** Some of the stock naturalizing may be of hybrids and horticultural selections involving additional species, including *P. betulifolia* Bunge and *P. bretschneideri* Rehder. **Comm:** This species has become an aggressive naturalizer in much of our area (Nesom 2000c; Vincent 2005; Culley & Hardiman 2007). **Syn:** = Ar, FNA9, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, Va, WH3. NatureServe GNR (Not Yet Ranked).

* ***Pyrus communis*** Linnaeus. COMMON PEAR. **Hab:** Planted, persistent around old houses and in orchards. **Dist:** Native of Europe. **Phen:** Apr; Aug-Oct. **Syn:** = C, F, FNA9, G, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Tx, WH3, WV, Robertson (1974). NatureServe G5 (Secure).

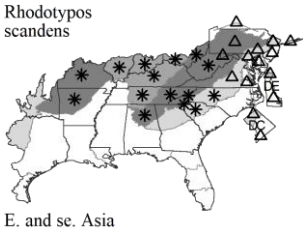


Rhaphiolepis Lindley 1820 (ASIAN-HAWTHORN)



A genus of about 5-15 species, shrubs, of e. Asia. References: Christenhusz, Fay, & Byng (2018); Kalkman in Kubitzki et al (2004); Liu et al (2020a); Liu et al (2020b).

* ***Rhaphiolepis umbellata*** (Thunberg) Makino. JAPANESE-HAWTHORN, YEDDA-HAWTHORN. **Hab:** Disturbed areas, marsh edges, also epiphytic on trunks of cultivated palms (as on Dauphin Island; H. Horne, pers. comm., 2013), and widely planted, likely to naturalize more extensively in the future. **Phen:** Mar-Apr. **Syn:** = K4; = *Pyrus umbellularia* M.F. Fay & Christenhusz – Christenhusz, Fay, & Byng (2018).



Rhodotypos Siebold & Zuccarini 1841 (JETBEAD)

A monotypic genus, a shrub, of Japan and China. References: Henrickson (2014a) in FNA9 (2014); Kalkman in Kubitzki et al (2004).

Identification Notes: Distinguished by its opposite leaves and black, beadlike fruits.

* ***Rhodotypos scandens*** (Thunberg) Makino. JETBEAD. **Hab:** Suburban woodlands, disturbed areas, roadsides, old house sites, well established locally. **Dist:** Native of e. Asia. **Phen:** Late Mar-May; Jun-Sep. **Syn:** = Ar, C, F, FNA9, G, Il, K1, K3, K4, Mi, NE, NY, Pa, Tn, Va, WV. NatureServe GNR (Not Yet Ranked).

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Rosa Linnaeus 1753 (ROSE)

A genus of more than 100 species, shrubs or woody vines; mainly of north temperate regions. Many cultivars cannot be readily identified to species.
References: Joly & Bruneau (2007); Kalkman in Kubitzki et al (2004); Lewis (2008); Lewis (2016); Lewis, Ertter, & Bruneau (2014) in FNA9 (2014); Robertson (1974).

Unkeyed taxa: *Rosa chinensis*

1 Stipules adnate to the petiole only basally, for < ½ their length; vigorous climbing vines, 3-5 (-10) m tall; petals white.
- 2 Stems brown-tomentose, stipitate-glandular; terminal leaflet petiolules 3-5 mm; pedicels tomentose, 3-6 mm; hypanthia subglobose, white tomentose; [section *Bracteatae*] ..... ***Rosa bracteata***
- 2 Stems glabrous, eglandular; terminal leaflet petiolules 9-13 mm; pedicels glabrous, 12-30 mm; hypanthia cupulate, densely setose [section *Laevigatae*] ..... ***Rosa laevigata***

1 Stipules adnate to the petiole > ½ their length; vigorous climbing vines or shrubs, 0.3-4 m tall; petals white, pink, rose-purple, or yellow.
- 3 Styles connate into a column which protrudes from the orifice by 3-6 mm (sometimes separating in fruit); stipule margins and auricles deeply laciniate (or entire to ciliate in *R. setigera*); vines, climbing and scrambling to 4 m tall; [section *Systylae*].
  - 4 Leaflets 3-5; stipule margins and auricles mostly entire or ciliate; inflorescences laxly corymbose; flowers 3-5 cm in diameter, petals single, rose-purple to pink; carpels 20-25, styles glabrous, exserted 5-6 mm beyond the orifice; [native] ..... ***Rosa setigera***
  - 4 Leaflets (5-) 7-9; stipule margins and auricles deeply laciniate; inflorescences paniculate; flowers 1.5-2.5 cm in diameter, petals single or double, white to shades of pink; carpels 6-20; styles glabrous or pubescent, exserted 3-5 mm beyond the orifice; [alien].
    - 5 Pedicels 18-25 mm, glabrous, eglandular; flowers 2-2.5 cm in diameter, hypanthium elongate-ovoid, 4-6.5 mm x 2-3 mm, eglandular; carpels 12-20, styles pubescent, exserted 3.5-5 mm beyond orifices (1.5-2 mm in diameter) of flat discs (3-4 mm in diameter) ..... ***Rosa lucieae***
    - 5 Pedicels 5-12 mm, tomentose, stipitate glandular at least near the base; flowers 1.5-2.5 cm in diameter; hypanthium 2 mm × 1-1.5 mm, eglandular or stipitate-glandular; carpels 6-11, styles glabrous, exserted 3-4 mm beyond the orifice (0.5-1 mm in diameter) of conical discs (2-3 mm in diameter) ..... ***Rosa multiflora***
- 3 Styles distinct, usually only the stigmas protruding from the orifice, by 0-4 mm; stipule margins and auricles entire to serrate, not laciniate; shrubs, erect or arching, to 0.3-5 m tall.
  - 8 Inflorescence of a solitary flower (rarely with a few laterals), the paired bracts on the pedicel caducous; [section *Gallicae*].
    - 9 Leaves not glandular-ciliate (or only remotely so); leaves not rugose ..... ***Rosa ×damascena***
    - 9 Leaves glandular-ciliate; leaves rugose ..... ***Rosa gallica***
  - 8 Inflorescence either corymbose, or of a solitary flower and its pedicel subtended by persistent bracts.
    - 10 Sepals disparate in size and shape, the outer pinnatifid with leafy segments; orifice of the hypanthium ca. 1 mm in diameter, the styles slightly exserted; [aliens]; [section *Caninae*].
      - 11 Stems to 5 m tall, prickles all similar; leaflets abaxially glabrous or rarely pubescent on midveins, eglandular; bracts 6-18 mm × 4-5 mm, glabrous; sepals abaxially eglandular ..... ***Rosa canina***
      - 11 Stems to 3 m tall, prickles of varying sizes; leaflets abaxially pubescent or tomentose, rarely glabrous, glandular; bracts 13-15 mm × 5-7 mm, tomentose; sepals abaxially densely stipitate-glandular. ..... ***Rosa rubiginosa var. rubiginosa***
    - 10 Sepals alike, all entire or with a few scarcely leafy teeth near the base; orifice of the hypanthium ca. 2-4 mm in diameter, the opening blocked by the stigmas; [natives and aliens]; [section *Cinnamomeae*].
      - 15 Hypanthium glabrous.
      - 15 Hypanthium with glands.
        - 18 Bristles present on new branches.
          - 20 Fertile branches armed with straight, thin or rarely stout, circular or somewhat flattened infrastipular prickles, lacking internodal prickles or aciculi (or if these present , few and scattered); stems mostly thin, pendent or upright; hypanthia (later hips) and pedicels stipitate-glandular (rarely eglandular) ..... ***Rosa carolina ssp. carolina***
          - 20 Fertile branches armed with straight, thin or often stout, circular or flattened infrastipular prickles, with internodal prickles of small prickles, aciculi, or stipitate glands, usually densely covering branches and adjacent stems; stems mostly thick, or upright; hypanthia (later hips) and pedicels stipitate-glandular or eglandular ..... ***Rosa carolina ssp. subserrulata***
        - 18 Bristles absent on new branches.
          - 22 Hypanthium typically with > 86 glands; terminal leaflet oblong, generally with 20-30 small teeth per side ..... ***Rosa palustris***
          - 22 Hypanthium typically with < 86 glands; terminal leaflet ovate, elliptic, or obovate, with 10-18 (-23) small teeth per side.
            - 24 Fertile branches armed with straight, thin or rarely stout, circular or somewhat flattened infrastipular prickles, lacking internodal prickles or aciculi (or if these present , few and scattered); stems mostly thin, pendent or upright; hypanthia (later hips) and pedicels stipitate-glandular (rarely eglandular) ..... ***Rosa carolina ssp. carolina***
            - 24 Fertile branches armed with straight, thin or often stout, circular or flattened infrastipular prickles, with internodal prickles of small prickles, aciculi, or stipitate glands, usually densely covering branches and adjacent stems; stems mostly thick, upright; hypanthia (later hips) and pedicels stipitate-glandular or eglandular ..... ***Rosa carolina ssp. subserrulata***

* ***Rosa bracteata*** J.C. Wendland. MCCARTNEY ROSE, CHICKASAW ROSE. **Hab:** Disturbed areas, suburban borders, persistent after cultivation. **Dist:** Native of China. **Phen:** May-Nov; Jul-Nov. **Syn:** = Ar, C, F, FNA9, G, K1, K3, K4, NcTx, RAB, S, Tx, Va, WH3, Robertson (1974). NatureServe G5 (Secure).

* ***Rosa canina*** Linnaeus. DOG ROSE. **Hab:** Pastures, old fields, fencerows, roadsides. **Dist:** Native of Europe. **Phen:** May-Jun; Sep-Oct. **Syn:** = C, F, FNA9, G, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Va, W, WV, Robertson (1974). NatureServe GNR (Not Yet Ranked).

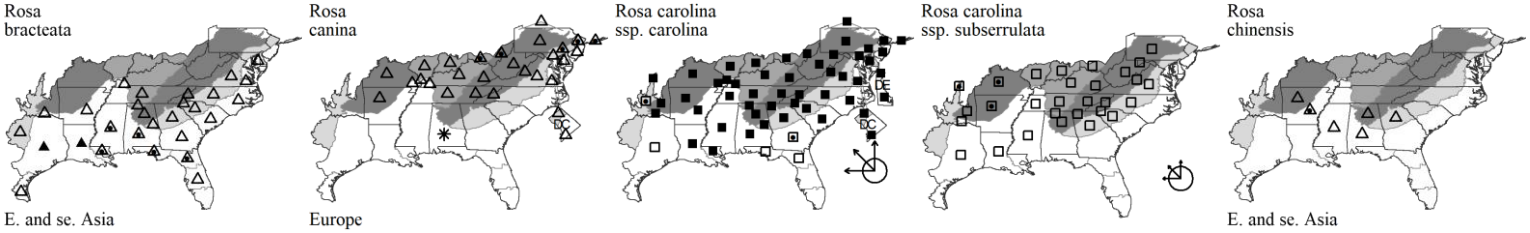
Rosa carolina Linnaeus *ssp.* ***carolina***. CAROLINA ROSE. **Hab:** Upland forests, woodlands, pastures, roadsides. **Dist:** NB and ON south to FL and TX. **Phen:** May-Jun; Aug-Oct. **Syn:** = FNA9, K3, K4, Mi, NE, NY, Tn, Va; < *Rosa carolina* – Ar, C, G, GrPl, NcTx, Pa, RAB, Tx, W, WH3, Joly & Bruneau (2007), Robertson (1974); > *Rosa carolina* – S; < *Rosa carolina* var. *carolina* – K1; > *Rosa carolina* var. *carolina* – F, Il; > *Rosa carolina* var. *grandiflora* (Baker) Rehder – F; > *Rosa carolina* var. *villosa* (Best) Rehder – F, Il; > *Rosa lyoni* Pursh – S; > *Rosa serrulata* Rafinesque – S.

Rosa carolina Linnaeus *ssp.* ***subserrulata*** (Rydberg) W.H. Lewis. CAROLINA ROSE. **Hab:** Glades and barrens. **Dist:** VT, ON, MI, and MO, south to SC, AL, and TX. **Phen:** May-Jul; Aug-Oct. **Syn:** = FNA9, K3, K4, Mi, NE, NY, Tn, Va; ? *Rosa carolina* – S; < *Rosa carolina* – Ar, C, G, GrPl, NcTx,

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Pa, RAB, Tx, W, Joly & Bruneau (2007), Robertson (1974); < *Rosa carolina* var. *carolina* – K1; > *Rosa carolina* var. *carolina* – F; ? *Rosa carolina* var. *grandiflora* (Baker) Rehder – F; ? *Rosa carolina* var. *villosa* (Best) Rehder – F; ? *Rosa lyoni* Pursh – S; ? *Rosa serrulata* Rafinesque – S.

* ***Rosa chinensis*** Thunberg. CHINESE ROSE. **Hab:** Suburban woodlands. **Dist:** Native of China. Reported for AL, MS, and VA (Kartesz 2010). **Syn:** = Ar, K1, K3, K4. NatureServe GNR (Not Yet Ranked).



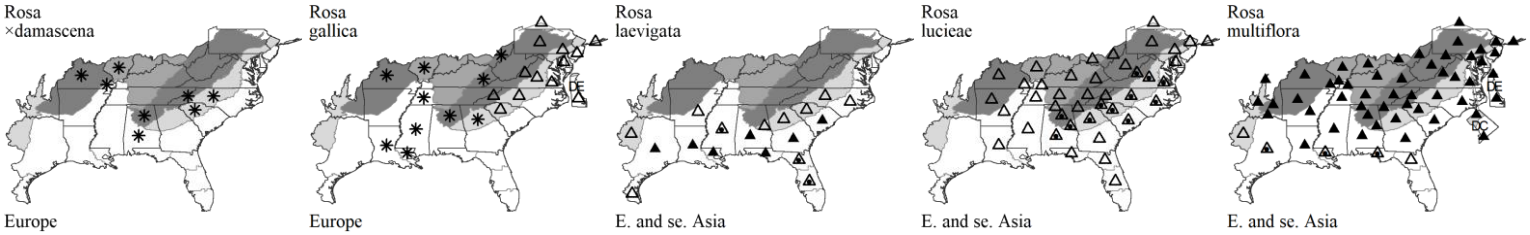
* ***Rosa ×damascena*** P. Miller [Rosa gallica × moschata]. DAMASK ROSE. **Hab:** Disturbed areas, persistent after cultivation. **Dist:** Native of Europe. **Phen:** May-Jun; Sep-Oct. **Syn:** = K1, K3, K4; = *Rosa damascena* P. Miller – RAB. NatureServe GNR (Not Yet Ranked).

* ***Rosa gallica*** Linnaeus. FRENCH ROSE. **Hab:** Disturbed areas. **Dist:** Native of Europe. **Phen:** May-Jul; Sep-Oct. **Comm:** There is a question as to whether the name *R. gallica* can be used; if not, it would be replaced with *R. austriaca*. Represented by many cultivated forms, some involving complex hybridization with other species. *R. ×damascena* P. Miller is apparently a hybrid of *R. gallica* and *R. moschata* J. Herrmann. **Syn:** = C, F, FNA9, G, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, Robertson (1974). NatureServe GNR (Not Yet Ranked).

* ***Rosa laevigata*** Michaux. CHEROKEE ROSE. **Hab:** Roadsides, moist forests. **Dist:** Native of China. Apparently introduced into the se. United States very early, where encountered by André Michaux in the 1790s and named by him as an apparent native species. **Phen:** Late Mar-Jun; Sep-Oct. **Syn:** = Ar, FNA9, K1, K3, K4, NcTx, RAB, S, Tx, WH3, Robertson (1974). NatureServe GNR (Not Yet Ranked).

* ***Rosa lucieae*** Franchet & Rochebrune ex Crépin. MEMORIAL ROSE, DOROTHY PERKINS ROSE, LUCIE ROSE. **Hab:** Roadbanks, railroad embankments, disturbed areas. **Dist:** Native of e. Asia. See Duncan (1985) for documentation for GA. **Phen:** May-Jul; Sep-Oct. **Syn:** = K4, NY; = *Rosa luciae* Franchet & Rochebrune ex Crépin – FNA9, NE, Va, orthographic variant; > *Rosa wichuraiana* Crépin – Ar, C, F, G, K1, K2, Pa, W, WH3, Robertson (1974); > *Rosa wichuriana* – Il, RAB, orthographic variant. NatureServe GNR (Not Yet Ranked).

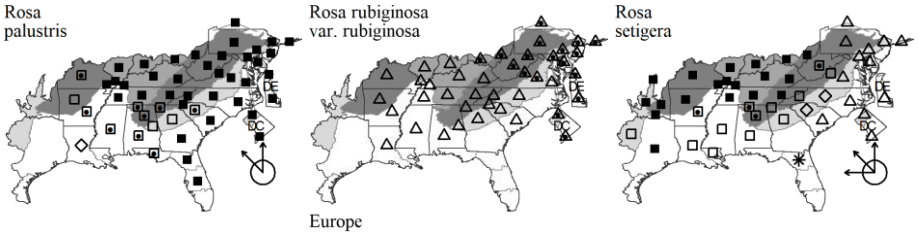
* ***Rosa multiflora*** Thunberg ex Murray. MULTIFLORA ROSE. **Hab:** Pastures, thickets, bottomlands, upland forests, bogs. **Dist:** Native of Asia, aggressively invasive. **Phen:** May-Jun; Sep-Oct. **Syn:** = Ar, C, F, FNA9, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV, Robertson (1974). NatureServe GNR (Not Yet Ranked).



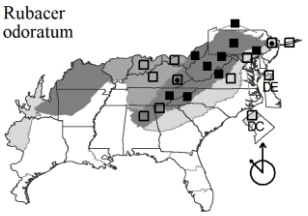
Rosa palustris Marshall. SWAMP ROSE. **Hab:** Swamp forests, bogs, fens, seeps, streamsides, tidal swamps, beaver ponds. **Dist:** NB and ON south to c. peninsular FL, MS, and ne. AR. **Phen:** May-Jul (-Aug); Sep-Oct. **Syn:** = Ar, C, F, FNA9, G, GW2, Il, K4, Mi, NE, NY, Pa, RAB, Tn, Va, W, WH3, WV, Joly & Bruneau (2007), Robertson (1974); > *Rosa floridana* Rydberg – S; > *Rosa lancifolia* Small – S; > *Rosa obtusiuscula* Rydberg – K1, K3, S; > *Rosa palustris* Marshall – K1, K3, S.

* ***Rosa rubiginosa*** Linnaeus *var*. ***rubiginosa***. EGLANTINE ROSE, SWEETBRIAR ROSE. **Hab:** Pastures, disturbed areas. **Dist:** Native of Europe. **Phen:** May-Jun; Sep-Oct. **Tax:** The name *R. eglanteria* was formally rejected in favor of *R. rubiginosa* (Brummitt 2005). **Syn:** = FNA9, K4; = *Rosa eglanteria* Linnaeus – Ar, C, F, G, Il, K1, NcTx, Pa, RAB, Tx, W, WV, Robertson (1974), rejected name; = *Rosa rubiginosa* – NE, NY; < *Rosa rubiginosa* – K3, Mi, S, Tn, Va.

Rosa setigera Michaux. OZARK ROSE, CLIMBING PRAIRIE ROSE. **Hab:** Dry-mesic to mesic upland forests and woodlands, prairies, bluffs, bottomland and riparian forests, stream banks, pastures, old fields, roadsides; nativity uncertain in portions of our area. **Dist:** ME west to WI and NE, south to FL and TX. **Phen:** May-Jun; Sep-Oct. **Syn:** = Ar, C, FNA9, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Va, W, WH3; > *Rosa setigera* var. *setigera* – F, G, GrPl, Il, K1, Tx, WV, Robertson (1974); > *Rosa setigera* var. *tomentosa* Torrey & A. Gray – F, G, GrPl, Il, K1, NcTx, Tx, WV, Robertson (1974).



Rubacer Rydberg 1903 (MAPLELEAF-RASPBERRY)



A genus of 2 species, shrubs, of North America. Often included in *Rubus*, but morphologically distinctive and forming a clade basal to core *Rubus* (Carter et al 2019). References: Alice et al (2014) in FNA9 (2014); Carter et al (2019).

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable

Rubacer odoratum (Linnaeus) Rydberg. EASTERN MAPLELEAF-RASPBERRY, PURPLE FLOWERING-RASPBERRY. **Hab:** Rocky upland forests, boulderfields, rock outcrops and clearings, moist roadsides, and thickets, especially on base-rich substrates. **Dist:** NS west to MI, south to w. NC, n. GA, and e. TN. **Phen:** Jun-Aug; Jul-Oct. **Syn:** = S; = *Rubus odoratus* Linnaeus – C, FNA9, G, Il, Mi, NE, NY, Pa, RAB, Tn, Va, W, Robertson (1974); > *Rubus odoratus* var. *columbianus* Millspaugh – F, K1, WV; > *Rubus odoratus* var. *odoratus* – F, K1, K3, K4, WV.

Rubus Linnaeus 1753 (BLACKBERRY, RASPBERRY, DEWBERRY, WINEBERRY, BRAMBLE)

A genus of about 250 species (if treated conservatively) or 2000-3000 microspecies, shrubs (and a few herbs), almost cosmopolitan in temperate areas. While the recent approach of grouping taxa into very broad "species" is not very satisfying, it is impossible at this time to create a coherent finer-scale taxonomy for *Rubus* across the region, and this treatment must be considered (like all before it) highly provisional. There also remain issues of generic circumscription, with morphologically divergent clades (sometimes of single species) basal to the rest of the genus (Carter et al. 2019), and here treated as separate genera (e.g. *Dalibarda* and *Rubacer* in our region). References: Alice & Campbell (1999); Alice et al (2014) in FNA9 (2014); Carter et al (2019); Kalkman in Kubitzki et al (2004); Ladd & Thomas (2015); Robertson (1974); Widrlechner (1998).

Identification Notes: With *Dalibarda* and *Rubacer* removed from *Rubus*, all of our species except *R. pubescens* have biennial stems. The first year the stems remain sterile and are termed primocanes. The second year, these stems produce lateral branches with flowers and are termed floricanes. Primocane and floricane leaves differ substantially in many species (less so in others).

1 Leaves (all) simple; stems unarmed. ..... ***Rubacer odoratum***
1 Leaves 3-9-foliolate (reduced simple leaves may also be present in the inflorescence); stems generally armed with prickles (sparsely so in a few species).
  4 Fruit separating from the receptacle, the receptacle remaining on the pedicel; stems either strongly white-glaucous (*R. occidentalis*), or densely beset with slender-based prickles and bristles (*R. idaeus*), or densely hairy with 3-5 mm long glandular hairs (*R. phoenicolasius*), or if not as above then the leaves pinnately 5-9-foliolate (*R. illecebrosus*) or with a rhombic terminal leaflet about as wide as long and densely white-tomentose below (*R. parvifolius*); [raspberries]. ..... ***Key A***
  4 Fruit retaining the receptacle; stems or leaves not as described above, except if beset with slender-based prickles and bristles then also < 1 m tall; [blackberries and dewberries].
    5 Canes very coarse, scrambling, often 2-5 m long, heavily armed; inflorescence cymose-paniculate; branches and pedicels of the floricanes armed with strong, flattened prickles (recurved cat's-claw, or nearly straight in *R. bifrons*); [alien, generally in disturbed habitats]; [Eurasian blackberries]. ..... ***Key B***
    5 Canes delicate to coarse, arching or trailing, 0-4 m long, unarmed to strongly armed; inflorescence racemiform; branches and pedicels of the floricanes generally unarmed; [native, though often in disturbed habitats].
      6 Primocanes prostrate, creeping, or low-arching, rooting at the tip or also at the nodes; [dewberries]. ..... ***Key C***
      6 Primocanes erect, ascending, or high-arching, not rooting; [native blackberries]. ..... ***Key D***

Key A - Raspberries

3 Inflorescence paniculiform, many-flowered; berries sticky, purplish-red, lacking a glaucous bloom ..... ***Rubus phoenicolasius***
3 Inflorescence corymbiform, few-flowered; berries not sticky, black or red (rarely purplish or yellow), with a glaucous bloom. ..... ***Rubus occidentalis***

Key B - Eurasian blackberries

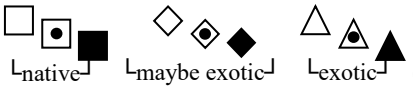
2 Prickles nearly straight; stems glabrescent; petals pale pink to deep pink ..... ***Rubus bifrons***
2 Prickles recurved; stems canescent above; petals white to pale pink ..... ***Rubus pascuus***

Key C - Dewberries

2 Stems primarily armed with narrow-based prickles or even narrower bristles, with or without stout-based prickles as well.
  3 Inflorescence racemiform; bristles of the stem nonglandular (very small glandular hairs may be present) ..... ***Rubus hispidus***
  3 Inflorescence reduced, normally to a single flower per branch of the floricane ..... ***Rubus trivialis***
2 Stems armed with stout-based, usually recurved prickles (bristles lacking, though weak, stalked glands may be present); leaf undersurfaces nearly glabrous or softly pubescent; leaves deciduous.
  4 Leaf undersurface thinly hairy, not soft to the touch (when fully developed).
    6 Canes 2-3 mm in diameter; prickles 1-2 mm long; primocane leaves mostly with 3 leaflets; inflorescences with 1-6 flowers ..... ***Rubus steelei***
    6 Canes 3-5+ mm in diameter; prickles 2-4 mm long; primocane leaves mostly with 5 leaflets; inflorescences with 4-12 flowers. ..... ***Rubus flagellaris***
  4 Leaf undersurface densely hairy, soft to the touch. ..... ***Rubus aboriginum***

Key D - American blackberries

3 Leaflets oblanceolate to obovate, definitely wider beyond the middle, generally obtuse or rounded at the tip; leaves densely white- or gray-tomentose beneath; [primarily of the Coastal Plain] ..... ***Rubus cuneifolius***
3 Leaflets lanceolate to ovate, widest below or near the middle, generally acute or acuminate at the tip; leaves glabrous to pubescent beneath, but the pubescence not notably tight and white or gray; [collectively widespread].
  4 Pubescence of the inflorescence rachis and pedicels predominantly gland-tipped, glandular hairs often present also on the young primocanes and the branches of the floricanes.

Key to Map Symbology: 

* : waif EN : endemic H : historic
N : no P : planted ? : questionable X : extirpated

..... ***Rubus allegheniensis***

4 Pubescence of the inflorescence rachis and pedicels nonglandular.

8 Primocane leaves with central leaflets ovate-elliptic to nearly orbicular; floricanes generally arching to low-arching, 5-13 (+) dm tall; inflorescences leafy-racemose.

10 Leaves glabrous (or very nearly so) beneath; canes with at most few and weak prickles; leaflets of the primocanes with attenuate to caudate apices ..... ***Rubus canadensis***

10 Leaves softly pubescent beneath; canes with many and strong prickles; leaflets of the primocanes with acute to acuminate apices ..... ***Rubus pensilvanicus***

8 Primocane leaves with central leaflets narrowly elliptic, elliptic, or obovate; floricanes generally erect to arching, 7-40 dm tall; inflorescences various. ..... ***Rubus argutus***

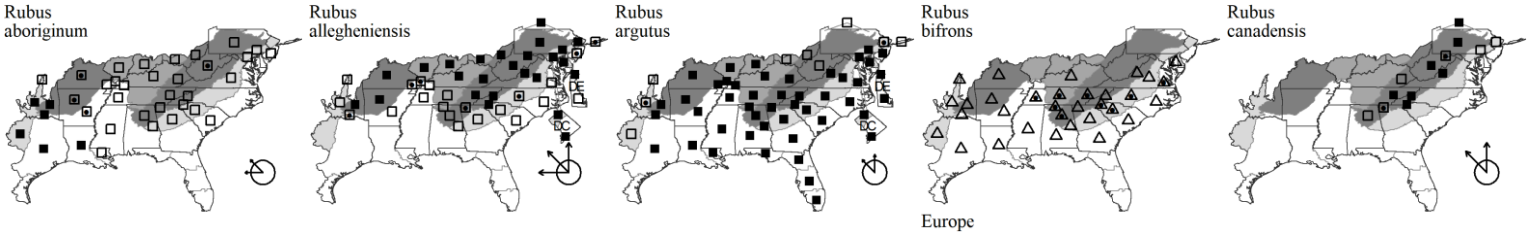
Rubus aboriginum Rydberg. **Hab:** Forests, woodlands, open areas, disturbed areas. **Dist:** PA and IA, south to SC, AL, LA, and TX. **Phen:** Apr-Jun. **Syn:** = K4, NcTx, Tx; > *Rubus aboriginus* – Il, orthographic variant; < *Rubus flagellaris* Willdenow – GrPl; > *Rubus mundus* L.H. Bailey – Il.

Rubus allegheniensis Porter. ALLEGHENY BLACKBERRY. **Hab:** Forests, woodlands, grassy balds. **Dist:** NS west to MN, south to w. NC, n. GA, and e. TN. **Phen:** May-Jun; Jul. **Syn:** = FNA9, G, GrPl, Il, Mi, NY, Pa, RAB, Tn, Va, W; < *Rubus allegheniensis* Porter – C; > *Rubus allegheniensis* var. *allegheniensis* – F, K1, K3, K4, WV; > *Rubus allegheniensis* var. *gravesii* Fernald – F, K1, K3, K4, WV; > *Rubus concameratus* H.A. Davis & T. Davis – WV; ? *Rubus nigrobaccus* L.H. Bailey – S; > *Rubus pugnax* L.H. Bailey – WV; > *Rubus reravus* L.H. Bailey – F.

Rubus argutus Link. SAWTOOTH BLACKBERRY. **Hab:** Thickets, disturbed areas. **Phen:** Apr-May; Jun. **Syn:** = C, F, G, GW2, Il, NE, RAB, S, Tn, W, Ladd & Thomas (2015); > *Rubus argutus* Link – K4; > *Rubus arvensis* L.H. Bailey – K4; > *Rubus louisianus* Berger – Tx; > *Rubus oklahomus* Biley – NcTx, Tx; > *Rubus persistens* Rydberg – Tx; > *Rubus saepescandens* Bailey – Tx.

* ***Rubus bifrons*** Vest. EUROPEAN BLACKBERRY. **Hab:** Disturbed areas, roadsides, thickets, old fields. **Dist:** Native of Europe. **Phen:** May-Jun; Jun-Jul. **Syn:** = C, FNA9, G, K1, Mi, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, W; > *Rubus armeniacus* Focke – Il, K3, K4; > *Rubus bifrons* Vest – F, K3, K4; > *Rubus linkianus* Seringe – S; > *Rubus procerus* P.J. Mueller – F.

Rubus canadensis Linnaeus. SMOOTH BLACKBERRY, THORNLESS BLACKBERRY. **Hab:** Forests, woodlands, grassy balds, especially common at high elevations. **Dist:** NL (Newfoundland) west to MN, south (primarily in the Appalachians) to w. NC, e. TN, and n. GA. **Phen:** Jun-Jul; Jul-Aug. **Syn:** = C, F, FNA9, G, K1, K3, Mi, NE, NY, Pa, RAB, S, Tn, Va, W, WV. NatureServe G5 (Secure).



Rubus cuneifolius Pursh. SAND BLACKBERRY. **Hab:** Woodlands, forests, disturbed areas. **Dist:** CT and NY (Long Island) south to s. FL and AL, MS, and se. LA, primarily on the Coastal Plain. **Phen:** Late Apr-early Jun; Jun-Jul. **Syn:** = C, FNA9, G, GW2, NE, NY, Pa, RAB, S, Va, W, WH3; > *Rubus audax* L.H. Bailey – K4; > *Rubus cuneifolius* Pursh – K1; > *Rubus cuneifolius* var. *cuneifolius* – F; > *Rubus cuneifolius* var. *subellipticus* Fernald – F; > *Rubus longii* Fernald – F, K1; > *Rubus probabilis* L.H. Bailey – K1; > *Rubus sejunctus* L.H. Bailey – F.

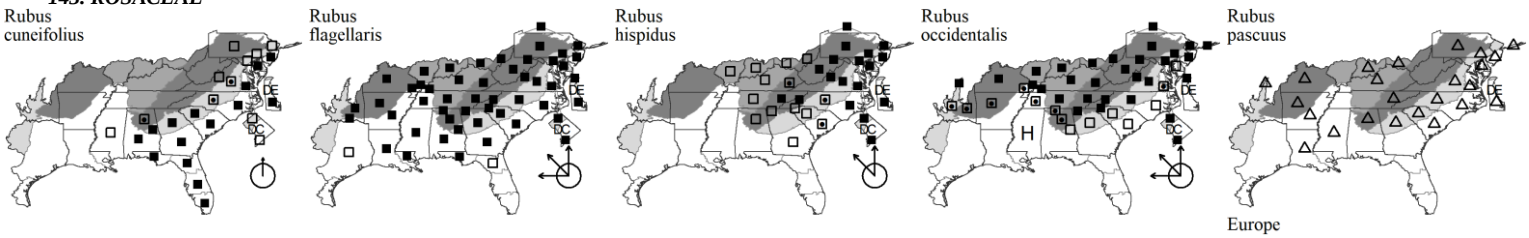
Rubus flagellaris Willdenow. COMMON DEWBERRY. **Hab:** Old fields, woodlands, roadsides, disturbed areas. **Dist:** NS west to MN, south to GA and LA. **Phen:** Apr-May; May-Jul. **Syn:** = Il, Pa, Ladd & Thomas (2015); > *Rubus akermani* Fernald – F; > *Rubus apogaeus* L.H. Bailey – K4, NcTx, Tx; > *Rubus arenicola* Blanchard – K4, NE; > *Rubus arundelanus* Blanchard – G; > *Rubus baileyanus* Britton – F, Il, K1, K4, S, WV; > *Rubus boyntoni* Ashe – F, orthographic variant; > *Rubus boyntonii* Ashe – K1, K4; > *Rubus cacaponensis* H.A. Davis & T. Davis – WV; > *Rubus cathartium* Fernald – F; > *Rubus clarus* L.H. Bailey – F, K1; > *Rubus cordifrons* L.H. Bailey – F; > *Rubus decor* L.H. Bailey – F, WV; > *Rubus depavitus* L.H. Bailey – F, K1; > *Rubus enslenii* Trattinnick – G, GrPl; > *Rubus exsularis* L.H. Bailey – WV; > *Rubus fecundus* L.H. Bailey – WV; > *Rubus felix* L.H. Bailey – F, WV; < *Rubus flagellaris* Willdenow – FNA9, Mi, NY, RAB, Tn, Va, W, WH3; > *Rubus flagellaris* Willdenow – C, F, G, GrPl, K1, NE, S, Tx, WV; > *Rubus grimesii* L.H. Bailey – F, K1; > *Rubus hypolasius* Fernald – F; > *Rubus imperiorum* Fernald – F; > *Rubus iniens* L.H. Bailey – F, K1; > *Rubus injunctus* L.H. Bailey – F, WV; > *Rubus invisus* (L.H. Bailey) Britton – F, K1, S, WV; > *Rubus jaysmithii* – F, K1, NE; > *Rubus kentuckiensis* L.H. Bailey – F, WV; > *Rubus longipes* Fernald – F; > *Rubus michiganensis* (Card ex L.H. Bailey) L.H. Bailey – WV; > *Rubus montensis* L.H. Bailey – WV; > *Rubus multifer* L.H. Bailey – Il, WV; > *Rubus nefrens* L.H. Bailey – F, K1; > *Rubus obvius* L.H. Bailey – F, K1; > *Rubus occidualis* L.H. Bailey – Il; > *Rubus particularis* L.H. Bailey – F, K1, WV; > *Rubus pernagaeus* Fernald – F, K1; > *Rubus plexus* Fernald – F, K1; > *Rubus profusiflorus* L.H. Bailey – WV; > *Rubus pronus* L.H. Bailey – WV; > *Rubus recurvicaulis* Blanchard – NE; > *Rubus redundans* L.H. Bailey – F; > *Rubus rosagnetis* L.H. Bailey – F; > *Rubus russeus* L.H. Bailey – WV; > *Rubus sailori* L.H. Bailey – WV; > *Rubus scambens* L.H. Bailey – F, K1; > *Rubus sewardianus* – F, K1; > *Rubus subinnoxius* Fernald – F; > *Rubus temerarius* L.H. Bailey – F, K1; > *Rubus terraltanus* L.H. Bailey – WV; > *Rubus tetricus* L.H. Bailey – F; > *Rubus vixalacer* L.H. Bailey – WV; > *Rubus whartoniae* L.H. Bailey – F, K1.

Rubus hispidus Linnaeus. SWAMP DEWBERRY, BRISTLY DEWBERRY. **Hab:** Bogs, moist woodlands and forests, disturbed moist areas. **Dist:** NS and QC west to WI, south to n. SC, n. and wc. GA (Carter, Baker, & Morris 2009), and MO. **Phen:** May-Jun; Jun-Jul. **Syn:** = C, FNA9, G, GW2, K4, Mi, NE, NY, Pa, RAB, S, Tn, Va, W; > *Rubus ambigens* Fernald – F; > *Rubus davisiorum* L.H. Bailey – F, WV; > *Rubus hispidus* Linnaeus – Il, K1, WV; > *Rubus hispidus* var. *hispidus* – F; > *Rubus hispidus* var. *obovalis* (Michaux) Fernald – F; > *Rubus huttonii* L.H. Bailey – F, WV; > *Rubus insignis* L.H. Bailey – Il; > *Rubus paganus* L.H. Bailey – K1, WV; > *Rubus porteri* L.H. Bailey – F, K1; > *Rubus provincialis* L.H. Bailey – K1, WV; > *Rubus tardatus* Blanchard – F, K1; > *Rubus vagulus* L.H. Bailey – F; > *Rubus vegrandis* L.H. Bailey – F; > *Rubus vermontanus* Blanchard – NE; > *Rubus vigil* L.H. Bailey – F; > *Rubus zaplutus* L.H. Bailey – F.

Rubus occidentalis Linnaeus. BLACK RASPBERRY, BLACKCAP. **Hab:** Roadsides, woodlands, thickets, disturbed areas. **Dist:** QC to ND and e. CO, south to n. GA, c. AL, n. MS, AR, and c. OK. **Phen:** Apr-Jun; Jun-Jul. **Syn:** = C, F, FNA9, G, GrPl, Il, K1, K3, Mi, NE, NY, Pa, RAB, S, Tn, Va, W, WV, Robertson (1974). NatureServe G5 (Secure).

* ***Rubus pascuus*** L.H. Bailey. TOPSY BLACKBERRY, CHESAPEAKE BLACKBERRY. **Hab:** Disturbed areas, thickets. **Dist:** Native of Europe. **Phen:** Jun-Jul; Aug. **Syn:** = FNA9, K3, NE, NY; = *Rubus discolor* Weihe & Nees – C, K1, Pa, Va, misapplied.

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

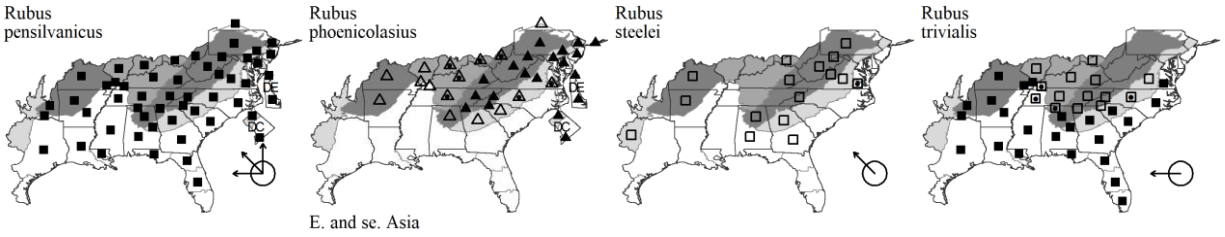


Rubus pensilvanicus Poiret. PENNSYLVANIA BLACKBERRY, EASTERN BLACKBERRY. **Hab:** Roadsides, thickets, woodlands. **Dist:** ME west to MN, south to FL and TX. **Phen:** Apr-May; late May-Jul. **Comm:** The most common "highbush" blackberry in most of our area, if circumscribed, as here and following FNA, to include *R. argutus*. **Syn:** = FNA9, GrPl, Mi, NY, Va, WH3; = *Rubus argutus* Link – W; > *Rubus abactus* L.H. Bailey – WV; > *Rubus andrewsianus* Blanchard – K4, WV; > *Rubus argutus* Link – C, F, G, GW2, K1, NE, RAB, S, Tn; > *Rubus barbarus* L.H. Bailey – F; > *Rubus bellobatus* L.H. Bailey – Il, WV; > *Rubus betulifolius* Small – RAB, S; > *Rubus blakei* L.H. Bailey – F; > *Rubus condensiflorus* L.H. Bailey – F; > *Rubus congruus* Bailey – F; > *Rubus cupressorum* Fernald – F; > *Rubus defectionis* Fernald – F, K1; > *Rubus densissimus* H.A. Davis & T. Davis – WV; > *Rubus dissitiflorus* Fernald – F; > *Rubus fatuus* Bailey – F; > *Rubus floricomus* Blanchard – F, K1; > *Rubus floridus* Trattinick – F, S; > *Rubus frondosus* Bigelow – F, K1, NE, WV; > *Rubus immanis* L.H. Bailey – K1; > *Rubus impar* L.H. Bailey – Il; > *Rubus jennisonii* L.H. Bailey – WV; > *Rubus jugosus* L.H. Bailey – F; > *Rubus laudatus* Berger – K1, WV; > *Rubus leggii* H.A. Davis & T. Davis – WV; > *Rubus libratus* L.H. Bailey – F; > *Rubus louisianus* Berger – F; > *Rubus oklahomus* Biley – NcTx; > *Rubus orarius* Blanchard – C; > *Rubus ostryifolius* Rydberg – G; > *Rubus pauxillus* L.H. Bailey – F, K1; > *Rubus pensilvanicus* Poiret – C, F, G, Il, K1, NE, Pa, Tn, WV; > *Rubus pergratus* Blanchard – Il, K1; > *Rubus philadelphicus* Blanchard – WV; > *Rubus praepes* L.H. Bailey – F; > *Rubus prestonensis* H.A. Davis & T. Davis – WV; > *Rubus pubifolius* L.H. Bailey – Il; > *Rubus recurvans* Blanchard – F, Il, K1; > *Rubus rosarius* L.H. Bailey – K1; > *Rubus subsolanus* L.H. Bailey – F, WV; > *Rubus tygartensis* H.A. Davis & T. Davis – WV; > *Rubus wisconsinensis* L.H. Bailey – Il.

* ***Rubus phoenicolasius*** Maximowicz. WINEBERRY, WINE RASPBERRY. **Hab:** Moist forests, roadsides, thickets. **Dist:** Native of e. Asia. **Phen:** May-Jun; Jun-Jul. **Comm:** The fruits are viscous to the touch and delicious. This plant is a serious invasive species in moist forests of the cooler portions of our region. **Syn:** = C, F, FNA9, G, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Va, W, WV. NatureServe G5 (Secure).

Rubus steelei L.H. Bailey. STEELE'S DEWBERRY. **Syn:** = Il, K4, WV. NatureServe G4? (Apparently Secure).

Rubus trivialis Michaux. SOUTHERN DEWBERRY, COASTAL PLAIN DEWBERRY. **Hab:** Roadsides, old fields, thickets, disturbed areas. **Dist:** E. MD south to s. FL, west to TX, north in the interior to MO. **Phen:** Mar-Apr; late Apr-May. **Syn:** = C, F, FNA9, G, GrPl, GW2, Il, K1, K3, K4, NcTx, RAB, Tn, Va, W, WH3; > *Rubus lucidus* Rydberg – S; > *Rubus nessianus* Bailey – Tx; > *Rubus trivialis* Michaux – S, Tx.



Spiraea Linnaeus 1753 (SPIRAEA, MEADOWSWEET, HARDHACK)

A genus of about 80-120 species, shrubs, of north temperate areas (especially Asia). Many species and hybrids are cultivated, and additional taxa to those treated below may be encountered as persistent or escaped. References: Kalkman in Kubitzki et al (2004); Lis (2014) in FNA9 (2014); Mink, Singhurst, & Holmes (2011b); Rehder (1940); Robertson (1974); Uttal (1974).

1 Inflorescence a simple umbel; flowers white; [section *Chamaedryon*]; [alien].
  2 Flowers 10-15 mm in diameter.
    3 Leaves 2-7 cm long, coarsely serrate and sometimes also slightly 3-lobed; inflorescences with > 6 flowers ..... ***Spiraea cantoniensis***
    3 Leaves 1-4 (-5) cm long, finely serrulate, not lobed; inflorescences with 3-6 flowers ..... ***Spiraea prunifolia***
  2 Flowers 6-10 mm in diameter.
    4 Leaf blades linear to lanceolate, 2.5-4 cm × 0.3-1 cm, > 4× as long as wide; flowers 6-8 mm in diameter ..... ***Spiraea thunbergii***
    4 Leaf blades ovate to obovate, 3-5 cm × 2-3 cm, < 2× as long as wide; flowers 7-10 mm in diameter ..... ***Spiraea ×vanhouttei***
1 Inflorescence a compound corymb or panicle; flowers white, pink, or red; [native or alien].
  5 Inflorescence a corymb, flat-topped or rounded, broader than long; [section *Calospyra*].
    ..... ***Spiraea japonica***
  5 Inflorescence a panicle, longer than broad; [section *Spiraea*].
    ..... ***Spiraea tomentosa***

* ***Spiraea cantoniensis*** Loureiro. **Hab:** Roadsides. **Dist:** Native of Asia. *S. cantoniensis* has been collected twice on Fort Bragg, NC, by Phil Crutchfield (specimen at Fort Bragg) (Sorrie, pers. comm.). Also reported for other scattered states in e. North America (AL, AR, LA, NY (Kartesz 1999, FNA). **Phen:** May-Jun; Jun-Sep. **Syn:** = Ar, FNA9, K1, K3, K4, NY. NatureServe GNR (Not Yet Ranked).

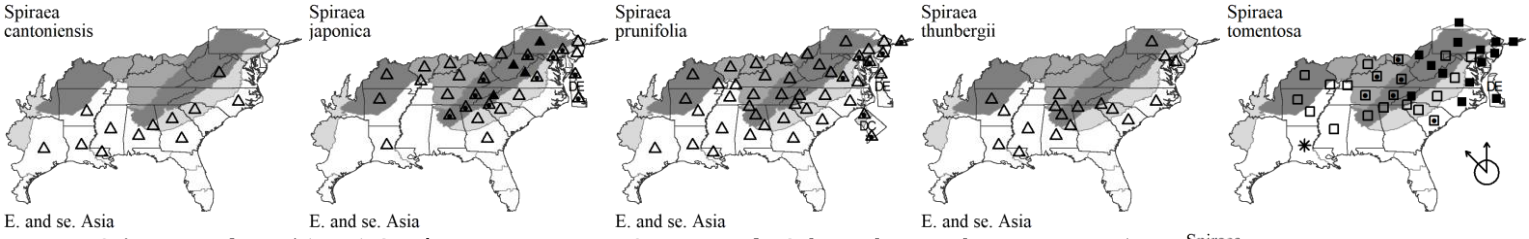
* ***Spiraea japonica*** Linnaeus f. JAPANESE SPIRAEA. **Hab:** Roadsides, woodland borders, old home-sites, bogs, alluvial forests. **Dist:** Native of Japan and China. **Phen:** May-Aug; Jul-Aug. **Syn:** = Ar, C, F, FNA9, G, Il, Mi, NY, Pa, RAB, Tn, Va, W, WV, Robertson (1974); > *Spiraea japonica* var. *fortunei* (Planchon) Rehder – K1, K3, K4, NE.

* ***Spiraea prunifolia*** Siebold & Zuccarini. BRIDAL-WREATH SPIRAEA. **Hab:** Cultivated, escaped or persisting. **Dist:** Native of China, Korea, and Taiwan. **Phen:** Apr-Aug; May-Nov. **Syn:** = Ar, C, FNA9, G, GrPl, Il, K1, K3, K4, NE, NY, Pa, Tn, Va; > *Spiraea prunifolia* var. *prunifolia*. NatureServe G5 (Secure).

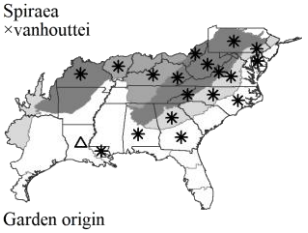
Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

* ***Spiraea thunbergii*** Siebold ex Blume. THUNBERG'S MEADOWSWEET. **Hab:** Roadsides, old homesites. **Dist:** Native of Asia. *S. thunbergii* has been collected from roadside at Fort Bragg, NC, by Phil Crutchfield (specimen at Fort Bragg) (Sorrie, pers. comm.). Also GA, MS, and MD (FNA9) and additional states (Kartesz 2020). **Phen:** Mar-May; Apr-Oct. **Syn:** = Ar, C, FNA9, GrPl, Il, K1, K3, K4, NE, NY. NatureServe GNR (Not Yet Ranked).

Spiraea tomentosa Linnaeus. HARDHACK, STEEPLEBUSH, ROSY MEADOWSWEET. **Hab:** Bogs, wet meadows. **Dist:** NS west to MN, south to SC, ne. GA, c. TN, ne. AL, and AR. **Phen:** Jul-Sep; Sep-Oct. **Syn:** = Ar, GW2, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Va, W, WV; > *Spiraea tomentosa* var. *rosea* (Rafinesque) Fernald – C, F, FNA9, G, Robertson (1974); > *Spiraea tomentosa* var. *tomentosa* – C, F, FNA9, G, Robertson (1974).



* ***Spiraea ×vanhouttei*** (Briot) Carrière. BRIDAL-WREATH SPIRAEA. **Hab:** Cultivated, escaped or persisting. **Dist:** A hybrid of garden origin between the Asian *S. cantoniensis* Loureiro and the Asian *S. trilobata* Linnaeus. **Phen:** May-Jun; Jun-Oct. **Syn:** = FNA9, Il, K1, K3, K4, Mi, Robertson (1974); = *Spiraea cantoniensis* × *trilobata* – NY; = *Spiraea vanhouttei* – C, G, GrPl.



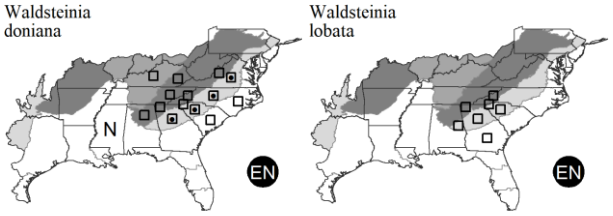
Waldsteinia Willdenow 1799 (BARREN-STRAWBERRY)

A genus of about 7 species, perennial herbs, of disjunct areas in the Northern Hemisphere. Sometimes included in *Geum*. Protopopova, Pavlichenko, and Stepanov (2021) supported its treatment as a genus separate from *Geum*.
References: Eriksson et al (2003); Kalkman in Kubitzki et al (2004); Phipps (2014b) in FNA9 (2014); Potter et al (2007); Protopopova, Pavlichenko, & Stepanov (2021); Smedmark & Eriksson (2002); Smedmark (2006); Weakley & Gandhi (2008).

1 Leaves trilobed (the sinuses cleft 1/4 to 3/4 the way to the midrib); leaves rather densely pubescent with stiff hairs, these distributed on the veins and on the intervein surfaces; [of a small area at the southern terminus of the Southern Appalachians in n. GA, nw. SC, and sw. NC) ..... ***Waldsteinia lobata***
1 Leaves trifoliolate (fully divided), and also typically additionally lobed; leaves sparsely pubescent with stiff hairs, these distributed mostly or strictly on the veins, the intervein surfaces glabrous to very sparsely pubescent; [more widespread].
..... ***Waldsteinia doniana***

Waldsteinia doniana Trattinnick. SOUTHERN BARREN STRAWBERRY. **Hab:** Forests, streambanks. **Dist:** VA and KY south to GA and AL. **Phen:** (Jan-) Mar-May; May-Jun. **Syn:** = S; = *Geum donianum* (Trattinick) Weakley & Gandhi – Va, Weakley & Gandhi (2008); = *Waldsteinia fragarioides* ssp. *doniana* (Trattinick) Teppner – K1, Tn, Robertson (1974); = *Waldsteinia fragarioides* (Michaux) Trattinick var. *parviflora* (Small) Fernald – C, F; = *Waldsteinia parviflora* Small – FNA9, G; < *Geum fragarioides* (Michaux) Smedmark = K3, V – K3, K4, Smedmark (2006); < *Waldsteinia fragarioides* (Michaux) Trattinnick – RAB, W, Bolle (1933).

Waldsteinia lobata (Baldwin ex Elliott) Torrey & A. Gray. LOBED BARREN STRAWBERRY. **Hab:** Forests, streambanks. **Dist:** Sw. NC south to nw. SC and n. and c. GA. **Phen:** Mar-May; May-Jun. **Comm:** Some populations appear to be morphologically intermediate between *W. lobata* and *W. doniana*; further study is needed. **Syn:** = FNA9, K1, S, Bolle (1933), Robertson (1974); = *Geum lobatum* (Baldwin ex Elliott) Smedmark – K3, K4, Smedmark (2006), Weakley & Gandhi (2008). NatureServe G3 (Vulnerable).



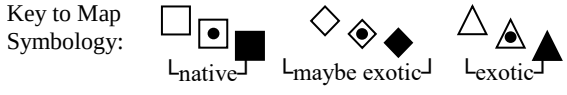
146. ELAEAGNACEAE A.L. de Jussieu 1789 (OLEASTER FAMILY) [in ROSALES]

A family of 3 genera and 30-50 species, shrubs, small trees, and lianas, of temperate Eurasia and North America, and tropical Asia and Australia.
References: Bartish & Swenson in Kubitzki et al (2004).

Elaeagnus Linnaeus 1753 (SILVERBERRY, OLEASTER, RUSSIAN-OLIVE)

A genus of 20-45 species, shrubs and small trees, of Asia (mostly) and North America. References: Bartish & Swenson in Kubitzki et al (2004).

1 Flowering in the fall (Oct-Nov) and fruiting in the spring (Mar-Apr); leaves evergreen; branches usually thorny ..... ***Elaeagnus pungens***
1 Flowering in the spring and fruiting in late summer or fall; leaves deciduous (somewhat coriaceous in texture and semi-persistent); branches thorny or not.



2 Leaves 3-8× as long as wide; leaves with only silver scales beneath; twigs with silver scales only; fruit orangish-yellow at maturity, lepidote with silver scales ..... ***Elaeagnus angustifolia***

2 Leaves 1.5-3× as long as wide; leaves with a mixture of silver and bronze scales beneath (the bronze scales may be few); twigs with a mixture of silver and bronze scales (the bronze scales turning dingy or blackish with age); fruit reddish-brown, pinkish, or silver at maturity, lepidote with silver and brown scales.

4 Fruit 10-15 mm long, bright red; fruiting pedicel 15-25 mm long; hypanthium tube about as long as the separate calyx lobes..... ***Elaeagnus multiflora***

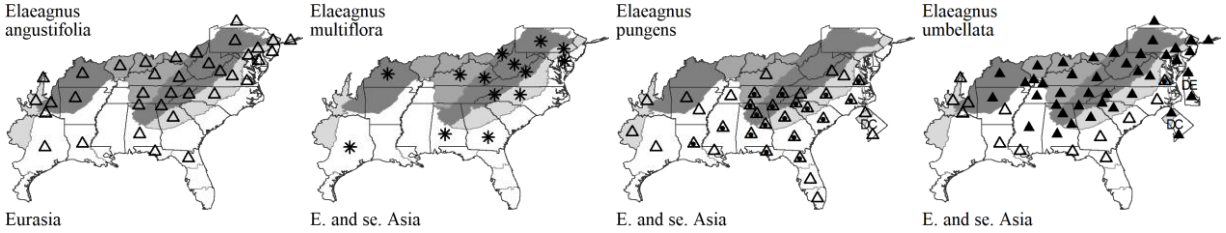
4 Fruit 6-8 mm long, silvery red; fruiting pedicel 8-12 mm long; hypanthium tube about 2× as long as the separate calyx lobes..... ***Elaeagnus umbellata***

* ***Elaeagnus angustifolia*** Linnaeus. RUSSIAN OLIVE, OLEASTER. **Hab:** Forests, pastures, disturbed areas. **Dist:** Native of Eurasia. **Phen:** May-Jul; Aug-Oct. **Syn:** = C, F, G, GrPl, Il, K1, K3, K4, Mi, NE, NY, Pa, Va. NatureServe GNR (Not Yet Ranked).

* ***Elaeagnus multiflora*** Thunberg. CHERRY ELAEAGNUS, CHERRY SILVERBERRY. **Hab:** Disturbed areas. **Dist:** Native of Japan and China. First reported for NC by Leonard (1971b). **Phen:** Apr-Jun. **Syn:** = C, F, G, Il, K1, K3, K4, NY, Tn; = *Elaeagnus multiflorus* – S, orthographic variant. NatureServe GNR (Not Yet Ranked).

* ***Elaeagnus pungens*** Thunberg. THORNY-OLIVE, AUTUMN SILVERBERRY. **Hab:** Forests and woodlands in suburban areas, spread by birds. **Dist:** Native of Japan. **Phen:** Oct-Nov; Mar-Apr. **Syn:** = Ar, K1, K3, K4, NcTx, NE, RAB, Tn, Va, WH3. NatureServe GNR (Not Yet Ranked).

* ***Elaeagnus umbellata*** Thunberg. ORIENTAL SILVERLEAF, AUTUMN-OLIVE, SPRING SILVERBERRY. **Hab:** Forests and woodlands, spread by birds. **Dist:** Native of Japan and China. **Phen:** Apr-May; Aug-Sep. **Comm:** This species has become a noxious weed shrub, still unfortunately sometimes promoted for "wildlife plantings". The rapidity of its increase may be judged by its treatment in Strausbaugh & Core (1978) as not definitely naturalized in WV; Harmon, Ford-Werntz, & Grafton (2006) map it for every county of WV. **Syn:** = Ar, C, F, G, Il, K3, K4, Mi, NY, Pa, RAB, Va, W, WH3, WV; = *Elaeagnus umbellatus* – S, orthographic variant; > *Elaeagnus umbellata* var. *parviflora* – Tn, orthographic error; > *Elaeagnus umbellata* Thunberg var. *parviflora* (Royle) C.K. Schneider – K1, NE. NatureServe GNRTNR (Not Yet Ranked).



147. RHAMNACEAE A.L. de Jussieu 1789 (BUCKTHORN FAMILY) [in ROSALES]

A family of about 50-52 genera and 900-950 species, mostly trees, shrubs, and lianas, cosmopolitan in distribution but concentrated in tropical and subtropical areas. The tribal classification used in the key is that of Richardson et al. (2000b). References: Brizicky (1964a); Medan & Schirarend in Kubitzki et al (2004); Nesom (2016b) in FNA12 (2016); Richardson et al (2000a); Richardson et al (2000b).

1 Leaves opposite (to subopposite). ..... ***Sageretia***

1 Leaves alternate.

6 Plant a woody vine. ..... ***Berchemia scandens***

6 Plant a shrub (sometimes clambering) or small tree.

8 Leaves with 3 (-5) prominent veins from near the base (and 1-3 additional pairs of veins along the midvein); leaf margins toothed (serrate or crenate).

10 Plants armed with stipular spines; fruit either fleshy (a drupe with 1 stone), or dry (a 1-seeded samara). ..... ***Ziziphus***

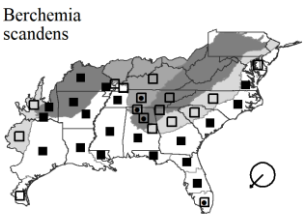
10 Plants not spiny; fruit dry, a 3-locular capsular with many seeds; [tribal placement uncertain]. ..... ***Ceanothus***

8 Leaves either with prominently pinnate venation (the lowermost lateral veins no more prominent than others) or with no prominent lateral veins; leaf margins either entire or toothed (serrate or crenate).

17 Winter buds naked, pubescent; flowers perfect, sepals, stamens, and petals 5; style undivided; leaves with 8-10 lateral veins on either side of the midvein... ***Frangula***

17 Winter buds with bud scales; flowers functionally unisexual, sepals and stamens 4 or 5 (the stamens rudimentary in the pistillate flowers), petals 0 or 4 (never 5); style divided for 1/3 to 2/3 its length into 2, 4 or 5 segments; leaves with (2-) 3-9 lateral veins on either side of the midvein..... ***Endotropis***

Berchemia Necker 1825 (SUPPLEJACK)



A genus of about 30 species, lianas, shrubs, and trees, of tropical to warm temperate Asia and se. North America. *Berchemia scandens* is the only New World species, and sister (as "*Berchemia* clade I") to the rest of the (Asian) genus (clades II, III, and IV). Huang et al. (2021) removed the two African species sometimes included in *Berchemia* to *Phyllogeiton*. References: Brizicky (1964a); Huang et al (2021); Medan & Schirarend in Kubitzki et al (2004); Nesom (2016c) in FNA12 (2016).

Identification Notes: The young stems are shining and red, orange, or green; older stems can reach at least 18 cm in diameter, with bark medium gray and smooth (though often marred by sap wells drilled by Yellow-bellied Sapsuckers). The smooth bark and neatly pinnately-veined leaves are distinctive.

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Berchemia scandens (Hill) K. Koch. SUPPLEJACK, AMERICAN RATTAN, ALABAMA SUPPLEJACK, CAROLINA SUPPLEJACK. **Hab:** Swamp forests, bottomlands, streambanks, also upland in mesic to even xeric forests, woodlands, glades, and prairies over calcareous rock or sediment. **Dist:** Se. VA south to s. FL, west to TX, north in the interior to nc. TN, w. TN, s. IL, and s. MO; Mexico (Chiapas) and Guatemala. **Phen:** Apr-May; Aug-Oct. **Comm:** *Berchemia scandens* climbs high into the crowns of swamp trees. **ID Notes:** The smooth gray bark on larger vines (often marred by sapsucker wells) is distinctive even when the leaves are high overhead; vines can be at least 18 cm in diameter. Younger twigs are bright green (or reddish tinted if sungrown), and the neatly pinnate venation is also distinctive. **Syn:** = C, F, FNA12, G, GW2, Il, K1, K3, K4, NcTx, RAB, S, Tn, Tx, Va, WH3, Brizicky (1964a). NatureServe G5 (Secure).

Ceanothus Linnaeus 1753 (REDROOT, NEW JERSEY TEA, CEANOTHUS)

A genus of about 58 species, shrubs, mostly in California. References: Brizicky (1964a); Coile (1988a); Fross & Wilken (2006); Medan & Schirarend in Kubitzki et al (2004); Schmidt & Wilken (2016) in FNA12 (2016).

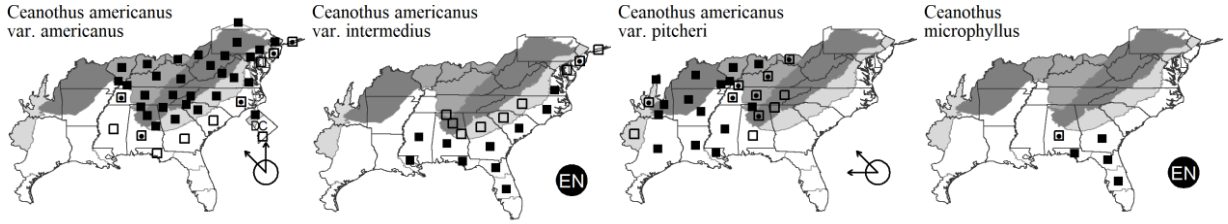
1 Leaves 0.2-1.0 cm long, obovate ..... ***Ceanothus microphyllus***
1 Leaves 2-10 cm long, elliptic to ovate.
  3 Leaves 2-4 (-6) cm long, mostly 1-2 cm wide; [primarily of sandy habitats of the Coastal Plain and rarely Piedmont] ..... ***Ceanothus americanus var. intermedius***
  3 Leaves (3-) 4-10 cm long, mostly 2.5-6 cm wide; [of various habitats of the Piedmont, Mountains, and rarely Coastal Plain]
    4 Lower surface of leaves persistently and densely short-hairy; leaves obtuse to subacute ..... ***Ceanothus americanus var. pitcheri***
    4 Lower surface of leaves glabrous or with scattered hairs mainly on the main veins; leaves acute to acuminate ..... ***Ceanothus americanus var. americanus***

Ceanothus americanus Linnaeus *var.* ***americanus***. COMMON NEW JERSEY TEA, NORTHEASTERN CEANOTHUS. **Hab:** Woodland borders, dry woodlands, glady openings, dry ridge forests and woodlands (pine or oak) in the Mountains. **Dist:** ME west to WI, south to FL Panhandle and AL. **Phen:** May-Jun; Jun-Jul. **Syn:** = C, F, G, Il, Brizicky (1964a), Coile (1988a), Fross & Wilken (2006); = *Ceanothus americanus* – S; < *Ceanothus americanus* – FNA12, K1, K3, K4, Mi, NE, NY, Pa, RAB, Va, W, WH3.

Ceanothus americanus Linnaeus *var.* ***intermedius*** (Pursh) Torrey & A. Gray. SOUTHEASTERN NEW JERSEY TEA, SOUTHEASTERN CEANOTHUS. **Hab:** Longleaf pine sandhills, dry sandy woodlands and forests, rocky openings around granitic or quartzitic rocks in the Piedmont. **Dist:** NJ (or possibly MA) south to c. peninsular FL, west to LA, mostly on the Coastal Plain, but disjunct inland to sandy soils around outcrops of siliceous rocks. **Phen:** May-Jun; Jun-Jul. **Tax:** The recognition of infraspecific taxa in the variable *C. americanus* is uncertain; var. *intermedius* may either represent ecological forms, or the variation may be too clinal to make taxonomic recognition rewarding. However, material sorts relatively easily, with some intermediates from the Piedmont; varietal status seems provisionally appropriate. **Syn:** = C, F, G, Brizicky (1964a), Coile (1988a), Fross & Wilken (2006); = *Ceanothus intermedius* Pursh – S; < *Ceanothus americanus* – FNA12, K1, K3, K4, RAB, Tn, Va, W, WH3.

Ceanothus americanus Linnaeus *var.* ***pitcheri*** Torrey & A. Gray. HAIRY NEW JERSEY TEA, MIDWESTERN CEANOTHUS. **Hab:** Prairies, woodland margins. **Dist:** IN west to IA and NE, south to nw. GA and e. and c. TX. **Phen:** Apr-Aug. **ID Notes:** This variety seems to be more floriferous and showy than the other two varieties, with inflorescences from the axils of many upper leaves per stem. **Syn:** = C, F, G, GrPl, Il, Tx, Brizicky (1964a), Coile (1988a), Fross & Wilken (2006); < *Ceanothus americanus* – FNA12, K1, K3, K4, NE, S.

Ceanothus microphyllus Michaux. SANDHILL CEANOTHUS. **Hab:** Longleaf pine sandhills. **Dist:** E. GA south to c. peninsular FL, west to s. AL, approaching to within a few kilometers of SC (in Screven and Chatham counties, GA), and should be sought in se. SC (except that its outlandish appearance makes it difficult to overlook!). **Phen:** Mar-Apr. **Comm:** *C.* ×*serpyllifolius* Nuttall (pro sp.) is apparently a hybrid of *C. americanus* var. *intermedius* and *C. microphyllus* (Coile 1988); it is known from scattered sites in FL and GA. **Syn:** = FNA12, K1, K3, K4, S, WH3, Brizicky (1964a), Coile (1988a), Fross & Wilken (2006). NatureServe G4G5 (Apparently Secure).

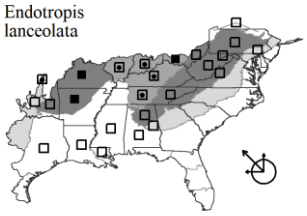


Endotropis Rafinesque 1825 (AMERICAN BUCKTHORN)

A genus of about 5 species, shrubs and small trees, of North America (including Mexico). Hauenschild et al. (2016b) discussed at length the rationale for recognizing *Ventia* and *Frangula* (in our flora) and *Oreoherzogia* as genera separate from *Rhamnus*. Hauenschild (2016c) corrected the name of *Ventia* to *Endotropis* Rafinesque and *Oreoherzogia* to *Atadinus* Rafinesque. References: Bolmgren & Oxelman (2004); Brizicky (1964a); Hauenschild et al (2016a); Hauenschild et al (2016b); Hauenschild et al (2016c); Johnston (1975); Medan & Schirarend in Kubitzki et al (2004); Nesom & Sawyer (2016) in FNA12 (2016).

Endotropis lanceolata (Pursh) Hauenschild. LANCE-LEAVED BUCKTHORN. **Hab:** Dry to moist thickets and woodlands over calcareous rocks, bottomland hardwood forests. **Dist:** PA west to WI and SD, south to AL and TX. **Phen:** Apr-May. **Tax:** Two varieties with partial geographic separation are sometimes recognized. Var. *lanceolata* ranges from PA south to AL, mostly in the Appalachians, and has young leaves and young branches pubescent and mature leaves soft pubescent below. Var. *glabrata* Gleason ranges from OH west to SD, south to w. VA (Ludwig 1999), KY, c. TN, AR, and KS, and has young leaves and young branches glabrous or with scattered hairs and mature leaves glabrous below. Johnston (1975) did not recognize infraspecific taxa, Yatskievych (2013) states that "intermediate plants are relatively widespread in the midwestern states",

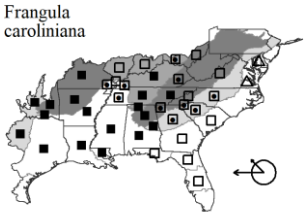
Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



and Nesom & Sawyer in FNA (2016) state that "plants with hirtellous-pubescent stems and leaves … are more restricted in distribution than glabrous plants, but the distinction often seems arbitrary". **Syn:** = *Rhamnus lanceolata* Pursh – Ar, FNA12, Pa, S, Tn, Tx, W, WV, Johnston (1975); > *Endotropis lanceolata* (Pursh) Hauenschild ssp. *glabrata* (Gleason) Hauenschild – Hauenschild et al (2016c); > *Endotropis lanceolata* (Pursh) Hauenschild ssp. *lanceolata* – Hauenschild et al (2016c); > *Rhamnus lanceolata* ssp. *glabrata* (Gleason) Kartesz & Gandhi – K1, K3, K4, NcTx; > *Rhamnus lanceolata* ssp. *lanceolata* – K1, K3, K4; > *Rhamnus lanceolata* var. *glabrata* – C, F, G, GrPl, Il, Va, Bricicky (1964a); > *Rhamnus lanceolata* var. *lanceolata* – C, F, G, Il, Va, Bricicky (1964a); > *Ventia lanceolata* ssp. *glabrata* (Gleason) Hauenschild – Hauenschild et al (2016b); > *Ventia lanceolata* ssp. *lanceolata* – Hauenschild et al (2016b).

Frangula P. Miller 1754 (BUCKTHORN)

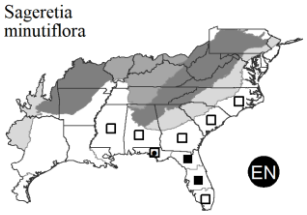
A genus of ca. 50 species, shrubs and small trees, of the northern hemisphere. The distinctions between *Frangula* and *Rhamnus s.l.* are many and meaningful; their separation at the generic level seems warranted based on morphological and molecular analyses (Richardson et al. 2000a; Bolmgren & Oxelman 2004; Hauenschild et al. 2016a, 2016b). References: Brizicky (1964a); Hauenschild et al (2016a); Hauenschild et al (2016b); Medan & Schirarend in Kubitzki et al (2004); Nesom in FNA () (in prep); Sawyer & Nesom (2016) in FNA12 (2016).



Frangula caroliniana (Walter) A. Gray. CAROLINA BUCKTHORN, INDIAN-CHERRY. **Hab:** Dry to moist barrens, woodlands, and forests, Coastal Plain limestone bluffs and shell middens, especially over mafic or calcareous rocks. **Dist:** Sw. VA west to s. OH and s. MO, south to c. peninsular FL and TX. **Phen:** May-Jun. **Syn:** = Ar, FNA12, K1, K3, K4, NcTx, Va; = *Rhamnus caroliniana* Walter – RAB, S, Tn, Tx, W, WH3; > *Frangula caroliniana* var. *caroliniana* – Il; > *Frangula caroliniana* (Walter) A. Gray var. *mollis* (Fernald) Mohlenbrock, – Il; > *Rhamnus caroliniana* Walter var. *caroliniana* – C, F, G, Bricicky (1964a); > *Rhamnus caroliniana* var. *mollis* Fernald – C, F, G, Bricicky (1964a). NatureServe G5 (Secure).

Sageretia Brongniart 1827 (MOCK BUCKTHORN)

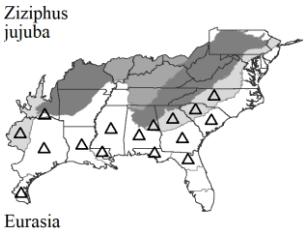
A genus of about 35 species, shrubs and trees, of tropical to warm temperate areas of Africa, Asia, and America. References: Brizicky (1964a); Medan & Schirarend in Kubitzki et al (2004); Nesom (1993c); Nesom (2016g) in FNA12 (2016).



Sageretia minutiflora (Michaux) C. Mohr. SMALL-FLOWERED BUCKTHORN. **Hab:** Shell middens and shell hammocks, dry calcareous hammocks and maritime forests. **Dist:** Se. NC south to s. FL, west to s. MS. **Phen:** Aug-Sep; Oct-Nov. **Tax:** *S. minutiflora* is apparently most closely related to *S. elegans* (Kunth) Brongniart, which ranges from s. Mexico south to s. South America. **Syn:** = FNA12, K1, K3, K4, RAB, S, WH3, Bricicky (1964a), Nesom (1993c). NatureServe G4 (Apparently Secure).

Ziziphus P. Miller 1754 (JUJUBE)

A genus of 85-100 species, shrubs and trees, of tropical and warm temperate areas. References: Brizicky (1964a); Medan & Schirarend in Kubitzki et al (2004); Nesom (2016l) in FNA12 (2016).



* ***Ziziphus jujuba*** P. Miller. CHINESE JUJUBE, COMMON JUJUBE, CHINESE DATE. **Hab:** Disturbed areas. **Dist:** Native of Eurasia. Reported from ec. GA (Jones & Coile 1988). **Phen:** May. **Comm:** Cultivated at least as far north as NC. *Z. jujuba* has been 'conserved' over *Z. zizyphus*. **Syn:** = FNA12, K3, K4, Tx, WH3, Bricicky (1964a); = *Ziziphus zizyphus* (Linnaeus) Karsten – K1, NcTx; = *Zizyphus zizyphus* (Linnaeus) Karsten – S, orthographic variant. NatureServe GNR (Not Yet Ranked).

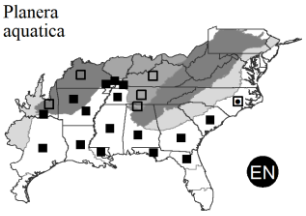
148. ULMACEAE Mirbel 1815 (ELM FAMILY) [in ROSALES]

As here circumscribed (excluding *Celtis* and relatives), a family of 6-7 genera and about 35 species, of temperate, subtropical, and boreal Northern Hemisphere, rarely extending into the Southern Hemisphere). Zavada & Kim (1996) discuss compelling reasons to remove *Celtis* from the Ulmaceae. References: Sherman-Broyles, Barker, & Schultz (1997) in FNA3 (1997); Todzia in Kubitzki, Rohwer, & Bittrich (1993); Zavada & Kim (1996).

1 Leaves strongly 3-veined from the base, the venation otherwise pinnate; fruit a drupe with thin flesh..... ***Celtis***
1 Leaf venation pinnate throughout, the venation strictly pinnate; fruit dry, a samara (flat and winged) or nutlike (with or without fleshy protuberances).
  2 Fruit a samara (flat and winged); primary lateral veins mostly parallel and unforked to the leaf margin ..... ***Ulmus***
  2 Fruit nutlike (globular, with or without fleshy protuberances); primary lateral veins either mostly parallel and unforked to the leaf margin, or mostly forking before reaching the margin.
  ..... ***Planera***

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Planera J.F. Gmelin 1791 (PLANER-TREE, WATER-ELM)



A monotypic genus, a tree, of temperate se. North America. References: Barker (1997) in FNA3 (1997); Todzia in Kubitzki, Rohwer, & Bittrich (1993).

Planera aquatica (Walter) J.F. Gmelin. PLANER-TREE, WATER-ELM. **Hab:** River swamps where flooded (often to depths of 1-2 m) in the winter. **Dist:** Se. NC (limited to the Waccamaw and Lumber rivers) south to n. FL, west to e. TX, and north in the Mississippi Embayment to w. TN, w. KY, s. IL, and se. MO. **Phen:** Apr. **Syn:** = Ar, C, F, FNA3, G, GW2, K1, K3, K4, RAB, S, Tn, Tx, WH3. NatureServe G5 (Secure).

Ulmus Linnaeus 1753 (ELM)

A genus of about 25-30 species, trees (rarely shrubs), of temperate and boreal regions of the Northern Hemisphere (most diverse in c. and n. Asia). Subgeneric classification shown in the key follows Whittemore et al. (2021). References: Kurz & Godfrey (1962); Sherman-Broyles (1997) in FNA3 (1997); Todzia in Kubitzki, Rohwer, & Bittrich (1993); Whittemore & Olsen (2011); Whittemore et al (2021); Wiegrefe, Sytsma, & Guries (1994).

1 Leaf blades mostly < 7 cm long, the base symmetrical to somewhat oblique.
  2 Samaras ciliate-margined; twigs often cork-winged; upper surfaces of leaves glabrous to scabrous; petioles 1-3 mm long; [native, sometimes weedy]; [subgenus *Oreoptelea*, section *Chaetoptelea*].
    ..... ***Ulmus alata***
  2 Samaras with glabrous margins; twigs never cork-winged; upper surfaces of leaves glabrous; petioles 2-8 mm long; [introduced, planted and sometimes naturalized or persistent].
    ..... ***Ulmus parvifolia***
1 Leaf blades mostly > 7 cm long, the base moderately to strongly oblique (rarely nearly symmetrical).
  5 Leaf uppersurface slightly to very strongly scabrous; leaf undersurface tomentose or villous, with tufts of hairs in the vein axils; flowers and fruits sessile or subsessile (on pedicels 0-2 mm long), in dense non-pendulous fascicles.
    ..... ***Ulmus rubra***
  5 Leaf uppersurface glabrous (or slightly to moderately scabrous, especially on stump sprouts or seedlings); leaf undersurface glabrous to tomentose, with or without tufts of hairs in the vein axils; flowers and fruits pedicellate (on pedicels 5-20 mm long), pendulous, in fascicles or racemes.
    8 Leaf undersurfaces glabrous or slightly pubescent, but always with tufts of hairs in the vein axils; branches never with corky wings; inflorescence a fascicle; [widespread in our area]; [subgenus *Oreoptelea*, section *Blepharocarpus*].
      9 Leaf bases strongly oblique; larger leaves 10-15 cm long; primary leaf teeth acuminate, often curved inward; [widespread in our area]
        ..... ***Ulmus americana var. americana***
      9 Leaf bases moderately oblique (rarely nearly symmetrical); larger leaves 7-10 cm long; primary leaf teeth acute, not curved; [moist calcareous sites in the Coastal Plain from se. NC southwards] ..... ***Ulmus americana var. floridana***
    8 Leaf undersurfaces moderately white or yellowish soft-pubescent, lacking prominent tufts of hairs in the vein axils (differing from the general pubescence of the surface); branches often developing corky wings; inflorescence a raceme or racemose cyme; [calcareous areas west of the Blue Ridge (w. PA, WV, KY, e. TN, nw. GA, and AL westwards)]; [subgenus *Oreoptelea*, section *Chaetoptelea*].
      ..... ***Ulmus serotina***

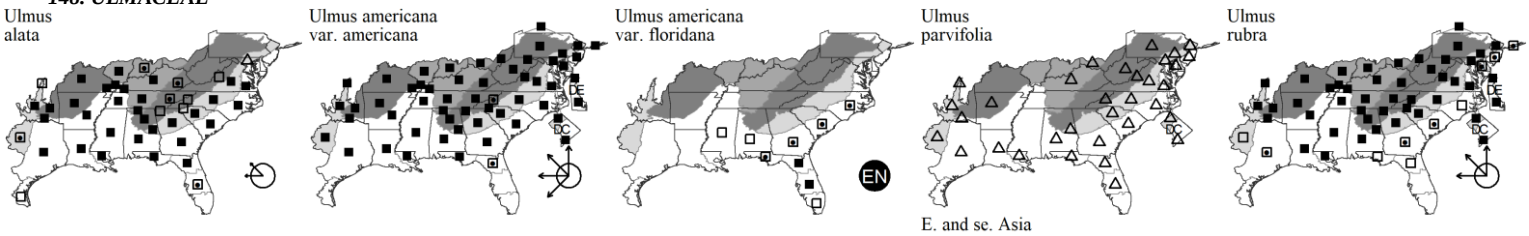
Ulmus alata Michaux. WINGED ELM. **Hab:** Rock outcrops, dry and mesic forests and woodlands, bottomlands, old fields, disturbed areas. **Dist:** N. VA west to MO, south to c. peninsular FL and c. TX. **Phen:** Feb-Mar; Mar-Apr. **Syn:** = Ar, C, F, FNA3, G, GrPl, GW2, Il, K1, K3, K4, NcTx, RAB, S, Tn, Va, W, WH3, Kurz & Godfrey (1962). NatureServe G5 (Secure).

Ulmus americana Linnaeus *var.* ***americana***. AMERICAN ELM, WHITE ELM. **Hab:** Swamps, bottomland forests, moist slopes, especially on relatively or strongly nutrient-rich substrates. **Dist:** NS, NB, and QC west to se. SK, south to n. FL, c. TX, and Mexico. **Phen:** Feb-Mar; Mar-Apr. **Tax:** It now appears that *U. americana* (in the broad sense) is a polyploid complex, with tetraploids throughout its distribution and diploids south of the glacial maximum (Whittemore & Olson 2011). **Comm:** Ascomycetous fungi, *Ophiostoma ulmi* and *O. novo-ulmi*, are the cause of the Dutch Elm disease. In our area, the effects of the disease appear to have been variable, with less impact southwards and in natural populations (as compared to suburban or urban plantings). **Syn:** = Kurz & Godfrey (1962); = *Ulmus americana* – S; < *Ulmus americana* – Ar, C, F, FNA3, G, GrPl, GW2, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, W, WH3, WV.

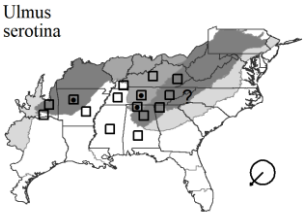
Ulmus americana Linnaeus *var.* ***floridana*** (Chapman) Little. FLORIDA ELM. **Hab:** Shell middens, other calcareous forests. **Dist:** Se. NC (north at least to Carteret County) south to c. peninsular FL, west to Panhandle FL and s. AL (H. Horne, pers. comm., 2013). **Phen:** Jan-Mar; Feb-Apr. **Syn:** = Kurz & Godfrey (1962); = *Ulmus floridana* Chapman – S; < *Ulmus americana* – C, F, FNA3, G, GW2, K1, K3, K4, RAB, W, WH3.

* ***Ulmus parvifolia*** Jacquin. CHINESE ELM, LACEBARK ELM. **Hab:** Disturbed secondary forests, roadsides, fencerows, old fields, other disturbed areas. **Dist:** Native of China and Japan. The bark on mature trees exfoliates creating a patchwork of gray, brown, green, and orange blotches. **Phen:** Aug-Oct; Sep-Nov. **Syn:** = FNA3, K1, K3, K4, NcTx, NE, Pa, Va, WH3. NatureServe GNR (Not Yet Ranked).

Ulmus rubra Muhlenberg. SLIPPERY ELM, RED ELM. **Hab:** Moist to fairly dry calcareous forests, rich bottomlands, rich cove forests in the low Mountains. **Dist:** ME, QC, and ON west to MN and ND, south to Panhandle FL and c. TX. **Phen:** Feb-Apr; Mar-May. **Comm:** *U. rubra* is susceptible to Dutch Elm Disease (see *U. americana*). **Syn:** = Ar, C, F, FNA3, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, W, WH3, WV, Kurz & Godfrey (1962); = *Ulmus fulva* Michaux – S. NatureServe G5 (Secure).



Ulmus serotina Sargent. SEPTEMBER ELM. **Hab:** Dry-mesic to mesic upland forests, bottomland and riparian forests, stream banks, bluffs, lake and pond margins, flatwoods; especially over limestone. **Dist:** KY, s. IL, and e. OK south to e. TN, nw. GA, AL, and MS; allegedly disjunct in ne. Mexico (COA and NLE) (Villaseñor 2016). Rugel collected this species on the French Broad River in 1842, the location attributed to NC by Mohr (1901). **Syn:** = Ar, C, F, FNA3, G, K1, K3, K4, S, Tn. NatureServe G4 (Apparently Secure).

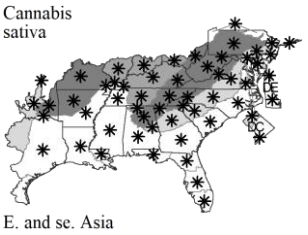


149. CANNABACEAE Martinov 1820 (HOPS FAMILY) [in ROSALES]

As circumscribed to include the Celtidaceae, a family of 14 genera and about 120 species, trees, shrubs, woody vines, herbs, and herbaceous vines, of cosmopolitan distribution. Zavada & Kim (1996) discuss compelling reasons to recognize the Celtidaceae as a family distinct from the Ulmaceae. The distinctiveness of the Celtidaceae from the Cannabaceae and Moraceae is more questionable; and Yang et al. (2013), Sytsma et al. (2002), and many others conclude that Celtidaceae should be considered a part of Cannabaceae. References: Kubitzki, Rohwer, & Bittrich (1993); Sherman-Broyles, Barker, & Schultz (1997) in FNA3 (1997); Small (1997) in FNA3 (1997); Sytsma et al (2002); Todzia in Kubitzki, Rohwer, & Bittrich (1993); Zavada & Kim (1996).

1 Tree or shrub; leaves simple and unlobed.
..... ***Celtis***
1 Herb or vine; leaves either compound or lobed.
3 Erect herb; leaves with 3-7 leaflets ..... ***Cannabis***
3 Climbing or sprawling vine; leaves simple, with 1-9 lobes ..... ***Humulus***

Cannabis Linnaeus 1753 (HEMP, MARIJUANA)



A genus of 1-3 species, herbs, originally native to c. Asia. *Cannabis* was formerly widely cultivated nearly worldwide for the fiber hemp; it is now better known as a drug. References: Hillig & Mahlberg (2004); Kubitzki, Rohwer, & Bittrich (1993); Small (1997) in FNA3 (1997).

* ***Cannabis sativa*** Linnaeus. HEMP, MARIJUANA. **Hab:** Disturbed areas and clandestinely cultivated plots. **Dist:** Native of Asia. Though perhaps not truly naturalized or persistent, *Cannabis* is treated here since clandestine cultivated plots are encountered by the field biologist, especially in fairly remote areas in the mountainous parts of our area. **Phen:** Jun-Oct. **Syn:** = F, FNA22, G, Mi, NcTx, NE, NY, Pa, WH3, WV; > *Cannabis sativa* ssp. *indica* (Lamarck) E. Small & Cronquist – K3, K4, Tn; > *Cannabis sativa* ssp. *sativa* – Tn; > *Cannabis sativa* Linnaeus ssp. *sativa* var. *sativa* – C, GrPl, K1, K3, K4; > *Cannabis sativa* ssp. *sativa* var. *spontanea* Vavilov – GrPl, K3, K4; > *Cannabis sativa* var. *sativa* – Il; > *Cannabis sativa* var. *spontanea* Vavilov – Il.

Celtis Linnaeus 1753 (HACKBERRY)

A genus of about 100 species, trees, shrubs, and woody vines, widespread in tropical, subtropical, and temperate regions worldwide. References: Henrickson (2010); Sherman-Broyles, Barker, & Schultz (1997) in FNA3 (1997); Todzia in Kubitzki, Rohwer, & Bittrich (1993); Whittemore in Mo3 (2013).

1 Branches armed with nodal thorns, (1-) 5-20 (-55) mm long.
..... ***Celtis iguanaea***
1 Branches unarmed.
5 Leaf blades (fully-formed leaves subtending fruits) 7-12 cm long, the longer side with 23-40 teeth, the shorter with 12-27 teeth; secondary veins 5-8 on each side of the midvein, the basalmost reaching the leaf margin at a point 1/3 to ½ the length of the leaf above the base; fruits 8-10 mm long .....
..... ***Celtis occidentalis***
5 Leaf blades (fully-formed leaves subtending fruits) 2.0-8.5 cm long, each side with 0-15 (-23?) teeth; secondary veins 3-5 on each side of the midvein, the basalmost reaching the leaf margin at a point 1/3 to 2/3 the length of the leaf above the base; fruits 5-10 mm long.
7 Plants shrubs or small trees, to 7 m tall, with ascending trunks and horizontal or arching leaders; bark often nearly smooth (sometimes with corky warts near the base or around wounds); leaf undersurface glaucous or pale green, usually distinctly lighter than the upper surface; flower stalks usually hairy (puberulent); twigs usually moderately to densely hairy (sometimes glabrous); anthers small and indehiscent, pollen malformed and generally sterile (< 10% of the grains stainable with acetocarmine) ..... ***Celtis pumila***
7 Plants usually trees, to 30 m tall, typically single-trunked, with erect leaders; bark with corky warts on trunks and major branches; leaf undersurface usually bright green, little if at all paler than the uppersurface; flower stalks glabrous (rarely with a few hairs); twigs glabrous or sparsely hairy; anthers well-developed, dehiscent, pollen copious, regular, and fertile (> 95% of the grains stainable with acetocarmine).
8 Leaves subtending fruits with margins entire or with 1-2 teeth 0.5-1 mm long on one side only (leaves of juvenile plants or of vigorous leader shoots may be more strongly toothed) ..... ***Celtis laevigata***
8 Leaves subtending fruits with margins with 2-15 teeth 1-2 mm long on each side ..... ***Celtis smallii***

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

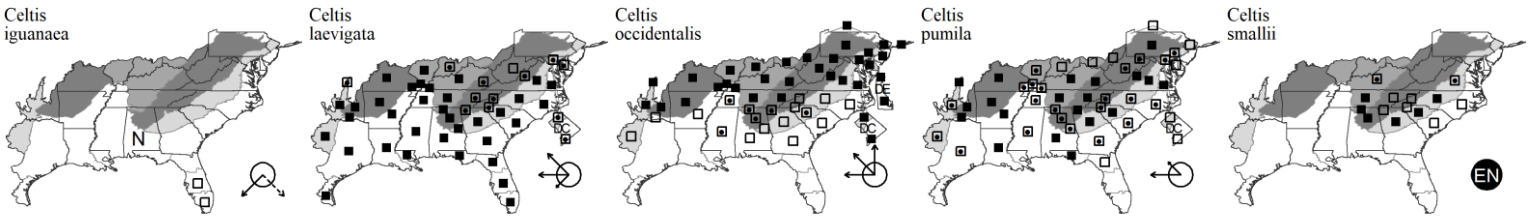
Celtis iguanaea (Jacquin) Sargent. IGUANA HACKBERRY. **Hab:** Shell-middens and calcareous coastal sites. **Dist:** Sw. peninsular FL; West Indies; American tropics. **Syn:** = Bah, K3, K4, WH3, Henrickson (2010); = *Momisia iguanaea* (Jacquin) Rose & Standley – S; < *Celtis pallida* Torrey – FNA3.

Celtis laevigata Willdenow. SOUTHERN HACKBERRY, SUGARBERRY. **Hab:** Bottomland forests, especially on natural levees, upland calcareous forests and woodlands, shell middens. **Dist:** MD, WV, IN, IL, MO and KS south to s. FL and TX. **Phen:** Apr-May; Aug-Oct. **Syn:** = *Celtis laevigata* var. *laevigata*; = *Celtis mississippiensis* Bosc – S; < *Celtis laevigata* Willdenow – Ar, C, FNA3, G, GW2, K3, K4, RAB, Tn, Va, W, WH3; > *Celtis laevigata* var. *laevigata* – F, GrPl, Il, Tx; > *Celtis laevigata* var. *texana* Sargent – F, GrPl, Il, Tx.

Celtis occidentalis Linnaeus. NORTHERN HACKBERRY. **Hab:** Xeric to mesic glades, outcrops, barrens, woodlands, and bottomland forests, usually over calcareous substrates. **Dist:** NH, QC, MB, and MT south to Panhandle FL, nc. TX, and ne. NM. **Phen:** Mar-May; Aug-Oct. **Syn:** = Ar, C, FNA3, G, K1, K3, K4, Mi, NE, NY, Pa, S, Tn, Tx, Va, W, WV; = *Celtis occidentalis* var. *occidentalis* – RAB; < *Celtis occidentalis* Linnaeus – WH3; > *Celtis occidentalis* var. *canina* (Rafinesque) Sargent – F, GrPl, Il; > *Celtis occidentalis* var. *occidentalis* – F, GrPl, Il; > *Celtis occidentalis* var. *pumila* (Pursh) A. Gray – F, GrPl, Il, misapplied.

Celtis pumila Pursh. DWARF HACKBERRY, GEORGIA HACKBERRY. **Hab:** Xeric to mesic glades, outcrops, barrens, woodlands, exposed bluffs, stream banks, and disturbed areas, often over calcareous substrate. **Dist:** NJ, PA, IN, IL, and KS south to Panhandle FL and TX. **Phen:** Apr-May; Aug-Oct. **Tax:** *C. pumila* Pursh has priority over *C. tenuifolia* Nuttall; the description in Pursh's flora ("a small straggling bush"), and more critically the type specimen, conform to what has more generally been known as *C. tenuifolia* (Whittemore in Yatskievych 2013). This species is mainly an apomictic triploid. **Syn:** = NY; = *Celtis georgiana* Small – S; = *Celtis occidentalis* var. *georgiana* (Small) H.E. Ahles – RAB; = *Celtis tenuifolia* Nuttall – Ar, C, FNA3, G, GrPl, K1, K3, K4, Mi, Pa, Tn, Va, W, WV; < *Celtis occidentalis* Linnaeus – WH3; > *Celtis tenuifolia* var. *georgiana* (Small) Fernald & Schubert – F, Il, Tx; > *Celtis tenuifolia* var. *tenuifolia* – F, Il, Tx.

Celtis smallii Beadle. SMALL'S HACKBERRY. **Hab:** Glades, woodlands, forests. **Dist:** VA and KY south to GA and AL, mainly inland. **Phen:** Apr-May; Aug-Oct. **Syn:** = S; = *Celtis laevigata* var. *smallii* (Beadle) Sargent – F, Il; < *Celtis laevigata* Willdenow – C, FNA3, G, GW2, K3, RAB, Tn, Va, W, WH3.



Humulus Linnaeus 1753 (HOPS)

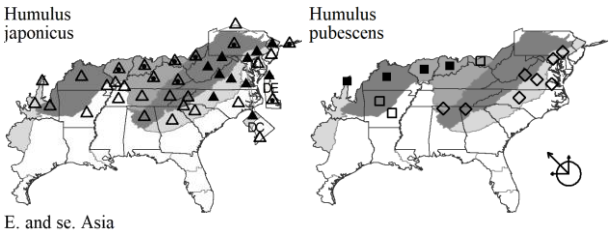
A genus of 2-6 species, herbaceous vines, of temperate regions of the Northern Hemisphere. References: Kubitzki, Rohwer, & Bittrich (1993); Small (1978); Small (1997) in FNA3 (1997); Tembrock, McAleer, & Gilligan (2016); Wu, Zhou, & Bartholomew in FoC.

1 Veins on lower surface of leaves armed with rigid, spinulose hairs; bracts of pistillate flowers spinulose-ciliate; most leaves 5-9 lobed..... ***Humulus japonicus***

1 Veins on lower surface of leaves more or less pubescent with lax, weak hairs, but lacking rigid, spinulose hairs; bracts of pistillate flowers smooth-margined; most leaves 1-3 lobed. ***Humulus pubescens***

* ***Humulus japonicus*** Siebold & Zuccarini. JAPANESE HOPS. **Hab:** Disturbed areas, particularly in rich, alluvial soils, where it has become a serious weed along major NC and VA rivers. **Dist:** Native of Japan, Taiwan, and China. **Phen:** Jun-Oct; Jul-Oct. **Comm:** The name *H. scandens* (see synonymy) has priority if indeed it applies to this taxon. **Syn:** = Ar, C, F, FNA3, G, GrPl, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, Va, W, WV, Small (1978); = *Humulus scandens* (Loureiro) Merrill – Tembrock, McAleer, & Gilligan (2016). NatureServe GNR (Not Yet Ranked).

Humulus pubescens (E. Small) Tembrock. MIDWESTERN HOPS. **Hab:** Disturbed areas, particularly in rich, alluvial soils; rare. **Dist:** NY and PA south to NC and ne. GA and west to MN, NE, KA, and AR. It is not clear whether the few occurrences east of the Blue Ridge (including those in NC and VA) are native or adventive from farther west. **Phen:** Jul-Aug; Sep-Oct. **Syn:** = K4, Tembrock, McAleer, & Gilligan (2016); = *Humulus lupulus* Linnaeus var. *pubescens* E. Small – Ar, C, FNA3, GrPl, Il, K1, NY, Pa, Small (1978); < *Humulus lupulus* Linnaeus – F, G, K3, RAB, S, Va, W. NatureServe G5T4? (Apparently Secure).



Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more)

* : waif EN : endemic H : historic

N : no P : planted ? : questionable X : extirpated

150. MORACEAE Gaudichaud-Beaupré 1835 (MULBERRY FAMILY) [in ROSALES]

A family of about 38 genera and 1100 species, trees, shrubs, vines, and herbs, of tropical, subtropical, and (few) warm temperate areas. Tribal classification follows Gardner et al. (2021). References: Gardner et al (2021); Rohwer & Berg in Kubitzki, Rohwer, & Bittrich (1993); Wunderlin (1997) in FNA3 (1997).

1 Herb, < 1.0 m tall; stems and leaves without latex; [tribe Dorstenieae]
..... ***Fatoua villosa***
1 Shrub or tree, at maturity over 1 m tall, or woody vine growing appressed to masonry; stems and leaves bearing translucent to milky-white latex.
3 Stipules connate, the stipule scar encircling the twig; inflorescence a syconium (the flowers borne on the inner walls of the fleshy receptacle); [tribe Ficeae] .....
..... ***Ficus***
3 Stipules free, the stipule scar not encircling the twig; inflorescence a spike, head, or catkin (the flowers borne exposed on a contracted or elongated axis or receptacle).
4 Leaves entire, unlobed or shallowly 3 (-5)-lobed; stems with axillary spines [tribe Chlorophoreae] ..... ***Maclura***
4 Leaves serrate, often also 3-15-lobed (the lobes sometimes deep); stems not armed.
5 Stems and leaves hirsute; leaves alternate, opposite, and whorled; [tribe Dorstenieae] ..... ***Broussonetia papyrifera***
5 Stems and leaves glabrous to pubescent; leaves alternate; [tribe Moreae] ..... ***Morus***

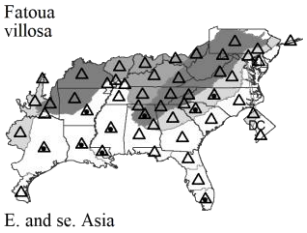
Broussonetia L'Héritier ex Ventenat 1799 (PAPER MULBERRY)

A genus of about 8 species, trees, shrubs, and vines, of tropical and subtropical Asia and Madagascar. References: Endress & Bittrich in Kubitzki, Rohwer, & Bittrich (1993); Wunderlin (1997) in FNA3 (1997).

* ***Broussonetia papyrifera*** (Linnaeus) L'Héritier ex Ventenat. PAPER MULBERRY. **Hab:** Urban lots, disturbed areas, roadsides. **Dist:** Native of e. Asia. **Phen:** Apr-May. **Syn:** = Ar, C, F, FNA3, G, GrPl, Il, K1, K3, K4, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, W, WH3; = *Papyrius papyriferus* (Linnaeus) Kuntze – S. NatureServe GNR (Not Yet Ranked).

Fatoua Gaudichaud-Beaupré 1830 (CRABWEED)

A genus of 2-3 species, herbs or weak shrubs, of Asia, Madagascar, and Australia. References: Endress & Bittrich in Kubitzki, Rohwer, & Bittrich (1993); Kral (1981c); Massey (1975); Miller & Wood (2003); Vincent (2004); Wunderlin (1997) in FNA3 (1997).



* ***Fatoua villosa*** (Thunberg) Nakai. CRABWEED, MULBERRY-WEED, FOOLISH-WEED. **Hab:** Disturbed areas, vegetable and flower gardens, landscaped areas around institutional buildings. **Dist:** Native of Asia (apparently se. Asian islands). As discussed by Massey (1975) and Vincent (2004), *Fatoua* was first reported in the United States (Louisiana) in the early 1960s. As of 2004, its distribution in North America had spread to include 28 states and the District of Columbia, including most states except the Great Plains and Rocky Mountains had spread (Vincent 2004, Sundell et al. 1999, Miller & Wood 2003). Since all early collections seem to be in and around greenhouses and nurseries, it is likely that it has been introduced in horticultural material, perhaps repeatedly (Kral 1981b). *Fatoua* appears to have become a fairly aggressive weed in eastern North America. It can be expected to continue to spread, and has the potential to become noxious. **Phen:** Jul-Nov. **ID Notes:** *Fatoua villosa* has alternate, ovate leaves with cordate bases, borne on long petioles (about as long as the leaf blade), the inflorescences are dense cymes borne on peduncles in the axils of leaves. Pubescence of the stem and foliage is uncinulate, giving the plant a "tacky" feel. An excellent illustration appears in Correll & Correll (1982). **Syn:** = Ar, Bah, FNA3, Il, K1, K3, K4, Mi, NcTx, NE, NY, Va, WH3, Massey (1975), Vincent (2004). NatureServe GNR (Not Yet Ranked).

Ficus Linnaeus 1753 (FIG)

A genus of about 750 species, trees, shrubs, and vines, of tropical, subtropical, and warm temperate areas. Rasplus et al. (2021) and discussed the evolution, phylogeny, and sectional classification of the genus. References: Endress & Bittrich in Kubitzki, Rohwer, & Bittrich (1993); Rasplus et al (2021); Wunderlin (1997) in FNA3 (1997).

1 Vine, climbing by adventitious roots, appressed to walls or trailing; leaves dimorphic (small and distichous on climbing branches, larger on non-climbing branches); [subgenus *Synoecia*] ..... ***Ficus pumila***
1 Shrub to tree, erect; leaves monomorphic.
..... ***Ficus carica***

* ***Ficus carica*** Linnaeus. EDIBLE FIG, GARDEN FIG. **Hab:** Grown for its fruits, persistent from plantings, persisting and naturalizing particularly on barrier islands, where it sometimes forms thickets on dunes, or otherwise in the outer Coastal Plain, where proximity to the ocean ameliorates cold winter temperatures. **Dist:** Native of w. Asia. **Phen:** May-Aug; Jul-Oct. **Comm:** This is the common cultivated fig, grown for its fruit in the Mid-east for millennia. **Syn:** = F, Fl3, FNA3, K1, K3, K4, Mi, NcTx, NY, RAB, S, Tx, WH3. NatureServe GNR (Not Yet Ranked).

* ***Ficus pumila*** Linnaeus. CLIMBING FIG. **Hab:** Walls, disturbed urban areas. **Dist:** Native of s. Asia. Locally common in Charleston, Savannah, Pensacola, Mobile, New Orleans, and other old seaports, where grown on walls as an ornamental, more recently planted more extensively in the

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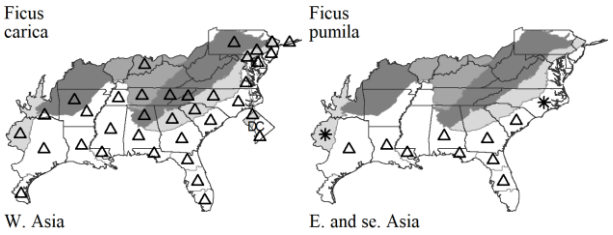
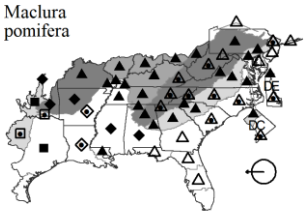
South, especially but not strictly in the Coastal Plain, commonly persisting and also spreading vegetatively into disturbed urban areas (cf. Diamond 2013). **Syn:** = Fl3, FNA3, K1, K3, K4, NcTx, WH3. NatureServe GNR (Not Yet Ranked).



Maclura Nuttall 1818 (OSAGE-ORANGE)

A genus of 11-12 species, trees, of sc. North America, e. Asia, tropical Asia, Africa, and South America. Generic circumscription and sectional classification follow Gardner et al. (2017). References: Endress & Bittrich in Kubitzki, Rohwer, & Bittrich (1993); Gardner et al (2017); Rehder (1940); Wunderlin (1997) in FNA3 (1997).



Maclura pomifera (Rafinesque) C.K. Schneider. OSAGE-ORANGE, BOW-WOOD, BOIS-D'ARC, HEDGE-APPLE. **Hab:** Dry-mesic to mesic upland forests and woodlands, bottomland and riparian forests, stream banks, fencerows, old fields, pastures, prairies, roadsides, naturalized beyond its native range from extensive planting in the eighteenth and nineteenth centuries. **Dist:** The native distribution is obscured by early introduction eastwards and spread from cultivation, probably native to an area from sw. AR and OK south to w. LA and e. and c. TX, but possibly native also in areas like the Black Belt of MS and AL. **Phen:** Apr-Jun; Aug-Oct. **Comm:** The large fruits are unmistakable: yellowish-green, grapefruit-sized, and wrinkled, reminiscent of a giant, spherical mulberry fruit. The wood is extremely heavy, fine-grained, a bright yellow-orange when fresh, but darkening with age, famous for making bows and also used in cabinetry. **Syn:** = Ar, C, F, FNA3, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, W, WH3, WV, Gardner et al (2017); = *Toxylon pomiferum* Rafinesque ex Sargent – S. NatureServe G5 (Secure).

Morus Linnaeus 1753 (MULBERRY)

A genus of about 10-15 species, trees, of warm temperate, subtropical, and tropical areas. References: Endress & Bittrich in Kubitzki, Rohwer, & Bittrich (1993); Galla et al (2009); Gardner et al (2021); Saar et al (2012); Wunderlin (1997) in FNA3 (1997).

Identification Notes: When not in flower or fruit, *Tilia* and *Morus* are often confused. They can be easily told apart by leaf venation. *Morus* has the main leaf veins splitting towards the margin but then rejoining to form a rather prominent, looping (scalloped) marginal vein; the basal veins 3, palmate, sometimes an additional prominent vein on each side joining the lateral vein above its divergence from the petiole end; and the main lateral leaf veins (above the basal veins) mainly alternate. *Tilia* has the main leaf veins splitting several times towards the leaf margin and leading into the teeth without rejoining and forming a marginal vein; the basal veins 5, palmate, all joining together at the summit of the petiole; and the main lateral leaf veins (above the basal veins) usually opposite.

2 Upper leaf surface glossy, glabrous or slightly scabrous; lower leaf surface glabrous, or slightly pubescent on the veins and in the vein axils only; ripe fruits black, purple, red, pink, or white; pistillate inflorescences 5-8 mm long (in flower)..... ***Morus alba***

2 Upper leaf surface dull, scabrous; lower leaf surface pubescent on the veins, veinlets, and the surface between the veins; ripe fruits black or purple; pistillate inflorescences 8-12 mm long (in flower)..... ***Morus rubra***

* ***Morus alba*** Linnaeus. WHITE MULBERRY, SILKWORM MULBERRY, RUSSIAN MULBERRY. **Hab:** Disturbed areas, vacant lots, roadsides, moist forests. **Dist:** Native of e. Asia. **Phen:** Mar-May; May-Jun. **Syn:** = Ar, C, F, FNA3, G, GrPl, GW2, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Tx, Va, W, WH3, WV, Galla et al (2009), Saar et al (2012); > *Morus alba* Linnaeus – Il, S; > *Morus nigra* Linnaeus – S, misapplied as to our material; > *Morus tatarica* Linnaeus – Il.

Morus rubra Linnaeus. RED MULBERRY. **Hab:** Bottomland forests, mesic slopes, disturbed areas, suburban woodlands. **Dist:** MA, VT, NY, MI, WI, and se. SD south to s. FL and w. TX, and into Mexico. **Phen:** Apr-May; May-Jun. **Tax:** *M. murrayana* D.E Saar & S.J. Galla (or alternatively treated as a variety of *M. rubra*) has recently been described as distinct from *M. rubra* and occurring widely in eastern North America (KY, TN, MO, IL, IN, MS, LA, VA, NC, and AL) (Galla et al. 2009; Saar et al. 2012). It is alleged to differ from *M. rubra* by its leaves to 38 cm long (vs. to 15 cm long), the outer three leaves on branchlets almost always > 15 cm long (vs. < 15 cm long), leaves with caudate apex (vs. acute to acuminate apex); mature fruit to 4 cm long and 1.5 cm wide but often thinner, with much size variation on a single individual (vs. mature fruit to 3 cm long). All the alleged characters appear to be highly variable and correlated with vigor. **Comm:** The fruits are very variable in quality from tree to tree. **Syn:** = Ar, C, F, G, GrPl, GW2, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, Va, W, WH3, WV; > *Morus murrayana* D.E. Saar & S.J. Galla – Il, Galla et al (2009); > *Morus rubra* Linnaeus – Il, Galla et al (2009); > *Morus rubra* var. *murrayana* (D.E. Saar & S.J. Galla) D.E. Saar – Gardner et al (2021), Saar et al (2012); > *Morus rubra* var. *rubra* – K1, Tx, Gardner et al (2021), Saar et al (2012); > *Morus rubra* Linnaeus var. *tomentosa* (Rafinesque) Bureau – Tx.

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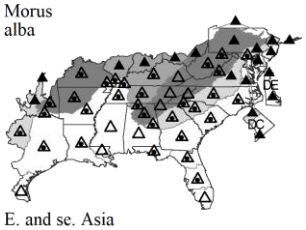
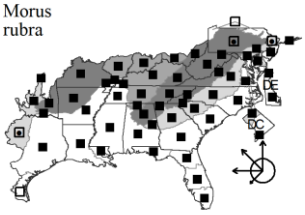
Morus alba



E. and se. Asia

Morus rubra



151. URTICACEAE A.L. de Jussieu 1789 (NETTLE FAMILY) [in ROSALES]

A family of about 45 genera and 1000 species, herbs, shrubs, vines, and trees, of cosmopolitan distribution in tropical, subtropical, and temperate regions. References: Boufford (1997) in FNA3 (1997); Friis in Kubitzki, Rohwer, & Bittrich (1993); Miller (1971a); Wu et al (2018).

2 Leaves opposite.
  3 Plant with stinging trichomes, these having a distinct bulbous or cylindrical base, and a stiff, translucent apex; [tribe *Urticeae*] ..... ***Urtica***
  3 Plant without stinging trichomes (or these minute and not apparent), the non-stinging hairs (if present) soft and flexible, lacking a bulbous or cylindrical base.
    4 Flowers in axillary spikes; foliage dull, yellow-green; leaves 3-veined from the base, the 2 main side veins reaching the margin about 2/3s of the way from blade base to blade tip, the midvein with 1-2 or more prominent secondary veins borne near or past the midpoint and at a sharply acute angle to the midvein, these arching to the leaf margin; [tribe *Boehmerieae*] ..... ***Boehmeria cylindrica***
    4 Flowers in axillary panicles or fascicles; foliage shiny, bright green; leaves 3-veined from the base, the 2 main side veins extending to the apex of the blade, the midvein with many secondary veins borne along its length at a nearly right angle, and connecting to the 2 main side veins rather than reaching the leaf margin; [tribe *Lecantheae*] ..... ***Pilea***
2 Leaves alternate (at least above, if not throughout).
  5 Leaves toothed; plant either with or without stinging trichomes.
    6 Flowers in axillary spikes; woody herb to 4 m tall, without stinging trichomes; leaf undersurfaces white-pubescent; [tribe *Boehmerieae*] ..... ***Boehmeria nivea***
    6 Flowers in terminal or axillary panicles; herb to 1.5 m tall, with stinging trichomes; leaf undersurfaces green; [tribe *Urticeae*] ..... ***Laportea***
  5 Leaves entire; plants without stinging trichomes.
    7 Stipules absent; [tribe *Parietarieae*] ..... ***Parietaria***
    7 Stipules present; [tribe *Boehmerieae*] ..... ***Pouzolzia zeylanica***

Boehmeria Jacquin 1760 (SWAMP-NETTLE)

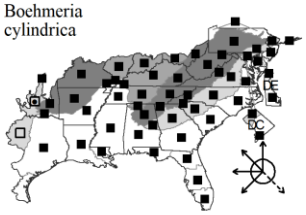
A genus of about 50-80 species, trees, shrubs, and perennial herbs, of warm temperate, subtropical, and tropical regions of the Old World and New World. Wu et al. (2018) showed *Boehmeria* to be polyphyletic, with *B. nivea* likely to be separated from the genus. References: Boufford (1997) in FNA3 (1997); Friis in Kubitzki, Rohwer, & Bittrich (1993); Wu et al (2018).

1 Leaves opposite (upper leaves sometimes subopposite or alternate); leaf lower surface glabrous, puberulent, or short-pilose, the pubescence not obscuring the green leaf surface; inflorescences (axillary) spikes, often leafy at their apices; herb to 1.5 m tall; [subgenus *Duretia*] ..... ***Boehmeria cylindrica***
1 Leaves alternate; leaf lower surface white-tomentose, the pubescence obscuring the green leaf surface; inflorescences (axillary) paniculately branched, never leafy at their apices; herb or shrub to 4 m tall; [subgenus *Tilocnide*] ..... ***Boehmeria nivea***

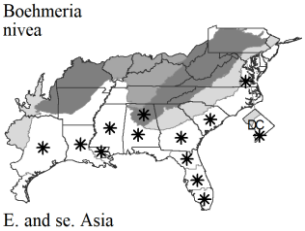
Boehmeria cylindrica (Linnaeus) Swartz. SWAMP-NETTLE. **Hab:** Swamp forests, bottomland forests, bogs, tidal marshes, other marshes, other wetlands. **Dist:** QC and MN south to FL and NM; West Indies; Mexico, Central America, and South America. **Phen:** Jul-Aug; Sep-Oct. **Syn:** = Ar, C, FNA3, G, GrPl, GW2, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, Tn, Va, W, WH3, WI; > *Boehmeria cylindrica* (Linnaeus) Swartz – S; > *Boehmeria cylindrica* var. *cylindrica* – F, Il, Tx; > *Boehmeria cylindrica* var. *drummondiana* (Weddell) Weddell – F, Il, Tx; > *Boehmeria decurrens* Small – S; > *Boehmeria drummondiana* Weddell – S.

* ***Boehmeria nivea*** (Linnaeus) Gaudichaud-Beaupré. RAMIE. **Hab:** Disturbed suburban areas, waste ground. **Dist:** Native of Asia. Reported for Lowndes County, GA (Carter, Baker, & Morris 2009). **Tax:** *Boehmeria nivea* will be removed from *Boehmeria*, either to a monotypic genus, *Ramium* (see synonymy) or perhaps to be included in related genera, such as *Sarcochlamys* Gaudichaud, *Archiboehmeria* C.J. Chen, or *Astrothalamus* C.B. Robinson (all natives of se. Asia). **Comm:** This plant has been cultivated for the fiber of its stems, which is extracted and used for fabric in a manner reminiscent of linen (which is made from stem fibers of *Linum usitatissimum*). **Syn:** = FNA3, K1, K3, K4, RAB, Tx, WH3; = *Ramium niveum* (Linnaeus) Small – S, the genus name illegitimate. NatureServe GNR (Not Yet Ranked).

Boehmeria cylindrica



Boehmeria nivea



E. and se. Asia

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

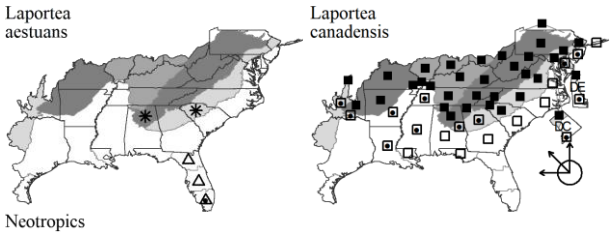
Laportea Gaudichaud-Beaupré 1830 (WOOD-NETTLE)

A genus of about 21 species, shrubs, perennial herbs, and annual herbs, of tropical and warm temperate e. Asia and temperate e. North America. References: Boufford (1997) in FNA3 (1997); Friis in Kubitzki, Rohwer, & Bittrich (1993).

1 Plants with stipitate-glandular trichomes as well as stinging trichomes; fruiting pedicels lacking lateral wings..... ***Laportea aestuans***
1 Plants with stinging trichomes only; fruiting pedicels laterally-winged..... ***Laportea canadensis***

* ***Laportea aestuans*** (Linnaeus) Chew. WEST INDIAN WOOD-NETTLE. **Hab:** Waste ground and agricultural areas (e.g. tree farms). **Dist:** Pretty regular in Miami. Reported for scattered sites in the se. US (Kartesz 2010). **Syn:** = Bah, FNA3, K3, K4, WH3. NatureServe G5 (Secure).

Laportea canadensis (Linnaeus) Weddell. WOOD-NETTLE. **Hab:** Moist, nutrient-rich forests, seepage swamps, especially abundant in cove forests in the Mountains and bottomlands in the Piedmont. **Dist:** NS and se. MB south to Panhandle FL and OK. **Phen:** May-Aug; late Jul-Oct. **Comm:** By mid-summer, *Laportea* often becomes the aspect dominant in rich, moist cove forests of the mountains (especially those with extensive seepage), visually replacing the diverse spring flora. The stinging hairs can penetrate pants made of light-weight or loosely woven fabrics. **Syn:** = Ar, C, F, FNA3, G, GrPl, GW2, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, Tn, Va, W, WH3, WV; ? *Urticastrum divaricatum* (Linnaeus) Kuntze – S. NatureServe G5 (Secure).



Parietaria Linnaeus 1753 (PELLITORY)

A genus of about 20 species, annual and perennial herbs, of nearly cosmopolitan distribution. References: Boufford (1997) in FNA3 (1997); Friis in Kubitzki, Rohwer, & Bittrich (1993); Hinton (1968).

1 Main lateral veins diverging from the midvein above the usually narrowly cuneate leaf base; larger leaves 2-5× as long as wide; achene 0.9-1.2 mm long
  2 Perennial; achenes dark brown, with an acute apex and lacking a mucro; tepals 2.0-3.5 mm long, longer than the involucral bracts (1.5-2.5 mm long); [alien weed]; [subgenus *Parietaria*]..... ***Parietaria judaica***
  2 Annual; achenes light brown, the apex rounded but with an apical mucro; tepals 1.5-2.0 mm long, shorter than the involucral bracts (1.8-5.0 mm long); [native, sometimes weedy]; [subgenus *Freirea*]..... ***Parietaria pensylvanica***
1 Main lateral veins diverging from the midvein at the usually truncate, rounded, or broadly cuneate leaf base; larger leaves 1-2× as long as wide; achene either 0.6-0.9 or 1.0-1.4 mm long.
  3 Achene 0.6-0.9 mm long, with a flanged stipe, the mucro located symmetrically at the pole of the achene; leaf blades 0.7-2.7 cm long..... ***Parietaria floridana***
  3 Achene 1.0-1.4 mm long, without a flanged stipe, the mucro located asymmetrically; leaf blades 1.0-6.5 cm long..... ***Parietaria praetermissa***

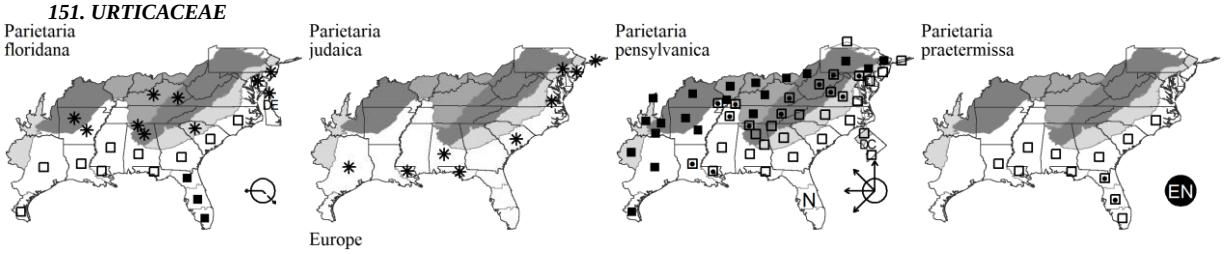
Parietaria floridana Nuttall. FLORIDA PELLITORY. **Hab:** Coastal shores, sometimes weedy in calcareous situations or around greenhouses. **Dist:** DE south to FL and west to TX, on the outer Coastal Plain; Bahamas. Reported for c. KY (Adanick & Medley 2020). **Phen:** Mar-frost; Apr-frost. **Tax:** Perhaps conspecific with *P. debilis*. **ID Notes:** This species has smaller leaves than *P. praetermissa*. **Syn:** = Ar, FNA3, GW2, K1, K3, K4, Tx, WH3, Hinton (1968); = *Parietaria nummularia* Small – C, F, S; < *Parietaria debilis* Forster – WI.

* ***Parietaria judaica*** Linnaeus. PELLITORY-OF-THE-WALL. **Hab:** Disturbed urban areas. **Dist:** Native of Europe. Reports of *P. officinalis* in our area are based on *P. judaica*. Reported for Beaufort County, SC (Bradley et al. [in prep.]). **Syn:** = FNA3, K4, Mi, NE, NY, WH3; > *Parietaria judaica* Linnaeus – K1, K3; > *Parietaria officinalis* – K1, K3.

Parietaria pensylvanica Muhlenberg ex Willdenow. PENNSYLVANIA PELLITORY, ROCK PELLITORY. **Hab:** In circumneutral soils, such as in thin soils at the bases of calcareous or subcalcareous cliffs or on calcareous shale barrens, rich floodplain soils. **Dist:** ME west to BC, south to e. NC, w. NC, SC (Gaddy 2014), AL, Panhandle FL, TX, NV, and Mexico. **Phen:** Apr-Oct; May-Oct. **Tax:** Two varieties are sometimes delimited, var. *pensylvanica* eastern and northern and var. *obtusa* (Rydberg ex Small) Shinners southwestern. **Syn:** = Ar, C, FNA3, G, GrPl, GW2, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Va, W, WH3; > *Parietaria obtusa* Rydberg – Tx; > *Parietaria pensylvanica* Muhlenberg ex Willdenow – F, Tx, WV, sensu stricto; > *Parietaria pensylvanica* var. *obtusa* (Rydberg ex Small) Shinners – NcTx; > *Parietaria pensylvanica* var. *pensylvanica* – NcTx.

Parietaria praetermissa Hinton. COASTAL PELLITORY. **Hab:** Shell middens, coastal hammocks. **Dist:** E. NC south to s. FL and west to w. LA. **Phen:** Mar-frost; Apr-frost. **Syn:** = FNA3, GW2, K1, K3, K4, WH3, Hinton (1968); = *Parietaria floridana* Nuttall – C, F, RAB, S, misapplied.

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



Pilea Lindley 1821 (CLEARWEED)

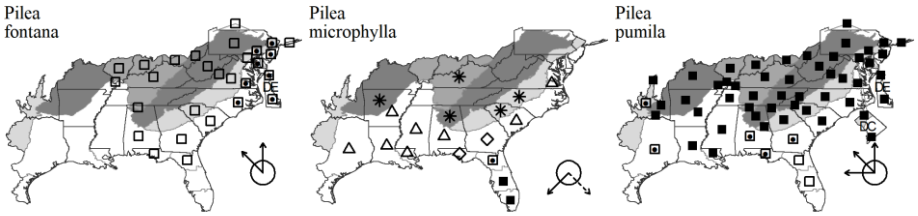
A genus of about 250 species, annual and perennial herbs, nearly cosmopolitan in tropical and warm temperate regions of the Old World and the New World. References: Boufford (1997) in FNA3 (1997); Floden & Engelhardt (2019); Friis in Kubitzki, Rohwer, & Bittrich (1993).

1 Leaf margins dentate; leaves 2-13 cm long, the 2 2 leaves of a pair equal in size.
  2 Achene 1-1.5× as long as broad, pebbled, dark brown, dark purple, or black, the margins slightly paler; leaves usually matte or slightly shiny ..... ***Pilea fontana***
  2 Achene 1.5-2× as long as broad, smooth, green or light brown, with slightly raised dark to black lines and mottlings; leaves usually shiny ..... ***Pilea pumila***
1 Leaf margins entire; leaves 0.1-1.0 (-1.8) cm long, the 2 leaves of a pair slightly to strongly unequal in size. ..... ***Pilea microphylla***

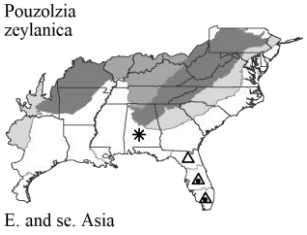
Pilea fontana (Lunell) Rydberg. BLACKFRUIT CLEARWEED, LESSER CLEARWEED. **Hab:** Swamp forests, freshwater marshes, tidal marshes, calcareous wetlands, sand bars. **Dist:** E. Canada west to MN and ND, south to FL, IN, and NE; disjunct in n. AL. **Phen:** Aug-Sep; Sep-Nov. **ID Notes:** Only reliably distinguishable from *P. pumila* using fruits, *P. fontana* is, however, somewhat less shiny and transparent-translucent. **Syn:** = C, F, FNA3, G, GrPl, GW2, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, Va, W, WH3; < *Adicea pumila* (Linnaeus) Rafinesque – S. NatureServe G5 (Secure).

Pilea microphylla (Linnaeus) Liebmann. ROCKWEED, ARTILLERYWEED. **Hab:** Marl prairies, hammocks, pine rocklands, old rock and brick walls, urban areas, hammocks, especially in thin soil over limestone. **Dist:** FL (perhaps more widespread as a native in the Southeastern US than just FL); West Indies; Mexico, Central America, and South America. Although listed by RAB for the Carolinas as "a weed in and around greenhouses, not established as part of our flora", this species is well-established and weedy in Charleston, SC and Savannah, GA. Native at least in FL, and perhaps further north, the original distribution unclear. **Phen:** Jan-Dec. **Syn:** = Ar, Bah, FNA3, K1, K3, K4, RAB, S, WH3; > *Pilea microphylla* var. *microphylla* – WI. NatureServe G5TNR (Not Yet Ranked).

Pilea pumila (Linnaeus) A. Gray. GREENFRUIT CLEARWEED, COOLWORT, RICHWEED. **Hab:** Swamp forests, bottomlands, freshwater marshes, tidal marshes, disturbed wet ground. **Dist:** QC west to MN, south to FL, LA, and OK. Sometimes considered to also occur in e. Asia, or these populations separated as *P. mongolica* Weddell, the course followed here. Additional study is needed. **Phen:** Aug-Sep (-Nov); Sep-Nov. **Syn:** = Ar, C, FNA3, G, GrPl, GW2, Il, K1, K3, K4, Mi, Pa, RAB, Tn, Va, W, WH3, WV; = *Pilea pumila* var. *pumila* – NE, NY; < *Adicea pumila* (Linnaeus) Rafinesque – S; > *Pilea pumila* var. *deamii* (Lunell) Fernald – F, K1, NcTx, Tx; > *Pilea pumila* var. *pumila* – F, K1, Tx.



Pouzolzia Gaudichaud-Beaupré 1830



A genus of ca. 70 species, herbs and shrubs, of the Old World and New World tropics. References: Boufford (1997) in FNA3 (1997); Friis in Kubitzki, Rohwer, & Bittrich (1993).

* ***Pouzolzia zeylanica*** (Linnaeus) Bennett & R. Brown. CEYLON POUZOLZIA, MIST VINE, REEK-KUDZU. **Hab:** Swamps, bottomlands, disturbed areas. **Dist:** Native of tropical se. and temperate e. Asia. **Syn:** = FNA3, K3, K4, WH3; = *Parietaria officinalis* – S, misapplied.

Urtica Linnaeus 1753 (STINGING NETTLE)

A genus of about 80 species, annual and perennial herbs, nearly cosmopolitan, but primarily in temperate regions of the Northern Hemisphere. References: Boufford (1997) in FNA3 (1997); Friis in Kubitzki, Rohwer, & Bittrich (1993); Grosse-Veldmann & Weigend (2017); Henning et al (2014); Woodland (1982); Woodland et al (1982).

1 Tap-rooted annual; stipules 1-3 mm long, spreading or deflexed; inflorescences usually shorter than the subtending leaf petiole, each panicle consisting of a mixture of pistillate and staminate flowers.

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

2 Flower clusters subglobose; mature achenes ovate, 1-1.5 mm long, < 1 mm wide; leaf teeth generally blunt, the sides of the tooth convex; [American clade] ..... ***Urtica chamaedryoides***

2 Flower clusters elongate; mature achenes triangular, 1.5-2.5 mm long, 1-1.5 mm wide; leaf teeth generally sharp, the sides of the tooth straight; [*Urtica urens* clade] ***Urtica urens***

1 Rhizomatous perennial; stipules 5-15 mm long, erect; inflorescences usually surpassing the subtending leaf petiole, each panicle of either pistillate or staminate flowers; [*Urtica dioica* clade].

3 Plants mainly dioecious (male and female flowers on separate plants), but some plants in populations monoecious (with basal inflorescences male and apical inflorescences female, or with male and female flowers intermixed in the same inflorescence); stems usually weak, sprawling, branching; stems strongly hispid with stinging hairs; leaf blades strongly hispid with stinging hairs on both surfaces; leaf teeth commonly 5-6 mm long ..... ***Urtica dioica ssp. dioica***

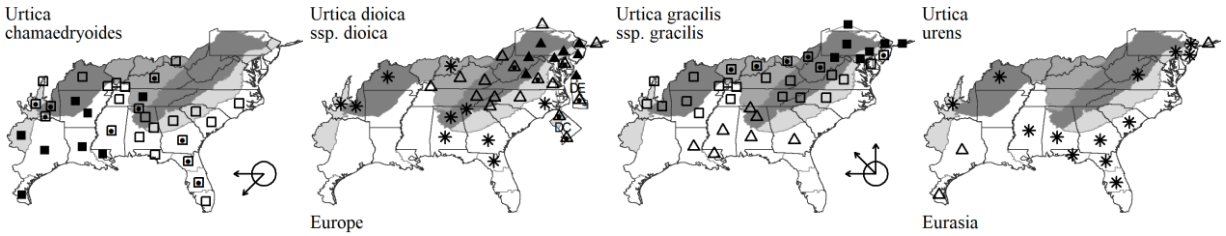
3 Plants mostly monoecious (with male and female flowers in separate inflorescences on the same plant, usually with basal and apical inflorescences female and median inflorescences male), rarely an entire plant male or female; stems upright, erect, less branched; stems glabrous to puberulent or strigose, lacking (or nearly so) stinging hairs; leaf blades glabrous or glabrescent above (lacking stinging hairs), glabrous to puberulent below (with some stinging hairs); leaf teeth commonly 2-3.5 mm long ..... ***Urtica gracilis ssp. gracilis***

Urtica chamaedryoides Pursh. DWARF STINGING NETTLE, HEARTLEAF NETTLE, ORTIGUILLA. **Hab:** Rich moist soil, usually on floodplains. **Dist:** WV, KY, se. MO and OK south to FL, TX, and Mexico; very rare east of the Blue Ridge. Notable disjunct eastern locations include Stevens Creek (McCormick County, SC), Congaree Swamp (Richland County, SC), and various sites on very rich levees of the Roanoke River (NC). **Phen:** Sep-May; Nov-Jul. **Comm:** Gaddy & Rayner (1980) report the common winter flowering of this species in our area. **Syn:** = Ar, C, F, FNA3, G, GrPl, Il, K1, K3, K4, NcTx, NY, RAB, S, WH3, Grosse-Veldmann & Weigend (2017), Woodland (1982); > *Urtica chamaedryoides* var. *chamaedryoides* – Tx; > *Urtica chamaedryoides* Pursh var. *runyonii* Correll – Tx. NatureServe G4G5 (Apparently Secure).

* ***Urtica dioica*** Linnaeus *ssp.* ***dioica***. EUROPEAN STINGING NETTLE, GREAT NETTLE. **Hab:** Bottomlands, roadsides, other disturbed areas, primarily in calcareous soils. **Dist:** Native of Europe. **Phen:** May-Jul; Jul-Sep. **Comm:** See *U. gracilis* for discussion of the two taxa. **Syn:** = FNA3, GrPl, K1, K3, K4, NE, NY, Pa, Tn, Grosse-Veldmann & Weigend (2017), Henning et al (2014), Woodland (1982); = *Urtica dioica* – F, S, Va, WV; = *Urtica dioica* var. *dioica* – C, G; < *Urtica dioica* – RAB, W, WH3, (also see U. gracilis). NatureServe G5T5? (Secure).

Urtica gracilis Aiton *ssp.* ***gracilis***. AMERICAN STINGING NETTLE. **Hab:** Bottomland forests and edges, particularly over limestone or mafic rocks. **Dist:** NL (Labrador) and NS west to AK, south to sw. VA, w. NC, s. OH, s. IL, s. MO, n. TX, s. NM, and se. AZ. **Phen:** May-Jul; Jul-Sep. **Tax:** The native stinging nettle of North America is best treated as specifically distinct from *U. dioica* of Europe. Woodland (1982) and Woodland, Bassett, Crompton, & Forget (1982) showed that *U. gracilis* differs from *U. dioica* in a variety of morphologic characters (see key), chromosome number (2n = 26 for *U. gracilis*, 2n = 52 for *U. dioica*), breeding system (monoecy vs. dioecy), and distribution (North American vs. Eurasian); furthermore, the two taxa could not be crossed. Woodland (1982) chose subspecific status, apparently to emphasize the close relationship of the two (and a third taxa in w. North America). The combination of morphological distinctiveness, allopatry, major differences in species biology, and incompatibility warrants separation as species. F (as *U. procera*), G (as *U. dioica* var. *procera*) and S include NC in the range; Woodland (1982), however, showed the range as extending only south to VA. Henning et al. (2014) further validate the idea that American "*U. dioica*" is specifically distinct from European *U. dioica*. **Syn:** = NY, Grosse-Veldmann & Weigend (2017), Henning et al (2014); = *Urtica dioica* Linnaeus ssp. *gracilis* (Aiton) Selander – FNA3, GrPl, K1, K3, K4, Mi, NE, Pa, Tn, Woodland (1982); = *Urtica dioica* Linnaeus var. *procera* (Muhlenberg ex Willdenow) Weddell – C, G; = *Urtica gracilis* Aiton – Ar, Il, S, Tx, Va, WV; < *Urtica dioica* – RAB, W; > *Urtica gracilis* Aiton – F; > *Urtica procera* Muhlenberg – F.

* ***Urtica urens*** Linnaeus. BURNING NETTLE, DOG-NETTLE, SMALL NETTLE. **Hab:** Disturbed areas. **Dist:** Native of Eurasia. **Phen:** Apr-May; May-Jul. **Syn:** = C, F, FNA3, G, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tx, WH3, WV, Grosse-Veldmann & Weigend (2017), Woodland (1982). NatureServe GNR (Not Yet Ranked).



153. FAGACEAE Dumortier 1829 (BEECH FAMILY) [in FAGALES]

A family of about 8 genera and 620-1050 species, trees and shrubs, mostly of the Northern Hemisphere, but extending into se. Asia and Australia. References: Elias (1971a); Govaerts & Frodin (1998); Kubitzki, Rohwer, & Bittrich (1993); Nixon (1997a) in FNA3 (1997).

1 Fruits partially enclosed in a scaly cup; leaves lobed, toothed, crenate, or entire ..... ***Quercus***

1 Fruits enclosed in a spiny or prickly bur; leaves toothed.

2 Nuts rounded or flattened on one or two sides; bur with long, straight spines; winter buds < 1 cm long; leaves elliptic or oblanceolate, some of them usually > 12 cm long ..... ***Castanea***

2 Nuts sharply triangular; bur with short, recurved prickles; winter buds 1.5-2.5 cm long; leaves ovate, 6-12 cm long ..... ***Fagus***

Castanea P. Miller 1754 (CHESTNUT, CHINQUAPIN)

A genus of 8-10 species, trees and shrubs, of temperate regions of the Northern Hemisphere. References: Johnson (1988); Kubitzki, Rohwer, & Bittrich (1993); Nixon (1997a) in FNA3 (1997); Perkins et al (2021); Spriggs & Fertakos (2021); Stanford (1998).

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated

153. FAGACEAE

1 Leaves elliptic to oblanceolate, mostly < 15 cm long, the apices acute to obtuse; twigs puberulent; spine-covered husk of fruit splitting into 2 sections, enclosing 1 nut; nut circular in cross-section, 7-19 mm in diameter; pistillate dichasia of 1 flower; leaves with stellate trichomes, with few bulbous-based trichomes when young, puberulent, pilose, tomentulose, or tomentose in age (usually rather densely so).
2 Longest spines of the fruit husk usually > 10 mm long; young twigs glabrous; petiole 8-10 (-15) mm long; [plants of n. AL and westward]..... ***Castanea ozarkensis***
2 Longest spines of the fruit husk usually < 10 mm long; young twigs puberulent; petiole 3-7 (-10) mm long; [plants widespread in our area]..... ***Castanea pumila***

1 Leaves elliptic, oblanceolate or lanceolate, 8-30 cm long, the apices acuminate, sometimes only shortly so; spine-covered husk of fruit splitting into 4 sections, enclosing 1-3 (-5) nuts; nut flattened on at least one side, 18-30 mm in diameter; pistillate dichasia of 3 flowers; leaves with or without stellate trichomes; twigs puberulent or glabrous.
3 Undersurface of leaves densely covered with bulbous-based trichomes when young, essentially glabrous in age; leaves mostly > 15 cm long, generally long-acuminate; twigs glabrous; trees single-trunked; spines of fruit husk weak, easily bent
4 Leaf margins ciliate; young twigs glaucous; burs with 1 nut..... ***Castanea alabamensis***
4 Leaf margins not ciliate; young twigs glabrous (but not glaucous); burs with (2-) 3 (-5) nuts..... ***Castanea dentata***
3 Undersurface of leaves persistently and densely tomentose beneath; leaves mostly < 15 cm long, generally short-acuminate; twigs puberulent; trees multi-trunked from base; spines of fruit husk stiff.
..... ***Castanea mollissima***

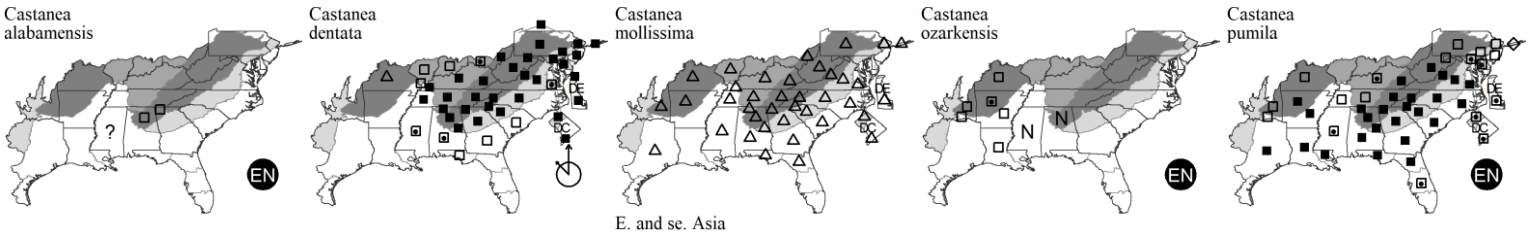
Castanea alabamensis Ashe. ALABAMA CHINQUAPIN. **Hab:** Dry forests and woodlands. **Dist:** Endemic to nw. GA and n. AL (and perhaps e. MS). **Syn:** = S; < *Castanea ozarkensis* Ashe – FNA3, K4; < *Castanea pumila* (Linnaeus) P. Miller – K3.

Castanea dentata (Marshall) Borkhausen. AMERICAN CHESTNUT. **Hab:** Mesic and xeric forests. **Dist:** S. ME, s. ON, MI, c. IN, s. IL, south to c. NC, c. GA, Panhandle FL, and sc. MS. **Phen:** Jun-Jul; Sep-Oct. **Comm:** Formerly one of the most important, largest, and most abundant forest trees in the Mountains of our area, *C. dentata* was severely affected by chestnut blight, *Cryphonectria parasitica* (Murrill) Barr, introduced at New York City in 1904 on nursery stock of *C. mollissima*. Blight spread steadily southward, reaching our area in the 1920's and 1930's. *C. dentata* remains rather abundant, but now occurs only as stump sprouts and small trees, usually reinfected by blight persisting on oaks and killed at about the size of first fruit production. The accidental introduction of chestnut blight and the subsequent profound alteration of the role of chestnut is one of the most tragic ecological disasters to have affected our area. *Castanea ×neglecta* Dode (pro sp.) [*C. dentata* × *pumila*], occurs in our area; "the leaves of the hybrid resemble those of *C. dentata* in size and shape but have the vestiture and stellate trichomes of *C. pumila*" (Johnson 1988). **Syn:** = C, F, Fl2, FNA3, G, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Va, W, WH3, Johnson (1988). NatureServe G3 (Vulnerable).

* ***Castanea mollissima*** Blume. CHINESE CHESTNUT. **Hab:** Forests. **Dist:** Native of China. This species is relatively resistant to chestnut blight and has been planted widely as an ornamental and nut tree; it sometimes naturalizes and appears nearly native. **Phen:** Jun-Jul; Sep. **Comm:** Reported for NC (Macon County) by Pittillo & Brown (1988). **Syn:** = Ar, C, Fl2, FNA3, Il, K1, K3, K4, Mi, NE, Pa, WH3. NatureServe GNR (Not Yet Ranked).

Castanea ozarkensis Ashe. OZARK CHINQUAPIN. **Hab:** Dry to dry-mesic upland woodlands and forests, bluffs, glade margins, usually in acid soils derived from sandstone or chert. **Dist:** S. MO, e. OK, and w. AR; disjunct in c. AL, where now apparently extirpated by blight. **Phen:** May-Jul; Sep-Oct. **Comm:** *C. ozarkensis* is related to *C. pumila*, though showing some relation as well to *C. dentata*. *C. ozarkensis* is more susceptible to blight than *C. pumila*. **Syn:** = S; = *Castanea pumila* P. Miller var. *ozarkensis* (Ashe) G.E. Tucker – Ar, K1, Johnson (1988); < *Castanea ozarkensis* Ashe – FNA3, K3, K4. NatureServe G5T3 (Vulnerable).

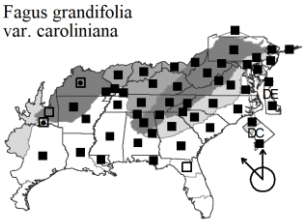
Castanea pumila (Linnaeus) P. Miller. COMMON CHINQUAPIN. **Hab:** Xeric forests and woodlands, generally in fire-maintained habitats. **Dist:** NJ, s. PA, n. KY, and s. MO, south to c. peninsular FL and se. TX. **Phen:** May-Jul; Sep-Oct. **Tax:** Some of the taxa previously recognized at specific or varietal rank may indeed warrant taxonomic recognition, but results are preliminary (J. Shaw, pers. comm., 2019). **Comm:** It is relatively resistant to chestnut blight. Riley, Vincent, & Widrlechner (2020) remove *C. pumila* from OH's flora. **Syn:** = Fl2, FNA3, K3, K4, NE, NY, Pa, Tn, Va, WH3; = *Castanea pumila* var. *pumila* – Ar, C, K1, Johnson (1988); > *Castanea alnifolia* Nuttall – S; > *Castanea alnifolia* Nuttall var. *alnifolia* – RAB, Tx; > *Castanea alnifolia* Nuttall var. *floridana* Sargent – RAB, Tx; > *Castanea ashei* (Sudworth) Sudworth – S; > *Castanea floridana* (Sargent) Ashe – S; > *Castanea pumila* (Linnaeus) P. Miller – G, S, W; > *Castanea pumila* var. *ashei* Sudworth – F, RAB, Tx; > *Castanea pumila* var. *pumila* – F, RAB, Tx. NatureServe G5T5? (Secure).



Fagus Linnaeus 1753 (BEECH)

A genus of about 10 species, trees, of temperate regions of the Northern Hemisphere. Our native trees belong to subgenus *Fagus*, section *Grandifolia* (Shen 1992). References: Cooper & Mercer (1977); Elias (1971a); Govaerts & Frodin (1998); Kubitzki, Rohwer, & Bittrich (1993); Nixon (1997a) in FNA3 (1997); Shen (1992); Stanford (1998).

Fagus grandifolia Ehrhart *var.* ***caroliniana*** (Loudon) Fernald & Rehder. WHITE BEECH, AMERICAN BEECH. **Hab:** Moist forests, from near sea level to low elevations in the Mountains, mostly below 1050 meters (3500 feet). **Dist:** Se. MA, OH, IN, s. IL, s. MI (?), and MO south to Panhandle FL and e. TX. **Phen:** Mar-May; Sep-Oct. **Tax:** Several subspecies, varieties, or phases of *Fagus grandifolia* have been described, and their taxonomic recognition is controversial. The most recent monographer, Shen (1992), recognizes three subspecies, one of which is limited to Mexico, the other two as treated here but at the subspecific level. I have here chosen to recognize two intergradient varieties in our area. A third variety, var. *mexicana* (Martínez) Little, of the mountains of México, is apparently most closely related to var. *grandifolia*. Cooper & Mercer (1977) studied

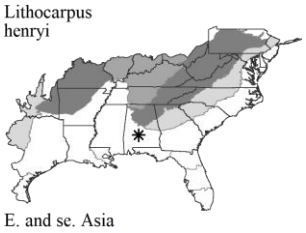


variation in NC, concluding that two genetic races or varieties were present, the montane var. *grandifolia* and the Piedmont and Coastal Plain var. *caroliniana*, but that patterns of variation were complicated. Hardin & Johnson (1985) and Hardin (1992, 1985) note that variation is "more-or-less" clinal, variation within populations is great, and they do not favor recognition of infraspecific taxa. Depending on one's tolerance or intolerance for intergradational varieties, one may choose to recognize one or two taxa in our area. **Syn:** = C, F, G, Il, Tx, Elias (1971a); = *Fagus grandifolia* ssp. *caroliniana* (Loudon) Camp ex Shen – Shen (1992), nomen nudum; < *Fagus grandifolia* – Ar, FNA3, K1, K3, K4, NE, NY, Pa, RAB, S, Tn, Va, W, WH3, WV, Cooper & Mercer (1977); < *Fagus grandifolia* ssp. *grandifolia* – Govaerts & Frodin (1998).

Lithocarpus Blume 1826 (STONE-OAK)

A genus of about 350 species, trees, of se. Asia.

* ***Lithocarpus henryi***. HENRY'S STONE-OAK. **Hab:** Spreading from horticultural use. **Dist:** Native of w. China. **Syn:** = K4, K4.



Quercus Linnaeus 1753 (OAK)

A genus of about 350-530 species, trees and shrubs, of temperate, subtropical, and rarely tropical regions of the Northern Hemisphere. Oaks are the predominant tree genus of our region, with a variety of species dominating much of the landscape in nearly every ecological situation. Only in a few specialized (and usually in some sense edaphically extreme) communities are oaks generally entirely absent: deepest Coastal Plain swamps, some Coastal Plain depression ponds, wettest pine savannas, pocosins, spruce-fir forests, highest elevation northern hardwood forests, and mountain bogs. Our native oaks are divided into three well-marked sections; other sections occur outside our area and two are present as naturalized introductions. North American red oaks (section *Lobatae* of subgenus *Quercus) are characterized by acorns maturing in two years (in one year in Q. elliottii*), styles elongate, abortive ovules are at the top of the seed, leaves and leaf lobes bristle-tipped, inner surface of the acorn shell velvety-pubescent, and acorns rooting in the spring. White oaks (section *Quercus* of subgenus *Quercus*) are characterized by acorns maturing in a single year, styles short or absent, abortive ovules at the base of the seed, leaves and leaf lobes not bristle-tipped, inner surface of the acorn shell smooth, and acorns rooting in the autumn. Nineteen of our *Quercus* species are in this group: *Q. alba, Q. austrina, Q. bicolor, Q. boyntonii, Q. chapmanii, Q. durandii var. breviloba, Q. durandii var. durandii, Q. lyrata, Q. macrocarpa var. macrocarpa, Q. margaretiae, Q. michauxii, Q. mohriana, Q. montana, Q. muehlenbergii, Q. oglethorpensis, Q. prinoides, Q. robur, Q. similis, Q.stellata*). The live oaks of the southeastern Coastal Plain, e. and c. TX, and Central America are section *Virentes* of subgenus *Quercus (Q. fusiformis, Q. geminata, Q. minima, Q. virginiana*). Hybrids within each section are frequent and diverse; hybrids do not naturally occur between the sections. References: Denk et al (2017); Duncan & Duncan (1988); Godfrey (1988); Hardin (1979b); Hunt (1990); Hunt (1994); Jensen in FNA (1997) in FNA3 (1997); Kubitzki, Rohwer, & Bittrich (1993); Manos & Hipp (2021); Mummaw (2018); Nixon & Muller (1997) in FNA3 (1997); Nixon in FNA (1997b) in FNA3 (1997); Stein, Binion, & Acciavatti (2003); Ward (2007d); Wilbur & Ho (2008); Wilbur (2002b).

Fifteen oak species in our area are typical of upland Coastal Plain communities with at least occasional fire: *Q. arkansana*, *Q. chapmanii*, *Q. geminata*, *Q. hemisphaerica*, *Q. incana*, *Q. laevis*, *Q. margaretiae*, *Q. marilandica* var. *ashei*, *Q. marilandica* var. *marilandica*, *Q. minima*, *Q. myrtifolia*, *Q. stellata*, and less typically *Q. falcata*, *Q. nigra*, *Q. velutina*, and *Q. virginiana*. Fire suppression of Coastal Plain communities, especially of longleaf pine sandhills, leads to an unnatural increase in the stature and abundance of oaks present. In frequent fire conditions, most oaks will persist as short, shrubby fire sprouts. Additional suggestions of how to recognize fire sprouts of these species are given below. In general, leaves of fire sprouts are larger and more deeply lobed than normal leaves. In species of the red oak group, the bristle tips are larger and more pronounced. Increased size in leaves is particularly noticeable when an area previously long fire-suppressed is burned (the large underground root system and nutritional resources of a small tree destroyed by fire being devoted to a few very vigorous sprouts). Fire sprouts are often in sunny conditions, which tend to make oak leaves more deeply lobed and more coriaceous than shaded leaves. White oaks with lobed leaves: *Q. margaretiae* – often forms dense clonal, stoloniferous patches in frequent fire conditions. Tends to retain standard leaf characteristics. *Q. stellata* – less prone to formal clonal patches. Sprout leaves often very large, with exaggerated lobing. Red oaks normally with deeply lobed leaves: *Q. laevis* -- not clonal. Vigorous sprouter, leaves more deeply lobed than any other fire red oak. Small sprouts often have vertical leaf orientation characteristic of adults, though vigorous fire sprouts have more normally disposed leaves. Sprout leaves sometimes very large, with very long, curving lobes. *Q. falcata* – not clonal. Sprout leaves generally less lobed than typical adult leaves, more like forma triloba, but larger and coarser in texture, difficult to distinguish in shape from *Q. marilandica* var. *marilandica* and *Q. velutina*. See pubescence differences in main key. *Q. velutina* – not clonal. Leaves variable, sometimes minimally lobed and closely resembling *Q. marilandica* var. *marilandica* and *Q. falcata*. See pubescence differences in main key. Red oaks normally with unlobed leaves: *Q. marilandica* var. *marilandica* – sprout leaves sometimes coarsely (though never deeply) lobed. Texture often very coriaceous, shiny, and very stiff. See pubescence characters in main key. *Q. nigra* – not very typically in fire-prone situations, except as a weedy invader. Young saplings, as well as fire sprouts, often with wildly different leaves than the typical adult form, frequently deeply lobed (for excellent illustrations showing variability in leaf shapes, see p. 329 of Godfrey, 1988 and pp. 51-52 of Godfrey & Wooten, 1981). Leaves always smaller and more glabrous than those of other fire oaks (except *Q. hemisphaerica*). *Q. incana* – generally not strongly clonal and

Key to Map Symbology: ←rare ←uncommon ←common (see introduction for more)

* : waif N : no X : extirpated
EN : endemic P : planted
H : historic ? : questionable

stoloniferous even in frequently burned situations; fire sprouts and vigorous shoots more prone to lobing than adult trees; even fire shoots, though, usually with only one to several lobes, and the characteristic bluish-green characteristic holds; see comments above on *Q. elliottii*. *Q. elliottii* – strongly clonal via a stoloniferous "runner", never treelike; leaves never lobed, even on fire sprouts, though fire sprout leaves can be larger (to 15 cm long and 5 cm wide); very difficult to tell from fire sprouts or seedlings of *Q. incana*, best separated by leaf pubescence (white in *Q. elliottii*, gray in *Q. incana*), margin (slightly revolute in *Q. elliottii*, flat in *Q. incana*), leaf vernation (planate in *Q. incana*, rolled in *Q. elliottii*), and acorn maturation (1 year in *Q. elliottii*, with acorns often on small plants, 2 years in *Q. incana*, with small plants rarely producing acorns). *Q. hemisphaerica* – not clonal; leaves of vigorous shoots and fire sprouts often shallowly lobed, the lobing usually fairly neat and regular, triangular-ascending, and with bristle tips. Live oaks: *Q. geminata* – sometimes clonal; leaves, even of sprouts, not normally with lobes or teeth. *Q. virginiana* – sometimes clonal; leaves of vigorous summer shoots (but apparently not spring shoots) often coarsely toothed, very similar to similar leaves of *Q. hemisphaerica*, but lacking bristle tips (instead the translucent margin with a darker, thickened callus at the tip of the tooth). *Q. minima* – always clonal; leaves often with teeth or lobes. Some oaks with ambiguous leaves are keyed in both Key A and Key D or in both Key B and Key C. The leaves of juvenile (seedling or sapling) branches, fire-sprout shoots, or other vigorous shoots (resulting from similar stimuli such as insect damage) are often much different than typical leaves and are not accounted for in these keys (see discussion at end of generic treatment). Hybrids are frequently encountered; they, too, are not keyed here, but can usually be identified (with difficulty) by their intermediate morphology and by parental context. Trichome types are useful in making and confirming identifications of oaks, since certain types are restricted to various groups of species. Hand lenses of 10× or 20× can be useful, but a dissecting scope with 20× to 40× dissecting microscope is far preferable. See Hardin (1992, 1976, 1979), and Thomson & Mohlenbrock (1979).

Identification Notes: Many oak species are well-adapted to ecological situations in which fires frequently burn the ground layer. Fire-maintained communities of the Piedmont and Mountains typically have oaks such as *Q. stellata*, *Q. marilandica* var. *marilandica*, *Q. ilicifolia*, and *Q. prinoides*. The two latter species are normally shrubby, and have become rarer because of fire suppression (they require fire to prevent larger trees from outcompeting them). In contrast, *Q. stellata* and *Q. marilandica* var. *marilandica* become larger and more frequent in fire-suppressed conditions.

1 Most of the leaves on a relatively mature tree entire and unlobed (some species frequently with some leaves on a tree, especially those on young or vigorous growth, that are toothed or shallowly lobed, the teeth or lobes generally few and irregular in size or location); [primarily either "laurel oaks" of section *Lobatae* or "live oaks" of section *Virentes*] ..... ***Key A***
1 Most of the leaves on a relatively mature tree lobed or toothed.
  2 Venation of the leaves neatly and evenly pinnate, the 3-17 (or more) main lateral veins on each side distinctly parallel to each other, each ending in a tooth or shallow, crenate lobe extending < ¼ of the way to the midrib; ["chestnut oaks" of sections *Quercus*, *Cerris*, and *Cyclobalanopsis*] ..... ***Key B***
  2 Venation of the leaves pinnate, but more branched and irregular, the 1-7 main lateral veins on each side rebranching into prominent side veins, the leaf usually distinctly lobed, at least some of the lobes of some of the leaves of a tree extending > ¼ of the way to the midrib.
    3 Apices of the lobes or teeth obtuse (rarely acute), lacking bristle tips; scales of the acorn cup thickened and tuberculate, not obviously imbricate; ["white oaks" of section *Quercus*] ..... ***Key C***
    3 Apices of the lobes or teeth acuminate (rarely acute), and with bristle tips; scales of the acorn cup flat and imbricate; ["red oaks" of section *Lobatae*] ..... ***Key D***

Key A - Leaves (most of them) entire and unlobed (Laurel Oaks and Live Oaks)

1 Leaves broadly obovate or spatulate, 1-2.5 (-3)× as long as wide.
  2 Leaves 10-30 cm long, with rounded, subcordate, truncate, or oblique bases; lower leaf surfaces thinly to densely pubescent with tawny to orange glandlike hairs; [section *Lobatae*; subsection *Phellos*] ..... ***Quercus marilandica var. marilandica***
  2 Leaves 2-10 (-15) cm long, mostly with cuneate or rounded bases (in some species sometimes subcordate, truncate, or oblique); lower leaf surfaces glabrous, glabrescent, or pubescent, but the pubescence not orange and glandlike.
    5 Twigs of the current year densely and finely hairy, obscuring the surface; [scrubby trees of sandhills from se. SC southward to FL, west to s. AL]; [section *Quercus*; subsection *Stellatae*] ..... ***Quercus chapmanii***
    5 Twigs of the year glabrous or sparsely pubescent; [shrubs, scrubby small trees, or large trees of various habitats, and collectively widespread in our area].
      6 Leaves grayish beneath; [section *Quercus*; subsection *Stellatae*] ..... ***Quercus durandii var. durandii***
      6 Leaves bright green or orange-scurfy beneath; [section *Lobatae*; subsection *Phellos*].
        9 Leaves evergreen, (including the petiole) usually < 4 cm long (sometimes to 9 cm long) and < 2 cm wide (to 6 cm wide); lower leaf surface usually entirely glabrous at maturity (rarely with pubescence in the vein axils); leaf blades rarely lobed; [shrub to scrubby tree of sandhills in se. SC and southward] ..... ***Quercus myrtifolia***
        9 Leaves deciduous, (including the petiole) usually > 5.5 cm long (rarely smaller) and usually 3-5 cm wide; lower leaf surface usually with tufts of hairs in the main vein axils beneath; leaf blades often lobed.
          10 Leaves with broadly cuneate to rounded leaf bases, the blades 5-15 cm long; lower leaf surfaces generally pubescent across the surface, and also with tufts in the axils; [of sw. GA westward] ..... ***Quercus arkansana***
          10 Leaves with cuneate bases, the blades 5-10 (-15) cm long; lower leaf surfaces glabrous, except for tufts of hairs in the vein axils; [widespread in our area] ..... ***Quercus nigra***
1 Leaves linear, elliptic, or narrowly obovate, 2-10× as long as wide.
  11 Leaves (at maturity) glabrous or at most sparsely pubescent on the surface below, though often with tufts of hairs in the main vein axils.
    12 Twigs of the year densely and finely hairy, obscuring the surface; leaves (at maturity) sparsely pubescent beneath; [scrubby trees of sandhills from se. SC south to FL, west to s. AL]; [section *Quercus*; subsection *Stellatae*] ..... ***Quercus chapmanii***
    12 Twigs of the year glabrous or sparsely pubescent; leaves (at maturity) bright green and glabrous beneath, though often with tufts of hairs in the main vein axils; [medium to large trees, more widespread, mostly of moist habitats, except *Q. hemisphaerica*]; [section *Lobatae*; section *Phellos*].
      13 Leaves predominantly lanceolate, mostly 6-12 cm long and 0.7-2 cm wide, most of them 5-8× as long as wide, the apex acute; mature leaves with tufts of hairs in the vein axils below, and sometimes also some pubescence on the blade surface near the midrib; blades never with lobes or teeth; leaves deciduous in autumn; young leaves bronze red, emerging tightly rolled lengthwise and appearing linear; [trees of bottomlands and upland depression swamps, mesic uplands, and also weedy and frequent in disturbed successional habitats] ..... ***Quercus phellos***

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

13 Leaves predominantly oblanceolate, obovate, or rhombic, mostly 2.5-10 cm long and 1.5-4 cm wide, most of them 2-5× as long as wide, the apex acute, obtuse, or rounded; mature leaves with or without tufts of hairs in the vein axils below, lacking pubescence on the blade surface; blades sometimes with 1-5 lateral lobes or teeth; leaves persisting until spring, or tardily and irregularly deciduous in winter; young leaves red, yellow, or green, not emerging tightly rolled lengthwise; [trees primarily either of swamp forests, maritime forests, or sandhills, not typically weedy].
14 Mature leaves entirely glabrous below; leaves mostly with acute apices and bristle tips (rarely a few rounded), mostly 2.5-8 cm long and 1-2 (-3) cm wide, the upper surface shiny, the vein network not readily visible when backlit; leaves evergreen (persisting until spring); petiole 0.5-2 mm long; leaves of vigorous growth often with dentate lobes; [trees of dry sandy habitats, such as sandhills, maritime forests, and dry hammocks] ..... ***Quercus hemisphaerica***
14 Mature leaves with tufts of stellate trichomes in the vein axils; leaves mostly with rounded apices (rarely a few acute and then bristle-tipped), mostly 5-10 cm long and (1.8-) 2-4 cm wide, the upper surface dull, the vein network readily visible when backlit; leaves tardily deciduous (at least northwards in the Southeast); petiole 2-6 mm long; leaves of vigorous growth rarely lobed, and then not dentate; [trees of moist habitats, such as floodplain forests, mesic slopes, and moist hammocks] ..... ***Quercus laurifolia***

11 Leaves (at maturity) persistently and densely pubescent on the surface below, the pubescence in some species so dense and tight as to be difficult to perceive without at least 10× magnification.
15 Leaves bristle-tipped (sometimes the bristle fallen or broken off, but leaving a truncate scar), deciduous in autumn; multi-armed trichomes of the rosulate or multiradiate types, many of the arms ascending or erect (never with the stellate or fused-stellate trichomes characteristic of the live oaks); acorns maturing in 2 years (immature acorns present through the winter on fruiting trees); [section *Lobatae*; subsection *Phellos*].
16 Leaves (including petiole) mostly 10-17 cm long, 3.5-7 cm wide; lower leaf surface (at maturity) sparsely to moderately densely pubescent with soft hairs; leaves lustrous dark-green above; [trees of the Mountains, Piedmont, and rarely Coastal Plain] ..... ***Quercus imbricaria***
16 Leaves (including petiole) mostly 4-11 cm long, 0.5-3.0 cm wide; lower leaf surface densely covered with soft hairs; leaves lustrous dark-green or bluish-green above; [stoloniferous shrubs and small to medium trees of the Coastal Plain].
17 Leaves 0.5-1.5 cm wide, mostly 4-8× as long as wide, lustrous dark-green above; acorns 8-12 mm long; petioles 1-3 mm long; [plant a stoloniferous shrub, to 1 m tall (or to 2 m in fire-suppressed pinelands)] ..... ***Quercus elliottii***
17 Leaves 1.5-3.0 cm wide, mostly 2-4× as long as wide, dull bluish-green above; acorns 10-15 mm long; petioles 4-15 mm long; [plant a small to medium tree] ..... ***Quercus incana***
15 Leaves not bristle-tipped, evergreen (overwintering, falling with the expansion of new leaves in the spring) or deciduous (in *Q. oglethorpensis* and *Q. mohriana*); multi-armed trichomes of the fused-stellate and stellate types, the arms parallel to the leaf surface, radiating from a well developed disc that appears as a white eye or dot at 20-40× magnification (or rosulate or multiradiate in *Q. oglethorpensis* and *Q. mohriana*); acorns maturing in 1 year (immature acorns not present through the winter, unless aborted).
18 Stellate hairs of the leaf undersurfaces at least in part erect or semi-erect, sometimes also with appressed stellae; leaves either deciduous in autumn or evergreen to tardily deciduous; bark gray. ..... ***Quercus oglethorpensis***
18 Stellate hairs of the leaf undersurfaces appressed to the surface; leaves evergreen (overwintering, falling with the expansion of new leaves in the spring); bark (on the tree species) brownish, deeply furrowed; [trees and stoloniferous shrubs either of sandy habitats of the Coastal Plain of GA, NC, SC, and VA or of rocky limestone areas of c. OK and c. TX]; [section *Virentes*].
20 Plant a stoloniferous shrub, to 1 m tall (or to 2 m in fire-suppressed pinelands) and producing acorns at that size ..... ***Quercus minima***
20 Plant a small to large tree, not producing acorns until >2m tall.
21 Leaf blades with the margins strongly revolute, and also the sides of the blades generally rolled downward and obscuring part of the lower surface, the leaf appearing boatlike (the depth of the "boat" often approaching the width of the leaf); midvein and major lateral veins impressed on the upper surface and raised on the lower surface (the lower surface therefore appearing rugose); buds dark brown; cup scales gray-tipped; pubescence of the lower surface stellate, both appressed and erect, the individual stellae readily visible at 20× magnification (sometimes at 10× magnification); acorns (1-) 2 (-6) per stalk; [typically a small tree of dry sands] ..... ***Quercus geminata***
21 Leaf blades flat, or the margins slightly to strongly revolute, the sides of the blade sometimes rolled downward, usually not obscuring part of the lower surface, the leaf not boatlike (the leaf much wider than deep); midvein and major lateral veins not impressed (or very slightly so) on the upper surface and only very slightly, if at all, raised on the lower surface (the lower surface therefore not appearing notably rugose); buds red-brown; cup scales red-tipped; pubescence of the lower surface stellate, all of it tightly appressed, the individual stellae readily visible only at 30× magnification (sometimes barely distinguishable at 20× magnification); acorns 1-2 per stalk. ..... ***Quercus virginiana***

Key B - Leaves with even crenations or teeth (Chestnut Oaks)

3 Scales of the acorn cup prolonged and long tapered; lateral veins terminating in a well-developed bristle; [species planted, and naturalizing]; [section *Cerris*; "East Asia group"] ..... ***Quercus acutissima***
3 Scales of the acorn cup acute to obtuse; lateral veins terminating in a minute mucro or hardened projection; [species native]; [section *Quercus*].
4 Acorns on peduncles (2-) 4-7 cm long; acorns 1.5-2.5 cm long; veins ending in crenations usually 6-10 on each side of leaf; [section *Quercus*; subsection *Prinoideae*] ..... ***Quercus bicolor***
4 Acorns sessile or on peduncles 0-1 cm long; acorns 1-2 cm or 2.5-3.5 cm long; veins ending in crenations usually 8-15 or 3-7 (if 3-7, then a stoloniferous shrub).
5 Leaves mostly obovate (but sometimes narrower and broadest near the middle of the leaf blade or towards the base, especially on sun leaves), with rounded teeth (crenations), the teeth sometimes with a minute mucro; hairs of the leaf undersurface clustered in sessile, stellate-appearing clusters of 2-8 hairs; acorns 2.5-3.5 cm long; large trees; [section *Quercus*; subsection *Albae*].
6 Hairs of the leaf undersurface in clusters with a diameter of 0.15-0.5 mm, dense to sparse; bark of mature trees light gray, loose, breaking into plates or scales ..... ***Quercus michauxii***
6 Hairs of the leaf undersurface asymmetric, appressed-stellate, with a diameter of 0.1-0.25 mm, sparse; bark of mature trees dark gray, tight, deeply furrowed ..... ***Quercus montana***
5 Leaves mostly narrowly elliptic, narrowly ovate, or narrowly obovate (but sometimes broadly obovate), with sharp ascending, often incurved teeth, the teeth ending in a hardened projection; hairs of the leaf undersurface tiny and stellate, with 6-10 rays parallel to the leaf surface; acorns 1-2 cm long; medium to large trees or stoloniferous shrubs; [section *Quercus*; subsection *Prinoideae*].
7 Medium to large tree; veins ending in teeth usually 7-13 on each side of the leaf; leaves 8-20 cm long and 4-10 cm wide; [dry to moist calcareous woodlands and forests] ..... ***Quercus muehlenbergii***
7 Stoloniferous shrub to 5 m tall; veins ending in teeth usually 3-8 (-9)on each side of the leaf; leaves 4-10 (-14) cm long and 2-6 (-8) cm wide; [dry, often sandy and acid woodlands] ..... ***Quercus prinoides***

Key C - Leaves with lobes not bristle-tipped (White Oaks)

1 Lower surfaces of mature leaves glabrous.
- 2 Leaf lobes with acute apices; sinuses often both broad and "flat-bottomed" (with portions parallel to the midrib); acorn cup covering 2/3 to 3/4 of acorn; [section *Quercus*; subsection *Prinoideae*] ..... ***Quercus lyrata***
- 2 Leaf lobes with obtuse apices; sinuses narrow (often notch-like), narrowly to broadly rounded or triangular (lacking portions parallel to the midrib); acorn cup covering < 1/4 to 1/2 of acorn.
  - 3 Leaves mostly 4-10 (-17) cm long, 2-5 (-9) cm wide, with 1-5 shallow lobes or undulations, extending 1/8 to 1/2 of the way to the midrib; acorn cup flat at the base, covering < ¼ of the acorn; [section Quercus; subsection *Stellatae*]. ..... ***Quercus durandii var. durandii***
  - 3 Leaves mostly 7-20 cm long, 3-10 cm wide, with 3-11 lobes, extending 1/4 to 5/6 of the way to the midrib (if the lobing < ½ of the way to the midrib, then the acorn cup rounded at the base and covering 1/4 to 1/2 of the acorn).
    - 6 Leaves with 7-11 lobes (the sinuses usually deep, those of the larger leaves usually about 2/3 to 5/6 of the way to the midrib), 10-20 cm long, 5-10 cm wide; terminal bud rounded or globose; basal scales of acorn cup thickened, the thickening giving the cup a knobby texture; [section *Quercus*; subsection *Albae*] ..... ***Quercus alba***
    - 6 Leaves with 3-7 lobes (the sinuses usually shallow, those of the larger leaves usually ranging from 1/4 to 1/2 of the way to the midrib), 7-15 cm long, 3-8 cm wide; basal scales of the acorn cup thin, appressed, the cup having a rough but not knobby texture; [section *Quercus*; subsection *Stellatae*] ..... ***Quercus austrina***

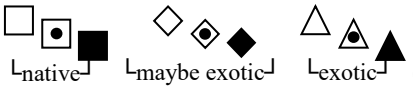
1 Lower surfaces of mature leaves pubescent, the pubescence varying from dense to sparse (sometimes minute and requiring 10× magnification to be readily visible).
- 7 Lower surfaces of mature leaves whitish to pale green, with a mixture of minute, sessile, stellate hairs with horizontal tips and longer stellate hairs with erect ascending tips; leaves shallowly lobed (if so, the lobes 9-19) to deeply lobed (if so, the lobes with acute apices), the sinuses extending 1/4 to 4/5 of the way to the midrib; [section *Quercus*; subsection *Prinoideae*].
  - 8 Leaves mostly shallowly lobed at the base, the sinuses extending 1/4 to 1/2 of the way to midrib, grading into mere crenations toward the tip of the leaf, the total number of lobes/crenations usually 9-19; acorns borne on peduncles 2-10 cm long; acorn cup covering 1/3 to 1/2 of acorn, the upper scales with long-acuminate apices ..... ***Quercus bicolor***
  - 8 Leaves mostly relatively deeply lobed throughout the length of the leaf, the sinuses extending 1/2 to 4/5 of the way to the midrib, the total number of lobes 3-13; acorns sessile or borne on peduncles up to 1 cm long; acorn cup covering 1/3 to 3/4 of acorn, the upper scales with acute, long-acuminate, to long-awned apices.
    - 9 Upper scales of the acorn cups thin and acute; acorn cup covering ½ to 3/4 of the acorn; [swamps in the Coastal Plain and lower Piedmont of GA, NC, SC, and VA] ..... ***Quercus lyrata***
    - 9 Upper scales of the acorn cups long-attenuate into nearly terete awns; acorn cup covering 1/3 to 1/2 of the acorn; [Mountains of VA] ..... ***Quercus macrocarpa var. macrocarpa***
- 7 Lower surfaces of mature leaves gray, green, pale green, or yellowish, glabrescent or densely pubescent, the hairs few-branched and erect; leaves mostly relatively deeply and obtusely lobed, rarely shallowly lobed (if so, the lobes 3-7), the sinuses extending 1/2 to 4/5 of the way to the midrib, the total number of lobes 3-7; acorns sessile or nearly so.
  - 10 Leaf lobes with acute apices; acorn cup covering 2/3 to 3/4 of acorn; [section *Quercus*; subsection *Prinoideae*] ..... ***Quercus lyrata***
  - 10 Leaf lobes with obtuse to rounded apices; acorn cup covering 1/3 to 1/2 of acorn; [section *Quercus*; subsection *Stellatae*].
    - 11 Woody twigs of the season glabrous or with scattered, deciduous 2-forked hairs; petioles of mature leaves 3-10 (-15) mm long; leaf blades (2.5-) 4-8 (-13.5) cm long, irregularly and often rather shallowly 3-5 (-7) lobed, the overall form of the leaf only rarely cruciform; largest lateral lobes usually at the midpoint of the blade (or even below it), the lobes usually not sublobed, tapering from base to tip; [xeric sandy sites in the Coastal Plain from se. VA southwards to c. peninsular and westwards to c. OK and c. TX] ..... ***Quercus margaretiae***
    - 11 Woody twigs of the season densely and persistently stellate-pubescent, especially toward the tip of the twig; petioles of mature leaves 15-20 mm long (*Q. stellata*) or 3-10 (-15) mm long (*Q. boyntonii* and *Q. similis*); leaf blades (5-) 7.5-15 (-20) cm long, usually 5-lobed, the overall form of the leaf typically cruciform (*Q. stellata*) or not (*Q. boyntonii* and *Q. similis*); largest lateral lobes of the leaves usually above the midpoint of the blade, these lobes either often sublobed or squarish in shape, usually wider near their tips than at their bases (*Q. stellata*) or not sublobed, tapering from base to tip (*Q. boyntonii* and *Q. similis*); [collectively widespread in our area].
      - 12 Leaves usually cruciform, the largest lateral lobes often sublobed or squarish in shape, usually wider near their tips than at their bases, and borne at right angles to the midrib; upper leaf blade surface glabrous; [usually of dry to dry-mesic upland situations, widespread in our area] ..... ***Quercus stellata***
      - 12 Leaves not cruciform, the largest lateral lobes usually not sublobed, the lobes tapering from base to tip, and borne at ascending angles relative to the midrib; upper leaf blade surface at least sparsely stellate-puberulent (even late into the season); [of temporarily flooded calcareous swamps of the Coastal Plain, from SC (NC?) southward and westward (*Q. similis*) or localized on sandstone in nc. AL (*Q. boyntonii*)].
        - 13 Rhizomatous shrubs to small trees, generally < 2 m tall; [sandstone outcrops in nc. AL] ..... ***Quercus boyntonii***
        - 13 Single-trunked large trees; [usually of temporarily flooded calcareous swamps of the Coastal Plain, from SC (NC?) southward and westward] ..... ***Quercus similis***

Key D - Leaves with lobes or teeth bristle-tipped (Red Oaks)

1 Leaves shallowly 3-lobed near the broad apex (some leaves of sprout or juvenile shoots may be more lobed); [section *Lobatae*; subsection *Phellos*].
- 2 Leaf blades 5-15 cm long; lower leaf surfaces glabrous, except for tufts of hairs in the vein axils (or pubescent across the surface in *Q. arkansana*].
  - 3 Leaves with broadly cuneate to rounded leaf bases, the blades 5-15 cm long; lower leaf surfaces generally pubescent across the surface, and also with tufts in the axils; [of sw. GA westward] ..... ***Quercus arkansana***
  - 3 Leaves with cuneate bases, the blades 5-10 (-15) cm long; lower leaf surfaces glabrous, except for tufts of hairs in the vein axils; [widespread in our area] ..... ***Quercus nigra***
- 2 Leaf blades 10-30 cm long; lower leaf surfaces pubescent across the surface (and often also with denser tufts of hairs in the vein axils).
  - 4 Petioles short and stout, 5-15 mm long; lower leaf surfaces thinly to densely pubescent with a mixture of tawny or orange glandlike hairs and stellate hairs whose structure is easily visible at 10× magnification ..... ***Quercus marilandica var. marilandica***
  - 4 Petioles long and slender, (14-) 20-50 mm long; lower leaf surfaces densely puberulent with tawny stellate hairs whose structure is barely visible at 10× magnification ..... ***Quercus falcata***

1 Leaves shallowly to deeply 5-12-lobed (some of the leaves of *Q. georgiana* only 3-lobed), the lobes primarily lateral.

Key to Map Symbology:



←rare ←uncommon ←common (see introduction for more)

* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable
X : extirpated

6 Mature leaves pubescent beneath on the surface with stellate hairs.
8 Petioles 0.5-1.0 (-1.8) cm long, generally twisted such that the blade is oriented in a vertical plane; leaves all deeply lobed, some of the sinuses extending > 4/5 of the way to the midrib; pubescence of the lower leaf surface greenish yellow, matted, and glandlike, usually sloughing off by late in the year; [section *Lobatae*; subsection *Phellos*] ..... ***Quercus laevis***
8 Petioles 2-5 cm long, not twisted so that the blade is oriented in a vertical plane; leaves shallowly to deeply lobed, some of the leaves on a tree generally shallowly lobed, none of the sinuses extending > 2/3 of the way to the midrib; pubescence of the lower leaf surface tawny or gray, stellate, not glandlike, persistent or sloughing off by late in the year.
9 Acorns 12-20 mm long, in a cup 15-25 mm across and 10-12 mm deep; mature leaves loosely and rather coarsely pubescent (the stellate hairs conspicuous and readily distinguishable at 10× magnification), often becoming nearly or entirely glabrous by late in the year (except for tufts of hairs in the vein axils); terminal bud 4-angled, 7-10 mm long, densely gray-tomentose; [section *Lobatae*; subsection *Coccineae*] ..... ***Quercus velutina***
9 Acorns 10-15 mm long, in a cup 12-14 mm across and 4-5 mm deep; mature leaves densely and finely pubescent (the stellate hairs minute and scarcely distinguishable at 10× magnification), the pubescence permanent; terminal bud only obscurely angled (if at all), 5-8 mm long, brown-puberulent; [section *Lobatae*; subsection *Phellos*].
10 Base of blades of sun-leaves typically rounded, thus forming a U-shape (some leaves cuneate, angled, or oblique); terminal lobe of leaves generally long-attenuated, narrow (its sides nearly parallel for much of its length), and curved to one side (falcate) (note that trees with the trilobed leaf form will key out above); leaves with 3-7 well-developed lobes, these often very irregular in size, shape, spacing, and orientation; pubescence of lower leaf surface normally tawny (when fresh) ..... ***Quercus falcata***
10 Base of blades of sun-leaves typically cuneate or angled, thus forming a V-shape (some leaves somewhat U-shaped or oblique); terminal lobe of leaves generally short, broadly triangular (its sides normally tapering toward the tip for most of their length), not strongly curved to one side; leaves with 5-9 well-developed lobes, these generally rather uniform in size, shape, spacing, and orientation; pubescence of leaf surface gray ..... ***Quercus pagoda***
6 Mature leaves glabrous beneath on the surface, with tufts of hairs in the main vein axils beneath.
11 Petioles 0.5-1.0 (-1.8) cm long, generally twisted such that the blade is oriented in a vertical plane; inner cup-scales of the acorn cup inflexed, thus the cup appearing to have a broadly rounded rim; [section *Lobatae*; subsection *Phellos*] ..... ***Quercus laevis***
11 Petioles 2.0-7 cm long, not twisted so that the blade is oriented in a vertical plane; inner cup-scales of the acorn cup not inflexed, thus the cup appearing to have a sharp rim appressed against the acorn.
12 Terminal buds 4-angled, 7-10 mm long, the bud scales densely gray-tomentose; [section *Lobatae*; subsection *Coccineae*] ..... ***Quercus velutina***
12 Terminal buds not 4-angled, 3-5 (-7) mm long, the bud scales glabrous or with ciliate margins.
13 Leaves relatively shallowly lobed, the sinuses extending up to 2/3 of the way to the midrib; upper leaf surface dull, not lustrous; [section *Lobatae*; subsection *Coccineae*].
..... ***Quercus rubra var. rubra***
13 Leaves relatively deeply lobed, the sinuses extending 2/3 to 9/10 of the way to the midrib; upper leaf surface lustrous.
15 Larger lateral lobes of most leaves with 1 bristle per lobe (-2 on some lobes); total bristle tips < 10/leaf; [section *Lobatae*; subsection *Phellos*].....
..... ***Quercus georgiana***
15 Larger lateral lobes of most leaves with 2 or more bristles; total bristle tips 9-50/leaf.
16 Terminal bud moderately to strongly silver or reddish pubescent in its upper half; [section *Lobatae*; subsection *Coccineae*].
..... ***Quercus coccinea***
16 Terminal bud glabrous or with a few scattered hairs.
19 Primary leaf lobes (and the secondary veins leading to them) largely alternate; acorn cup with thin (< 1.5 mm in cross section) walls, deeply goblet-shaped, covering 1/3-1/2 of the nut, the inner surface pubescent; [section *Lobatae*; subsection *Palustres*] ..... ***Quercus texana***
19 Primary leaf lobes (and the secondary veins leading to them) opposite or sub-opposite; acorn cup with thick (> 1.5 mm in cross section) walls, saucer- or cup-shaped, covering 1/4-1/3 of the nut, inner surface glabrous or with ring of hairs around scar.
20 Leaf blades mostly as wide or wider than long, 5 (-7)-lobed; [of dry glades and ridgetops]; [section *Lobatae*; subsection *Coccineae*]
21 [AR only] ..... ***Quercus acerifolia***
21 [fairly widespread in the inland provinces] ..... ***Quercus species 1***
20 Leaf blades mostly longer than wide, 5-7 (-11)-lobed; [of submesic or moist slopes and bottomlands].
..... ***Quercus shumardii***

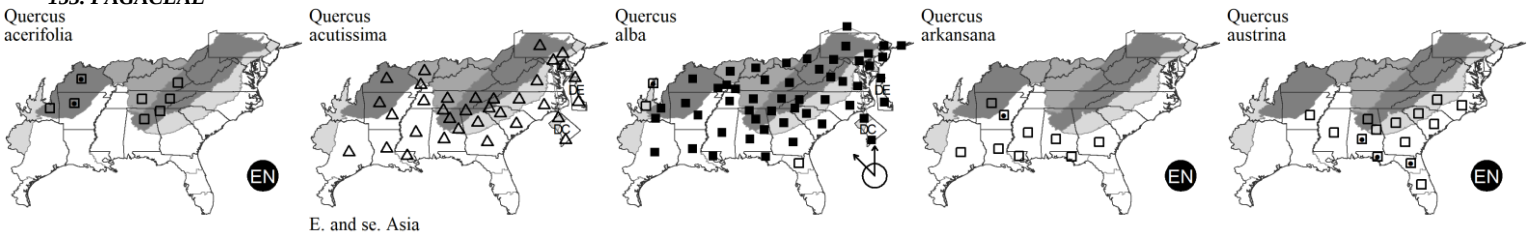
Quercus acerifolia (E.J. Palmer) Stoynoff & W.J. Hess ex R.J. Jensen. MAPLE-LEAF OAK. **Hab:** Glades and dry ridge-tops, calcareous glades, calcareous woodlands. **Dist:** Interior Highlands of AR, MO, and OK; disjunct in limestone areas in c. TN, and e. KY, e. TN, nw. GA, and ne. AL. **Phen:** Apr; Sep-Oct (of the second year). **Tax:** The circumscription adopted here of *Q. acerifolia* includes dry, calcareous site plants often called *Q. shumardii* var. *schneckii*, but this name is misapplied to them. **Syn:** = K3, K4; > *Quercus acerifolia* (E.J. Palmer) Stoynoff & W.J. Hess ex R.J. Jensen – Ar, FNA3; > *Quercus shumardii* var. *schneckii* (Britton) Sargent – Ar.

* ***Quercus acutissima*** Carruthers. SAWTOOTH OAK. **Hab:** Commonly cultivated as a suburban street tree and also widely planted in 'wildlife food plots', rarely naturalizing. **Dist:** Native of Japan. This species has been a popular recommendation for 'wildlife plantings' in the recent past, and entire stands can be encountered in relatively remote areas, planted by federal and state land management agencies; why 'wildlife' species in our area need more oak trees is somewhat mystifying! **Comm:** See Whittemore (2004) for additional information. Spreading from plantings in Knoxville, TN (D. Estes, pers. comm., 2007). **Syn:** = Ar, Il, K1, K3, K4, Pa, Va. NatureServe GNR (Not Yet Ranked).

Quercus alba Linnaeus. WHITE OAK. **Hab:** Mesic to xeric forests. **Dist:** ME west to MN, south to Panhandle FL and e. TX. **Phen:** Apr; Sep-Nov (of the same year). **Tax:** Hardin (1975) discusses introgression between *Q. alba* and many other species of *Quercus* subgenus *Quercus*. **Comm:** Historically, one of the most valuable timber trees of eastern North America. *Q. alba* is probably the most abundant native plant in our area, and in eastern North America, based on biomass, leaf area, and ubiquity. **Syn:** = Ar, C, F, Fl2, FNA3, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, W, WH3, WV; < *Quercus alba* Linnaeus – S.

Quercus arkansana Sargent. ARKANSAS OAK. **Hab:** Dry bluffs. **Dist:** Sw. and wc. GA and Panhandle FL west in a fragmented distribution to sw. AR and e. TX. **Syn:** = Ar, Fl2, FNA3, K1, K3, K4, S, WH3. NatureServe G3 (Vulnerable).

Quercus austrina Small. BLUFF OAK. **Hab:** River bluffs, mesic hammocks, dry hammocks, natural levees of brownwater rivers, over mafic rocks, on shell or calcareous sediments. **Dist:** Essentially a Southeastern Coastal Plain endemic: sc. NC south to n. FL and west to MS, and apparently disjunct in sw. AR. **Phen:** Apr; Oct (of the same year). **Syn:** = Ar, Fl2, FNA3, K1, K3, K4, RAB, WH3; < *Quercus alba* Linnaeus – S.



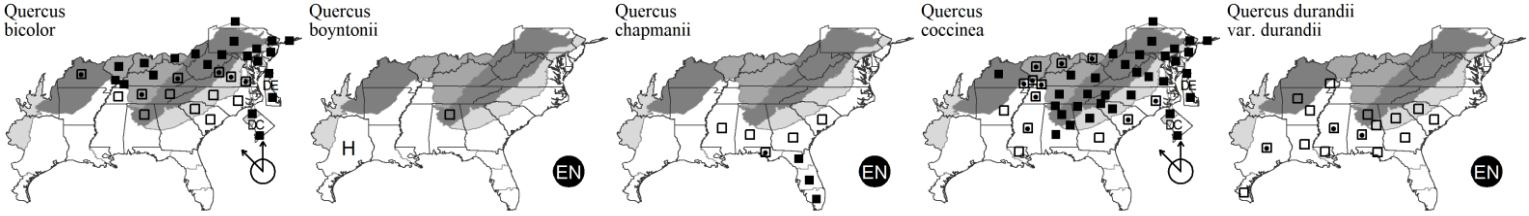
Quercus bicolor Willdenow. SWAMP WHITE OAK. **Hab:** Bottomland swamps and wet forests with calcareous sediments, upland depression swamp forests over mafic rocks such as gabbro or diabase. **Dist:** ME, ON and MN, south to NC, SC (Nelson 1993), TN, n. AL, MS, and s. MO. **Phen:** Apr; Sep (of the same year). **Syn:** = C, F, FNA3, G, GrPl, GW2, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Va, W. NatureServe G5 (Secure).

Quercus boyntonii Beadle. BOYNTON OAK. **Hab:** Dry forests. **Dist:** Ne. AL and (possibly) TX. **Syn:** = FNA3, K1, K3, K4, S, Tx. NatureServe G1 (Critically Imperiled).

Quercus chapmanii Sargent. CHAPMAN OAK. **Hab:** Dry pinelands, longleaf sandhills, scrubby flatwoods, Florida scrub. **Dist:** A Southeastern Coastal Plain endemic: se. SC south to s. FL, west to sw. AL. **Phen:** Feb-Mar; Sep-Nov (of the same year). **Syn:** = Fl2, FNA3, K1, K3, K4, RAB, S, WH3. NatureServe G4G5 (Apparently Secure).

Quercus coccinea Münchhausen. SCARLET OAK. **Hab:** Xeric upland forests. **Dist:** Centered in the Appalachians, from s. ME south to c. AL, but ranging west to MS, ne. AR (Crowleys Ridge), s. IL, and s. MI. **Phen:** Apr-May; Sep-Nov (of the second year). **Syn:** = Ar, C, F, FNA3, G, Il, K3, K4, NE, NY, Pa, RAB, S, Tn, Va, W, WV; > *Quercus coccinea* var. *coccinea* – K1; > *Quercus coccinea* var. *tuberculata* Sargent – K1.

Quercus durandii Buckley *var*. ***durandii***. DURAND'S OAK, BASTARD OAK, DURAND'S WHITE OAK. **Hab:** Calcareous bluffs, glades, prairies, ravines, hardwood flatwoods, bottomland forests. **Dist:** Se. SC south to FL Panhandle, west to e. TX and sw. AR. **Phen:** Apr-May; Sep-Nov (of the same year). **Tax:** The name *Q. sinuata* was interpreted by Ward (2007d) as most likely to apply to the hybrid *Q. falcata* × *phellos*, and he neotypified the name based on that basis. **Syn:** = *Quercus sinuata* Walter var. *sinuata* – FNA3, K1, K3, K4, NcTx, Tx; > *Quercus durandii* Buckley – RAB, S; < *Quercus sinuata* – Ar. NatureServe G4G5T4 (Apparently Secure).



Quercus elliottii Wilbur. RUNNING OAK. **Hab:** Pine flatwoods, especially on loamy soils in the Middle Coastal Plain, pine rocklands. **Dist:** A Southeastern Coastal Plain endemic: se. NC south to s. FL and west to s. MS. **Phen:** Mar-Apr; Sep (of the first year). **Tax:** Wilbur (2002b) and Wilbur & Ho (2008) discussed the reasons for rejecting the traditional use of *Q. pumila* for this species; Walter's diagnosis stated that *Q. pumila* has leaves that are glabrous and glaucous below, ruling out application to this species. Ward (2007d) disagreed and defended the traditional usage. **Syn:** = K3, K4, Wilbur & Ho (2008), Wilbur (2002b); = *Quercus pumila* Walter – Fl2, FNA3, K1, RAB, S, WH3, Hunt (1990), Ward (2007d), misapplied. NatureServe G3G5 (Apparently Secure).

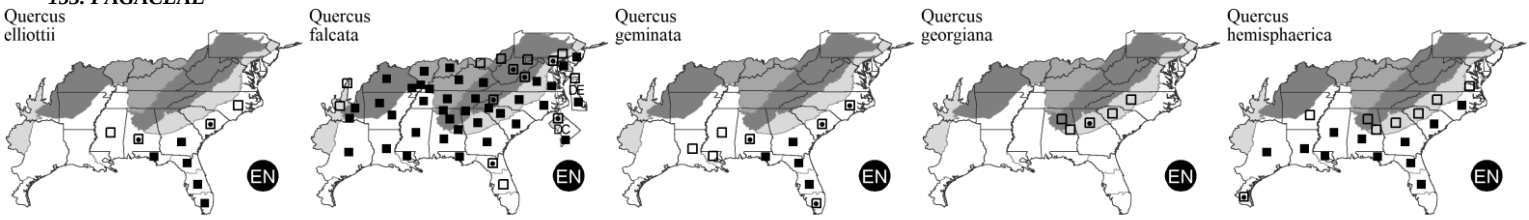
Quercus falcata Michaux. SPANISH OAK, SOUTHERN RED OAK. **Hab:** Upland forests, usually xeric or submesic, but occasionally in mesic situations. **Dist:** Widespread in se. North America, north to e. OK, s. MO, s. IL, s. IN, s. OH, WV, se. PA, NJ, and reported (apparently without specimen documentation) from Long Island, NY. **Phen:** Apr-May; Sep-Nov (of the second year). **Comm:** "*Q. triloba* Michaux", the form with the leaves only shallowly trilobed at the apex, can cause confusion. Though even medium-sized trees sometimes have leaves only of this form (rather than the typical form, deeply 5-7-lobed, the terminal lobe long-attenuate and falcate), it has no taxonomic merit. **Syn:** = Ar, C, Fl2, FNA3, Il, K1, K3, K4, NcTx, Pa, Tn, Va, W, WH3, WV; = *Quercus falcata* var. *falcata* – G, GW2, RAB; = *Quercus rubra* – S, misapplied; < *Quercus falcata* Michaux – Tx; > *Quercus falcata* var. *falcata* – F; > *Quercus falcata* var. *triloba* (Michaux) Nuttall – F.

Quercus geminata Small. SAND LIVE OAK. **Hab:** Xeric sandhills (northward restricted to areas very near the coast), Florida scrub, coastal dry hammocks. **Dist:** A Southeastern Coastal Plain endemic: se. NC south to s. FL, and west to s. MS. **Phen:** Apr; Sep-Nov (of the same year). **Comm:** The alleged occurrence of *Q. geminata* as far north as se. VA is apparently based on ambiguous specimens that probably are only *Q. virginiana* (the so-called var. *maritima*). A careful study of the genetics, morphology, and ecology of *Q. geminata* and *Q. virginiana* supports their recognition as separate species (Cavender-Bares & Pahlich 2009). *Q. geminata* flowers about 2-3 weeks later than *Q. virginiana* when growing in close proximity. **Syn:** = Fl2, FNA3, GW2, K1, K3, S, WH3; < *Quercus virginiana* P. Miller – RAB.

Quercus georgiana M.A. Curtis. GEORGIA OAK. **Hab:** Dry slopes, ridges, and bluffs, mainly over granite and quartzite. **Dist:** Sc. NC south and west through GA to c. AL; the NC population discovered by David Campbell in 2010 (pers.comm., specimens at NCU and UNCC). **Phen:** Apr; Sep-Oct (of the second year). **Comm:** This small tree conspicuously retains tawny dry leaves through the winter, reminiscent of *Acer leucoderme*, *Acer floridanum*, and young *Fagus grandifolia*. **Syn:** = FNA3, K1, K3, K4, RAB, S. NatureServe G3 (Vulnerable).

Quercus hemisphaerica Bartram ex Willdenow. SAND LAUREL OAK, DARLINGTON OAK. **Hab:** Longleaf pine sandhills, dry hammocks, and other dry, sandy soils, a component of maritime forests with *Q. virginiana*, and widely planted as a street tree in most parts of our region. **Dist:** Essentially a Southeastern Coastal Plain endemic: se. VA south to c. FL and west to s. TX, north uncommonly in the interior to nc. AL, n. MS, and s. AR. **Phen:** Mar-Apr; Sep-Nov (of the second year). **Comm:** Often confused with *Q. laurifolia* (see the key for distinctions). *Q. hemisphaerica* is the semi-evergreen laurel oak planted widely as a street tree in southern cities, often intermixed with the strictly deciduous *Q. phellos*. **Syn:** = Ar, C, F, FNA3, K3, K4, Tx, Va, Hunt (1990); = *Quercus laurifolia* Michaux – S, misapplied; > *Quercus hemisphaerica* var. *hemisphaerica* – K1; > *Quercus hemisphaerica* var. *maritima* (Michaux) Muller – K1; < *Quercus laurifolia* Michaux – Fl2, RAB, WH3.

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



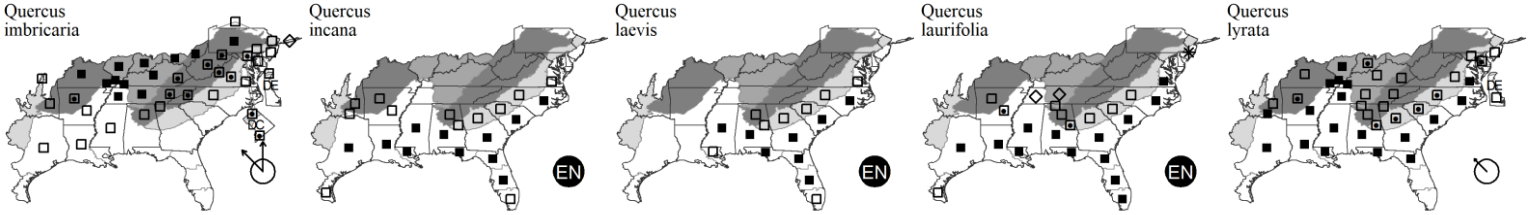
Quercus imbricaria Michaux. SHINGLE OAK. **Hab:** Rich soils of upper floodplains of rivers and creeks, often at the base of the slope into the upland, also on lower slopes, upland depression swamps, and in drier forests over diabase, limestone, or other calcareous or mafic claypan soils, rarely extending to 5100 feet elevation. **Dist:** Primarily midwestern, ranging from NJ, PA, n. OH, s. MI, n. IL, and c. IA, south to e. VA, nc. and w. NC, sc. TN, n. AL, and n. AR. **Phen:** Apr-May; Oct (of the second year). **Syn:** = Ar, C, F, FNA3, G, GrPl, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Va, W, WV, Hunt (1990). NatureServe G5 (Secure).

Quercus incana Bartram. BLUEJACK OAK. **Hab:** Sandhills, primarily in somewhat loamier textured, submesic soils, inland from the Coastal Plain on coarse sandy alluvium or upland ridges over quartzite or other acidic rocks. **Dist:** Primarily a species of the Southeastern Coastal Plain, but rarely extending inland into the Piedmont (especially on coarse sandy alluvium): se. VA south to c. peninsular FL and west to e. TX, sw. AR, and se. OK. **Phen:** Apr; Sep-Nov (of the second year). **ID Notes:** This oak is recognizable even at a distance by its bluish color. **Syn:** = Ar, F, Fl2, FNA3, K1, K3, K4, NcTx, RAB, Va, WH3, Hunt (1990); = *Quercus cinerea* Michaux – C, G, S. NatureServe G5 (Secure).

Quercus laevis Walter. TURKEY OAK. **Hab:** Longleaf pine sandhills, primarily in very xeric soils of deep sandy deposits (Carolina bay rims, old beach dunes, early Cenozoic deposits of the Sandhills Province), or inland from the Coastal Plain on dry ridges and slopes over quartzite or other acidic rock types. **Dist:** Essentially a Southeastern Coastal Plain endemic: se. VA south to s. FL and west to e. LA. **Phen:** Apr; Sep-Oct (of the second year). **Comm:** The leaves turn an intense orange-red in the autumn (Nov). **Syn:** = C, F, Fl2, FNA3, G, K1, K3, K4, RAB, S, Va, WH3, Hunt (1990). NatureServe G5 (Secure).

Quercus laurifolia Michaux. LAUREL OAK. **Hab:** Mesic to seasonally flooded soils of floodplains, also (rarely) mesic slopes and swamps in maritime forests. **Dist:** A Southeastern Coastal Plain endemic: se. VA south to s. FL and west to e. TX and s. AR. **Phen:** Mar-Apr; Sep-Nov (of the second year). **ID Notes:** Sometimes confused with *Q. hemisphaerica*, but (in addition to the key characters above) *Q. laurifolia* has blunter leaf tips, flowers about 2 weeks earlier, and generally occupies much moister habitats. **Syn:** = Ar, C, F, FNA3, G, GW2, K1, K3, K4, Tx, Va, Hunt (1990); = *Quercus obtusa* (Willdenow) Ashe – S; < *Quercus laurifolia* Michaux – Fl2, RAB, WH3.

Quercus lyrata Walter. OVERCUP OAK. **Hab:** Seasonally rather deeply and frequently flooded soils of floodplains of the Coastal Plain, less commonly in seasonally flooded swamps in Triassic basins in the lower Piedmont, and rarely in upland depression swamps of the Piedmont (developed over clays weathered from mafic rocks) and Coastal Plain. **Dist:** Primarily a species of the Southeastern Coastal Plain: DE south to Panhandle FL, west to e. TX and se. OK, north in the inland to w. TN, s. IN, s. IL, and se. MO. **Phen:** Mar-May; Sep-Oct (of the same year). **Comm:** Of our oaks, *Q. lyrata* tolerates the wettest habitats, both in terms of depth and duration of flooding. **Syn:** = Ar, C, F, Fl2, FNA3, G, GW2, Il, K1, K3, K4, NcTx, RAB, S, Tn, Tx, Va, WH3. NatureServe G5 (Secure).



Quercus macrocarpa Michaux *var*. ***macrocarpa***. BUR OAK, MOSSYCUP OAK. **Hab:** Rich bottomland forests, sometimes in drier forests, woodlands, oak savannas, and prairie edges, and then usually over limestone or other calcareous rocks. **Dist:** NB and QC west to s. MB, south to nw. VA, KY, TN, LA, and TX. **Phen:** Mar-May; Sep-Oct (of the same year). **Comm:** Variation in this species needs additional study; *Q. macrocarpa* in our area is the typic variety or subspecies if other taxa are recognized. **Syn:** = GrPl, K1, K3, K4; < *Quercus macrocarpa* – Ar, C, F, FNA3, G, GW2, Il, Mi, NcTx, NE, NY, Pa, S, Tn, Tx, Va, W, WV. NatureServe G5T5 (Secure).

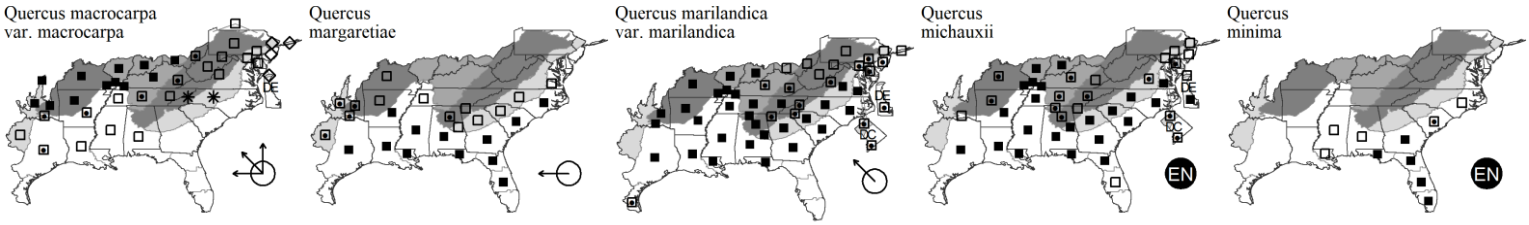
Quercus margaretiae Ashe ex Small. SAND POST OAK, MARGARET'S OAK. **Hab:** Longleaf pine sandhills, typically in slightly loamy or clayey soils, not usual in the deepest and most xeric sands; outside of the distribution of *Pinus palustris*, in deep sandy, loamy, or rocky sites; also dry bluff forests. **Dist:** Primarily a species of the Southeastern Coastal Plain: se. VA south to FL and west to c. TX and OK. **Phen:** Apr; Sep-Nov (of the same year). **Tax:** As stated by Fernald (1950), this oak was "chivalrously named [by W.W. Ashe] in 1903 for Margaret Henry Wilcox, who two years later became Mrs. Ashe". There has been controversy, however, over the spelling of the specific epithet; it should be corrected to '*margaretiae*' (Weakley & McCormick 2020). **Syn:** *Quercus margaretta* – Ar, orthographic variant; = *Quercus margaretta* – C, FNA3, G, RAB, S, Tn, WH3, orthographic variant; = *Quercus margarettae* Ashe ex Small – Fl2, K3, K4, Va, orthographic variant; = *Quercus margarettiae* Ashe ex Small – K1, NcTx, orthographic variant; = *Quercus stellata* var. *margaretta* (Ashe ex Small) Sargent – F, GrPl, orthographic variant; > *Quercus drummondii* Liebmann – Tx; > *Quercus margaretta* – Tx. NatureServe G5 (Secure).

Quercus marilandica Münchhausen *var*. ***marilandica***. BLACKJACK OAK. **Hab:** Upland forests and woodlands, usually on periodically droughty soils, as over shrink-swell clays, sandstones, deep sands, sands with clay lenses, and shallow soils over acidic bedrock. **Dist:** NY (Long Island), NJ, se. PA, w. VA, s. OH, s. IN, c. IL, s. IA, and se. NE south to s. GA, Panhandle FL, and sc. TX (west to the Prairie border). **Phen:** Apr-May; Sep-Nov (of the second year). **Comm:** There are historical accounts of the existence of prairies or barrens in the vicinity of Charlotte in the late eighteenth century, known as the "the blackjack lands". These areas were described as open and prairie-like, until the early nineteenth century, when they became dominated by dense forests of blackjack oak. The previously open condition was almost certainly maintained by fire, perhaps set by the Waxhaw Indians. Blackjack oak has long been considered an indicator of 'poor' soil (from an agricultural perspective), as in Guthrie (1820), who

states in his discussion of NC, "the Black Jack land is generally poor, … and is avoided by farmers, as unproductive". **Syn:** = Ar, K1, NY, Va, Hunt (1990); < *Quercus marilandica* – C, F, Fl2, FNA3, G, GrPl, Il, K3, K4, NcTx, Pa, RAB, S, Tn, Tx, W, WH3, WV. NatureServe G5T4T5 (Apparently Secure).

Quercus michauxii Nuttall. BASKET OAK, SWAMP CHESTNUT OAK. **Hab:** Bottomland forests, especially in fertile soils of upper terraces where flooded only infrequently and for short periods, upland depression ponds, sometimes on moist lower slopes. **Dist:** NJ south to n. peninsular FL and west to e. TX and se. OK, north in the interior to s. IL and s. IN. **Phen:** Apr-May; Sep-Oct (of the same year). **Tax:** See discussion under *Q. montana* about the application of the name *Q. prinus* Linnaeus. **Syn:** = Ar, C, F, Fl2, FNA3, G, GW2, Il, K1, K3, K4, RAB, Tn, Va, W, WH3; = *Quercus prinus* Linnaeus – S, Tx, name rejected (possibly misapplied and a source of confusion).

Quercus minima (Sargent) Small. DWARF LIVE OAK. **Hab:** Pine flatwoods, coastal fringe sandhills, pine rocklands. **Dist:** A Southeastern Coastal Plain endemic: se. NC (New Hanover County) south to s. FL, west to s. MS. **Phen:** Apr; Sep-Nov (of the same year). **Syn:** = Fl2, FNA3, K1, K3, K4, S, WH3.



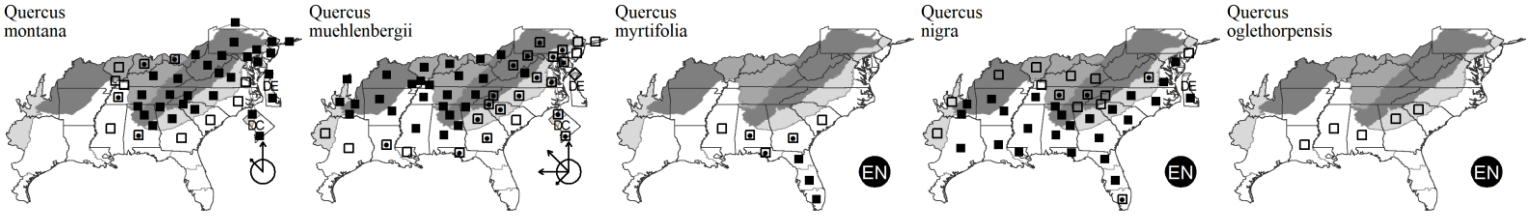
Quercus montana Willdenow. ROCK CHESTNUT OAK, MOUNTAIN OAK. **Hab:** Xeric forests of ridges and slopes, shale barrens, occasionally in mesic situations especially where rocky. **Dist:** Primarily Appalachian but broadly distributed in e. North America: s. ME, NY, MI, s. UN, s. IL, and se. MO (Smith & Parker 2005) south to c. GA, c. AL, ne. MS (and LA?). **Phen:** Apr; Sep-Nov (of the same year). **Tax:** The proper application of the Linnaean "*Q. prinus*" has been controversial and unclear, having been debated and variously applied for well over a century. The name "*Q. prinus*" has nomenclatural priority over either "*Q. montana*" or "*Q. michauxii*", but it is not clear which species was intended; after centuries of uncertainty, Whittemore & Nixon (2005) proposed its formal rejection and the proposal was formally and unanimously accepted (Brummitt 2007). **Syn:** = FNA3, K3, K4, Mi, NE, NY, Pa, S, Tn, Va, W; = *Quercus prinus* Linnaeus – C, F, G, Il, K1, RAB, WV, name rejected (probably misapplied, and a source of confusion).

Quercus muehlenbergii Engelmann. YELLOW OAK, CHINQUAPIN OAK. **Hab:** Slopes and bluffs, on soils derived from calcareous or mafic rocks. **Dist:** S. New England and ON west to WI, se. MN, and IA, south to nw. FL, TX, and n. Mexico (CHH, COA, NLE, SON, TAM). **Phen:** Apr-May; Oct-Nov (of the same year). **Tax:** The species was originally named as "*Quercus mühlenbergii*", which must be corrected under the Shenzhen Code to '*muehlenbergii'*. **Comm:** The similar *Q. montana* sometimes has a few leaves with somewhat sharply lobed leaves, but these are minutely mucronate and lack the well-developed callus of *Q. muehlenbergii*. Additionally, *Q. muehlenbergii* has a flaky, light gray bark, very different from the dark gray, deeply furrowed bark of *Q. montana*. **Syn:** = Ar, C, F, Fl2, GrPl, K1, K3, K4, Mex, Mi, NcTx, NE, NY, RAB, Tx, Va, WH3, WV; = *Quercus muhlenbergii* – FNA3, Il, Pa, S, Tn, W, orthographic variant; = *Quercus prinoides* Willdenow var. *acuminata* (Michaux) Gleason – G. NatureServe G5 (Secure).

Quercus myrtifolia Willdenow. MYRTLE OAK. **Hab:** Longleaf pine sandhills, Florida scrub, oak scrub, dry flatwoods, coastal dunes. **Dist:** A Southeastern Coastal Plain endemic: se. SC south to s. FL, west to se. MS. **Phen:** Feb-Mar; Sep (of the second year). **Syn:** = Fl2, FNA3, K1, K3, K4, RAB, WH3, Hunt (1990); < *Quercus myrtifolia* Willdenow – S.

Quercus nigra Linnaeus. WATER OAK, PADDLE OAK. **Hab:** Bottomland forests, especially on levees or second terraces where flooded infrequently and for short periods, less commonly on mesic slopes, but also now widely distributed and common as a "weed tree" in upland situations. **Dist:** Primarily a species of the Southeastern Coastal Plain: s. NJ south to s. FL and west to e. TX and se. OK, north in the interior to se. TN, c. TN, w. and sc. KY (Clark et al. 2005), se. MO, and e. OK. **Phen:** Apr; Sep-Nov (of the second year). **Comm:** Seedlings and fire sprouts of this species are highly variable in leaf morphology; see discussion at end of generic treatment. **Syn:** = Ar, C, Fl2, FNA3, G, GW2, Il, K1, K3, K4, NcTx, RAB, S, Tn, Va, W, WH3, Hunt (1990); > *Quercus nigra* var. *heterophylla* (Aiton) W.W. Ashe – F; > *Quercus nigra* var. *nigra* – F.

Quercus oglethorpensis Duncan. OGLETHORPE OAK. **Hab:** Bottomland forests, upland oak flats over clays (Iredell and Enon soils). **Dist:** Widely scattered from nc. SC, to adjacent ec. And c. GA, AL (Sorrie pers. comm. 2002), c. MS, and ne. LA. **Phen:** Apr; Sep-Oct (of the same year). **Syn:** = FNA3, GW2, K1, K3, K4, RAB. NatureServe G3 (Vulnerable).



Quercus pagoda Rafinesque. CHERRYBARK OAK, SWAMP SPANISH OAK. **Hab:** Bottomland forests, especially on second terraces, also mesic to dry-mesic upland sites, especially where somewhat base-rich. **Dist:** A Southeastern Coastal Plain endemic: e. and c. VA south to nw. FL and west to se. TX and north in the interior to e. TN, s. IL, and s. IN. **Phen:** Apr-May; Sep-Nov (of the second year). **Syn:** = Ar, C, Fl2, FNA3, Il, K1, K3, K4, S, Tn, Va, WH3; = *Quercus falcata* var. *pagodifolia* Elliott – F, G, GW2, RAB; < *Quercus falcata* Michaux – Tx.

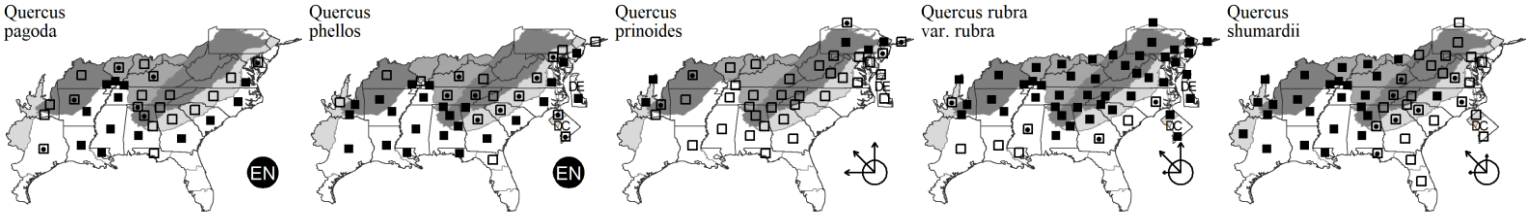
Quercus phellos Linnaeus. WILLOW OAK, "PIN OAK". **Hab:** Bottomland forests, especially on natural levees and second terraces, also in upland depression swamps developed on clay soils and in upland clay hardpan situations, weedy and successional on slopes and upland sites as a "weed tree" following disturbance, and widely planted as a street tree in towns and cities. **Dist:** Primarily a species of the Southeastern Coastal Plain: NY (Long Island), s. NJ, and se. PA south to s. GA and Panhandle FL, west to e. TX and se. OK, north in the interior to e. TN, s. KY, w. KY, s. IL, and se. MO, and e. OK. **Phen:** Mar-May; Sep-Nov (of the second year). **Syn:** = Ar, C, F, Fl2, FNA3, G, GW2, Il, K1, K3, K4, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, Hunt (1990). NatureServe G5 (Secure).

Key to Map Symbology: □ native; ◇ maybe exotic; △ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Quercus prinoides Willdenow. DWARF CHINQUAPIN OAK. **Hab:** Xeric upland glades, barrens, and woodlands, on clay soils derived from mafic or calcareous rocks or in sandy acidic soils, probably in sites which naturally burned rather frequently. **Dist:** MA and s. MI south to NC, Panhandle FL (L. Anderson, pers.comm., 2021), OK, and TX. **Phen:** Apr; Aug-Sep (of the same year). **Comm:** Fire suppression in the sites where this rare oak occurs has nearly or entirely extirpated it from much of our area. **Syn:** = Ar, C, FNA3, GrPl, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Va, W; = *Quercus prinoides* var. *prinoides* – G; > *Quercus prinoides* var. *prinoides* – F; > *Quercus prinoides* var. *rufescens* Rehder – F. NatureServe G5 (Secure).

Quercus rubra Linnaeus *var*. ***rubra***. RED OAK. **Hab:** Moist to fairly dry forests of slopes, coves, and ravines, below 1000 meters elevation. **Dist:** Widespread in e. North America, south to e. VA, GA, AL, MS, AR, and OK. **Phen:** Apr; Aug-Sep (of the second year). **Syn:** = F, FNA3, K1, Mi, RAB, WV; = *Quercus borealis* Michaux f. var. *maxima* (Marshall) W.W. Ashe – G, GrPl; = *Quercus maxima* (Marshall) W.W. Ashe – S; < *Quercus rubra* – Ar, C, Il, K3, K4, NE, NY, Pa, Tn, Va, W. NatureServe G5T5 (Secure).

Quercus shumardii Buckley. SHUMARD OAK. **Hab:** Moist and fertile soils of bottomlands and moist slopes, also in xeric sites over calcareous rocks (such as limestone). **Dist:** Sc. PA, OH, s. MI, IN, s. IL, MO, and e. KS south to n. peninsular FL and TX. **Phen:** Apr; Sep-Oct (of the second year). **Tax:** A number of varieties have been recognized in *Q. shumardii*, and the morphological and habitat variation needs additional study. Var. *schneckii* (Britton) Sargent is apparently distributed in calcareous uplands west of the Blue Ridge, especially on dry limestone slopes. It is allegedly distinguished by the acorn cups rounded to turbinate below (vs. flattened and saucer-shaped in var. *shumardii*). Hess & Stoynoff (1998) tentatively concluded that no varieties should be recognized within *Q. shumardii*. Additional study is needed. **Syn:** = C, Fl2, FNA3, K3, K4, Mi, NcTx, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3; = *Quercus shumardii* var. *shumardii* – Ar; > *Quercus shumardii* var. *schneckii* (Britton) Sargent – F, G, GrPl, Il, K1, WV, misapplied; > *Quercus shumardii* var. *shumardii* – F, G, GrPl, Il, K1, WV.



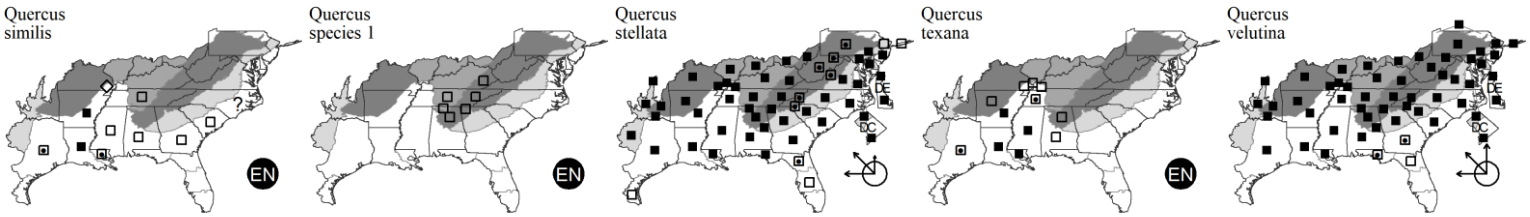
Quercus similis W.W. Ashe. SWAMP POST OAK, DELTA OAK. **Hab:** Hardwood flatwoods and bottomland hardwood forests, especially over calcareous or subcalcareous substrates. **Dist:** SC south to GA, west to e. TX; disjunct in c. TN. **Comm:** *Q. similis* resembles *Q. stellata*, differing in its less definitely cross-shaped leaves and its distinctly wetland habitat. **Syn:** = Ar, FNA3, K1, K3, Tn, Tx; < *Quercus stellata* Wangenheim.

Quercus species 1. **Hab:** Glades and dry ridge-tops, calcareous glades, calcareous woodlands. **Dist:** Interior Highlands of AR, MO, and OK; disjunct in limestone areas in c. TN, and e. KY, e. TN, nw. GA, and ne. AL. **Phen:** Apr; Sep-Oct (of the second year).

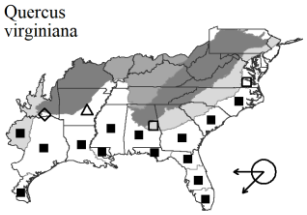
Quercus stellata Wangenheim. POST OAK. **Hab:** Upland forests and woodlands, especially in clay or rocky soils and in communities at least formerly exposed to fire. **Dist:** Se. MA, s. NY, s. PA, s. OH, s. IN, s. IA, and e. KS south to n. peninsular FL and c. and se. TX. **Phen:** Apr; Sep-Nov (of the same year). **Tax:** In KS, OK, and TX, post oak is one of the trees that forms the Prairie boundary. There is no question of the distinctness of *Q. margaretiae* from *Q. stellata*. See *Q. similis*. **Syn:** = Ar, C, Fl2, FNA3, G, Il, K1, K3, K4, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV; = *Quercus stellata* var. *stellata* – F, GrPl; < *Quercus stellata* Wangenheim.

Quercus texana Buckley. NUTTALL OAK, TEXAS RED OAK. **Hab:** Bottomland hardwood forests, hardwood flatwoods, swamps, also now widely planted well east of its native distribution. **Dist:** AL, TN, w. KY (Clark et al. 2005), s. IL, se. MO, south and west to e. TX. **Phen:** Apr-May. **Syn:** = Ar, FNA3, Il, K1, K3, Tn; = *Quercus nuttallii* E.J. Palmer – F, GW2.

Quercus velutina Lamarck. BLACK OAK, QUERCITRON. **Hab:** Upland forests and woodlands, especially in fairly xeric and sandy soils. **Dist:** ME west to MN and NE, south to Panhandle FL and TX. **Phen:** Apr-May; Sep-Oct (of the second year). **Syn:** = Ar, C, F, Fl2, FNA3, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV. NatureServe G5 (Secure).



Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



Quercus virginiana P. Miller. LIVE OAK. **Hab:** Locally common to abundant in maritime forests and maritime scrub on barrier islands, more rarely inland (though regularly on the mainland from se. NC south, and extending substantially inland from s. SC south), sometimes in dry, fire-maintained habitats more usually occupied by *Q. geminata*, also planted (especially in the outer Coastal Plain). **Dist:** A Southeastern Coastal Plain endemic: se. VA south to s. FL and west to TX. Villaseñor (2016) lists *Q. virginiana* as also fairly widespread in Mexico (CHH, COA, NLE, SLP, TAM, VER). **Phen:** Apr; Sep-Nov (of the same year). **Comm:** *Q. fusiformis* Small of TX has sometimes been treated as a variety of *Q. virginiana*, but is best separated as a species. Flowering before *Q. geminata* when growing together. **Syn:** = Ar, Fl2, FNA3, GW2, K1, K3, K4, Mex, NcTx, S, Va, WH3; > *Quercus geminata* Small – C, misapplied; > *Quercus minima* (Sargent) Small – Tx, misapplied; < *Quercus virginiana* P. Miller – G, RAB; > *Quercus virginiana* P. Miller – C, Tx; > *Quercus virginiana* var. *maritima* (Michaux) Sargent – F, misapplied; > *Quercus virginiana* var. *virginiana* – F.

154. MYRICACEAE Richard ex Kunth 1817 (BAYBERRY FAMILY) [in FAGALES]

A family of about 3-5 genera and 55 species, trees and shrubs, nearly cosmopolitan. See *Morella* for discussion of our three genera. References: Bornstein (1997) in FNA3 (1997); Elias (1971b); Kubitzki, Rohwer, & Bittrich (1993); Wilbur (1994).

Morella Loureiro 1790 (BAYBERRY, WAX-MYRTLE, CANDLEBERRY)

Wilbur (1994) makes a compelling case for the recognition of three genera among eastern North American Myricaceae, and for application of the name *Myrica* to *Myrica gale*. The typification of the genus *Myrica* with *Myrica gale* Linnaeus has been confirmed (Brummitt 1999); thus, the familiar southeastern species placed by many authors in *Myrica* must take another name. Wilbur (1994) prefers to treat our species as subgenus *Cerothamnus* (Tidestrom) Wilbur of genus *Morella* Loureiro; subgenus *Morella* is restricted to e. Asia, the Philippines, and Malaysia, and differs in a number of ways from subgenus *Cerothamnus*, including its fleshy and succulent, rather than waxy and hard, berries. Small maintained *Cerothamnus* at the generic level. Wilbur's inclusion of *Cerothamnus* in *Morella* may well be warranted (and is followed here), but I disagree with his provisional decision to include the taxon treated below as *Morella pumila* in *Morella cerifera*, and the taxon treated below as *Morella pensylvanica* in *Morella caroliniensis*, though their appropriate rank may be questioned. References: Bornstein (1997) in FNA3 (1997); Kubitzki, Rohwer, & Bittrich (1993); Wilbur (1994); Wilbur (2002a).

1 Fresh leaves odorless when crushed; staminate flowers with 6-10 stamens (or as few as 3 in distal flowers); leaves usually entire; [of s. GA south and west]; [subgenus *Cerothamnus*, series *Faya*] ..... ***Morella inodora***
1 Fresh leaves aromatic when crushed; staminate flowers with 3-5 (-7) stamens; leaves usually serrate, at least near the tip; [collectively widespread in our area]; [subgenus *Cerothamnus*, series *Cerothamnus*].
  2 Leaves oblanceolate (generally narrowly so), most of them 0.5-1.5 cm wide, 4-6× as long as wide, evergreen; mature fruits 2.0-3.5 mm in diameter.
    3 Medium shrub to small tree (usually 2-10 m tall), not stoloniferous; leaves of fertile branches 4-9 cm long, 8-20 mm wide; [of a wide range of wetland habitats, including wet Coastal Plain pinelands; also planted and naturalized in upland sites] ..... ***Morella cerifera***
    3 Small shrub (usually < 1 m tall), strongly stoloniferous; leaves of fertile branches 1.5-5 cm long, 3-13 mm wide; [restricted to Coastal Plain pinelands (or areas formerly so)] ..... ***Morella pumila***
  2 Leaves elliptic to broadly oblanceolate, most of them 1.5-4 (-5.2) cm wide, 2-4× as long as wide, evergreen to deciduous; mature fruits 3.0-7.0 mm in diameter. ..... ***Morella caroliniensis***

Morella caroliniensis (P. Miller) Small. POCOSIN BAYBERRY, EVERGREEN BAYBERRY. **Hab:** Pocosins, wet savannas and pine flatwoods, sandhill seepage bogs, and other peaty or sandy-peaty wetlands. **Dist:** Primarily limited to the Southeastern Coastal Plain, from NJ south to FL and west to TX and AR. **Phen:** Apr; Aug-Oct. **Tax:** *Morella caroliniensis* and *Morella pensylvanica* are not conspecific. **Syn:** = K1, K3, K4, Va; = *Myrica caroliniensis* P. Miller – WH3; = *Myrica heterophylla* Rafinesque – Ar, C, FNA3, RAB, Tx, W, Elias (1971b); < *Cerothamnus carolinensis* – S; < *Morella caroliniensis* (P. Miller) Small – Wilbur (1994); > *Myrica heterophylla* var. *curtissii* (Chevallier) Fernald – F; > *Myrica heterophylla* var. *heterophylla* – F; < *Myrica pensylvanica* Loiseleur – G, Pa. NatureServe G5 (Secure).

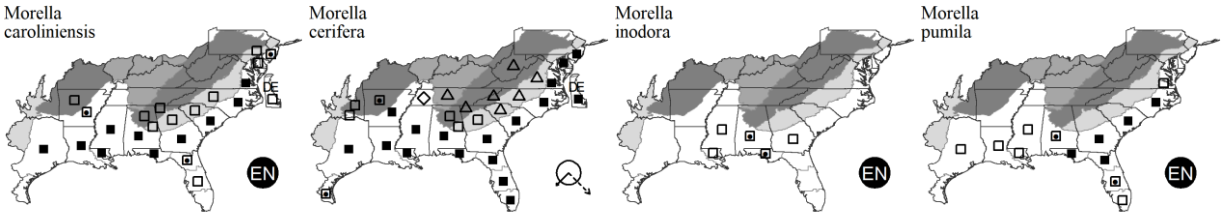
Morella cerifera (Linnaeus) Small. COMMON WAX-MYRTLE, SOUTHERN BAYBERRY. **Hab:** Interdune swales (where often dominant), pocosins, brackish marshes, other wet to moist habitats, now also widely planted (including in the Piedmont) as an ornamental or landscaping shrub and persistent or naturalizing in suburban woodlands. **Dist:** As a native, widespread in the Coastal Plain of Southeastern United States: NJ south to FL and west to TX; Bahamas; West Indies; Central America. **Phen:** Apr; Aug-Oct. **Comm:** Our most common *Morella*, and also the largest, sometimes becoming a small tree, to at least 15 m tall and 25 cm DBH. See *Morella pumila* for a discussion of the controversial taxonomy of *Morella cerifera* and *Morella pumila*. **Syn:** = K3, K4, Va; = *Cerothamnus ceriferus* (Linnaeus) Small – S; = *Myrica cerifera* – F, G, NcTx, Tx; = *Myrica cerifera* Linnaeus var. *cerifera* – RAB, Elias (1971b); < *Morella cerifera* (Linnaeus) Small – Il, K1, Wilbur (1994); < *Myrica cerifera* – Ar, C, FNA3, GW2, WH3.

Morella inodora (Bartram) Small. ODORLESS BAYBERRY. **Hab:** Acid wetlands, especially in wooded, acid, streamhead "bogs" and bayheads, often associated with *Magnolia virginiana*, *Tamala palustris*, *Cyrilla racemiflora*, *Cliftonia monophylla*, and *Lorinseria areolata*. **Dist:** A Southeastern Coastal Plain endemic: se. GA west to s. MS. **Syn:** = K1, K3, K4, Wilbur (1994); = *Cerothamnus inodorus* (Bartram) Small – S; = *Myrica inodora* Bartram – FNA3, GW2, WH3, Elias (1971b). NatureServe G4 (Apparently Secure).

Morella pumila (Michaux) Small. DWARF BAYBERRY, DWARF WAX-MYRTLE. **Hab:** Savannas, pine flatwoods, relatively moist to extremely dry sites in sandhills (under *Quercus laevis* and *Q. geminata*). **Dist:** A Southeastern Coastal Plain endemic: se. VA south to s. FL and west to e. TX. **Phen:** Mar-Apr; Aug-Oct. **Tax:** Some authors dismiss the distinction between this taxon and *Morella cerifera* as merely environmental, while others treat the two as distinct at the varietal or specific level. In our area at least, they appear to be genetically distinct. They often occur in close proximity (though their typical habitats differ, they can be seen side by side in wet spodosolic pine savannas, sometimes also intermixed with *Morella caroliniensis*), and maintain their distinctiveness. There are some observations that there is a phenologic difference, with *Morella pumila* peak flowering 3 weeks later than *Morella cerifera* (J. Townsend, pers. comm., 2002; A. Weakley, 2018). Though the issue remains unresolved, the stoloniferous growth of *Morella pumila* is not merely a fire response; I here maintain the two as distinct, pending further research. **Syn:** = K3, K4, Va;

154. MYRICACEAE

= *Cerothamnus pumilus* (Michaux) Small – S; = *Myrica cerifera* Linnaeus var. *pumila* Michaux – RAB, Elias (1971b); = *Myrica pusilla* Rafinesque – F, G, Tx; < *Morella cerifera* (Linnaeus) Small – K1, Wilbur (1994); < *Myrica cerifera* – C, FNA3, GW2, WH3.



155. JUGLANDACEAE A.P. de Candolle 1818 (WALNUT FAMILY) [in FAGALES]

A family of about 8 genera and 60 species, trees and shrubs, mostly temperate. References: Elias (1972); Manos & Stone (2001); Stone in Kubitzki, Rohwer, & Bittrich (1993); Stone (1997a) in FNA3 (1997).

2 Fruit with husk dehiscent into 4 valves; pith of twigs continuous; leaves with (3-) 5-17 (-19) leaflets, the largest usually the terminal or final 2 lateral; nut with shell smooth, ridged, or irregularly wrinkled (but not deeply furrowed); terminal buds with imbricate (overlapping) or valvate scales; [tribe *Juglandeae*, subtribe *Caryinae*]..... ***Carya***

2 Fruit with husk indehiscent; pith of twigs chambered (not always developing until autumn of the first year's growth); leaves with (7-) 11-19 (-23) leaflets, the largest usually about halfway up the leaf; nut with shell deeply furrowed in a complex corrugated pattern; terminal buds with valvate; [tribe *Juglandeae*, subtribe *Juglandinae*]..... ***Juglans***

Carya Nuttall 1818 (HICKORY)

Contributed by Alan S. Weakley & Robert K. Peet

A genus of about 18 species, trees, of e. North America (south into s. Mexico), and e. Asia. *Carya* in our area is separated into two sections, section *Apocarya* (*C. aquatica, C. cordiformis, C. illinoinensis*) and section *Carya* (*C. carolinae-septentrionalis, C. floridana, C. glabra, C. laciniosa, C. myristiciformis, C. ovalis, C. ovata, C. pallida, C. texana, C. tomentosa*). The southeastern United States is the center of diversity of *Carya*. Our area includes all 13 North American species, and 13 of 18 species worldwide. Section *Rhamphocarya* includes a single Asian species. The remaining 4 species in the genus are all in section *Apocarya*: *C. palmeri* Manning of Mexico and 3 Asian species. *C. cordiformis, C. aquatica, C. illinoinensis, C. myristiciformis, C. laciniosa, C. ovata,* and *C. carolinae-septentrionalis* are diploids, with n = 16. *C. pallida, C. floridana, C. texana, C. glabra, C. ovalis,* and *C. tomentosa* are tetraploids with n = 32 (Stone 1961). As suggested by Stone, Adrouny, & Flake (1969), it seems possible that reticulate evolution involving extant or extinct diploid species is responsible for some of the difficulties in the *C. glabra-ovalis* complex. Many hybrids have been described, but some are questionable. Additionally, Hardin & Stone (1984) state that "most of these hybrids are localized and have not led to introgressive populations, or at least none that have been recognized". Ecologically, *Carya* is one of the more diverse and ubiquitous genera of trees in our area, surpassed in number of species, abundance, and ecological amplitude only by *Quercus* and *Pinus*. This has led to a long tradition of describing large parts of our area (in particular the Piedmont) as being characterized by "oak-hickory" or "oak-pine-hickory" forests (e.g. Küchler 1964; Greller 1988; Schafale & Weakley 1990; Skeen, Doerr, & Van Lear 1993). Ware (1992) and others have recently questioned this tradition, pointing out that *Carya* only rarely dominates or codominates, primarily in specialized circumstances (such as in soils with greater cation concentrations, derived from mafic rocks). The association of many (but certainly not all) species of hickories with soils with high base status was noted in print as early as 1820 in an account of the landscape of North Carolina. "The sandy pine barrens, and all the lands on which pine is the exclusive growth, are unfriendly to agriculture; but where the pine is intermixed with oak and hickory, the soil is good. Some of our strongest lands have tall pine, mixed not only with hickory and oak, but also with walnut and cherry, and such trees that indicate the best soil. Where hickory prevails, the land is strong" (Guthrie 1820). References: Elias (1972); Hardin & Stone (1984); Hardin (1952); Hardin (1992); Harrar & Harrar (1962); Little (1969); Manning (1950); Sargent (1918); Stone in Kubitzki, Rohwer, & Bittrich (1993); Stone (1961); Stone (1997b) in FNA3 (1997); Stone, Adrouny, & Flake (1969).

Identification Notes: Surface vestiture of leaves and bud scales is useful in distinguishing species of *Carya*. Some use of these characters can be made with a 10× or 20× hand lens; better still is a dissecting microscope. It is important to understand the different trichome types mentioned in the key (terminology follows Hardin 1990 and Hardin & Stone 1984). Short acicular trichomes are simple, unicellular trichomes tapered to a pointed tip, 0.10-0.35 mm long and with rough walls. Long acicular trichomes ("solitary" of Hardin & Stone 1984) are similar to short acicular, but are much larger, 0.45-1.6 mm long, and have smooth walls. Fasciculate trichomes are multicellular and have 2-8 straight or curled rays radiating from a clustered base. Multiradiate trichomes are similar to fasciculate, but have 8-17 rays, the inner (and usually more upright) rays attached basally above the outer (and usually more spreading) rays. Capitate glandular trichomes are unicellular or multicellular, and are distinguished by their bulbous or expanded tip; they are usually 0.02-0.1 mm long. Peltate scales are flat or dome-shaped shields or disks, slightly to strongly glandular, (sometimes regularly or irregularly lobed) and can be either sessile or stalked (they are often referred to as scales, resin dots, peltate glands, or lepidote scales). On the lower surfaces of leaflets, peltate scales are of two types: large peltate scales are 0.08-0.3 mm in diameter and are round, with smooth or slightly irregular margins, while small peltate scales are 0.025-0.12 mm in diameter and are either round, irregularly lobed or regularly 2- or 4-lobed.

1 Terminal buds elongate, flattened in cross-section, with 4-6 valvate scales; leaves with 7-13 (-19) leaflets, these symmetrical to strongly falcate; fruit sutures narrowly winged.

2 Leaves with 7-9 (-11) leaflets, these symmetrical to slightly falcate; fasciculate trichomes with 2-4 rays; terminal bud, 9-19 mm long, bright orangey yellow to dull orange-tan; [common and widely distributed tree in our area, typically in floodplain and slope forests] ..... ***Carya cordiformis***

2 Leaves with (7-) 9-19 leaflets, these slightly to strongly falcate; fasciculate trichomes with 2-8 rays; terminal bud {} mm long, brown to rusty-brown.

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

3 Leaves with (7-) 9-11 (-13) leaflets, the lower surfaces pubescent at least along the midrib and in the main vein axils; bark shaggy; lateral petiolules 0-2 mm long; nut flattened and angled in cross-section; kernel bitter; [native, of swamp forests, primarily in the Coastal Plain] ..... ***Carya aquatica***

3 Leaves with (7-) 11-19 leaflets, the lower surfaces nearly glabrous; bark scaly, with small exfoliating plates; lateral petiolules 0-7 mm long; nut round in cross-section; kernel sweet; [introduced, frequently cultivated, long persistent, and occasionally naturalized] ..... ***Carya illinoinensis***

1 Terminal buds ovoid, terete in cross-section, with 6-15 imbricate scales; leaves with (3-) 5-9 (-11) leaflets, these symmetrical to slightly falcate; fruit sutures not winged (except *C. myristiciformis*).

4 Bark shaggy (on large trees separating in segments to a meter in length); leaves with (3-) 5 (-7) leaflets; serrations of the leaflets densely (or only moderately) ciliate when young, most densely so just below the tooth apex, the hairs sloughing with age but leaving a subapical tuft of white trichomes on at least some teeth; fallen foliage turning black.

5 Twigs slender, hardened first-year growth or second-year growth 1-3 mm in diameter; terminal bud 6-15 mm long, glabrous to sparsely puberulent (except for ciliate fringe on the scales), reddish-brown (usually turning black on drying); lower surface of leaflets nearly glabrous, except for tufts of trichomes in the main vein axils, and only slightly lepidote with a few, scattered scales, the large peltate scales yellow and round, the small peltate scales brown, 2- and 4-lobed; terminal leaflet 2-5 (-6) cm wide ..... ***Carya carolinae-septentrionalis***

5 Twigs stout, hardened first-year growth or second-year growth (2.5-) 3-6 mm in diameter; terminal bud 9-18 mm long, tomentose, tan to brown (rarely turning black on drying); lower surface of leaflets moderately to densely hirsute with acicular and fasciculate hairs (sometimes the hairs more or less limited to the main veins), and also moderately lepidote, the large peltate scales yellow and round, the small peltate scales dark brown and mostly round; terminal leaflet (4-) 6-15 cm wide ..... ***Carya ovata***

4 Bark tight (the ridges typically forming an interlocking diamond pattern), scaly, or shaggy (when shaggy, the separated segments normally much < 1 meter long); leaves with (3-) 5-9 (-11) leaflets; serrations of the leaflets glabrous or ciliate, but lacking subapical tufts of trichomes; fallen foliage not notably blackening.

6 Twigs stout; terminal buds 8-20 mm long; leaves with (5-) 7-9 (-11) leaflets; lower surface of leaflets moderately to densely hirsute with a mixture of acicular (single), fascicled (2-8 rays), and multiradiate (8-many rays) hairs; small peltate scales of the lower surface of leaflets all round; fruit husk 4-13 mm thick; nuts slightly to strongly 4-angled toward the apex.

7 Bark shaggy; petiole hirtellous; leaflet apex acuminate; lower surface of leaflets hirsute with acicular (single), 2-6-rayed fascicled, and occasional multiradiate hairs; fruit husk pubescent, lacking pustulate bumps; fruit 4-7 cm long; nut 3-6 cm long; [rare in our area] ..... ***Carya laciniosa***

7 Bark tight; petiole hirsute; leaflet apex acute; lower surface of leaflets densely hirsute with acicular (single) and abundant 2-8-rayed fascicled and multiradiate hairs; fruit husk glabrous, with pustulate bumps; fruit 3.5-5 cm long; nut 2.5-3.5 cm long; [common in our area] ..... ***Carya tomentosa***

6 Twigs slender; terminal buds 3-15 mm long; leaves with 3-7 (-9) leaflets; lower surface of leaflets mostly glabrous, except for along the midrib and primary veins, and sometimes hirsute on the surface with acicular (single) and infrequent fascicled (2-8 rays) hairs (lacking multiradiate trichomes); small peltate scales of the lower surface of leaflets of various types, 4-lobed and/or irregular scales often more frequent than round scales; fruit husk 2-5 mm thick; nuts either 4-angled or not toward the apex.

8 Terminal bud 3-15 mm long, either predominantly pubescent (also sparsely lepidote) or densely lepidote (*C. floridana*); leaves with 3-7 (-9) leaflets; lower surface of spring leaflets slightly to densely lepidote with irregular and round peltate scales (4-lobed peltate scales uncommon or absent).

10 Fruit husk indehiscent at maturity or tardily splitting to base along 1 suture; leaves with (3-) 5 (-7) leaflets, glabrous to pubescent beneath; petiole usually green; fruits ellipsoidal, pyriform, or subglobose; bark tight ..... ***Carya glabra***

10 Fruit husk splitting to base at maturity along 2-4 sutures; leaves with (5-) 7 leaflets, pubescent beneath; petiole reddish; fruits typically ellipsoidal; bark tight or often scaly or somewhat shaggy ..... ***Carya ovalis***

8 Terminal bud 4-10 mm long, predominantly lepidote (also pubescent); leaves with (5-) 7 (-9) leaflets; lower surface of spring leaflets densely lepidote with 4-lobed, irregular, and round peltate scales, giving the undersurface a reflective, silvery-tan, rusty-brown, or bronze sheen.

11 Lepidote scales initially silver, soon turning bronze, and giving the buds, young twigs, and undersurface of the leaves a metallic bronze sheen; fruit 2-3 cm long; [of calcareous swamps, bottomlands and slopes of the Coastal Plain of se. NC southward] ..... ***Carya myristiciformis***

11 Lepidote scales silvery-tan or rusty-brown, giving the buds, young twigs, and undersurface of the leaves a dull or slightly shiny tan, dull yellow, or rusty-brown color; fruit 3-5 cm long; [usually of upland and acidic forests and woodlands, collectively widespread in our area]. ..... ***Carya pallida***

Carya aquatica (F. Michaux) Elliott. WATER HICKORY, BITTER PECAN. **Hab:** Swamp forests, where flooded during the winter months. **Dist:** Se. VA south to s. peninsular FL, west to e. TX, north inland to se. MO, s. IL, and se. OK. **Phen:** Mar-May; Oct. **Syn:** = Ar, C, F, FNA3, G, GW2, Il, K1, K3, NcTx, RAB, Tn, Tx, Va, WH3; = *Hicoria aquatica* (Michaux f.) Britton – S. NatureServe G5 (Secure).

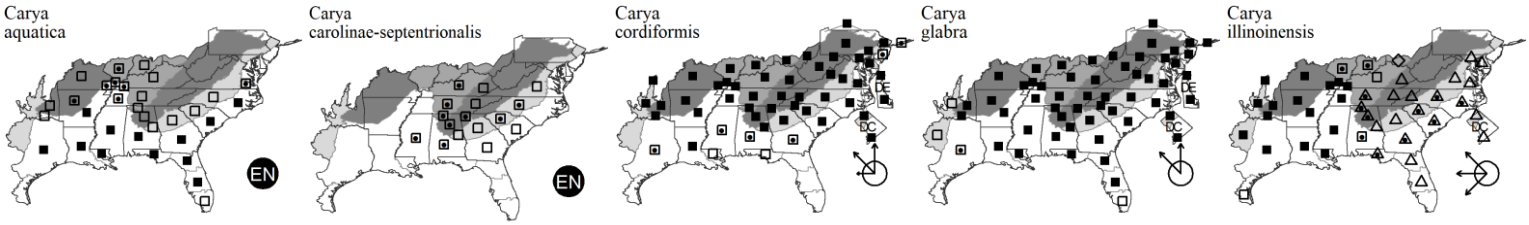
Carya carolinae-septentrionalis (W.W. Ashe) Engler & Graebner. CAROLINA SHAGBARK HICKORY, CAROLINA HICKORY. **Hab:** Upland flats, especially those weathered from mafic rocks and with shrink-swell soils dominated by montmorillonitic clays, less typically on slopes and bottomlands. **Dist:** Sc. VA (Halifax County) south to GA, AL, and MS, and inland northward to c. TN and sc. KY. **Phen:** Apr-May; Oct. **Comm:** First reported for VA by Wieboldt et al. (1998). The taxonomic status of *C. carolinae-septentrionalis* has been controversial, with some workers reducing it to variety of *C. ovata* or not recognizing it at all; it seems to us morphologically and ecologically distinctive and to represent an independent evolutionary lineage. Hardin & Stone (1984) found differences in trichomes, and in a study of nut oils, Stone, Adrouny, & Flake (1969) found *C. ovata* "surprisingly distant" from *C. carolinae-septentrionalis*. There are reports that the two taxa are also phenologically separated, *C. carolinae-septentrionalis* leafing out about two weeks earlier than *C. ovata*, when growing together in the c. Piedmont of NC. Though usually ecologically and/or geographically segregated, the two species sometimes occur together or in close proximity to one another; they maintain their distinctness in such situations. **Syn:** = C, G, K1, K3, K4, RAB, Tn, Va; = *Carya ovata* (P. Miller) K. Koch var. *australis* (W.W. Ashe) Little – FNA3; = *Hicoria carolinae-septentrionalis* W.W. Ashe – S. NatureServe G5? (Secure).

Carya cordiformis (Wangenheim) K. Koch. BITTERNUT HICKORY. **Hab:** Forests and woodlands, especially in rich, moist alluvial or slope forests. **Dist:** ME and s. QC west to MN and NE, south to Panhandle FL and e. TX. **Phen:** Apr-Jun; Oct. **Syn:** = Ar, C, F, FNA3, G, GrPl, GW2, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, W, WH3; > *Hicoria cordiformis* (Wangenheim) Britton var. *cordiformis* – S; > *Hicoria cordiformis* var. *latifolia* – S. NatureServe G5 (Secure).

Carya glabra (P. Miller) Sweet. PIGNUT HICKORY. **Hab:** In a very wide variety of forests and woodlands. **Dist:** S. NH west to s. MI, se. IA, and se. KS, south to c. peninsular FL and e. TX. **Phen:** Apr-May; Oct. **Tax:** The *C. glabra-C. ovalis* portion of this treatment is tentative; in our area, this group has been variously treated as consisting of between 1 and 10 (or more) taxa. Here we recognize two species (*C. glabra* and *C. ovalis*) and no varieties, but further study of variation in this group is needed. Var. *megacarpa* in particular seems to show correlation of morphological traits and geographic distribution, with larger fruits (2.5-5 cm long vs. 1.5-3.5 cm long), thicker husks (ca. 3.5 mm thick vs. ca. 2 mm thick), large terminal leaflets (often to 20-25 cm long, vs. 10-17 cm long), and a primarily southern Coastal Plain distribution. **Syn:** = C, GW2, K1, NY, RAB, Tn, Va, WH3; = *Carya glabra* var. *glabra* – W; < *Carya glabra* (P. Miller) Sweet – Ar, FNA3, K3, K4, Mi, NE, Pa; > *Carya glabra* var. *glabra* – F, G, Il; > *Carya glabra* var.

megacarpa (Sargent) Sargent – F, G, Il; > *Carya leiodermis* Sargent – Tx; > *Carya ovalis* (Wangenheim) Sargent var. *hirsuta* (W.W. Ashe) Sargent – F; > *Hicoria austrina* Small – S; > *Hicoria glabra* (P. Miller) Britton var. *glabra* – S; > *Hicoria glabra* (P. Miller) Britton var. *hirsuta* W.W. Ashe – S.

Carya illinoinensis (Wangenheim) K. Koch. PECAN. **Hab:** Bottomland forests, hardwood flatwoods, swamps, margins of fields, pastures, often along larger rivers; eastwards (out of native range) introduced and persistent around dwellings and in pecan orchards, escaped to suburban woodlands, rural forest edges and floodplains, also commonly cultivated. **Dist:** Sw. OH, IN, IL, e. IA south to AL, MS, LA, TX, and widespread in Mexico; now also widely spread eastwards as a result of cultivation. **Phen:** Apr-May; Oct. **Comm:** The spelling of the specific epithet has been a source of controversy. **Syn:** = C, FNA3, Il, K1, K3, K4, Mex, NcTx, Tn, Tx, Va, WH3; = *Carya illinoensis* – F, G, GrPl, GW2, RAB, orthographic variant; > *Hicoria pecan* (Marshall) Britton – S; > *Hicoria texana* LeConte – S. NatureServe G5 (Secure).



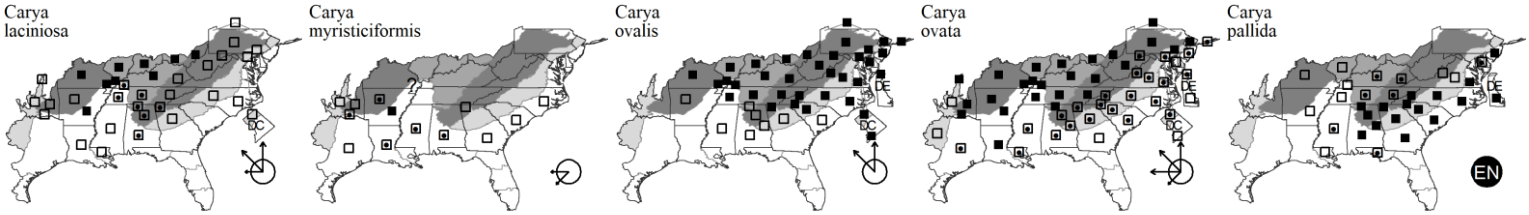
Carya laciniosa (F. Michaux) W.P.C. Barton. KINGNUT HICKORY, BIG SHELLBARK HICKORY. **Hab:** Bottomland forests, hardwood flatwoods, swamps; rarely in mesic upland forests and on rich lower slopes. **Dist:** NY and s. ON west to IA, south to NC, nw. GA, MS, and OK. **Phen:** Apr-May; Oct. **Comm:** This species is sometimes planted, but occurs native in nw. GA, along the Roanoke River (Halifax and Northampton counties, NC) and New Hope Creek (Durham County, NC). **ID Notes:** Leaf rachises tend to curl up and persist throughout the winter (bare of leaflets, which senesce and drop), creating a distinctive look. **Syn:** = Ar, C, F, FNA3, G, GrPl, GW2, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, Tn, Tx, W; = *Hicoria laciniosa* (Michaux f.) Sargent – S. NatureServe G5 (Secure).

Carya myristiciformis (F. Michaux) Elliott. NUTMEG HICKORY. **Hab:** Hardwood flatwoods, bottomland hardwood forests, riparian and upland calcareous woodlands, nonriverine swamps over calcareous substrates, including calcareous clays and coquina limestone (‘marl’). **Dist:** Se. NC south to GA, and from wc. AL west to e. TX and se. OK; disjunct in Mexico (COA, NLE, SLP, TAM). **Phen:** Apr; Oct. **Comm:** The bronze sheen of the leaflets of this species is diagnostic. First reported for NC by Leonard (1971b). **Syn:** = Ar, FNA3, K1, K3, K4, Mex, NcTx; = *Carya myristicaeformis* – GW2, RAB, Tx, orthographic variant; = *Hicoria myristicaeformis* (Michaux f.) Britton – S. NatureServe G4 (Apparently Secure).

Carya ovalis (Wangenheim) Sargent. RED HICKORY. **Hab:** Forests and woodlands. **Dist:** MA west to WI, south to GA, MS, and AR. **Phen:** Apr-Jun; Oct. **Syn:** = C, K1, RAB, Tn, Va; = *Carya glabra* (P. Miller) Sweet var. *odorata* (Marshall) Little – W; = *Hicoria microcarpa* (Sargent) Sargent – S; < *Carya glabra* (P. Miller) Sweet – Ar, FNA3, K3, K4, Mi, NE, Pa; > *Carya ovalis* var. *obcordata* (Muhlenberg & Willdenow) Sargent – F, G, Il; > *Carya ovalis* var. *obovalis* Sargent – F, G, Il; > *Carya ovalis* var. *odorata* (Marshall) Sargent – F, G, Il.

Carya ovata (P. Miller) K. Koch. COMMON SHAGBARK HICKORY. **Hab:** Rich moist bottomlands, slopes, occasionally on dry upland flats. **Dist:** S. ME and s. QC west to MN and NE, south to GA and TX; also disjunct in Mexico. **Phen:** Apr-May; Oct. **Syn:** = C, F, G, GrPl, GW2, K1, K3, K4, Mi, NcTx, NE, RAB, Tn, Tx, Va, W; = *Carya ovata* var. *ovata* – Ar, FNA3, NY, Pa; = *Hicoria ovata* (P. Miller) Britton – S; > *Carya ovata* var. *fraxinifolia* Sargent – Il; > *Carya ovata* var. *nuttallii* Sargent – Il; > *Carya ovata* var. *ovata* – F, Il; > *Carya ovata* var. *pubescens* Sargent – F.

Carya pallida (W.W. Ashe) Engler & Graebner. SAND HICKORY, PALE HICKORY. **Hab:** Dry sandy or rocky forests and woodlands. **Dist:** S. NJ south to Panhandle FL, west to TX, inland in the interior to w. NC, KY, s. IL, and AR. **Phen:** Apr-May; Oct. **Syn:** = Ar, C, F, FNA3, G, Il, K1, K3, K4, RAB, Tn, Va, W, WH3; = *Hicoria pallida* W.W. Ashe – S. NatureServe G5 (Secure).



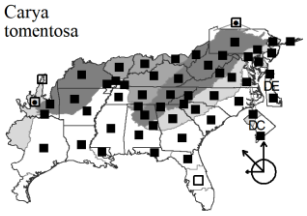
Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more)

* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable

X : extirpated

155. JUGLANDACEAE



Carya tomentosa (Lamarck) Nuttall. MOCKERNUT HICKORY, WHITE HICKORY. **Hab:** Forests and woodlands. **Dist:** MA west to IN and IA, south to n. peninsular FL and TX. **Phen:** Apr-May; Oct. **Tax:** There has been confusion and controversy for several centuries over the specific epithet. The oldest basionym available is *Juglans alba* Linnaeus, which apparently included disparate elements, including this taxon and *C. ovata*. Following a more circumscribed typification by Crantz in 1766, the epithet '*alba*' should have been applied to this taxon, but continued to be applied in various ways. Rehder (1945) proposed that *C. alba* should be considered a *nomen ambiguum*, but agreed that it applied correctly to what has often been called *C. tomentosa*. He argued that the use of *C. alba* should be rejected "in order to avoid confusion and ambiguity". In 2008, Ward & Wiersema (2008) formally proposed rejection of *Juglans alba* (the basionym of *Carya alba*), and the Committee has recommended its rejection unanimously (Brummitt 2010). For further discussion see Rehder (1945), Howard & Staples (1983), Wunderlin, Hansen, & Hall (1985), and Brummitt (2010). **Comm:** One of the most common forest trees of much of our area. **Syn:** = C, F, FNA3, G, GrPl, Il, K3, K4, NE, NY, Pa, RAB, Tn, Va, W, WH3; = *Carya alba* (Linnaeus) Nuttall ex Elliott – Ar, K1, NcTx; = *Hicoria alba* (Linnaeus) Britton – S. NatureServe G5 (Secure).

Juglans Linnaeus 1753 (WALNUT)

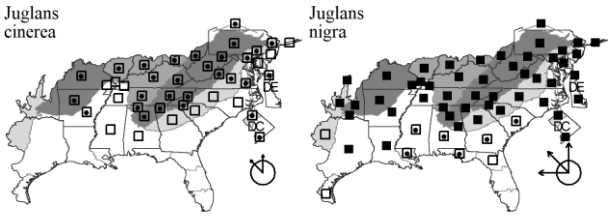
A genus of about 21 species, trees and shrubs, of Mediterranean Europe to e. Asia, and North America to Andean South America. References: Stanford (1998); Stanford, Harden, & Parks (2000); Stone in Kubitzki, Rohwer, & Bittrich (1993); Whittemore & Stone (1997) in FNA3 (1997).

4 Lower surface of the leaflets densely hirsute with 4-8-rayed fascicled hairs; fruits ellipsoid, densely pubescent with reddish-brown glandular hairs; leaf scars with a velvety ridge along the upper margin; leaves with (7-) 11-17 leaflets; pith dark brown; terminal buds 12-18 mm long; bark of mature trees pale..... ***Juglans cinerea***

4 Lower surface of the leaflets hirsute with single and 2-rayed fascicled hairs; fruits spherical or nearly so, lepidote with peltate scales and occasional glandular hairs; leaf scars without a velvety ridge along the upper margin; leaves with (9-) 15-19 (-23) leaflets; pith light brown; terminal buds 8-10 mm long; bark of mature trees dark..... ***Juglans nigra***

Juglans cinerea Linnaeus. BUTTERNUT, WHITE WALNUT. **Hab:** Moist, nutrient-rich forests. **Dist:** NB west to MN, south to n. GA and AR. **Phen:** Apr-May; Oct. **Comm:** This tree, formerly common, is afflicted with butternut canker disease, which now threatens its continued existence. **Syn:** = Ar, C, F, FNA3, G, GrPl, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, Tn, Va, W, WV; = *Wallia cinerea* (Linnaeus) Alefeld – S. NatureServe G3 (Vulnerable).

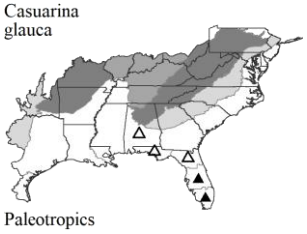
Juglans nigra Linnaeus. BLACK WALNUT. **Hab:** Moist, nutrient-rich forests of floodplains and slopes, calcareous hammocks. **Dist:** MA west to MN, south to Panhandle FL and TX. **Phen:** Apr; Oct. **Comm:** The dark brown wood is famous for cabinetry and other uses; it is one of the most prized of North American hardwoods. The nuts, though difficult to crack, are prized for their intense flavor. The husk is used as a dye. Country people dehusk the nuts by putting them in dirt or gravel driveways where the passage of car tires removes the husk but does not crack the nut. **Syn:** = Ar, C, F, FNA3, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, W, WH3, WV; = *Wallia nigra* (Linnaeus) Alefeld – S. NatureServe G5 (Secure).



156. CASUARINACEAE R. Brown 1814 (CASUARINA FAMILY) [in FAGALES]

A family of 4 genera and about 100 species, trees and shrubs, of Malesia, Australia, and Melanesia. References: Johnson & Wilson in Kubitzki, Rohwer, & Bittrich (1993); Rogers (1982c); Wilson (1997b) in FNA3 (1997).

Casuarina Linnaeus 1759 (CASUARINA, BEEFWOOD, SHE-OAK)



A genus of about 17 species, trees, tropical to warm temperate in s. Asia, Australia, and Polynesia. References: Johnson & Wilson in Kubitzki, Rohwer, & Bittrich (1993); Rogers (1982c); Wilson (1997b) in FNA3 (1997).

* ***Casuarina glauca*** Sieber ex Sprengel. GRAY SHE-OAK, SUCKERING AUSTRALIAN-PINE, SCALY-BARK BEEFWOOD. **Hab:** Disturbed beaches and yards. **Dist:** Native of Australia. Reported for Panhandle FL by Kunzer et al. (2009). Reported for AL by Barger et al. (2012), "definitely naturalized and suckering", originally as *C. equisetifolia*. **Syn:** = Bah, FNA3, K1, K3, K4, WH3. NatureServe GNR (Not Yet Ranked).

158. BETULACEAE S.F. Gray 1822 (BIRCH FAMILY) [in FAGALES]

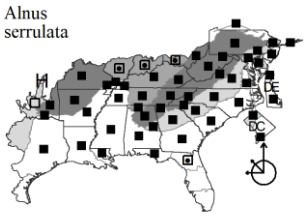
A family of 6 genera and about 150 species, primarily of subarctic to cold temperate regions of the Northern Hemisphere, but extending through Central America to n. South America. The two subfamilies recognized here are sometimes elevated to family status, as by Govaerts & Frodin (1998). References: Furlow (1990); Furlow (1997) in FNA3 (1997); Govaerts & Frodin (1998); Hardin (1971a); Kubitzki, Rohwer, & Bittrich (1993).

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

158. BETULACEAE

1 Scales of the pistillate catkins persistent; leafy involucre absent; fruit a small winged nut; [subfamily *Betuloideae*].
  2 Pistillate scales woody, forming a persistent conelike catkin; plant a shrub, < 4 m tall (except *A. glutinosa*) ..... ***Alnus***
  2 Pistillate scales deciduous with or soon after the fruits; plant a tree, > 10 m tall at maturity ..... ***Betula***
1 Scales of the pistillate catkins caducous; leafy involucre present, conspicuous; fruit an unwinged nut; [subfamily *Coryloideae*].
  3 Nut spherical, 1-1.5 cm in diameter, closely enveloped by the involucre ..... ***Corylus***
  3 Nut ovoid, 0.4-0.6 cm long, loosely or not at all enveloped by the involucre.
    4 Infructescence bracts flat, 1-3 lobed, not enclosing the nut; bark gray, smooth; trunk moderately to strongly fluted; buds 4-angled ..... ***Carpinus***
    4 Infructescence bracts inflated, loosely enclosing the nut; bark brown, shreddy; trunk not fluted; buds not 4-angled ..... ***Ostrya***

Alnus P. Miller 1754 (ALDER)



A genus of about 25-35 species, shrubs and trees, of subarctic to warm temperate regions of the Northern Hemisphere, and in montane situations south to n. South America. References: Banaev & Adel'shin (2009); Chen & Li (2004); Chery (2015); Furlow (1990); Furlow (1997) in FNA3 (1997); Gray (1842); Hardin (1971a); Kubitzki, Rohwer, & Bittrich (1993); Navarro et al (2003); Schrader & Graves (2002).

Alnus serrulata (Aiton) Willdenow. TAG ALDER, SMOOTH ALDER, HAZEL ALDER. **Hab:** Streambanks, bogs, wet thickets. **Dist:** NS west to s. QC, MO, and OK, south to ne. FL, Panhandle FL, and TX. **Phen:** Feb-Mar; Aug-Oct. **Syn:** = Ar, C, FNA3, G, GrPl, GW2, Il, K1, K3, K4, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, W, WH3, Furlow (1990), Hardin (1971a); = *Alnus rugosa* (Du Roi) Sprengel – S, misapplied; > *Alnus serrulata* var. *serrulata* – F; > *Alnus serrulata* var. *subelliptica* Fernald – F. NatureServe G5 (Secure).

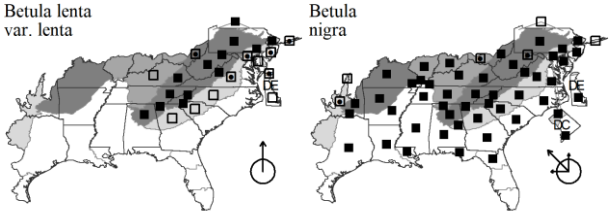
Betula Linnaeus 1753 (BIRCH)

A genus of 35-100 species, trees, shrubs, and subshrubs, of subarctic and temperate regions of the Northern Hemisphere. The subgeneric classification shown follows Schenk et al. (2008). References: Furlow (1990); Furlow (1997) in FNA3 (1997); Govaerts & Frodin (1998); Grant & Thompson (1975); Hardin (1971a); Järvinen et al (2004); Kubitzki, Rohwer, & Bittrich (1993); Schenk et al (2008).

3 Leaves broadly cuneate at the base; inner bark of the twigs bitter, not aromatic; [subgenus *Betulaster*] ..... ***Betula nigra***
3 Leaves rounded to subcordate at the base; inner bark of the twigs with odor and flavor of wintergreen; [subgenus *Betulenta*].
..... ***Betula lenta var. lenta***

Betula lenta Linnaeus *var. **lenta***. SWEET BIRCH, CHERRY BIRCH, BLACK BIRCH, "MAHOGANY.". **Hab:** Forests at low to high elevations; common (uncommon in Piedmont). **Dist:** S. ME west to OH, south to GA and n. AL. **Phen:** Mar-Apr; Jun-Jul. **Comm:** This species is generally restricted elevationally in North Carolina to medium elevations and lower, but in VA it reaches higher elevations, where it can be as common as *B. alleghaniensis*. *B. lenta* was once the primary source of methyl salicylate (wintergreen flavoring), used in medicines and confections; this is now produced synthetically. **Syn:** = Va; = *Betula lenta* Linnaeus – F, FNA3, G, K1, K3, K4, Pa, RAB, S, Tn, W, WV, Furlow (1990); < *Betula lenta* Linnaeus – C, NE, NY, Hardin (1971a). NatureServe G5TNR (Not Yet Ranked).

Betula nigra Linnaeus. RIVER BIRCH, RED BIRCH. **Hab:** Riverbanks, streambanks, floodplains, sandbars, disturbed uplands. **Dist:** NH west to se. MN and e. KS, south to ne. FL, FL Panhandle, and e. TX. **Phen:** Mar-Apr; May-Jun. **Syn:** = Ar, C, F, FNA3, G, GrPl, GW2, Il, K1, K3, K4, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV, Furlow (1990), Hardin (1971a). NatureServe G5 (Secure).



Carpinus Linnaeus 1753 (HORNBEAM, IRONWOOD, MUSCLE-TREE, WATER-BEECH, BLUE-BEECH)

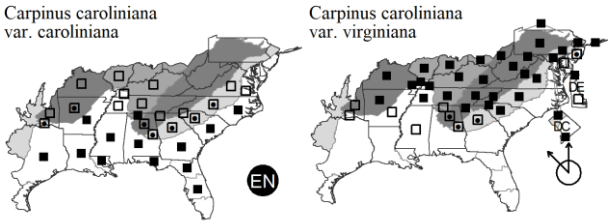
A genus of about 26 species, trees, in temperate regions of the Northern Hemisphere, extending southward to se. Asia and Central America. The smooth gray bark gives *Carpinus* the names 'Water-beech' and 'Blue-beech', the fluted, sinewy appearance of the trunk the name 'Muscle-tree', and the very hard, heavy wood the name 'Ironwood'. References: Furlow (1987a); Furlow (1987b); Furlow (1990); Furlow (1997) in FNA3 (1997); Govaerts & Frodin (1998); Hardin (1971a); Kubitzki, Rohwer, & Bittrich (1993).

1 Leaves narrowly ovate to oblong-ovate, 3-8.5 cm long, 1-4.5 cm wide, the apex acute, secondary teeth small and blunt, the lower leaf surface lacking conspicuous dark glands; bracts of the infructescence with rounded to subacute tips and few, blunt teeth; [primarily of the Coastal Plain and lower Piedmont] .....
..... ***Carpinus caroliniana var. caroliniana***
1 Leaves ovate to elliptic, 5.8-12.5 cm long, 2.5-6.0 cm wide, usually abruptly narrowed to the tip (sometimes gradually tapered to a long, acuminate apex), the secondary teeth often almost as long as the primary teeth, sharp-tipped, the lower leaf surface with conspicuous dark-brown glands; bracts of the infructescence mostly sharp-tipped and bearing several sharp teeth; [primarily of the Mountains and Piedmont] ..... ***Carpinus caroliniana var. virginiana***

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Carpinus caroliniana Walter *var. **caroliniana***. COASTAL AMERICAN HORNBEAM, MUSCLETREE, LEANTREE, LECHILLO, WATER BEECH. **Hab:** Streambanks, riverbanks, bottomland forests, lower slopes, maritime forests. **Dist:** S. NJ, e. MD, and e. VA south to c. peninsular FL, west to e. TX, and north in the inland to s. MO and s. IL. **Phen:** Mar-May; Sep-Oct. **Tax:** The treatment as two taxa was established by Furlow (1987a, 1987b) largely through statistical methods. The two taxa have some morphologic and phytogeographic coherence, but intergradation appears to be extensive, and individual specimens (in the herbarium) or trees (in the field) may not be readily identifiable to variety. **Syn:** = C, F, Il; = *Carpinus caroliniana* ssp. *caroliniana* – Ar, FNA3, K1, K3, K4, Furlow (1987b), Furlow (1990); < *Carpinus caroliniana* – G, GW2, NcTx, RAB, S, Tn, Tx, Va, WH3, Hardin (1971a). NatureServe G5T4T5 (Apparently Secure).

Carpinus caroliniana Walter *var. **virginiana*** (Marshall) Fernald. INLAND AMERICAN HORNBEAM, BLUE BEECH. **Hab:** Rich cove forests, streambanks, riverbanks, bottomland forests, lower slopes. **Dist:** ME, QC and s. ON west to MN, south to e. VA, c. NC, n. GA, n. AL, n. MS, AR, and se. OK. **Phen:** Mar-Apr; Sep-Oct. **Tax:** See discussion of the two varieties under *Carpinus caroliniana* var. *caroliniana*. **Syn:** = C, F, Il; = *Carpinus caroliniana* ssp. *virginiana* (Marshall) Furlow – Ar, FNA3, K1, K3, K4, NE, NY, W, Furlow (1987b), Furlow (1990); < *Carpinus caroliniana* – G, GW2, Mi, Pa, RAB, S, Tn, Va, Hardin (1971a). NatureServe G5T5 (Secure).



Corylus Linnaeus 1753 (HAZELNUT, FILBERT)

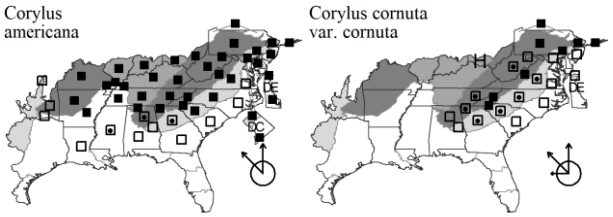
A genus of about 15-18 species, shrubs and trees, of temperate regions of the Northern Hemisphere. Eurasian species of this genus, *C. avellana* Linnaeus and *C. maxima* P. Miller, are the sources of commercial filberts or hazelnuts. They are sometimes cultivated in North America, especially in the Pacific Northwest. Our wild species are also excellent eating, but wild animals, especially squirrels, usually harvest them before they are ripe. References: Forest & Bruneau (2000); Furlow (1997) in FNA3 (1997); Govaerts & Frodin (1998); Kubitzki, Rohwer, & Bittrich (1993); Whitcher & Wen (2001).

1 Mature involucre 1.5-3 cm long, the lobes flattened and laciniate; young twigs and petioles stipitate-glandular; [section *Corylus*, subsection *Corylus*] ..... ***Corylus americana***

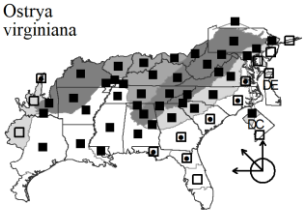
1 Mature involucre 4-7 cm long, extended into a tubular beak; young twigs and petioles villous, glandless; [section *Corylus*, subsection *Siphonochlamys*] ..... ***Corylus cornuta var. cornuta***

Corylus americana Walter. AMERICAN HAZELNUT, AMERICAN FILBERT. **Hab:** Rocky woodlands, mesic to rich forests and thickets. **Dist:** ME west to SK, south to GA, LA, and OK. **Phen:** Feb-Mar; Sep-Oct. **Syn:** = Ar, C, FNA3, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Va, W, WV, Furlow (1990), Hardin (1971a); > *Corylus americana* var. *americana* – F, G, GrPl; > *Corylus americana* var. *indehiscens* E.J. Palmer & Steyermark – F, G, GrPl. NatureServe G5 (Secure).

Corylus cornuta Marshall *var. **cornuta***. BEAKED HAZELNUT. **Hab:** Dry rocky woodlands, thickets, high elevation forests and openings, seepage swamps. **Dist:** The species ranges from NL (Newfoundland) west to BC, south to NJ, n. GA, e. TN (Chester, Wofford, & Kral 1997), OH, MO, CO, and CA. **Phen:** Feb-Apr; Aug-Oct. **Tax:** Var. *cornuta* occupies most of that range; var. *californica* (A.L.P.P. de Candolle) Sharp [ssp. *californica* (A.L.P.P. de Candolle) E. Murray], a small tree, is far western and grades into var. *cornuta*. **Syn:** = K1, K3, K4, Va, Furlow (1990); = *Corylus cornuta* ssp. *cornuta* – FNA3, NE, NY; < *Corylus cornuta* – C, F, G, GrPl, Il, Mi, Pa, RAB, S, Tn, W, WV, Hardin (1971a). NatureServe G5T5 (Secure).



Ostrya Scopoli 1760 (HOP-HORNBEAM, IRONWOOD)



A genus of 5-9 species, trees, of temperate regions of the Northern Hemisphere. References: Furlow (1997) in FNA3 (1997); Govaerts & Frodin (1998); Kubitzki, Rohwer, & Bittrich (1993).

Ostrya virginiana (P. Miller) K. Koch. AMERICAN HOP-HORNBEAM, IRONWOOD, LEVERWOOD. **Hab:** Mesic to dry forests, often rocky, especially over basic rocks, reaching high elevations. **Dist:** NS west to MB, south to c. peninsular FL, Panhandle FL, and TX. **Phen:** Mar-May; Aug-Oct. **Comm:** One of our heaviest and hardest woods. **Syn:** = Ar, C, FNA3, G, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, Va, W, WH3, WV, Furlow (1990), Hardin (1971a); = *Ostrya virginiana* var. *virginiana* – K1; > *Ostrya virginiana* var. *lasia* Fernald – F, GrPl, Il, Tx; > *Ostrya virginiana* var. *virginiana* – F, GrPl, Il. NatureServe G5T5 (Secure).

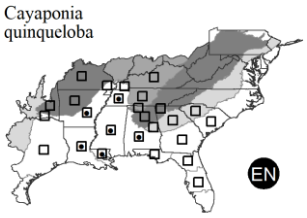
Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

163. CUCURBITACEAE A.L. de Jussieu 1789 (GOURD FAMILY) [in CUCURBITALES]

A family of about 97-120 genera and 800-1000 species, of tropical and subtropical areas, with a few extending to temperate areas. References: Nesom (2011b); Nesom (2015b) in FNA6 (2015); Schaefer & Renner in Kubitzki (2011).

1 Ovaries and fruits muricate, tuberculate, or echinate; fruits 1-25 cm long at maturity.
  2 Plants prostrate; tendrils absent; leaves with whitish-crisped margins; [section *Bryoniae*] ..... ***Ecballium***
  2 Plants climbing; tendrils present; leaves with green margins
    3 Corolla 5-lobed, yellow, the petals 7-25 mm long; fruit muricate or tuberculate, 10-25-seeded, dehiscent by 3 valves or somewhat irregularly; tendrils with 1-2 branches; [tribe *Joliffieae*] ..... ***Momordica***
    3 Corolla 5-6-lobed, white, the petals 0.5-6 mm long; fruit echinate, 1- or 4-seeded, indehiscent or dehiscent by 2 pores; tendrils with 3 branches; [tribe *Sicyeae*].
    ..... ***Sicyos***
1 Ovaries and fruits smooth or pubescent, but not prickly; fruits 1-70 cm long at maturity.
  5 Leaves pinnately lobed, the divisions rounded; fruit surface green and white, the flesh red or pink; [tribe *Benincaseae*] ..... ***Citrullus***
  5 Leaves palmately lobed, the divisions angular and toothed; fruit surface red, green, white, black, orange, yellow, or blue, the flesh white, orange, yellow, tan, or green.
    6 Fruit < 3 cm long; tendrils present, simple; [native, mostly in moist forests or thickets].
      7 Fruit surface red at maturity; pedicel of pistillate flowers and fruits 1-3 mm long; [tribe *Cucurbiteae*] ..... ***Cayaponia***
      7 Fruit surface black or dark green at maturity; pedicel of pistillate flowers and fruits > 20 mm long; [tribe *Benincaseae*] ..... ***Melothria***
    6 Fruit > 5 cm long; tendrils absent or present (if present, forked); [introduced, mostly in gardens, fields, or disturbed places].
      8 Corolla white; [bottle gourd, ivy gourd]; [tribe *Benincaseae*].
      ..... ***Lagenaria***
      8 Corolla yellow; [canteloupe, cucumber, luffa, squash, gourd, pumpkin].
        10 Corolla < 3 cm long; [cantaloupe, cucumber]; [tribe *Benincaseae*] ..... ***Cucumis***
        10 Corolla > 5 cm long; [luffa, squash, gourd, pumpkin].
        ..... ***Cucurbita***

Cayaponia Silva Manso 1836



A genus of about 75 species, herbaceous vines, of tropical, subtropical and warm-temperate America. References: Nesom (2015b) in FNA6 (2015); Schaefer & Renner in Kubitzki (2011).

Cayaponia quinqueloba (Rafinesque) Shinners. FIVE-LOBE-CUCUMBER. **Hab:** Swamp forests, river banks, hammocks. **Dist:** E. SC south to GA and FL Panhandle, west to e. TX, north in the interior to w. TN. **Phen:** Jun-Nov. **Syn:** = Ar, FNA6, K1, K3, K4, NcTx, Tn, Tx, WH3; = *Cayaponia boykinii* (Torrey & A. Gray) Cogniaux – RAB, S; > *Cayaponia grandifolia* (Torrey & A. Gray) Small – GW2; > *Cayaponia quinqueloba* (Rafinesque) Shinners – GW2. NatureServe G4 (Apparently Secure).

Citrullus Schrader 1836 (WATERMELON)

A genus of 7 species, annual or perennial herbaceous vines, of Africa, Mediterranean Europe, and w. Asia. References: Chomicki & Renner (2015); Dane & Lang (2004); Nesom (2011b); Nesom (2015b) in FNA6 (2015); Paris (2015); Schaefer & Renner in Kubitzki (2011).

Unkeyed waifs: *Citrullus amarus*

1 Perennials; stems pustulate-scabrous to pustulate-hispid; tendrils unbranched or rarely 2-fid; fruits 4-7 (-10) cm in diameter; flesh of fruit dry-spongy, yellowish orange to pale yellow, intensely bitter ..... ***Citrullus colocynthis***
1 Annuals; stems villous; tendrils 2-3-fid; fruits 12-35+ cm in diameter; flesh of fruit juicy, red, yellow, or greenish, sweet ..... ***Citrullus lanatus***

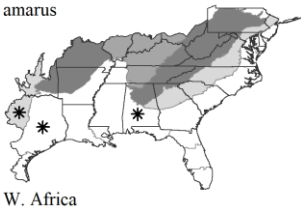
* ***Citrullus amarus*** Schrader. CITRON MELON. **Hab:** Disturbed areas. **Dist:** Native of Africa. See Barger et al. (2019) for details on the record from Montgomery County, AL. **Phen:** May-Oct. **Syn:** = K4, Chomicki & Renner (2015); = *Citrullus caffer* Schrader – FNA6; = *Citrullus lanatus* (Thunberg) Matsumura & Nakai var. *citroides* (L.H. Bailey) Mansfield – K3; = *Citrullus vulgaris* Schrader var. *citroides* L.H. Bailey – Tx. NatureServe GNRTNR (Not Yet Ranked).

* ***Citrullus colocynthis*** (Linnaeus) Schrader. COLOCYNTH. **Hab:** On ballast, presumably only a waif. **Dist:** Native of w. Asia and Mediterranean Africa and Europe. **Syn:** = FNA6, K3, K4, Chomicki & Renner (2015), Nesom (2011b). NatureServe GNR (Not Yet Ranked).

* ***Citrullus lanatus*** (Thunberg) J. Matsumura & Nakai. WATERMELON. **Hab:** Gardens, fields, trash heaps, commonly cultivated in home gardens and commercially, sometimes volunteering from seed the following year. **Dist:** Native of n. Africa. **Syn:** = Bah, Mi, NE, Chomicki & Renner (2015), but needing conservation with a new type; = *Citrullus lanatus* (Thunberg) Matsumura & Nakai ssp. *lanatus* – FNA6, NY, Nesom (2011b); = *Citrullus vulgaris* var. *vulgaris* – Tx; < *Citrullus citrullus* (Linnaeus) Karsten – S; < *Citrullus lanatus* (Thunberg) J. Matsumura & Nakai – Il, K4, Meso4.1, WH3; < *Citrullus lanatus* (Thunberg) Matsumura & Nakai var. *lanatus* – Ar, K1, K3, NcTx; < *Citrullus vulgaris* Schrader – F, G, RAB. NatureServe GNRTNR (Not Yet Ranked).

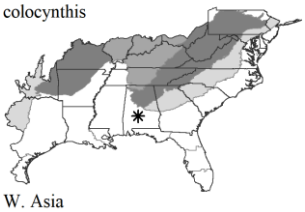
Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Citrullus amarus



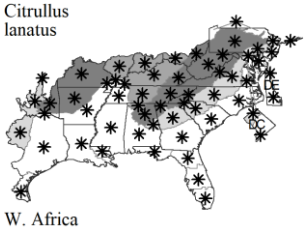
W. Africa

Citrullus colocynthis



W. Asia

Citrullus lanatus



W. Africa

Cucumis Linnaeus 1753 (CANTELOUPE, MUSKMELON, CUCUMBER)

A genus of ca. 55 species, herbaceous vines, native of the Old World (but see discussion under *C. melo* var. *texanus*). Infrageneric classification follows Schaefer (2007). References: Decker-Walters et al (2002); Kirkbride (1993); Munger & Robinson (1991); Nesom (2015b) in FNA6 (2015); Schaefer & Renner in Kubitzki (2011); Schaefer (2007); Silberstein et al (1999); Stepansky, Kovalski, & Perl-Treves (1999).

1 Fruits with spine-bearing tubercles (aculeae); [West Indian gherkin]; [subgenus *Cucumis*; section *Aculeatosi*].
  2 Plants monoecious; pedicels of pistillate flowers cylindrical (isodiametric through their length); staminate inflorescences of (1-) 2-5 flowers in a sessile fascicle ... ***Cucumis metulifer***
  2 Plants dioecious; pedicels of pistillate flowers and fruits flaring upwards; staminate inflorescences 3-10 in a pedunculate or sessile raceme. ***Cucumis anguria var. anguria***
1 Fruits smooth, reticulate, or hairy, lacking aculeae; [subgenus *Cucumis*; section *Cucumis*].
  4 Leaf blade central lobe broadly triangular; corolla tube of female flower 3.5-6.5 mm long; corolla tube of male flower 3.4-4.9 mm long; [cucumber] ..... ***Cucumis sativus***
  4 Leaf blade central lobe elliptic, oblong or ovate; corolla tube of female 0.8-2.8 mm long; corolla tube of male flower 0.8-2.0 mm long.
    5 Fused portion of hypanthium or youngest fruits with appressed hairs; stem abundantly beset with retrorse prickles; fruit diameter 2.5-5 cm ..... ***Cucumis melo var. texanus***
    5 Fused portion of hypanthium or youngest fruits with spreading hairs; stems smooth or nearly so; fruit diameter > 10 cm.
      6 Fruits with netted, warty, or scaly rind; ripe fruits with orange (rarely green) flesh, with aromatic flavor and musky odor; [canteloupes, muskmelons, etc.] .. ***Cucumis melo var. cantalupo***
      6 Fruits with smooth or wrinkled rind; ripe fruits with white or green flesh, lacking musky odor; [honeydews, etc.] ..... ***Cucumis melo var. inodorus***

* ***Cucumis anguria*** Linnaeus *var*. ***anguria***. BUR GHERKIN. **Hab:** Disturbed areas. **Dist:** Native of Africa. **Phen:** Jul-Oct. **Syn:** = FNA6, K3, K4, NcTx, NY; < *Cucumis anguria* – NE, S, Schaefer (2007).

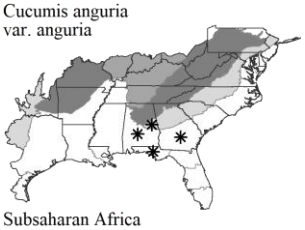
* ***Cucumis melo*** Linnaeus *var*. ***cantalupo*** Seringe. CANTELOUPE, MUSKMELON. **Hab:** Gardens, fields, trash heaps, commonly cultivated in home gardens and commercially, sometimes volunteering from seed the following year. **Dist:** Native of Asia. **Phen:** May-Oct. **Syn:** = *Cucumis melo* ssp. *melo* var. *cantalupo* Seringe – FNA6; = *Cucumis melo* var. *cantalupensis* Naudin – Munger & Robinson (1991), Stepansky, Kovalski, & Perl-Treves (1999); < *Cucumis melo* Linnaeus – Ar, F, G, Il, K1, NcTx, RAB, S, WH3, WV, Schaefer (2007); < *Cucumis melo* ssp. *melo* – NY, Kirkbride (1993); < *Cucumis melo* var. *melo* – K4. NatureServe GNRTNR (Not Yet Ranked).

* ***Cucumis melo*** Linnaeus *var*. ***inodorus*** Jacquin. HONEYDEW, WINTER MELON. **Hab:** Gardens, fields, trash heaps, sometimes cultivated in our area. **Dist:** Native of Asia. **Syn:** = Munger & Robinson (1991), Stepansky, Kovalski, & Perl-Treves (1999); = *Cucumis melo* ssp. *melo* var. *inodorus* – FNA6; < *Cucumis melo* Linnaeus – Ar, Bah, F, G, K1, Mi, NcTx, NE, RAB, S, WH3, Schaefer (2007); < *Cucumis melo* ssp. *melo* – NY, Kirkbride (1993); < *Cucumis melo* var. *melo* – K4.

Cucumis melo Linnaeus *var*. ***texanus*** Naudin. GULF COAST MELON. **Hab:** Fields, roadsides, other disturbed areas; apparently evolved into a distinct variety in the southeastern United States from Asian stock introduced in the precolonial period. **Dist:** Panhandle FL south to peninsular FL, west through s. MS, s. TX, and Mexico. **Tax:** Decker-Walters et al. (2002) show that var. *texanus* is morphologically and molecularly distinct from the most closely related varieties, the Asian var. *chito* (C. Morren) Naudin and var. *dudaim* (Linnaeus) Naudin; they postulate that var. *texanus* was likely introduced from Asia in pre-Columbian times. **Syn:** = Decker-Walters et al (2002); = *Cucumis melo* ssp. *agrestis* (Naudin) Pangalo var. *texanus* – FNA6; < *Cucumis melo* Linnaeus – Ar, F, G, K1, NcTx, RAB, S, WH3, Schaefer (2007); < *Cucumis melo* ssp. *agrestis* (Naudin) Pangalo – Kirkbride (1993); < *Cucumis melo* Linnaeus var. *agrestis* Naudin – K4; < *Cucumis melo* var. *chito* – Munger & Robinson (1991), Stepansky, Kovalski, & Perl-Treves (1999); < *Cucumis melo* var. *melo* – Tx. NatureServe GNRTNR (Not Yet Ranked).

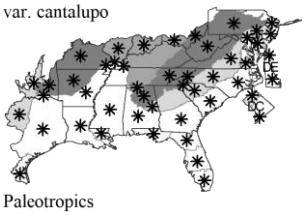
* ***Cucumis metulifer*** E. Meyer ex Naudin. AFRICAN HORNED CUCUMBER. **Hab:** Disturbed areas. **Dist:** Native of Africa. **Phen:** Jul-Sep. **Syn:** = *Cucumis metuliferus* E. Meyer ex Naudin – FNA6, K4, WH3. NatureServe GNR (Not Yet Ranked).

Cucumis anguria var. anguria



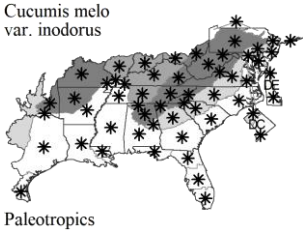
Subsaharan Africa

Cucumis melo var. cantalupo



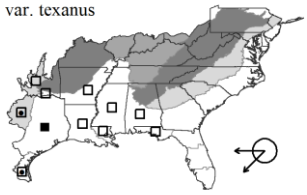
Paleotropics

Cucumis melo var. inodorus

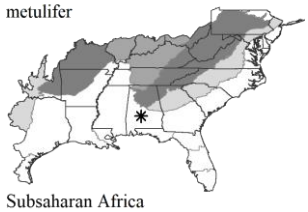


Paleotropics

Cucumis melo var. texanus



Cucumis metulifer



Subsaharan Africa

Key to Map Symbology:

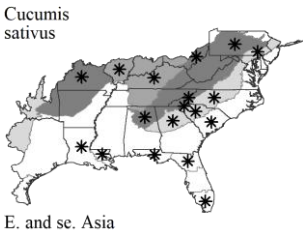
* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable

X : extirpated

163. CUCURBITACEAE

* ***Cucumis sativus*** Linnaeus. CUCUMBER. **Hab:** Gardens, fields, trash heaps, commonly cultivated in home gardens and commercially, sometimes volunteering from seed the following year. **Dist:** Native of s. Asia. **Phen:** May-Sep (-Nov). **Syn:** = Bah, F, G, Il, K1, K3, K4, Meso4.1, NE, WH3, Kirkbride (1993), Schaefer (2007); > *Cucumis sativus* var. *sativus* – FNA6, NY. NatureServe GNR (Not Yet Ranked).



Cucurbita Linnaeus 1753 (SQUASH, ZUCCHINI, PUMPKIN, GOURD, VEGETABLE MARROW)

A genus of 14-22 species, annual or perennial herbaceous vines, of the New World tropics and subtropics. References: Castellanos-Morales et al (2018); Nesom (2011b); Nesom (2015b) in FNA6 (2015); Schaefer & Renner in Kubitzki (2011).

3 Stems and leaves variously pubescent, the hairs generally not pustulate-based. ..... ***Cucurbita maxima***

3 Stems and leaves hispid with pustulate-based hairs.

5 Wild plants; fruit almost always bitter, solid ivory or green-and-white striped, usually not yellow or orange; rind smooth. ..... ***Cucurbita melopepo var. texana***

5 Cultivated plants (or occurring as waifs and short-term naturalized population, usually in proximity to cultivation); fruit non-bitter (except for some ornamental gourds), variously colored, often at least partially yellow or orange; rind smooth, ribbed, or with warts.

7 [scallop, pattypan, acorn, crookneck, and straightneck squashes, most ornamental gourds] ..... ***Cucurbita melopepo var. melopepo***

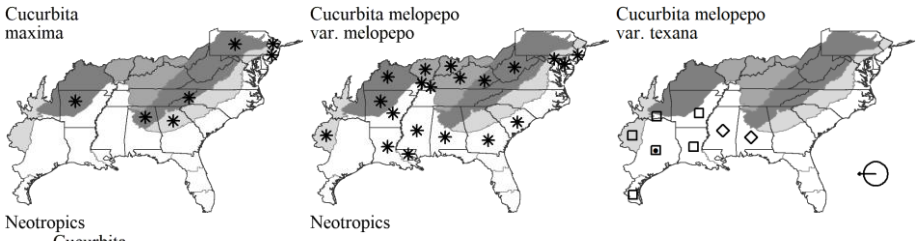
7 [cocozelle, jack-o'-lantern pumpkins, vegetable marrows, zucchini, some ornamental gourds] ..... ***Cucurbita pepo***

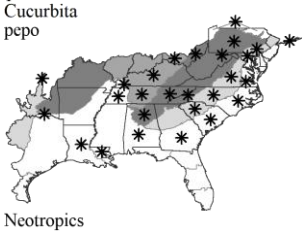
* ***Cucurbita maxima*** Duchesne. HUBBARD SQUASH, PUMPKIN. **Hab:** Gardens, fields, trash heaps, commonly cultivated in home gardens and commercially, sometimes volunteering from seed the following year. **Dist:** Native of tropical America. **Phen:** Jun-Oct. **Syn:** = Ar, F, FNA6, K1, K3, K4, Mi, NE, Castellanos-Morales et al (2018). NatureServe GNR (Not Yet Ranked).

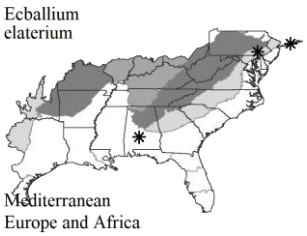
* ***Cucurbita melopepo*** Linnaeus *var*. ***melopepo***. CROOKNECK SQUASH, STRAIGHTNECK SQUASH, SCALLOP SQUASH, PATTYPAN SQUASH, ACORN SQUASH, SPAGHETTI SQUASH, ORNAMENTAL GOURD. **Hab:** Gardens, fields, trash heaps; commonly cultivated in home gardens and commercially, rarely volunteering from seed the following year. **Dist:** Native of tropical America. **Phen:** May-Oct. **Syn:** = *Cucurbita melopepo* ssp. *melopepo* – K4; = *Cucurbita melopepo* ssp. *melopepo* var. *melopepo* – FNA6; = *Cucurbita melopepo* ssp. *texana* (Scheele) Nesom var. *melopepo* – Castellanos-Morales et al (2018), Nesom (2011b); = *Cucurbita pepo* Linnaeus var. *ovifera* (Linnaeus) Harz – Il, K2. NatureServe G4G5TNRQ (Not Yet Ranked).

Cucurbita melopepo Linnaeus *var*. ***texana***. TEXAS SQUASH, TEXAS GOURD. **Hab:** Bottomlands. **Dist:** AL west to se. NM, south through TX. **Phen:** Jul-Oct. **Syn:** *Cucurbita pepo* Linnaeus ssp. *ovifera* (Linnaeus) D.S. Decker var. *texana* (Scheele) D.S. Decker – Ar; = *Cucurbita melopepo* ssp. *texana* (Scheele) Nesom var. *texana* (Scheele) Nesom – FNA6, K3, K4, Nesom (2011b); = *Cucurbita pepo* Linnaeus var. *texana* (Scheele) D. Decker – K2, Castellanos-Morales et al (2018); < *Cucurbita texana* Scheele – NcTx, Tx. NatureServe G4G5T4? (Apparently Secure).

* ***Cucurbita pepo*** Linnaeus. PUMPKIN, ZUCCHINI, ORNAMENTAL GOURD, VEGETABLE MARROW. **Hab:** Gardens, fields, trash heaps; commonly cultivated in home gardens and commercially, sometimes volunteering from seed the following year. **Dist:** Native of tropical America. **Phen:** May-Oct. **Syn:** = Bah, F, K4, Mi, NE, Pa, RAB, WV, Nesom (2011b); = *Pepo pepo* (Linnaeus) Britton ex Small – S; > *Cucurbita pepo* ssp. *pepo* – FNA6, Meso4.1, NY; > *Cucurbita pepo* var. *pepo* – Il, K1, K2.





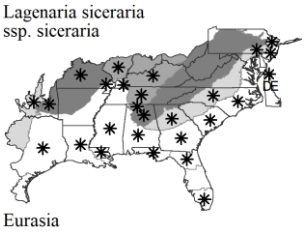


Ecballium A. Richard 1824 (SQUIRTING CUCUMBER)

A monotypic genus, an herbaceous vine, of Mediterranean Europe, n. Africa, and w. Asia. References: Nesom (2015b) in FNA6 (2015); Schaefer & Renner in Kubitzki (2011).

* ***Ecballium elaterium*** (Linnaeus) A. Richard. SQUIRTING CUCUMBER. **Hab:** Disturbed areas. **Dist:** Native of Mediterranean Europe, n. Africa, and w. Asia. **Phen:** Jun-Aug. **Syn:** = FNA6, K3, K4, NY. NatureServe GNR (Not Yet Ranked).

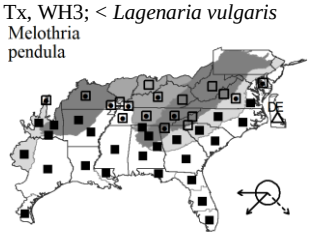
Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



Lagenaria Seringe 1825 (BOTTLE GOURD)

A genus of 6 species, herbaceous vines, of sub-Saharan Africa and Madagascar. References: Nesom (2015b) in FNA6 (2015); Schaefer & Renner in Kubitzki (2011).

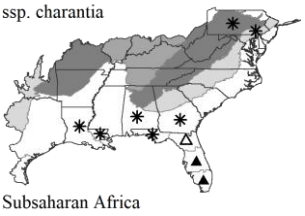
* ***Lagenaria siceraria*** (Molina) Standley *ssp.* ***siceraria***. BOTTLE GOURD, CALABASH GOURD. **Hab:** Gardens, fields, trash heaps, commonly cultivated in home gardens and commercially, rare as a volunteer from seed the following year. **Dist:** Native of Africa. One of the oldest cultivated plants. **Phen:** May-Sep. **Syn:** = FNA6; < *Cucurbita lagenaria* Linnaeus – S; < *Lagenaria leucantha* Rusby – G; < *Lagenaria siceraria* – Il, K1, K3, K4, Meso4.1, NcTx, NE, Tx, WH3; < *Lagenaria vulgaris* Seringe – F, RAB. NatureServe GNRTNR (Not Yet Ranked).



Melothria Linnaeus 1753 (MELONETTE)

A genus of about 12 species, herbaceous vines, of the New World. References: Nesom (2015b) in FNA6 (2015); Schaefer & Renner in Kubitzki (2011).

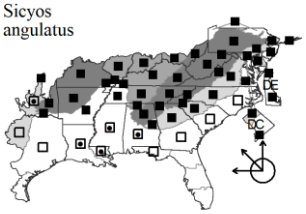
Melothria pendula Linnaeus. MELONETTE, CREEPING CUCUMBER, MOUSE MELON, MELONCITO. **Hab:** Bottomland forests, moist roadsides and disturbed areas, marshes. **Dist:** DC, MD, and VA west to IN, south to FL and TX; also widespread in the West Indies, Mexico, Central America, and South America. **Phen:** Jun-Nov. **Syn:** = Ar, Bah, C, F, FNA6, G, GW2, Il, K4, Meso4.1, NcTx, RAB, Tn, Tx, Va, W, WH3; > *Melothria microcarpa* Shuttleworth – S; > *Melothria nashii* Small – S; > *Melothria pendula* Linnaeus – S; > *Melothria pendula* var. *aspera* – K1, K3, S; > *Melothria pendula* var. *crassifolia* (Small) Cogniaux – K1, K3; > *Melothria pendula* var. *pendula* – K1, K3.



Momordica Linnaeus 1753 (BALSAM-APPLE, BITTER MELON)

A genus of ca. 60 species, herbaceous vines, of the Old World tropics. References: Nesom (2015b) in FNA6 (2015); Schaefer & Renner in Kubitzki (2011).

* ***Momordica charantia*** Linnaeus *ssp.* ***charantia***. BALSAM-PEAR, BALSAM-APPLE, BITTER MELON, CERASEE, ASOSI. **Hab:** Disturbed areas, roadsides, fence-rows. **Dist:** Native of Africa. Reported for Panhandle FL by Anderson (2007) and Kunzer et al. (2009), and for Alabama by Diamond (2021). **Phen:** Apr-Nov. **Comm:** An additional subspecies, ssp. *macroloba* Achigan-Dako & Blattner, is known from wc. Africa. **Syn:** = FNA6; < *Momordica charantia* – Bah, K1, K3, K4, Meso4.1, NE, S, Tx, WH3. NatureServe GNR (Not Yet Ranked).



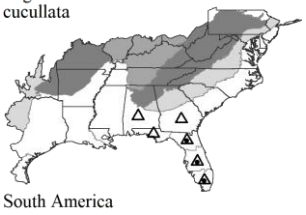
Sicyos Linnaeus 1753 (BUR-CUCUMBER)

A genus of about 50 species, annual or perennial vines, of Australia, Pacific Islands, tropical America. References: Nesom (2011a); Nesom (2015b) in FNA6 (2015); Schaefer & Renner in Kubitzki (2011).

Sicyos angulatus Linnaeus. BUR-CUCUMBER, NIMBLE-KATE, STAR-CUCUMBER. **Hab:** Moist forests and thickets. **Dist:** S. ME west to MN and se. ND, south to Panhandle FL and c. TX. **Phen:** May-Nov. **Syn:** = Ar, C, F, FNA6, G, GrPl, GW2, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV, Nesom (2011a). NatureServe G5 (Secure).

166. BEGONIACEAE C. Agardh 1824 (BEGONIA FAMILY) [in CUCURBITALES]

A family of 2 genera and about 1300-1500 species, herbs and shrubs, of tropical and subtropical (rarely warm temperate) regions. References: Brouillet (2015) in FNA6 (2015); de Wilde in Kubitzki (2011).



Begonia Linnaeus 1753 (BEGONIA)

A genus of about 1300-1500 (or more) species, herbs and shrubs, of tropical and subtropical (rarely warm temperate) regions. References: Brouillet (2015) in FNA6 (2015); de Wilde in Kubitzki (2011).

* ***Begonia cucullata*** Willdenow. WAX BEGONIA, CLUB BEGONIA. **Hab:** Hydric hammocks, mesic hammocks, streamsides, floodplain swamps, disturbed places. **Dist:** Native of South America. Escaped or persistent in e. GA (Jones and Coile 1988) and AL (Woods & Diamond 2006), south to Panhandle FL, ne. FL (Wunderlin & Hansen 2004) and s. peninsular FL. **Phen:** Jan-Dec. **Syn:** = FNA6, K1, K3, K4, WH3. NatureServe GNR (Not Yet Ranked).

168a. PARNASSIACEAE Martinov 1820 (GRASS-OF-PARNASSUS FAMILY) [in CELASTRALES]

A family of 2 genera and about 16 species, herbs, of largely north temperate and arctic areas. Numerous anomalous features separate *Parnassia* from the Saxifragaceae; affinities with the Droseraceae, Clusiaceae, Celastraceae, and other families have been historically suggested. It is now clear that

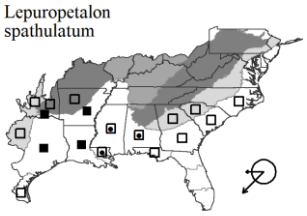
Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

its affinities lie with Celastraceae, but APG III's (2009) and APG IV's (2016) inclusion of it in Celastraceae seems premature; it is here retained as separate. Considering the uncertainties of its relationships, *Parnassia* is best treated as a family, the Parnassiaceae, as suggested by numerous workers as early as 1821, and increasingly accepted in recent decades. The very distant relationship of *Parnassia* to the Saxifragaceae (sensu stricto) has been strongly reaffirmed by molecular analyses (Morgan & Soltis 1993, Soltis et al. 2000, Savolainen et al. 2000). References: Ma, Ball, & Levin (2016) in FNA12 (2016); Simmons . [including LEPUROPETALACEAE] in Kubitzki et al (2004).

1 Plants diminutive, rosettes < 3 cm across; winter annual ..... ***Lepuropetalon***
1 Plants larger, rosettes over 8 cm across; perennial from rhizomes ..... ***Parnassia***

Lepuropetalon Elliott 1817 (LEPUROPETALON)

A monotypic genus, of se. North America, Mexico, c. Chile, and Uruguay. Sometimes treated as part of a broad and polymorphic Saxifragaceae, *Lepuropetalon* has often been associated with *Parnassia* in the Parnassiaceae. Morgan & Soltis (1993) suggest a close relationship of *Lepuropetalon* and *Parnassia*, as well as the "distant relationship between both genera and the Saxifragoideae". The affinities of *Lepuropetalon* with *Parnassia* remain uncertain, however, as emphasized by Gastony & Soltis (1977) in their analysis of chromosomes and partially reiterated by Morgan & Soltis (1993). *Lepuropetalon* is here treated in the Parnassiaceae, as supported by molecular analyses (Soltis et al. 2000, Savolainen et al. 2000); treatment in a monotypic Lepuropetalaceae is perhaps equally warranted. References: Gastony & Soltis (1977); Saar (2016) in FNA12 (2016); Simmons in Kubitzki et al (2004); Spongberg (1972); Ward & Gholson (1987); Wilbur (1988b).



Lepuropetalon spathulatum Elliott. LEPUROPETALON, LITTLE-PEOPLE, PETITEPLANT. **Hab:** In moist open areas, such as seepage on granitic flatrocks, ditches, seasonally wet depressions. **Dist:** Se. NC and SC south to GA and FL Panhandle (Kunzer et al. 2009), west to e. TX and Mexico; also in Chile and Uruguay. **Phen:** Feb-Apr. **Comm:** As indicated by Ward & Gholson (1987), *Lepuropetalon* is more common than collections would indicate; the rosettes are 0.5-2 (-3) cm across, the greenish flowers are 2-3 mm across. It has been considered "the smallest terrestrial angiosperm" (Morgan & Soltis 1993). Its apparently greater abundance in the western portion of its range, where largely found by a few botanists "who have made determined efforts to establish its range" (Ward & Gholson), and in habitats such as granitic flatrocks, which have overall received close scrutiny, may be more a reflection of its diminutive size and early season of occurrence than of its real distribution and abundance. The recent increase in collections, mostly in disturbed or human-maintained habitats, also suggests a possible increase in abundance (and range?) from its original state. It should be more vigorously sought in the eastern part of our area. The presence of lines of red glandular dots on the leaves and sepals is a helpful diagnostic character. **Syn:** = Ar, FNA12, GW2, K1, K3, K4, NcTx, RAB, S, Tx, WH3. NatureServe G4G5 (Apparently Secure).

Parnassia Linnaeus 1753 (GRASS-OF-PARNASSUS, PARNASSIA)

A genus of 15-70 species, herbs, primarily of arctic and north temperate areas. Our species (especially *Parnassia caroliniana*) are among the most southerly of the genus in distribution. *Parnassia* (all species) are among the most beautiful of our native plants. From a distance the white flowers are attractive but not extraordinary; when observed closely, though, the delicate tracery of the green veins on the waxy white petals is astonishing. References: Alexander (1934a); Alexander (1934b); Ball (2016) in FNA12 (2016); Gastony & Soltis (1977); GW2; Simmons in Kubitzki et al (2004); Spongberg (1972).

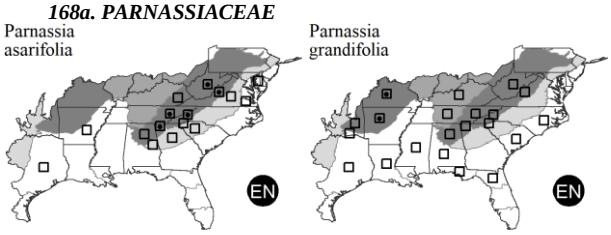
Identification Notes: Note that the five staminodia are (in our species) deeply three-lobed to the base, thus appearing as 15.

1 Leaf blades reniform, as wide or wider than long, the base strongly cordate; staminodia shorter than the stamens [note that the stamens elongate after the staminodia; thus at a certain early stage the stamens of *P. asarifolia* may be shorter than the staminodia; check several flowers]; petal margins crisped ..... ***Parnassia asarifolia***
1 Leaf blades ovate, longer than wide, the base rounded, broadly cuneate, truncate, or cordate; staminodia longer than the stamens (*P. caroliniana* and *P. grandifolia*) or shorter than the stamens (*P. glauca*); petal margins planar. ..... ***Parnassia grandifolia***

Parnassia asarifolia Ventenat. APPALACHIAN PARNASSIA, KIDNEY-LEAVED GRASS-OF-PARNASSUS, APPALACHIAN GRASS-OF-PARNASSUS, BROOK PARNASSIA. **Hab:** Bogs, sphagnous seeps, brookbanks, generally in more acidic habitats than *P. grandifolia*, up to elevations over 1800 m. **Dist:** VA, e. WV, sw. AR south to GA; disjunct in the Coastal Plain of e. TX and sc. AR (in acidic seepages), but primarily in the Appalachian and Ozarkian highlands. **Phen:** (Jul-) Aug-Nov (-Dec). **Syn:** = Ar, C, F, FNA12, G, GW2, K1, K3, K4, RAB, S, Tn, Tx, Va, W, WV. NatureServe G4 (Apparently Secure).

Parnassia grandifolia A.P. de Candolle. LIMESEEP PARNASSIA, BIGLEAF GRASS-OF-PARNASSUS. **Hab:** Fens, gravelly seepages, pineland seepage bogs and ecotones, primarily or solely over calcareous, mafic, or ultramafic rocks, in the outer Coastal Plain in seepage over marl on nearly vertical river bluffs on the Cape Fear River (NC) and in pineland seepage bogs. **Dist:** VA, WV, s. MO, and OK south to n. GA, Panhandle FL, s. MS (Sorrie & Leonard 1999), AR, and e. TX, primarily in the Appalachian and Ozarkian highlands. **Phen:** Aug-Nov (-Dec). **Comm:** The discovery of populations of this species in Brunswick and Columbus counties, NC, was remarkable. In the Panhandle of FL and the West Gulf Coastal Plain of LA and TX it also occurs in wet savannas and pitcherplant bogs (MacRoberts, MacRoberts, & Jackson 2004), in FL sometimes in close proximity to *P. caroliniana*; *Parnassia* in Coastal Plain savannas should not necessarily be assumed to be *P. caroliniana*. **Syn:** = Ar, C, F, FNA12, G, GW2, K1, K3, K4, RAB, S, Tn, Tx, Va, W, WH3, WV, Alexander (1934b). NatureServe G3 (Vulnerable).

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



168b. CELASTRACEAE R. Brown 1814 (BITTERSWEET FAMILY) [in CELASTRALES]

A family of about 100 genera and 1400 species, trees, shrubs, lianas, perennial and annual herbs, nearly cosmopolitan, especially in the tropics and subtropics. References: Brizicky (1964a); Ma, Ball, & Levin (2016) in FNA12 (2016); Simmons in Kubitzki et al (2004).

1 Lianas, climbing by adventitious roots, twining, or scrambling.
  2 Plants climbing by adventitious roots; sepals and petals 4; ovaries 4-carpellate (capsules 4-locular)..... ***Euonymus***
  2 Plants climbing by twining or scrambling; sepals and petals 5; ovaries 3-carpellate (capsules 3-locular).
  ..... ***Celastrus***
1 Shrubs or trees, more or less erect and without climbing adaptations.
  ..... ***Euonymus***

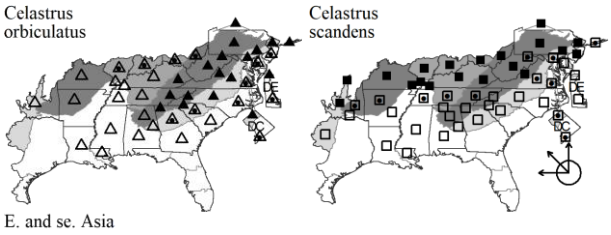
Celastrus Linnaeus 1753 (BITTERSWEET)

A genus of about 30 species, lianas, primarily in e. Asia, Malaysia, Oceania, Madagascar, and Central and South America. The one species native to e. North America is related to e. Asian species. The grammatical gender of the genus has been conserved as masculine (Brummitt 2005). References: Duncan (1969); Leicht-Young et al (2007); Ma & Levin (2016a) in FNA12 (2016); Simmons in Kubitzki et al (2004).

1 Flowers in 2-3-flowered axillary cymes; mature leaves mostly obovate, averaging 1.2-1.4 (-1.7)× as long as wide; expanding leaves folded (conduplicate); capsule yellow (contrasting with the seeds); pollen white..... ***Celastrus orbiculatus***
1 Flowers in 6-many-flowered panicles terminal on leafy branches or branchlets; mature leaves mostly ovate-lanceolate to elliptic, averaging (1.8-) 2.0-2.6× as long as wide; expanding leaves rolled (involute); capsule orange (similar in color to the seeds); pollen yellow ..... ***Celastrus scandens***

* ***Celastrus orbiculatus*** Thunberg. ORIENTAL BITTERSWEET. **Hab:** Bottomland and riparian forests, mesic upland forests and bluffs, glade margins, disturbed areas, thickets, roadsides, forests. **Dist:** Native of Asia. *C. orbiculatus* is grown for its attractive fruits; it has become a noxious weed in much of our area. **Phen:** May-Jun; Aug-Sep. **Comm:** The first reports of its occurrence in our area appear to be in the 1960's; it is now much more common in most of our area than its native relative, *C. scandens*. **Syn:** = Ar, C, F, FNA12, GrPl, Il, K3, K4, Mi, NE, NY, Pa, RAB, Tn, Va, W, Duncan (1969); = *Celastrus orbiculata* – G, K1, orthographic variant. NatureServe GNR (Not Yet Ranked).

Celastrus scandens Linnaeus. AMERICAN BITTERSWEET. **Hab:** Dry-mesic to mesic upland forests and woodlands, bluffs, riparian and bottomland forests, glade margins. **Dist:** QC west to MB and WY, south to w. SC, n. GA, AL, LA, and TX. **Phen:** May-Jun; Aug-Sep. **Syn:** = Ar, C, F, FNA12, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, Duncan (1969). NatureServe G5 (Secure).



Euonymus Linnaeus 1753 (SPINDLE-TREE, EUONYMUS, STRAWBERRY-BUSH)

A genus of ca. 129 species, of temperate and tropical areas, trees, shrubs, and lianas. The genus name was variously spelled '*Euonymus'* and '*Evonymus'* by Linnaeus. The spelling *Euonymus* has been nomenclaturally conserved. The genus is now considered to be grammatically masculine, and adjectival specific epithets therefore end in '*-us'*. References: Ma & Funston (2008); Ma & Levin (2016b) in FNA12 (2016); Simmons in Kubitzki et al (2004); Voss (1985).

1 Leaf undersurface with mostly erect hairs to ca. 0.2 mm long; petioles 8-20 mm long; flowers 4-merous; [native]; [section *Euonymus*] .....
  ..... ***Euonymus atropurpureus***
1 Leaf undersurface glabrous (or with some hairs on the midrib); petioles 1-33 mm long; flowers 4- or 5-merous; [introduced or native].
  2 Leaves evergreen; flowers 4-merous; [introduced species, rarely naturalized]; [section *Ilicifolii*].
    3 Leaves 2-5.5 cm long, 2-3.5 cm wide; capsule 5-6 mm in diameter; plant creeping..... ***Euonymus fortunei***
    3 Leaves (3-) 5-10 (-12) cm long, (2-) 3-5 (-5.5) cm wide; capsule 6-9 (-12) mm in diameter; plant erect..... ***Euonymus japonicus***
  2 Leaves deciduous; flowers 4- or 5-merous; [introduced or native].
  ..... ***Euonymus americanus***

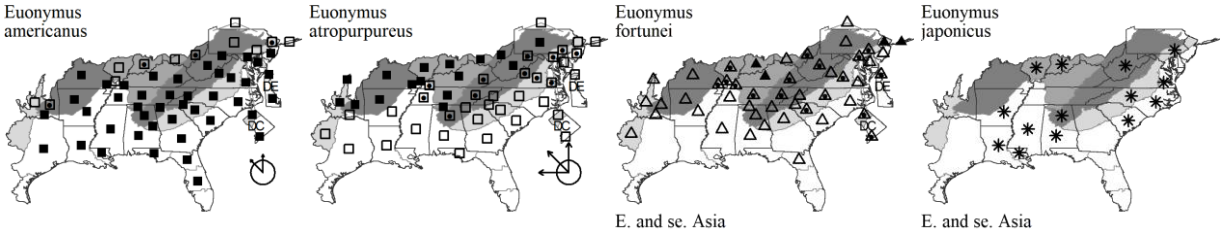
Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Euonymus americanus Linnaeus. STRAWBERRY-BUSH, HEART'S-A-BUSTIN' (-WITH-LOVE). **Hab:** Mesic to submesic forests. **Dist:** Se. NY west to s. OH and se. MO, south to n. peninsular FL and TX. **Phen:** May-Jun; Sep-Oct. **Tax:** A variety, var. *angustifolius* (Pursh) Alph. Wood, with narrowly lanceolate to linear leaves, has been named and occurs in our area; it is of uncertain status (Brizicky 1964) but is here considered a form. **Syn:** = Ar, C, F, FNA12, G, Il, K3, K4, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV; = *Euonymus americana* – K1. NatureServe G5 (Secure).

Euonymus atropurpureus Jacquin. AMERICAN WAHOO, BURNING BUSH. **Hab:** Bottomland forests, riverbanks, mostly on rich alluvial sediments, or on slopes over mafic or calcareous rocks. **Dist:** NY west to ND, south to Panhandle FL and TX. **Phen:** May-Jul; Aug-Oct. **Tax:** Two varieties are sometimes recognized: a widespread var. *atropurpureus* and var. *cheathumii* Lundell endemic to TX. **Syn:** = C, F, FNA12, G, GrPl, Il, K4, NY, Pa, RAB, S, Tn, Va, W, WH3, WV; = *Euonymus atropurpurea* – Mi, Voss (1985); > *Euonymus atropurpurea* var. *atropurpurea* – K1; > *Euonymus atropurpureus* var. *atropurpureus* – Ar, K3, NE, Tx; > *Euonymus atropurpureus* var. *cheathumii* Lundell – K3; > *Euonymus atropurpureus* var. *cheatumii* – Tx, orthographic variant; > *Evonymus atropurpurea* var. *atropurpurea* – NcTx, orthographic variant; > *Evonymus atropurpurea* var. *cheathumii* Lundell – NcTx, orthographic variant.

* ***Euonymus fortunei*** (Turczaninow) Handel-Mazzetti. WINTERCREEPER, CHINESE SPINDLE-TREE, CLIMBING EUONYMUS. **Hab:** Bottomlands, swamps, upland suburban woodlands. **Dist:** Native of China. **Phen:** May-Jun; Oct-Dec. **Tax:** There is some confusion about the appropriate taxonomic treatment about various cultivated (and escaped) forms that have been attributed to this name. **Comm:** Sometimes climbing into the canopy. **Syn:** = F, FNA12, G, K4, Mi, NE, NY, Pa, Va, Ma & Funston (2008), Voss (1985); < *Elaeodendron fortunei* Turczaninow – K3; > *Euonymus fortunei* (Turczaninow) Handel-Mazzetti var. *radicans* (Siebold ex Miquel) Rehder – K1; > *Euonymus hederaceus* Champ. ex Bentham – Il, K2, Tn; > *Euonymus kiautschovica* Loesener – K1; > *Euonymus kiautschovicus* Loesener – Il.

* ***Euonymus japonicus*** Thunberg. JAPANESE SPINDLE-TREE. **Hab:** Disturbed areas, especially on barrier islands. **Dist:** Native of Japan. **Comm:** Especially widely planted on barrier islands and in other maritime situations because of its resistance to salt damage (Brown 1959). Reported for AR (Serviss et al. 2017a; Serviss et al. 2020). **Syn:** = C, FNA12, Il, K3, K4, Ma & Funston (2008); = *Euonymus japonica* – K1. NatureServe GNR (Not Yet Ranked).



171. OXALIDACEAE R. Brown 1818 (WOOD-SORREL FAMILY) [in OXALIDALES]

A family of 5-6 genera and 800 species, herbs, shrubs, vines, and small trees, nearly cosmopolitan (especially temperate). References: Cocucci in Kubitzki et al (2004); Nesom (2016o) in FNA12 (2016).

Oxalis Linnaeus 1753 (WOOD-SORREL, OXALIS)

A genus of about 700 species, herbs, shrubs, and vines, nearly cosmopolitan. References: Cocucci in Kubitzki et al (2004); Eiten (1963); Franck et al (2016); Horne, Barger, & Nesom (2013); Kelley & Vincent (2020); Lourteig (1979); Lourteig (1990); Nesom (2009b); Nesom (2009c); Nesom (2016o) in FNA12 (2016); Nesom, Spaulding, & Horne (2014); Robertson (1975); Ward (2004a).

3 Plant acaulescent; leaves basal; flowers white, pink, or purple.
  5 Leaflets obdeltoid (the apical lobes angular, each leaf thus with 6 "points").
    6 Leaflets green; flowers pink, blooming mainly spring-summer; plants with bulbs and bulblets; leaflet apex usually truncate ..... ***Oxalis intermedia***
    6 Leaflets purple or green; flowers white, blooming mainly in the winter; plants with scale-clad rhizomes; leaflet apex usually deeply notched ..... ***Oxalis triangularis***
  5 Leaflets obcordate (the apical lobes rounded, each leaf thus with 6 rounded lobes).
    7 Flowers solitary (rarely in simple umbels of up to 5 flowers); plants either rhizomatous (*O. montana*) or bulbous (*O. brasiliensis* and *O. hispidula*); tips of sepals plane; leaflets lacking oxalate deposits (visible as dots)
      9 Abaxial leaf surface sparsely but evenly strigose with fine hairs; leaflet margins glabrous to sparsely irregularly ciliate with loose, fine hairs; outer bulb scales 5-8 (-13)-nerved; sepal apices without orange tubercles; aerial propagules sometimes produced at bracteole region of scape ..... ***Oxalis brasiliensis***
      9 Abaxial leaf surface strongly strigose to hirsute-strigose; leaflet margins prominently ciliate with stiff, sharp-pointed hairs; outer bulb scales 3- (-5)-nerved; sepal apices with a pair of elongate orange tubercles; aerial propagules never produced ..... ***Oxalis hispidula***
    7 Flowers in umbels; plants bulbous; tips of sepals with orange callosities; leaflets with oxalate deposits (visible as dots) distributed either evenly over the entire surface, around the margins of the leaflets, or at the apical notch of the leaflets; [section *Ionoxalis*].
      10 Sepals conspicuously appressed-pubescent; leaflets with reddish-brown callosities mostly along the margins; [naturalized] ..... ***Oxalis articulata***
      10 Sepals glabrous or sparsely pubescent; leaflets with reddish-brown callosities either scattered over the surface or only at the apical notch; [native or naturalized]
        11 Leaflets 25-45 mm long; leaflets with reddish-brown callosities scattered over the surface; [naturalized] ..... ***Oxalis debilis***
        11 Leaflets 8-15 mm long; leaflets with reddish-brown callosities only at the apical notch; [native] ..... ***Oxalis violacea***
3 Plant caulescent; leaves alternate; flowers yellow; [section *Corniculatae*].
  13 Stems evenly strigose from base to peduncles and pedicels.
    14 Flowers 1-3 (-8) in umbelliform cymes; flowers homostylous; petals 5-12 mm long, yellow, without red lines ..... ***Oxalis dillenii***
    14 Flowers (2-) 3-5 (-8) in umbelliform cyme; flowers distylous; petals (6-) 12-16 (-17) mm long, yellow with prominent red lines in the corolla throat ..... ***Oxalis texana***

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

13 Stems pilose to villous to nearly glabrous, rarely strigose and then only on peduncles or pedicels.
15 Petals 9-20 (-23) mm long, red-lined in the throat (sometimes very faintly so).
16 Corolla throats strongly red-lined within; petals 9-20 mm long; flowers 1 or (2-) 3-8 in umbelliform cymes above the level of the leaves; stems densely and pilose with stiffly spreading non-septate hairs; stoloniform rhizomes lignescent or ligneous and numerous on an individual plant
17 Petals 9-15 mm long; plants cespitose or weakly colonial; pedicels strigose with short hairs that are curved towards pedicel apex ..... ***Oxalis colorea***
17 Petals (13-) 15-20 (-23) mm long; plants strongly colonial; pedicels villous with long straightish hairs..... ***Oxalis macrantha***
16 Corolla throats yellow, very faintly to strongly red-lined within; petals 10-18 mm long; flowers 1 or 2-4 (-8) in regular or irregular cymes, above or within the level of the leaves; stems nearly glabrous to sparsely or densely pilose or villous with septate hairs or a mixture of septate and non-septate hairs; stoloniform rhizomes usually 1 or few, herbaceous or lignescent. ..... ***Oxalis grandis***
15 Petals 4-9 (-11) mm long, yellow, without red lines in the throat.
19 Stems repent, rooting at most nodes; seeds brown, transverse ridges not white; stipules oblong with distinct flanges and free auricles ..... ***Oxalis corniculata***
19 Stems erect, usually arising singly from the base, rarely decumbent, not or very rarely rooting at the nodes, from a short, thin, often herbaceous to slightly lignescent rhizome etc. ; seeds all brown or with white transverse ridges; stipules absent or so reduced to be barely evident.
20 Stems (5-) 8-30 (-35) cm, sparsely pilose with non-septate hairs to almost completely glabrous, arising from a taproot, often producing lignescent stolons; flowers 1 or 2 (-3, rarely 4-5) in umbelliform cymes; capsules glabrous to sparsely puberulent, not villous ..... ***Oxalis florida***
20 Stems 20-60 (-90) cm long, sparsely to very sparsely pilose with nonseptate hairs or a mixture of nonseptate and septate hairs or densely villous with septate hairs, arising singly from the base from a short herbaceous to lignescent rhizome; flowers usually (3-) 5-7 (-15) in regular (rarely irregular) cymes; capsules villous to puberulent and villous to glabrate..... ***Oxalis stricta***

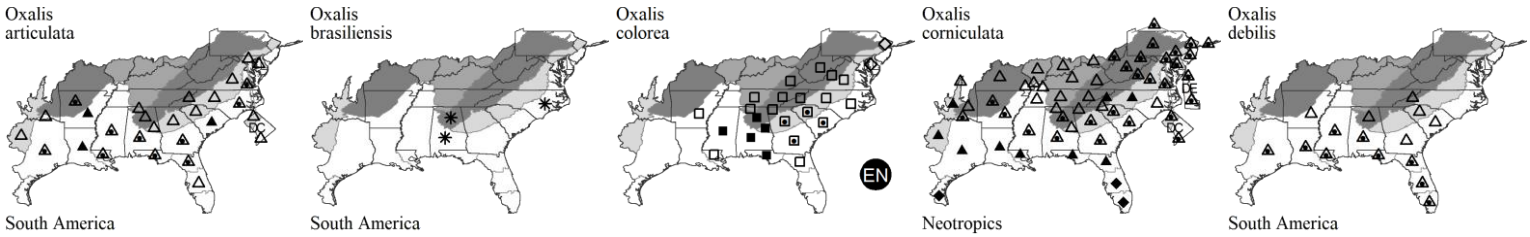
* ***Oxalis articulata*** Savigny. **Hab:** Roadsides, old gardens. **Dist:** Native of South America. **Syn:** = FNA12, K4, WH3, Kelley & Vincent (2020), Nesom (2009b); ? *Ionoxalis martiana* (Zuccarine) Small – S, misapplied; > *Oxalis articulata* Savigny ssp. *rubra* (St. Hilaire) Lourteig – NcTx; > *Oxalis rubra* St. Hilaire – Ar, K1, RAB, Tx, Va, Robertson (1975).

* ***Oxalis brasiliensis*** G. Loddiges. **Hab:** Disturbed roadsides. **Dist:** Native of Argentina, Uruguay, and Brazil. **Phen:** Mar-Jul. **Comm:** See Horne, Barger, & Nesom (2013) for additional and more detailed information. **Syn:** = FNA12, K4, Horne, Barger, & Nesom (2013).

Oxalis colorea (Small) Fedde. SMALL'S WOOD-SORREL. **Hab:** Longleaf pine sandhills, dry-mesic and mesic forests, thin soils around rock outcrops, disturbed areas. **Dist:** E. MD and sc. and w.VA west to MO, south to n. FL and e. LA. **Phen:** (Mar-) Apr-May (-Oct). **Syn:** = FNA12, K4; = *Xanthoxalis colorea* Small – S.

* ***Oxalis corniculata*** Linnaeus. CREEPING LADY'S-SORREL. **Hab:** Gardens, fields, disturbed areas, sometimes more natural areas including pinelands, dunes. **Dist:** Probably native of New World tropics and subtropics, possibly including the deeper South. Now nearly worldwide in distribution. **Phen:** Feb-Dec. **Syn:** = Bah, C, F, FNA12, GrPl, Il, K1, K4, Mi, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, WV, Eiten (1963), Robertson (1975); = *Oxalis repens* Thunberg – G; < *Oxalis corniculata* Linnaeus – WH3; > *Oxalis corniculata* var. *atropurpurea* Planchon – Ward (2004a); > *Oxalis corniculata* var. *corniculata* – Ward (2004a); > *Xanthoxalis corniculata* (Linnaeus) Small – S; > *Xanthoxalis langloisii* Small – S.

* ***Oxalis debilis*** Kunth. **Hab:** Disturbed areas. **Dist:** Native of South America. **Phen:** Mar-Jun. **Syn:** = FNA12, K3, K4, WH3, Nesom (2009b); > *Oxalis corymbosa* A.P. de Candolle – Bah, Tx, Robertson (1975), Ward (2004a); > *Oxalis debilis* Kunth var. *corymbosa* (A.P. de Candolle) Lourteig – K1. NatureServe G4G5T4T5 (Apparently Secure).



Oxalis dillenii Jacquin. SOUTHERN YELLOW WOOD-SORREL. **Hab:** Roadsides, pastures, lawns, a wide variety of other habitats. **Dist:** NS west to SK, south to FL, TX, NM; introduced elsewhere. **Phen:** Feb-Nov. **Tax:** See Nesom, Spaulding, & Horne (2014) for additional information. **Syn:** = Ar, C, FNA12, K1, K3, K4, Mi, NE, NY, Va; = *Oxalis stricta* Linnaeus – WV, misapplied; < *Oxalis corniculata* Linnaeus – WH3; < *Oxalis dillenii* Jacquin – Tn; > *Oxalis dillenii* Jacquin – GrPl, RAB; > *Oxalis dillenii* ssp. *dillenii* – W, Eiten (1963), Robertson (1975), Ward (2004a); > *Oxalis dillenii* ssp. *filipes* (Small) Eiten – Pa; > *Oxalis dillenii* var. *dillenii* – Tx; > *Oxalis dillenii* var. *radicans* Shinners – Tx; > *Oxalis florida* Salisbury – F; > *Oxalis florida* Salisbury var. *filipes* (Small) H.E. Ahles – RAB; > *Oxalis florida* var. *florida* – RAB; ? *Oxalis fontana* Bunge – Il; < *Oxalis stricta* Linnaeus – NcTx; > *Oxalis stricta* Linnaeus – G, misapplied; > *Xanthoxalis brittoniae* (Small) Small – S; > *Xanthoxalis filipes* Small – S.

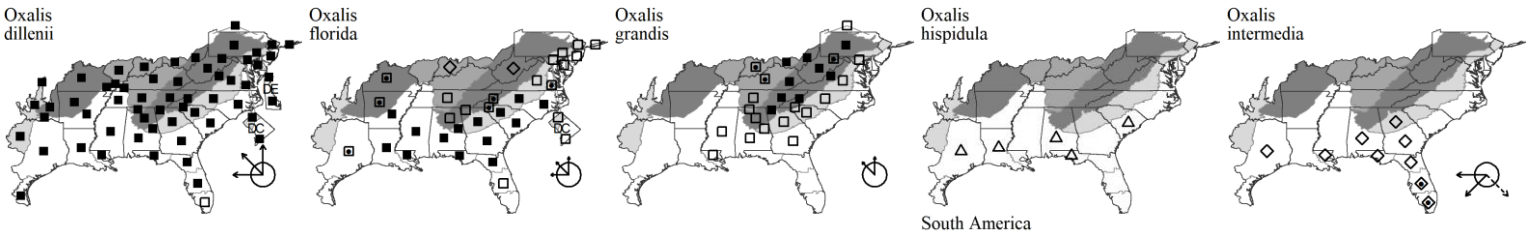
Oxalis florida Salisbury. **Hab:** Floodplain forests, moist fields, ditches, bluffs, and moist slopes. **Dist:** VT and CT south to FL, west to LA, AR, and MO. **Phen:** Mar-May (-Sep). **Syn:** = Ar, FNA12, NE, NY, Va; = *Oxalis florida* Salisbury var. *recurva* (Elliott) H.E. Ahles – RAB; = *Oxalis macrantha* (Trelease) Small – C; = *Oxalis recurva* Elliott var. *recurva* – F; < *Oxalis corniculata* Linnaeus – WH3; < *Oxalis dillenii* Jacquin – K3, Tn; > *Oxalis dillenii* ssp. *filipes* (Small) Eiten – W, Eiten (1963), Robertson (1975), Ward (2004a); > *Oxalis filipes* – F; > *Oxalis priceae* Small ssp. *colorea* (Small) Eiten – K1, Eiten (1963), Robertson (1975), misapplied; < *Oxalis recurva* – G; > *Xanthoxalis filipes* Small – S; > *Xanthoxalis recurva* (Elliott) Small – S.

Oxalis grandis Small. GREAT YELLOW WOOD-SORREL. **Hab:** Rich moist forests, rocky bluffs. **Dist:** PA, OH, and IN, south to SC, GA, AL, MS. **Phen:** May-Aug. **Syn:** = C, F, FNA12, G, K1, K3, K4, Pa, RAB, Tn, Va, W, Eiten (1963), Robertson (1975); = *Xanthoxalis grandis* (Small) Small – S. NatureServe G4G5 (Apparently Secure).

* ***Oxalis hispidula*** Zuccarini. **Hab:** Lawns, wet ditches, disturbed roadsides. **Dist:** Native of Argentina, Uruguay, Paraguay, and Brazil. See Horne, Barger, & Nesom (2013) and Franck et al. (2016) for additional and more detailed information. Also abundant in lawns in Monroe, LA (Ouachita Parish). Kelley & Vincent (2020) report naturalization in multiple areas in Louisiana. **Phen:** Oct-Dec. **Syn:** = FNA12, K4, Horne, Barger, & Nesom (2013).

* ***Oxalis intermedia*** A. Richard. WEST INDIAN WOOD-SORREL, CUBAN PURPLE WOOD-SORREL. **Hab:** Disturbed areas. **Dist:** FL west to CA, south into the New World tropics; West Indies. **Phen:** Apr-Sep. **Syn:** = Bah, FNA12, K4, NE, Nesom (2009b); < *Oxalis latifolia* – WH3.

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



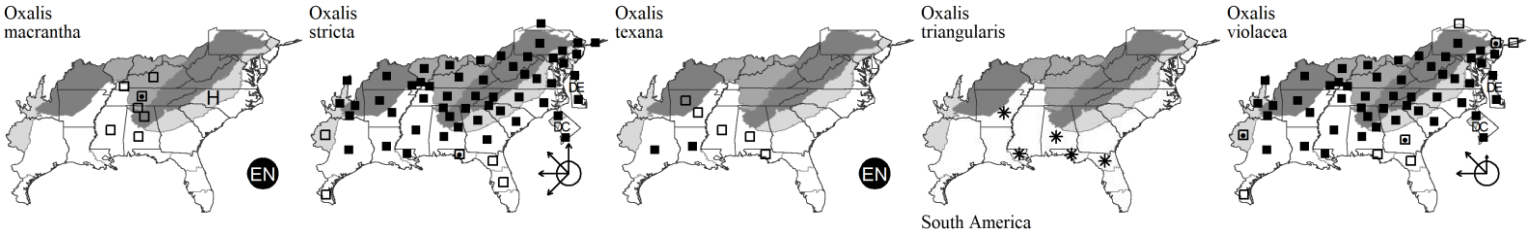
Oxalis macrantha (Trelease) Small. SADIE PRICE'S YELLOW WOOD-SORREL. **Hab:** Rich woodlands. **Dist:** KY and TN south to GA, Panhandle FL, AL, MS, and se. LA; disjunct in c. NC. **Comm:** *O. macrantha* predates *O. priceae* and thus is the name to use. **Syn:** = FNA12, K4, WH3; = *Oxalis priceae* – Tn; = *Oxalis priceae* Small ssp. *priceae* – K1, Eiten (1963), Robertson (1975); = *Oxalis recurva* Elliott var. *macrantha* (Trelease) Wiegand – F; = *Xanthoxalis macrantha* (Trelease) Small – S; < *Oxalis recurva* – G; > *Xanthoxalis hirsuticaulis* (Small) Small – S; > *Xanthoxalis priceae* Small – S.

Oxalis stricta Linnaeus. COMMON YELLOW WOOD-SORREL. **Hab:** Disturbed areas, also in a variety of natural habitats. **Dist:** Widespread in North America, now widespread nearly worldwide. **Phen:** May-Oct. **Syn:** = Ar, C, FNA12, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, Tn, Tx, Va, W, WV, Eiten (1963), Robertson (1975), Ward (2004a); = *Oxalis europaea* – G; < *Oxalis corniculata* Linnaeus – WH3; > *Oxalis europaea* var. *bushii* (Small) Wiegand – F; > *Oxalis europaea* Jord. var. *europaea* – F; < *Oxalis stricta* Linnaeus – NcTx; > *Xanthoxalis bushii* Small – S; > *Xanthoxalis cymosa* (Small) Small – S; > *Xanthoxalis rufa* Small – S; > *Xanthoxalis stricta* (Linnaeus) Small – S.

Oxalis texana (Small) Fedde. TEXAS WOOD-SORREL. **Hab:** Glades, woodlands, forests. **Dist:** Panhandle FL and AL west to TX. **Phen:** Mar-May (-Jun). **Syn:** = Ar, FNA12, K4, Nesom (2009b); = *Oxalis lyonii* Pursh – Lourteig (1979); = *Oxalis priceae* Small ssp. *texana* (Small) Eiten – K1, Tx, Eiten (1963), Robertson (1975). NatureServe G3G5TNR (Not Yet Ranked).

* ***Oxalis triangularis*** A. Saint-Hilaire. PURPLE SHAMROCK. **Hab:** Disturbed areas. **Dist:** Native of Brazil and Argentina. See Serviss, Hardage, & Peck (2021) for discussion of marginal naturalization in AR. **Phen:** Apr-May. **Syn:** = FNA12, WH3, Nesom (2009b); > *Oxalis triangularis* A. St. Hilaire ssp. *papilionacea* (Hoffmannsegg ex Zuccarini) Lourteig – K4.

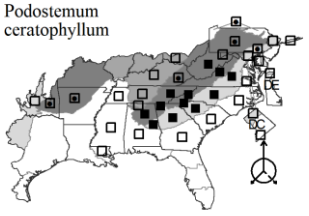
Oxalis violacea Linnaeus. VIOLET WOOD-SORREL. **Hab:** Dry to moist forests. **Dist:** MA, VT, MI, SD, and CO south to FL, TX, and AZ. **Phen:** Mid Feb-May (-Jul). **Syn:** < *Ionoxalis violacea* (Linnaeus) Small – S; < *Oxalis violacea* Linnaeus – Ar, C, FNA12, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, W, WH3, Nesom (2009b), Robertson (1975), Ward (2004a); > *Oxalis violacea* var. *trichophora* Fassett – F, WV; > *Oxalis violacea* var. *violacea* – F, WV.



185. PODOSTEMACEAE Richard ex Kunth 1816 (RIVERWEED FAMILY) [in MALPIGHIALES]

A family of about 47-49 genera and 280 species, aquatic herbs, of tropical, subtropical, and rarely temperate regions of the New World and Old World. References: Cook & Rutishauser in Kubitzki, Bayer, & Stevens (2007); Graham & Wood (1975); Philbrick & Crow (2015) in FNA6 (2015).

Podostemum Michaux 1803 (RIVERWEED)



A genus of about 7-17 species, reduced aquatic herbs, of tropical to temperate America. References: Cook & Rutishauser in Kubitzki, Bayer, & Stevens (2007); Graham & Wood (1975); Philbrick & Crow (1983); Philbrick & Crow (2015) in FNA6 (2015).

Identification Notes: *Podostemum* is a curious plant, seeming more like an alga than a vascular plant in color, texture, mode of attachment to substrate (by a fleshy disk), and irregular thalloid branching.

Podostemum ceratophyllum Michaux. THREADFOOT, RIVERWEED, RIFFLEWEED. **Hab:** Attached to rocks and dams in rapidly or slowly flowing water. **Dist:** NS, ME, and QC south to sw. GA, s. AL, s. MS, se. LA (Florida parishes), AR, and w. TN; disjunct in the Ozark-Ouachita Highlands of w. AR and e. OK; Dominican Republic; Honduras. **Phen:** May-Jul. **Comm:** Fehrmann, Philbrick, & Halliburton (2012) demonstrate very low genetic diversity in the populations north of the glacial maximum, in the Ozark-Ouachita Highlands, and in Central America, and high genetic diversity in the portion of the unglaciated southeast east of the Mississippi River. **Syn:** = Ar, C, F, FNA6, G, K1, K3, K4, NE, NY, Pa, RAB, Tn, Va, W, WV, Graham & Wood (1975); = *Podostemon ceratophyllum* – GW2, Tx, orthographic variant; > *Podostemon abrotanoides* Nuttall – S; > *Podostemon ceratophyllum* – S, orthographic variant. NatureServe G5 (Secure).

186. HYPERICACEAE A.L. de Jussieu 1789 (ST. JOHN'S-WORT FAMILY) [in MALPIGHIALES]

A family of 7-9 genera and 480-560 species, herbs, shrubs, and trees, nearly cosmopolitan. It appears from molecular analysis that recognition of the Hypericaceae is (after all) warranted. *Hypericum* is in a clade with *Podostemum* and *Bonnetia*, sister to a clade including Clusiaceae s.s. (Savolainen

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et al. 2000), and unless the morphologically very different Podostemaceae is to be included in a broad Clusiaceae, Hypericaceae and Podostemaceae must be recognized. References: Adams (1973); Godfrey (1988); Robson (2015e) in FNA6 (2015); Stevens in Kubitzki, Bayer, & Stevens (2007); Wood & Adams (1976).

1 Petals yellow; stamens fascicled or not, if fascicled then not into 3 fascicles of 3 stamens each; staminodia (hypogynous glands) lacking; perianth 4-5-merous..... ***Hypericum***
1 Petals pale pink; stamens fascicled, in 3 fascicles of 3 stamens each; staminodia (hypogynous glands) present, alternating with the fascicles of stamens; perianth 5-merous ***Triadenum***

Hypericum Linnaeus 1753 (ST. JOHN'S-WORT)

A genus of 370-420 species, trees, shrubs, and herbs, primarily temperate. *Hypericum* in our area is a large, complex, and interesting genus, with a number of unresolved questions remaining. The species treated in Key B have often been treated in the segregate genus *Ascyrum*; evidence from a variety of disciplines now suggests that they should be included in *Hypericum* (Adams & Robson 1961; Calie, Schilling, & Webb 1983; Robson 1996; Nürk et al. 2013). *Triadenum* is almost basal in (or to) *Hypericum*, and its inclusion in *Hypericum* has also been recently promoted (e.g. Nürk et al. 2013), but its retention at generic rank is suggested by its morphological distinction and position as a basal clade. References: Adams & Robson (1961); Adams (1957); Adams (1962); Adams (1973); Allison (2011); Calie, Schilling, & Webb (1983); Cooperrider (1989); Culwell (1970); Godfrey (1988); Meseguer et al (2015); Meseguer, Aldasoro, & Sanmartín (2013); Nürk et al (2013); Robson & Adams (1968); Robson (1985, 1990, 2001, 2002, 2006); Robson (1996); Robson (2015a) in FNA6 (2015); Sorrie (2012); Stevens in Kubitzki, Bayer, & Stevens (2007); Weakley et al (2011); Webb (1980).

Identification Notes: "Longest leaves" should be sought at branch nodes.

1 Petals pale pink; stamens fascicled, in 3 fascicles of 3 stamens each; staminodia (hypogynous glands) present, alternating with the fascicles of stamens; perianth 5-merous ***Triadenum***
1 Petals yellow; stamens fascicled or not, if fascicled then not into 3 fascicles of 3 stamens each; staminodia (hypogynous glands) lacking; perianth 4-5-merous.
  2 Leaves with an articulation at the very base, this appearing as a narrow line, groove, or abrupt change of color and texture which extends across the petiole; shrubs; [section *Myriandra*].
    3 Leaves needle-like, 0.5-1.5 (-2) mm wide, the margins essentially parallel (*H. galioides* keyed here and below); [subsection *Centrosperma*] ***Key A***
    3 Leaves, at least the largest on the plant, not needle-like, wider than 2 mm, the margins not parallel, the widest point often beyond the middle.
      4 Petals 4; sepals 4 (rarely 2); plant 5-100 cm tall; leaves 2-40 mm long; foliage bluish-green when fresh; [subsection *Ascyrum*] ***Key B***
      4 Petals 5; sepals 5; plant 50-250 cm tall; leaves (10-) 20-70 mm long; foliage green when fresh; [subsections *Centrosperma* and *Brathydium*] ***Key C***
  2 Leaves without an articulation at the very base, the petiole merging gradually into the stem with no break, groove, or abrupt change in color or texture; herb, decumbent shrub, or shrub.
    5 Leaves ascending or appressed, 1-nerved, < 1 mm wide; inflorescence either a compound raceme or a dichasial cyme; annual or perennial herbs; [section *Brathys*] ***Key D***
    5 Leaves spreading or ascending, generally multi-nerved, > 1 mm wide; inflorescence a dichasial cyme; herbs or shrubs.
      9 Capsule 3 (-4) locular; stamens connate at the base into 3 or 5 fascicles; leaves with black glandular dots as well as translucent glandular dots when backlit (except in *H. perforatum*); sepals and/or petals marked with black glandular dots or lines; perennial herbs; [section *Hypericum*] ***Key E***
      9 Capsule 1-locular; stamens separate or connate at the base, but not grouped into fascicles; leaves with translucent glandular dots, without black glandular dots (when backlit); sepals and petals with translucent glandular lines or dots only, not also marked with black glandular dots or lines.
        10 Shrubs, decumbent shrubs, or suffruticose herbs; [section *Myriandra*, subsections *Brathydium*, *Pseudobrathydium*, and *Suturosperma*] ***Key F***
        10 Herbs; [section *Trigynobrathys* and section *Myriandra* subsection *Suturosperma*] ***Key G***

Key A - shrubby St. John's-worts with needle-like leaves and flowers with 5 petals and 5 sepals [section *Myriandra*, subsection *Centrosperma*]

1 Longest leaves 4-16 mm long.
  2 Upper leaf surface convex, merging gradually with revolute margins; leaves oblanceolate to linear-oblanceolate ("oblinear"); [east and west of the Mississippi River in the Coastal Plain] ***Hypericum galioides***
  2 Upper leaf surface plane, abruptly angled to the revolute portion; leaves linear; [east of the Mississippi in the Coastal Plain].
    3 Capsules 3-4.5 (-6) mm long; longest leaves 7-16 mm long; corollas 13-17 mm in diameter; seeds reddish-amber or brown, the alveoli not in distinct longitudinal rows, the seed lacking longitudinal ridges except for the two marginal sutures; primary branches with two ridged or winged angles running the length of the internodes, extending from the leaf midribs (but not the margins) at the base of the paired leaves; leaf surface glossy; [of alfisols and ultisols of wet pine savannas, flatwoods, and seepage bogs] ***Hypericum brachyphyllum***
    3 Capsules 6-9 mm long; longest leaves 4-10 (-11); corollas 13-15 mm in diameter; seeds dark red to black, the alveoli in distinct longitudinal rows, with raised ridges often evident between the rows; primary branches with six ridged or winged angles running the length of the internodes, extending from the midribs and margins at the base of the paired leaves; leaf surface dull; [of seasonally dry spodosol pine flatwoods and interdune flats and hollows] ..... ***Hypericum tenuifolium***
1 Longest leaves 13-30 mm long.
  5 Plant a low shrub, <4 dm tall, more-or-less decumbent, forming dense clumps or patches; flowers 10-12 mm in diameter; inflorescence elongate (flowers at up to 5 nodes); [of dry to mesic soils of the lower Piedmont and inner Coastal Plain from sc. VA to ec. AL; disjunct to rock outcrops of the sc. GA Coastal Plain] ..... ***Hypericum lloydii***
  5 Plant an erect shrub, 5-40 dm tall, with single main stem branched above; flowers 13-26 mm diameter; inflorescence elongate (3-7 nodes) or short (1-3 nodes in *H. fasciculatum* and *H. chapmanii*); [of wet soils of the Coastal Plain].
    6 Undersurface of most leaves easily visible (exposed) on both sides of the midrib, the veins usually obvious on the undersurface; leaves narrowly oblanceolate to linear-oblanceolate ("oblinear"), 1.5-5 (-7) mm wide; inflorescence elongate (3-7 nodes) ***Hypericum galioides***
    6 Undersurface usually not visible except for the midrib (leaf margins nearly touching the midrib for its entire length), if the undersurface visible then no veins visible; leaves linear, needle-like, 0.5-1.5 mm wide; inflorescence elongate or short.

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

9 Inflorescence elongate (3-7 nodes); stem bark tight, thin, not exfoliating or exfoliating in narrow strips, grayish (not revealing buff or pale cinnamon color); leaf undersurface, if exposed at all, distinctly paler than the upper surface; [usually associated with flowing water (blackwater streams and impoundments)]..... ***Hypericum nitidum***

9 Inflorescence short (1-3 nodes); stem bark corky-thickened to spongy, exfoliating in broad strips or sheets revealing buff or pale cinnamon color; leaf undersurface, if exposed at all, about the same color as the upper surface; [usually associated with static water (Carolina bays, impoundments, beaver ponds, borrow pits, flatwoods depressions, cypress-gum ponds and stringers)]. ..... ***Hypericum fasciculatum***

Key B - shrubby St. John's-worts with 4 petals and 4 (rarely 2) sepals [section *Myriandra*, subsection *Ascyrum*]

1 Styles and carpels 3 (rarely 4); leaves (5-) 7-20 mm wide, rounded, subcordate, or cordate-clasping at the base; plant an erect shrub.
2 Leaves cordate-clasping at the base; [of e. GA southward]..... ***Hypericum tetrapetalum***
2 Leaves rounded or subcordate at the base; [collectively widespread in our area]. ..... ***Hypericum crux-andreae***

1 Styles and carpels 2 (3 in *H. microsepalum*); leaves 1-7 mm wide, mostly cuneate (or if rounded the leaves < 8 mm long and 3 mm wide); erect or decumbent shrub.
4 Sepals nearly equal in size; styles 3; [s. GA south to n. FL]..... ***Hypericum microsepalum***
4 Sepals markedly unequal, one opposite pair large and enclosing the capsule; styles 2; [collectively widespread].
5 Pedicels 6-13 mm long, soon reflexed; subtending bractlets located near the last pair of leaves; decumbent shrub, to 2 dm tall..... ***Hypericum suffruticosum***
5 Pedicels 1-5 mm long, erect; subtending bractlets located midway between the base of the flower and the last pair of leaves; erect or decumbent shrub, mostly 1-15 dm tall.
6 Erect shrub, usually with a single stem, freely branched well above ground level (or from ground level if injured, as by fire, but then the multiple branches still erect rather than decumbent), to 1 m or more tall; leaves usually variable in size and shape, widest near the middle..... ***Hypericum hypericoides***
6 Decumbent, matted shrub, with several prostrate stems arising from a primary rootstock near ground level, each with numerous erect branchlets, rarely over 3 dm tall; leaves usually relatively uniform in size and shape, widest above the middle ..... ***Hypericum stragulum***

Key C - shrubby St. John's-worts with broader leaves (mostly lanceolate or oblanceolate) and flowers with 5 petals and 5 sepals

1 Leaves cordate-clasping at the base, ovate, averaging about 2× as long as wide; [of s. SC southward]; shrub wandlike or branched, becoming corky-thickened below; [Coastal Plain, se. SC south to s. FL, west to s. MS]; [section *Myriandra*, subsection *Brathydium*]..... ***Hypericum myrtifolium***

1 Leaves cuneate at the base, oblanceolate, oblong, elliptic, or narrowly elliptic, 2.5-10× as long as wide; shrub prolifically bushy-branched when well-developed, with thin bark; [collectively widespread]; [section *Myriandra*, subsection *Centrosperma*].
2 Leaves mostly narrowly oblanceolate, the larger 2-3 cm long, 2-5 (-7) mm wide, mostly 5-10× as long as wide; seeds 0.4-0.8 mm long, dark brown ..... ***Hypericum galioides***
2 Leaves mostly oblong, elliptic, narrowly elliptic, or broadly oblanceolate, the larger (2-) 3-7 cm long, 1-15 mm wide, mostly 2.5-7.5× as long as wide; seeds 0.8-1.5 mm long, amber to medium or dark brown.
3 Flowers solitary, terminal (or in 3-flowered terminal cymes); petals 10-20 mm long; sepals 7-15 mm long; shrubs to 1 m tall..... ***Hypericum frondosum***
3 Flowers (1-) 3-many in terminal cymes; petals 5-10 mm long; sepals 1.5-8 mm long; shrubs to 3 m tall.
4 Flowers (1-) 3-7 per inflorescence; capsules (6-) 7-14 mm long; larger leaves (4-) 7-14 mm wide..... ***Hypericum prolificum***
4 Flowers 7-many per inflorescence; capsules (3-) 4.5-7 mm long; larger leaves 1-10 (-14) mm wide.
5 Styles and carpels (3-) 5; mature capsule deeply lobed (with longitudinal deep grooves); sepals with 3-7 basal veins..... ***Hypericum lobocarpum***
5 Styles and carpels 3 (-5); mature capsule not deeply lobed; sepals with 1-3 basal veins.
6 Leaves (1.8-) 2.8-8.3 (-11) mm wide, the widest on a plant always over 4 mm wide; [widespread]..... ***Hypericum densiflorum***
6 Leaves 1.0-3.7 (-4.1) mm wide; [of the Ridge and Valley of nw. GA, c. and nw. AL, and e. TN]..... ***Hypericum interior***

Key D - herbaceous St. John's-worts with leaves ascending or appressed, 1-nerved, < 1 mm wide and with a diffuse, racemose or dichasial inflorescence

2 Leaves linear-subulate, (5-) 8-20 mm long; capsules 1-1.75× as long as the sepals; seeds coarsely rugose-areolate; stamens 10-22..... ***Hypericum drummondii***
2 Leaves scale-like, 1-5 mm long; capsules ca. 2-3× as long as the sepals; seeds minutely and inconspicuously reticulate; stamens 5-10 ..... ***Hypericum gentianoides***

Key E - herbaceous St. John's-worts with broad leaves, 3 (-4) locular capsules, stamens connate at base into 3 or 5 fascicles, leaves with black dots as well as translucent glands (except in *H. perforatum*), and sepals and/or petals marked with black dots or lines

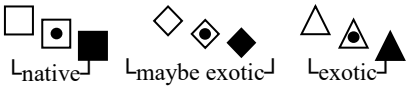
1 Smaller stems strongly wing-angled; seeds 1.0-1.3 mm long; leaves of the main stem (8-) 11-20 (-26) mm long, those of the lateral branches typically much smaller; leaves punctate primarily with translucent glands; [alien, usually in disturbed habitats]; [section *Hypericum*]..... ***Hypericum perforatum***

1 Smaller stems not wing-angled; seeds 0.6-1.1 mm long; leaves of the main stem (11-) 21-48 (-64) mm long, those of the lateral branches nearly to quite as large; leaves punctate with black glands; [native, in a variety of habitats]; [section *Graveolentia*].
3 Sepals 3-6 mm long; styles (2.5-) 5.4-7.4 (-9.0) mm long; petals (6.0-) 9.2-12.2 (-14.0) mm long; leaf apices acute..... ***Hypericum pseudomaculatum***
3 Sepals 1.5-4.0 mm long; styles (1.0-) 1.4-2.4 (-3.0) mm long; petals (3.0-) 4.3-5.9 (-9.0) mm long; leaf apices obtuse to slightly retuse ..... ***Hypericum punctatum***

Key F - shrubby and subshrubby St. John's-worts

2 Leaves 5-15× as long as wide; stamens 120-200 or 45-85; plants 1.5-6 dm tall.
3 Stamens 120-200; leaves 20-35 mm long × 3-5 mm wide; seeds 1.5-1.8 mm long; [section *Myriandra*, subsection *Brathydium*] ..... ***Hypericum dolabriforme***
3 Stamens 45-85; leaves 30-70 mm long × 3-15 mm wide; seeds 2.0-2.7 mm long; [section *Myriandra*, subsection *Suturospermum*]..... ***Hypericum sphaerocarpum***

Key to Map Symbology:



←rare ←uncommon ←common (see introduction for more)

* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable

X : extirpated

2 Leaves 2-5× as long as wide; stamens 30-95; plants 4-20 dm tall; [section *Myriandra*, subsection *Suturosperma*].
4 Larger leaves 4-10 mm wide, 3-5× as long as wide; axillary leaf fascicles present in main leaf axils; seeds pale brown, faintly reticulate, 0.4-0.5 mm long..... ***Hypericum cistifolium***
4 Larger leaves 10-30 mm wide, 1.5-3× as long as wide; axillary leaf fascicles absent; seeds dark brown, strongly reticulate, 1.5-2 mm long.
5 Flowers in simple 3-flowered cymes or in compound cymes with up to 8 flowers; sepals 3 mm long, oblong, obtuse apically; capsules ovoid, 8-10 mm long (excluding the styles) and 5-7 mm broad; seeds 1.8-2.0 mm long, cylindric, sometimes slightly falcate, dull brown when mature..... ***Hypericum apocynifolium***
5 Flowers usually in many-flowered cymes terminating branches; sepals 1.5-2.0 mm long, usually triangular-acute; capsules ovoid to subglobose, 4-5 mm long (excluding the styles) and 4-5 mm broad; seeds 1.5-1.8 mm long, usually falcate-cylindric, dark purplish-brown and lustrous when mature ..... ***Hypericum nudiflorum***

Key G - herbaceous St. John's-worts with broad leaves, 1-locular capsules, stamens separate or connate at base, but not grouped into fascicles, leaves with translucent dots, without black dots, sepals and petals with translucent lines or dots only, not marked with black dots or lines

1 Stems and leaves pubescent; [section *Trigynobrathys*]..... ***Hypericum setosum***
1 Stems and leaves glabrous.
4 Styles 2-4 mm long; stamens (35-) 50-80; petals orange-yellow or burnt yellow.
6 Punctate glands absent on the stem (rarely very few on the internodes of the inflorescence); punctate glands of the leaves small, round, distributed on the lower leaf surface, becoming sparse toward the base of the leaf and toward the midrib; midstem leaves mostly broadest at or beyond the middle..... ***Hypericum virgatum***
6 Punctate glands frequent on the stem; punctate glands of the leaves and stem large, oval, distributed evenly and densely on the lower leaf surface, also dense on the upper leaf surface in *H. denticulatum* and *H. harperi* (absent on upper leaf surface in *H. species 1*); midstem leaves usually broadest at or below the middle.
8 Leaves 10-35 (-40) mm long, 3-8 (-12) mm wide, 3-10× as long as wide, lanceolate to linear-lanceolate, mostly ascending to spreading, often equaling the internodes; sepals 3.0-5.0 mm long, 0.8-2.5 mm wide, acute to acuminate; lanceolate to linear-lanceolate; upper portion of stem with numerous axillary branches; lower stem usually spongy-thickened with aerenchymatous tissue; [of upland depression ponds of the Coastal Plain, growing where seasonally inundated]..... ***Hypericum harperi***
8 Leaves 5-20 (-24) mm long, 5-15 mm wide, 1.2-2.5× as long as wide, ovate to obovate to narrowly elliptic, mostly appressed to the stem, mostly shorter than the internodes; sepals 3.0-8.0 mm long, 1.5-4.0 mm wide, acute; lower stem not spongy-thickened with aerenchymatous tissue (or slightly so in *H. erythreae*); [of moist pinelands of the Coastal Plain, very rarely disjunct inland to bog habitats in the Piedmont and Mountains]. ***Hypericum denticulatum***
4 Styles 0.5-1.5 mm long; stamens 5-22; petals bright golden-yellow.
10 Leaves lanceolate to linear, 6-30 mm long, 0.5-6 mm wide, the leaf base attenuate to cuneate ***Hypericum canadense***
10 Leaves ovate to elliptic, 3-35 mm long, 2-15 mm wide, the leaf base rounded to cordate-clasping.
12 Sepals broadest near the base; inflorescence with few or no normally sized leaves, these only low in the inflorescence, giving the inflorescence a naked appearance. ***Hypericum gymnanthum***
12 Sepals broadest near the middle; inflorescence with many normally sized leaves and leaflike bracts, giving the inflorescence a leafy appearance; [collectively widespread].
15 Inflorescence branches from the upper 1-6 nodes of the stem, the further branching repeatedly monochasial; stem with apical internode well developed, usually longer than the internode below; sepals broader above the middle, more-or-less imbricate; [of the Coastal Plain]..... ***Hypericum mutilum var. latisepalum***
15 Inflorescence branches from the upper 2-10 nodes of the stem, the further branching mostly dichasial; stem with apical internode shorter than the internode below or even essentially absent; sepals broader below the middle, not imbricate (rarely broader above the middle and imbricate); [widespread]..... ***Hypericum mutilum var. mutilum***

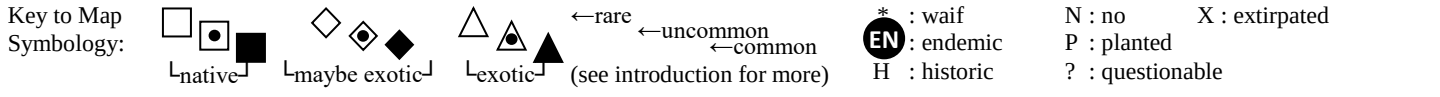
Hypericum apocynifolium Small. **Hab:** Mesic bluffs and ravines, ridges and natural levees in floodplains. **Dist:** C. GA, s. GA, and Panhandle FL west to se. AR and e. TX. **Syn:** = Ar, FNA6, K4, S, Tx, WH3, Adams (1962), Godfrey (1988), Robson (1996); < *Hypericum nudiflorum* Michaux ex Willdenow – GW2, K1, K3, Adams (1973).

Hypericum brachyphyllum (Spach) Steudel. **Hab:** Ponds and wet pine flatwoods. **Dist:** Se. SC south to n. FL, west to s. MS and e. LA. **Tax:** See also *Hypericum limosum* and *Hypericum species 1*, both included within the concept of *Hypericum brachyphyllum* in most sources. **Syn:** < *Hypericum aspalathoides* Willdenow – S; < *Hypericum brachyphyllum* (Spach) Steudel – FNA6, GW2, K1, K3, K4, WH3, Adams (1962), Adams (1973), Godfrey (1988), Robson (1996), Sorrie (2012).

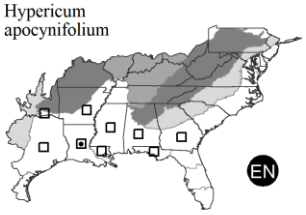
Hypericum canadense Linnaeus. CANADA ST. JOHN'S-WORT. **Hab:** Bogs, pine savannas, ditches. **Dist:** NL (Newfoundland) and QC west to MN, south to s. GA, ne. FL, Panhandle FL, and MS; also in Holland and Ireland, where considered by some to be native. **Phen:** Jul-Sep. **Comm:** Hybrids with *H. mutilum* and/or *H. boreale* have been called *H. ×dissimulatum* E.P. Bicknell (pro sp.). **Syn:** = C, FNA6, G, GW2, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Va, W, WH3, WV, Adams (1973), Robson (1985, 1990, 2001, 2002, 2006); > *Hypericum canadense* var. *canadense* – F; > *Hypericum canadense* var. *galiiforme* Fernald – F.

Hypericum cistifolium Lamarck. **Hab:** Pine savannas, wet pine flatwoods. **Dist:** E. NC south to s. FL, west to e. TX. **Phen:** Jun-Aug. **Syn:** = FNA6, GW2, K1, K3, K4, RAB, Tx, WH3, Adams (1962), Adams (1973), Godfrey (1988), Robson (1996); > *Hypericum cistifolium* Lamarck – S; > *Hypericum opacum* Torrey & A. Gray – S. NatureServe G5 (Secure).

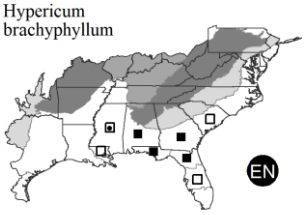
Hypericum crux-andreae (Linnaeus) Crantz. ST. ANDREW'S CROSS, ST. PETER'S-WORT. **Hab:** Pine flatwoods, pine savannas, bogs, seeps, mesic to dryish forests and woodlands. **Dist:** NY (Long Island) and NJ south to s. FL, west to e. TX, primarily on the Coastal Plain, but scattered inland to w. NC and n. GA, also north in the interior to c. TN, s. KY, c. AR, and se. OK. **Phen:** Jun-Oct. **Syn:** = Ar, FNA6, GW2, K1, K3, K4, NcTx, Pa, Tn, W, WH3, Godfrey (1988), Robson (1996); = *Ascyrum stans* Michaux ex Willdenow – F, G, Tx; = *Hypericum stans* (Michaux ex Willdenow) W.P. Adams & Robson – C, RAB, Adams (1962), Adams (1973); > *Ascyrum cuneifolium* Chapman – S; > *Ascyrum stans* Michaux ex Willdenow – S. NatureServe G5 (Secure).



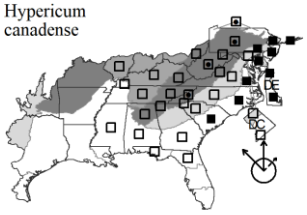
Hypericum apocynifolium



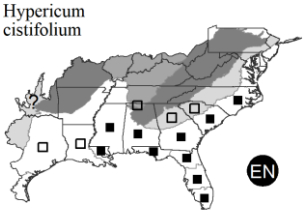
Hypericum brachyphyllum



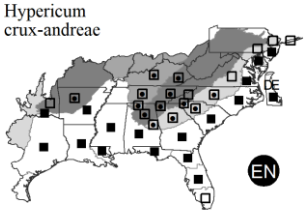
Hypericum canadense



Hypericum cistifolium



Hypericum crux-andreae



Hypericum densiflorum Pursh. MOUNTAIN BUSHY ST. JOHN'S-WORT. **Hab:** Bogs, streambanks, dry to moist forests, rock outcrops, moist forests, pine savannas. **Dist:** Sw. PA south to n. GA and c. AL in and near the Mountains; NY (Long Island) and NJ south to SC in the Coastal Plain; s. GA west to AL in the Coastal Plain. **Phen:** Jun-Sep. **Syn:** = *Hypericum densiflorum* Pursh var. *densiflorum* – Tn, Weakley et al (2011); < *Hypericum densiflorum* Pursh – C, FNA6, GW2, K1, K3, K4, NE, Pa, RAB, Va, W, WV, Adams (1973), Robson (1996); > *Hypericum densiflorum* Pursh – S; < *Hypericum densiflorum* Pursh var. *densiflorum* – F, G, (also see H. interior); > *Hypericum glomeratum* Small – S.

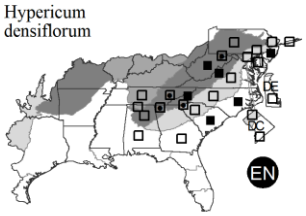
Hypericum denticulatum Walter. COPPERY ST. JOHN'S-WORT. **Hab:** Wet pine savannas, wet pine flatwoods, adjacent ditches, borrow scrapes, blackwater stream shores. **Dist:** Se. NY (Long Island) and s. NJ south to e. GA (McIntosh County) (Sorrie 1998b) on the Coastal Plain; disjunct inland in c. and w. NC, sc. TN, and in s. AL. **Phen:** Jul-Sep. **Tax:** See discussion under *H. virgatum*. **Syn:** = FNA6, K1, K3, K4, NY, Pa, S, Tn, Va, Allison (2011); = *Hypericum denticulatum* ssp. *denticulatum* – Robson (1985, 1990, 2001, 2002, 2006); = *Hypericum denticulatum* var. *denticulatum* – C, F, G, RAB, Adams (1973); < *Hypericum denticulatum* Walter – GW2, WH3.

Hypericum dolabriforme Ventenat. GLADE ST. JOHN'S-WORT. **Hab:** Limestone glades and barrens. **Dist:** In nw. GA (Jones & Coile 1988) and e. TN (Chester, Wofford, & Kral 1997); this species should be sought in sw. VA. **Syn:** = C, F, FNA6, G, K1, K3, K4, NE, S, Tn, Adams (1962), Adams (1973), Robson (1996). NatureServe G4 (Apparently Secure).

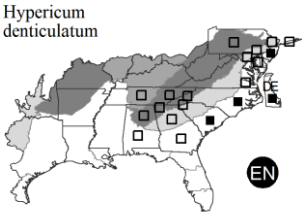
Hypericum drummondii (Greville & Hooker) Torrey & A. Gray. NITS-AND-LICE, DRUMMOND'S ST. JOHN'S-WORT. **Hab:** Dry woodlands, woodland borders, fields. **Dist:** MD west to OH, IL, and se. KS, south to Panhandle FL and c. TX. **Phen:** Jul-Sep. **Syn:** = Ar, C, F, FNA6, G, GrPl, GW2, Il, K1, K3, K4, Mo2, NcTx, Pa, RAB, Tn, Tx, Va, W, WH3, WV, Adams (1973), Robson (1985, 1990, 2001, 2002, 2006); = *Sarothra drummondii* Greville & Hooker – S. NatureServe G5 (Secure).

Hypericum fasciculatum Lamarck. PEELBARK ST. JOHN'S-WORT. **Hab:** Wet pine savannas, beaver ponds, upland depression ponds. **Dist:** E. NC south to s. FL, west to s. MS and e. LA. **Phen:** May-Sep. **Syn:** = Ar, FNA6, GW2, K1, K3, K4, RAB, WH3, Adams (1962), Adams (1973), Godfrey (1988), Robson (1996), Sorrie (2012); < *Hypericum fasciculatum* Lamarck – S.

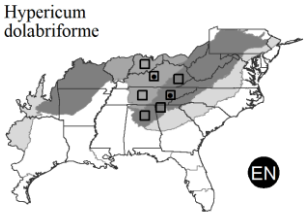
Hypericum densiflorum



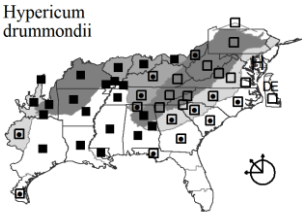
Hypericum denticulatum



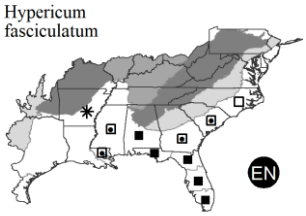
Hypericum dolabriforme



Hypericum drummondii



Hypericum fasciculatum



Hypericum frondosum Michaux. GOLDEN ST. JOHN'S-WORT, CEDAR GLADE ST. JOHN'S-WORT. **Hab:** Rock outcrops and rocky woodlands; also in dry disturbed areas. **Dist:** S. IN and KY south to GA, AL, and e. MS; W. LA and e. TX. **Phen:** Late May-Aug. **Syn:** = C, F, FNA6, G, K1, K3, K4, NE, NY, Tn, Tx, Va, W, WH3, Adams (1962), Adams (1973), Godfrey (1988), Robson (1996); > *Hypericum aureum* Bartram – S; > *Hypericum splendens* Small – S. NatureServe G4 (Apparently Secure).

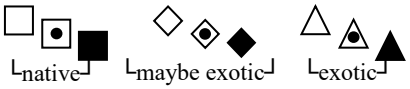
Hypericum galioides Lamarck. **Hab:** Wet pine savannas, wet pine flatwoods, pools, edges of bottomlands. **Dist:** E. NC south to c. peninsular FL, west to s. AR and se. TX. **Phen:** Jun-Aug. **Syn:** = FNA6, GW2, K1, K3, K4, RAB, Tx, WH3, Adams (1962), Adams (1973), Godfrey (1988), Robson (1996), Sorrie (2012); > *Hypericum ambiguum* Elliott – S; > *Hypericum galioides* Lamarck – S. NatureServe G5 (Secure).

Hypericum gentianoides (Linnaeus) Britton, Sterns, & Poggenburg. PINEWEED, ORANGE-GRASS, ORANGEWEED. **Hab:** Fields, rock outcrops, woodland borders, eroding areas, pond margins, pine flatwoods. **Dist:** ME and ON west to MN, south to s. FL and TX. **Phen:** Jul-Oct. **Syn:** = Ar, C, F, FNA6, G, Il, K1, K3, K4, Mo2, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, W, WH3, WV, Adams (1973), Robson (1985, 1990, 2001, 2002, 2006); = *Sarothra gentianoides* Linnaeus – S. NatureServe G5 (Secure).

Hypericum gymnanthum Engelmann & A. Gray. CLASPING-LEAF ST. JOHN'S-WORT. **Hab:** Pine savannas, wet pine flatwoods, sinkhole ponds (Augusta and Rockingham counties, VA), other wet to moist habitats. **Dist:** S. NJ south to ne. FL, Panhandle FL, west to c. TX, and scattered inland in PA, WV, sc. TN, OH, IN, IL, MO, and e. KS; also disjunct in Guatemala (introduced?). **Phen:** Jun-Sep. **Comm:** Added to the flora of KY in 2013 by Martina Hines (Littlefield 2014). **Syn:** = Ar, C, F, FNA6, G, GW2, Il, K1, K3, K4, Mo2, NcTx, Pa, RAB, S, Tn, Tx, Va, WH3, Adams (1973), Robson (1985, 1990, 2001, 2002, 2006). NatureServe G4 (Apparently Secure).

Hypericum harperi R. Keller. HARPER'S ST. JOHN'S-WORT. **Hab:** Clay-based Carolina bays, other upland depression ponds, with *Taxodium ascendens*. **Dist:** E. and c. SC south to sw. GA and e. Panhandle FL and se. AL. **Phen:** Jul-Sep. **Tax:** *H. harperi* should be sought in sc. and se. NC, where it may well occur. This species has generally been considered a part of *H. denticulatum* or *H. virgatum*, but Webb (1980) makes a convincing argument for its recognition, including the ecological differentiation and absence of intermediates or hybrids when growing in proximity to *H. denticulatum*. See *H. virgatum* for additional discussion. **Syn:** = FNA6, K3, K4, WH3, Allison (2011), Robson (1985, 1990, 2001, 2002, 2006); < *Hypericum acutifolium* Elliott – S; < *Hypericum denticulatum* Walter – GW2; < *Hypericum denticulatum* Walter var. *acutifolium* (Elliott) Blake – RAB, Adams (1973); < *Hypericum harperi* R. Keller – K1.

Key to Map Symbology:

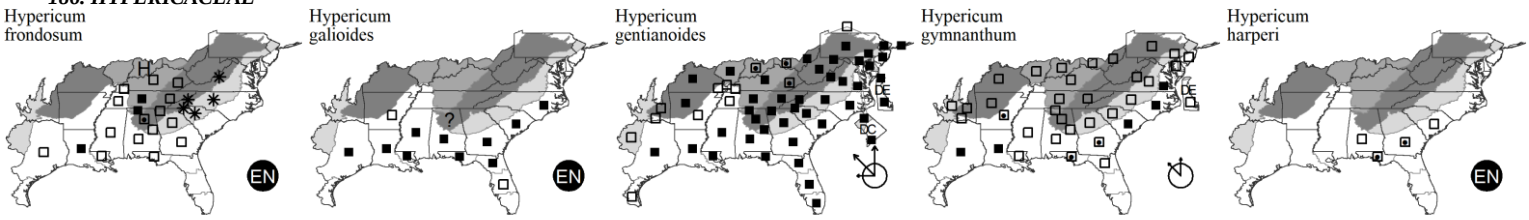


←rare ←uncommon ←common (see introduction for more)

* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable

X : extirpated



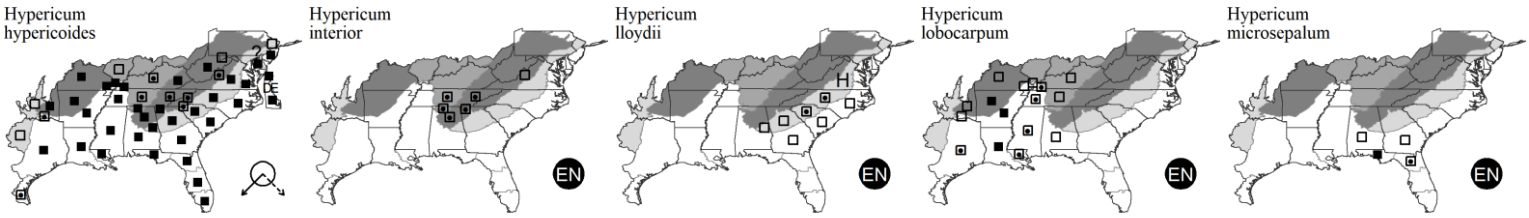
Hypericum hypericoides (Linnaeus) Crantz. ST. ANDREW'S CROSS. **Hab:** Dry forests and woodlands. **Dist:** NJ, w. VA, c. KY, se. MO, and c. OK, south to s. FL and e. TX; West Indies; Mexico south to n. Central America. **Phen:** May-Aug. **Tax:** Very variable and probably warranting division into at least varieties. Coastal Plain (especially sandhill) plants are smaller- and narrower-leaved. **Syn:** = Bah, C, GW2, RAB, Tn, Va, W, WH3, Adams (1962), Adams (1973), Godfrey (1988); = *Ascyrum hypericoides* Linnaeus – Il; = *Hypericum hypericoides* ssp. *hypericoides* – Ar, FNA6, K1, K3, K4, Mo2, NcTx, Robson (1996); > *Ascyrum hypericoides* Linnaeus – S; > *Ascyrum hypericoides* Linnaeus var. *hypericoides* – F, G, Tx; > *Ascyrum hypericoides* Linnaeus var. *oblongifolium* (Spach) Fernald – F, G, Tx; > *Ascyrum linifolium* Spach – S. NatureServe G5T5 (Secure).

Hypericum interior Small. INTERIOR BUSHY ST. JOHN'S-WORT. **Hab:** Rocky forests, riverbanks, seeps, especially over limestone or dolostone. **Dist:** Sw. VA, e. and c. TN, nw. GA south to c. AL. **Tax:** Brought out of general synonymy under *H. densiflorum* as a variety in Weakley et al. (2011), but better treated at species rank. **Syn:** = S; = *Hypericum densiflorum* Pursh var. *interior* (Small) Sorrie & Weakley – Tn, Weakley et al (2011); < *Hypericum densiflorum* Pursh – FNA6, K1, K3, K4, Adams (1962), Adams (1973), Robson (1996). NatureServe G5TNR (Not Yet Ranked).

Hypericum lloydii (Svenson) W.P. Adams. LLOYD'S ST. JOHN'S-WORT. **Hab:** Dry woodlands, longleaf pine sandhills, edges of granitic flatrocks, edges of Altamaha Grit outcrops, roadbanks. **Dist:** Sc. VA (Sorrie & LeBlond 2008) south to c. AL, mainly in the lower Piedmont and upper Coastal Plain. **Phen:** Jun-Sep. **ID Notes:** Unique among our "needle-leaved" Hypericums for its dry, upland habitat. **Syn:** = FNA6, K1, K3, K4, RAB, Va, Adams (1962), Adams (1973), Robson (1996), Sorrie (2012). NatureServe G4? (Apparently Secure).

Hypericum lobocarpum Gattinger. FIVE-LOBE ST. JOHN'S-WORT. **Hab:** Mesic prairies, pine flatwoods, stream banks, river scour; also roadsides and ditches through these habitats. **Dist:** C. KY, c. TN (Chester, Wofford, & Kral 1997) and s. MS west to s. IL, se. OK, and e. TX. **Phen:** Late May-Sep. **Comm:** Credited to SC by Robson (1996), based on specimens debated and dismissed by Adams (1973). The basis for attribution of *H. lobocarpum* to "Blue Ridge, N.C." by Small (1933) is unknown. **Syn:** = Ar, C, FNA6, Il, K1, K3, Mo2, S, Tn, Adams (1962), Adams (1973), Robson (1996); = *Hypericum densiflorum* var. *lobocarpum* (Gattinger) Svenson – F, G, Tx; < *Hypericum densiflorum* Pursh – GW2.

Hypericum microsepalum (Torrey & A. Gray) A. Gray ex S. Watson. FLATWOODS ST. JOHN'S-WORT. **Hab:** Moist to wet pine flatwoods. **Dist:** S. GA and se. AL (Houston County) south to Panhandle FL. **Phen:** Feb-May (-Nov). **Syn:** = FNA6, GW2, K1, K3, K4, WH3, Adams (1962), Adams (1973), Godfrey (1988), Robson (1996); = *Crookea microsepala* (Torrey & A. Gray) Small – S. NatureServe G4 (Apparently Secure).



Hypericum mutilum Linnaeus *var.* ***latisepalum*** Fernald. SOUTHERN DWARF ST. JOHN'S-WORT. **Hab:** Marshes and other wet habitats. **Dist:** Se. SC south to s. FL, west to TX. Fernald (1950) considers this taxon to be north to NJ. **Phen:** Jun-Oct. **Comm:** Hybrids with *H. canadense* have been called *H.* ×*dissimulatum* E.P. Bicknell (pro sp.). **Syn:** = F, Tx; = *Hypericum mutilum* ssp. *latisepalum* (Fernald) N. Robson – FNA6, K4, Robson (1985, 1990, 2001, 2002, 2006); < *Hypericum mutilum* – G, GW2, K1, K3, NcTx, RAB, S, W, WH3, Adams (1973).

Hypericum mutilum Linnaeus *var.* ***mutilum***. COMMON DWARF ST. JOHN'S-WORT. **Hab:** Bogs, fens, marshes, shores, other wet habitats. **Dist:** NL (Newfoundland) and QC west to MB, south to s. FL and c. TX; scattered (probably as an adventive) farther west in North America, in Central and South America, and Europe. **Phen:** Jun-Oct. **Tax:** Hybrids with *H. canadense* have been called *H.* ×*dissimulatum* E.P. Bicknell (pro sp.). **Syn:** = F, Tx, Va; = *Hypericum mutilum* ssp. *mutilum* – FNA6, K4, Mo2, NY, Robson (1985, 1990, 2001, 2002, 2006); < *Hypericum mutilum* – Ar, C, G, GrPl, GW2, Il, K1, K3, Mi, NcTx, NE, Pa, RAB, S, Tn, W, WH3, WV, Adams (1973). NatureServe G5T5 (Secure).

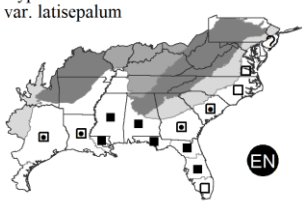
Hypericum myrtifolium Lamarck. MYRTLE-LEAF ST. JOHN'S-WORT. **Hab:** Ponds. **Dist:** Se. SC south to s. FL, west to se. MS, a Southeastern Coastal Plain endemic. **Comm:** Small (1933) reports this species from SC; this distribution is now documented by a specimen from Jasper Co., SC (P. McMillan, pers. comm.). **Syn:** = FNA6, GW2, K1, K3, K4, S, WH3, Adams (1962), Adams (1973), Godfrey (1988), Robson (1996). NatureServe G4G5 (Apparently Secure).

Hypericum nitidum Lamarck. **Hab:** Usually in flowing water of blackwater streams. **Dist:** C. SC south to Panhandle FL, west to sw. AL. **Phen:** Jun-Aug. **Syn:** = GW2, K1, K3, K4, RAB, WH3, Adams (1962), Adams (1973), Godfrey (1988), Sorrie (2012); = *Hypericum nitidum* ssp. *nitidum* – FNA6, Robson (1996). NatureServe G4 (Apparently Secure).

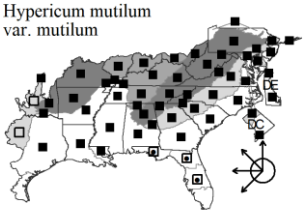
Hypericum nudiflorum Michaux ex Willdenow. **Hab:** Streambanks, moist forests, swamps. **Dist:** Se. VA south to Panhandle FL, west to e. TX, s. AR, and se. OK; disjunct in Cumberland Plateau of TN. **Phen:** Jun-Jul. **Syn:** = C, F, FNA6, G, K4, RAB, S, Tn, Tx, Va, W, WH3, Adams (1962), Godfrey (1988), Robson (1996); < *Hypericum nudiflorum* Michaux ex Willdenow – GW2, K1, K3, Adams (1973).

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

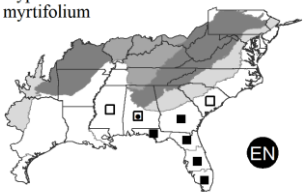
Hypericum mutilum var. latisepalum



Hypericum mutilum var. mutilum



Hypericum myrtifolium



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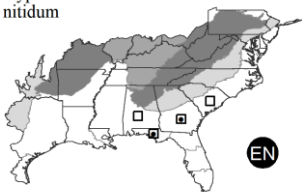
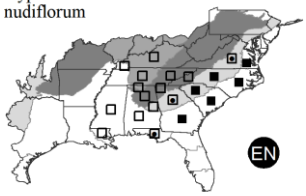


Hypericum nudiflorum



* ***Hypericum perforatum*** Linnaeus. EUROPEAN ST. JOHN'S-WORT, KLAMATH-WEED. **Hab:** Fields, pastures, roadsides, woodland borders. **Dist:** Native of Europe. See Duncan (1985) for documentation for GA. **Phen:** Jun-Sep. **Syn:** = Ar, C, F, G, GrPl, Il, K1, K3, K4, Mi, Mo2, NcTx, Pa, RAB, S, Tn, Va, W, WV, Adams (1973); = *Hypericum perforatum* ssp. *perforatum* – FNA6, NE, NY, Robson (1985, 1990, 2001, 2002, 2006). NatureServe GNR (Not Yet Ranked).

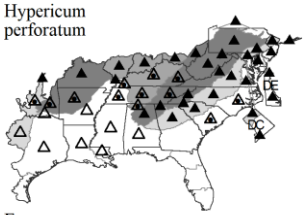
Hypericum prolificum Linnaeus. SHRUBBY ST. JOHN'S-WORT. **Hab:** Bogs, seepages, dry rocky forests, rock outcrops, riverside prairies. **Dist:** NY west to s. MI and MN, south to GA, LA, and e. TX. **Phen:** Jun-Oct. **Syn:** = Ar, C, FNA6, G, Il, K1, K3, K4, Mi, Mo2, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV, Adams (1962), Adams (1973), Robson (1996); = *Hypericum spathulatum* (Spach) Steudel – F. NatureServe G5 (Secure).

Hypericum pseudomaculatum Bush. LARGE SPOTTED ST. JOHN'S-WORT. **Hab:** Wet, moist, or dry forests and fields. **Dist:** SC south to Panhandle FL, west to TX, north in the interior to e. TN (?), c. IL, s. MO, and c. OK. **Phen:** Jun-Sep. **Comm:** {records east of the Ozarks need to be studied more carefully}. **Syn:** = Ar, C, FNA6, G, Il, K1, K3, K4, Mo2, NcTx, RAB, S, Tx, WH3, Adams (1973), Robson (1985, 1990, 2001, 2002, 2006); = *Hypericum punctatum* Lamarck var. *pseudomaculatum* (Bush) Fernald – F; < *Hypericum punctatum* Lamarck – GrPl.

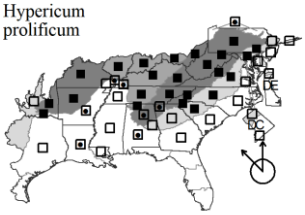
Hypericum punctatum Lamarck. SPOTTED ST. JOHN'S-WORT. **Hab:** Fields, woodland borders. **Dist:** QC west to MN, south to c. peninsular FL and e. TX. **Phen:** Jun-Sep. **Syn:** = Ar, C, FNA6, G, Il, K1, K3, K4, Mi, Mo2, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, W, WH3, WV, Adams (1973), Robson (1985, 1990, 2001, 2002, 2006); = *Hypericum punctatum* var. *punctatum* – F; < *Hypericum punctatum* Lamarck – GrPl; > *Hypericum punctatum* Lamarck – S; > *Hypericum subpetiolatum* E.P. Bicknell ex Small – S.

Hypericum setosum Linnaeus. HAIRY ST. JOHN'S-WORT. **Hab:** Pine savannas, wet pine flatwoods, boggy areas, adjacent ditches, fireplow lines, and scrapes. **Dist:** Se. VA south to c. peninsular FL, west to se. TX. **Phen:** May-Sep. **Syn:** = C, F, FNA6, G, GW2, K1, K3, K4, RAB, S, Tx, Va, WH3, Adams (1973), Robson (1985, 1990, 2001, 2002, 2006). NatureServe G4G5 (Apparently Secure).

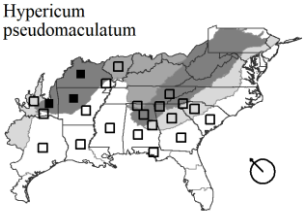
Hypericum perforatum



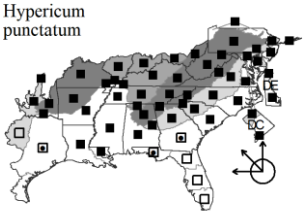
Hypericum prolificum



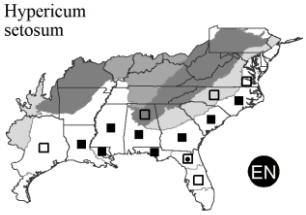
Hypericum pseudomaculatum



Hypericum punctatum



Hypericum setosum



Europe

Hypericum sphaerocarpum Michaux. BARRENS ST. JOHN'S-WORT, ROUNDFRUIT ST. JOHN'S-WORT. **Hab:** Limestone glades and barrens, prairies. **Dist:** C. OH, s. MI, s. WI, IA, and se. NE south through KY, e. and c. TN (Chester, Wofford, & Kral 1997), to nw. GA (GAHP 2003), c. AL, c. MS, LA, and ne. TX; also reported for sw. PA, where considered adventive (Rhoads & Klein 1993). **Phen:** Jun-Sep. **Syn:** = Ar, C, F, FNA6, G, GrPl, K1, K3, K4, Mi, Mo2, NcTx, Pa, Tn, Tx, Adams (1962), Adams (1973), Robson (1996); > *Hypericum sphaerocarpon* var. *sphaerocarpon* – Il; > *Hypericum sphaerocarpum* var. *turgidum* (Small) Svenson – Il; > *Hypericum turgidum* Small – S.

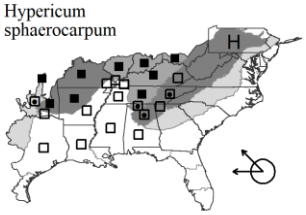
Hypericum stragulum W.P. Adams & Robson. LOW ST. JOHN'S-WORT, STRAGGLING ST. JOHN'S-WORT. **Hab:** Dry rocky or sandy woodlands. **Dist:** MA (Nantucket Island), NY (Long Island), west to s. PA, s. OH, s. IN, s. IL, c. MO, se. KS, and c. OK, south to ne. NC, c. SC, c. GA, n. AL, n. MS, n. LA, and c. TX. **Phen:** May-Aug. **Syn:** = C, NE, NY, Pa, Tn, Va, W, Adams (1962), Adams (1973); = *Ascyrum hypericoides* Linnaeus var. *multicaule* (Michaux ex Willdenow) Fernald – F, G, GrPl, Tx, WV; = *Ascyrum multicaule* Michaux ex Willdenow – Il; = *Hypericum hypericoides* (Linnaeus) Crantz ssp. *multicaule* (Michaux ex Willdenow) Robson – Ar, FNA6, K1, K3, Mo2, NcTx, Robson (1996); = *Hypericum stragalum* – RAB, misspelling.

Hypericum suffruticosum W.P. Adams & Robson. PINELAND ST. JOHN'S-WORT. **Hab:** Pine savannas and flatwoods. **Dist:** Se. NC south to c. peninsular FL, west to se. LA. **Phen:** Apr-Jun. **Syn:** = FNA6, K1, K3, K4, RAB, WH3, Adams (1962), Adams (1973), Godfrey (1988), Robson (1996); = *Ascyrum pumilum* Michaux – S. NatureServe G4G5 (Apparently Secure).

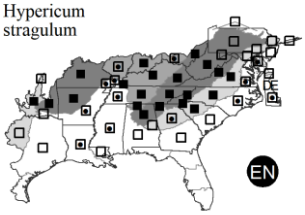
Hypericum tenuifolium Pursh. SANDHILL ST. JOHN'S-WORT. **Hab:** Pine flatwoods, pine savannas, longleaf pine sandhills. **Dist:** Se. NC south to s. peninsular FL; Panhandle FL and se. AL. **Phen:** Jun-Sep (-Dec). **Tax:** Robson (1996) indicated that the older name *H. tenuifolium* Pursh has now been adequately shown to apply to this taxon. **Syn:** = FNA6, K3, K4, WH3, Robson (1996), Sorrie (2012); = *Hypericum reductum* (Svenson) W.P. Adams – GW2, K1, RAB, Adams (1962), Adams (1973), Godfrey (1988); < *Hypericum aspalathoides* Willdenow – S. NatureServe G5 (Secure).

Hypericum tetrapetalum Lamarck. **Hab:** Wet pinelands and in depressional wetlands (open or dominated by *Taxodium ascendens*). **Dist:** E. GA (within a few counties of se. SC), south to s. FL, west to Panhandle FL; Cuba. Reports from SC are based on misidentifications (K. Bradley, pers.comm., 2021). **Syn:** = FNA6, GW2, K1, K3, K4, WH3, Adams (1962), Godfrey (1988), Robson (1996); = *Ascyrum tetrapetalum* (Lamarck) Vail – S. NatureServe G5 (Secure).

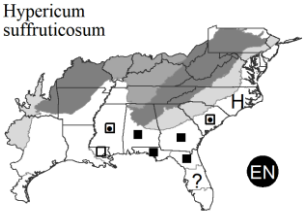
Hypericum sphaerocarpum



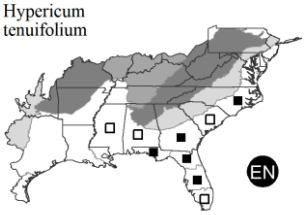
Hypericum stragulum



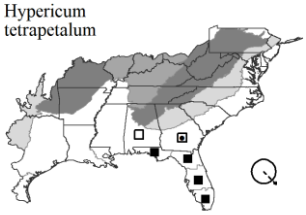
Hypericum suffruticosum



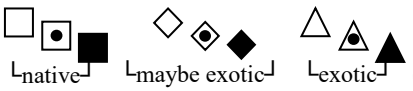
Hypericum tenuifolium



Hypericum tetrapetalum



Key to Map Symbology:



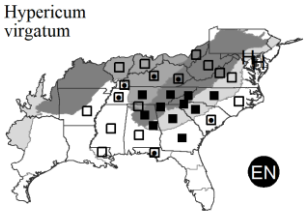
←rare ←uncommon ←common (see introduction for more)

* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable

X : extirpated

186. HYPERICACEAE



Hypericum virgatum Lamarck. STRICT ST. JOHN'S-WORT. **Hab:** Hardpan woodlands, rock outcrops, woodland borders, glades and barrens (especially over mafic or ultramafic rocks). **Dist:** MD west to s. OH, s. IN, and s. IL, south to c. NC, c. SC, sw. GA, Panhandle FL, s. MS, and se. LA. **Phen:** Late Jun-Sep. **Tax:** Though treated by most recent authors as a variety of *H. denticulatum*, *H. virgatum* is better considered as a distinct species. Webb (1980) recognized *H. harperi* as a separate species (it had previously been considered a part of *H. virgatum*), and continued to recognize this taxon as a variety of *H. denticulatum*. However, based on the nature of the punctate glands, size of seeds, inland distribution, etc., it appears that *H. virgatum* is more distantly related to *H. denticulatum* and *H. harperi* than they are to one another; recognition at the species level is warranted for *H. virgatum*. As pointed out by Webb, *H. denticulatum* is primarily tetraploid (n = 24), while *H. virgatum* and *H. harperi* are (as far as is known) strictly diploid. Additionally, the aberrant populations from granitic outcrops in the Brushy Mountains of Alexander and Wilkes counties, NC referred by Webb (1980) to this taxon are distinct, and more closely allied to *H. denticulatum* and *H. harperi*; see *Hypericum radfordiorum* for additional discussion. **Syn:** = Ar, FNA6, K1, K3, K4, Tn, Va, Allison (2011); = *Hypericum denticulatum* ssp. *acutifolium* (Elliott) N. Robson – Robson (1985, 1990, 2001, 2002, 2006); < *Hypericum acutifolium* Elliott – S, (also see H. harperi); < *Hypericum denticulatum* Walter – GW2, Il, WH3; < *Hypericum denticulatum* Walter var. *acutifolium* (Elliott) Blake – C, F, G, RAB, W, Adams (1973), (also see H. harperi); > *Hypericum denticulatum* var. *recognitum* Fernald & Schubert – F, RAB, WV.

Triadenum Rafinesque 1836 [1837] (MARSH ST. JOHN'S-WORT)

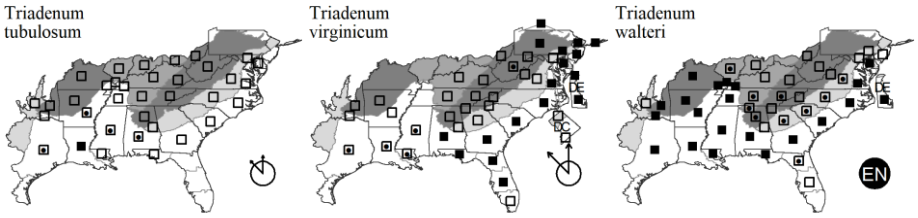
A genus of about 10 species, perennial herbs, of e. North America and e. Asia. Sometimes merged into *Hypericum*, *Triadenum* is one of a few basal clades that seem better separated at generic rank from *Hypericum*. References: Robson (2015d) in FNA6 (2015).

1 Leaves narrowed to the cuneate or broadly cuneate (rarely truncate) base.
  2 Lower leaves sessile; sepals 5-7 mm long, acute (to obtuse); leaves lacking translucent or dark glands or punctae; styles 0.5-1.5 mm long (best seen in fruit)..... ***Triadenum tubulosum***
  2 Lower leaves petiolate; sepals 3-5 mm long, obtuse; leaves with translucent glands and dark punctae; styles 1.5-3 mm long (best seen in fruit)..... ***Triadenum walteri***
1 Leaves clasping, cordate, or subcordate at the base. ***Triadenum virginicum***

Triadenum tubulosum (Walter) Gleason. SOUTHERN MARSH ST. JOHN'S-WORT. **Hab:** Bogs, peaty wetlands, drawdown sloughs along rivers, drawdown shorelines along man-made reservoirs. **Dist:** Se. VA south to Panhandle FL, west to LA, and north in the interior to se. and c. TN, s. IL and s. OH. **Phen:** Aug-Sep. **Syn:** = Ar, C, FNA6, G, GW2, Il, K1, Mo2, Tn, WH3, Adams (1973); = *Hypericum tubulosum* Walter – K3, K4, RAB, Tx, Va; = *Hypericum tubulosum* Walter var. *tubulosum* – F; = *Triadenum longifolium* Small – S. NatureServe G4? (Apparently Secure).

Triadenum virginicum (Linnaeus) Rafinesque. COMMON MARSH ST. JOHN'S-WORT. **Hab:** Bogs, fens, tidal swamps and marshes, other peaty wetlands. **Dist:** NS west to OH and s. ON, south to s. FL and MS, mostly on the Coastal Plain but scattered inland. **Phen:** Jul-Sep. **Syn:** = Ar, C, FNA6, G, GW2, Il, K1, Mi, Pa, S, Tn, WH3; = *Hypericum virginicum* Linnaeus – K3, K4, NE, NY, RAB, Tx; = *Hypericum virginicum* var. *virginicum* – F, WV; < *Triadenum virginicum* (Linnaeus) Rafinesque – W, Adams (1973).

Triadenum walteri (J.F. Gmelin) Gleason. WALTER'S MARSH ST. JOHN'S-WORT. **Hab:** Swamp forests and marshes. **Dist:** MD south to n. peninsular FL, west to e. TX, and north in the interior to s. MO, s. IL, and OH. **Phen:** Jul-Sep. **Syn:** = Ar, C, FNA6, G, GW2, Il, K1, Mo2, NcTx, Pa, Tn, W, WH3, Adams (1973); = *Hypericum tubulosum* Walter var. *walteri* (J.F. Gmelin) Lott – F, WV; = *Hypericum walteri* J.F. Gmelin – K3, K4, RAB, Tx, Va; = *Triadenum petiolatum* (Walter) Britton – S. NatureServe G5 (Secure).



191. ELATINACEAE Dumortier 1829 (WATERWORT FAMILY) [in MALPIGHIALES]

A family of 2 genera and about 35 species, herbs. References: Kubitzki (2014); Tucker (1986); Tucker (2016b) in FNA12 (2016).

Elatine Linnaeus 1753 (WATERWORT)

A genus of about 10 species, aquatic, tropical and temperate, especially North America and Eurasia. Changing taxonomic concepts and under-collection of members of this genus in our area make the treatment here particularly provisional. Distribution and habitat information is uncertain until more collections are made and existing collections reviewed and re-annotated. References: Kubitzki (2014); Razifard, Tucker, & Les (2016) in FNA12 (2016); Tucker (1986).

1 Capsules 2-locular; petals 2; leaf base rounded to truncate..... ***Elatine minima***
1 Capsules 3-locular; petals 3 or 0; leaf base attenuate to cuneate (rarely rounded in *E. brachysperma*).
  3 Seeds with (9-) 14-17 pits per row; seed pits 1-2× as long as wide, the ends rounded..... ***Elatine brachysperma***

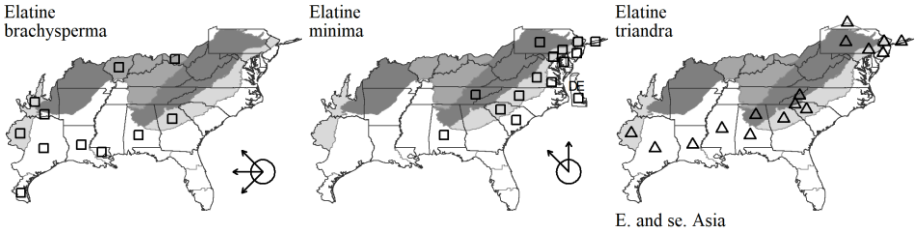
Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated

3 Seeds with (13-) 16-30 (-35) pits per row; seed pits 2-3× as long as wide, the ends angular-hexagonal.
..... ***Elatine triandra***

Elatine brachysperma A. Gray. SHORTSEED WATERWORT. **Hab:** Mud or shallow water. **Dist:** Widely scattered in North America. It has been reported for nc. GA (Jones & Coile 1988). **Phen:** Jun-Aug. **Syn:** = F, FNA12, GrPl, Il, K1, K3, K4, NcTx, Tx; = *Elatine triandra* Schkuhr var. *brachysperma* (A. Gray) Fassett – C, G. NatureServe G5 (Secure).

Elatine minima (Nuttall) Fischer & C.A. Meyer. TINY WATERWORT. **Hab:** Tidal flats, lakes, mud flats, pools on granite flatrocks. **Dist:** First found in NC in 1990, *E. minima* is widespread in ne. United States, south to VA, NC, and SC (Horn, pers. comm., 2004). **Phen:** Jul-Oct. **Comm:** The only known site for this species in NC is the spillway of an artificial lake (Lake Butner, Granville County); it is uncertain whether it should be considered native or exotic in NC. It may have been introduced by waterfowl or humans. **Syn:** = C, F, FNA12, G, K1, K3, K4, Mi, NE, NY, Pa, Tn, Va. NatureServe G5 (Secure).

* ***Elatine triandra*** Schkuhr. THREE-STAMENED WATERWORT. **Hab:** Shores, pools. **Dist:** Apparently native of e. and se. Asia. **Phen:** Jun-Sep. **Syn:** = FNA12, K4, NE, NY, Tx.

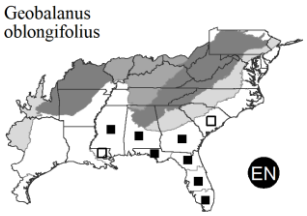


197. CHRYSOBALANACEAE R. Brown 1818 (COCO-PLUM FAMILY) [in MALPIGHIALES]

A family of about 18 genera and 530 species, trees and shrubs, of tropical and subtropical areas, especially tropical America. References: Bardon et al (2016); Prance in Kubitzki (2014); Prance & Sothers (2003); Prance (1970); Whetstone & Nixon (2016) in FNA12 (2016).

Geobalanus Small 1913

A monotypic genus, a shrub, endemic to the se. United States. Bardon et al. (2016) show with robust molecular sampling that "*Licania michauxii*" is sister to a complex group consisting of *Couepia, Gaulettia*, *Afrolicania, Hirtella*, and 3 additional clades of *Licania*. It seems best to acknowledge the evolutionarily isolated status of this species (estimated to have diverged from the larger clade in the Oligocene about 28 million years BP; Bardon et al. 2016) by placing it in the monotypic genus *Geobalanus*, as done by Small (1913b, 1933). References: Bardon et al (2016); Prance in Kubitzki (2014); Prance & Sothers (2003); Prance (1970); Prance (1972); S2; Small (1913b); Whetstone & Nixon (2016) in FNA12 (2016).



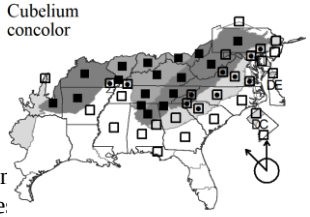
Geobalanus oblongifolius (Michaux) Small. GOPHER-APPLE, GROUND-OAK. **Hab:** Longleaf pine sandhills, dry pine flatwoods, pine rocklands. **Dist:** Se. SC south to s. FL, west to e. LA (Florida parishes), abundant and ubiquitous in dry sandy habitats in the southern part of its range. **Phen:** May-Jun; Sep-Oct. **Tax:** The two taxa recognized by Small (1933) await additional study. *G. pallidus* of s. FL pine rocklands and other pine flatwoods in s. and c. peninsular FL is alleged to differ in its white tomentose lower leaf surfaces, pubescent ovary, and larger and more spherical fruits. **Comm:** A rare upright shrub form (to over 15 dm tall) has been found in Brevard County, FL, suggesting that *G. oblongifolius* evolved from a taller and more upright ancestor (Ward & Taylor 1999). **Syn:** = *Chrysobalanus oblongifolius* Michaux – RAB, S2; = *Licania michauxii* Prance – FNA12, K1, K3, WH3, Prance & Sothers (2003), Prance (1970), Prance (1972); > *Geobalanus oblongifolius* (Michaux) Small – S, Small (1913b); > *Geobalanus pallidus* Small – S, Small (1913b). NatureServe G4G5 (Apparently Secure).

200. VIOLACEAE Batsch 1802 (VIOLET FAMILY) [in MALPIGHIALES]

A family of about 31 genera and 1100 species, herbs, shrubs, lianas, and trees, cosmopolitan in distribution, but especially diverse in the tropics. References: Ballard () (in prep); Ballard, Burwell, & Lockhart (2020) in Weakley et al (2020); Ballard et al. (1994); Little & McKinney (2015a) in FNA6 (2015); McKinney & Russell (2002); Paula-Souza & Ballard (2014); Wahlert et al (2014).

1 Plant acaulescent or caulescent; leaf blades of many species about as broad as long or broader, base cordate; peduncle not articulated; bottom petal spurred at base, blade distinctly shorter than lateral and upper petals ..... ***Viola***
1 Plant caulescent; leaf blades much longer than broad, base narrowly cuneate; peduncle/pedicel juncture articulated; bottom petal saccate at base, blade slightly to greatly exserted beyond lateral and upper petals.
..... ***Cubelium***

Cubelium Rafinesque ex Britton & A. Brown 1897 (GREEN-VIOLET)



A monotypic genus, a perennial herb, native to eastern North America. "Recent comprehensive phylogenetic investigations of the Violaceae family demonstrated that broadly circumscribed *Hybanthus* was extensively

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : plar ? : que

polyphyletic, and that the sole trait of a bottom petal which was saccate at base failed to delineate natural evolutionary groups (Feng 2005; Tokuoka 2008; Wahlert et al. 2014). The majority of New World hybanthoids formed a well supported clade and were subsequently segregated into the resurrected genus Pombalia on the basis of differences in floral and seed features and anatomical traits (Paula-Souza and Ballard 2014). Our temperate eastern North American native hybanthoid now belongs to the resurrected monotypic genus *Cubelium*, with the genus and species first validly published by Britton and Brown (1897). It is sister to the very small genus *Hybanthus* sensu stricto from Mesoamerica and the West Indies, that consists of three species of shrubs and treelets. Our Eastern Green Violet differs from *Hybanthus* sensu stricto in herbaceous habit, highly reduced cymose inflorescence, and several unique floral, fruit, seed and anatomical features." (Ballard 2020). References: Ballard (2020); Ballard () (in prep); Ballard, Burwell, & Lockhart (2020) in Weakley et al (2020); Ballard, Paula-Souza, & Wahlert in Kubitzki (2014); Little (2015) in FNA6 (2015); McKinney & Russell (2002); Paula-Souza & Ballard (2014); Wahlert et al (2014).

Cubelium concolor (T.F. Forster) Rafinesque ex Britton & A. Brown. GREEN-VIOLET. **Hab:** Very nutrient-rich and mesic forests, especially over calcareous substrates such as limestone and dolomite, sometimes extending upslope into dry-mesic or even dry forests and woodlands when the soils are very basic. **Dist:** VT and s. ON west to MI and KS, south to SC, GA, Panhandle FL, s. AL, ne. MS, and AR. **Phen:** Cleistogamous flowers: Apr-early May; late May-Jun. Chasmogamous flowers: Late May-Jun; Aug-Oct. **Syn:** = K4, S, Ballard () (in prep); = *Hybanthus concolor* (T.F. Forster) Sprengel – Ar, C, F, Fl2, FNA6, G, GrPl, Il, K1, K3, Mi, NE, NY, Pa, RAB, Tn, Va, W, WH3, WV, McKinney & Russell (2002). NatureServe G5 (Secure).

Viola Linnaeus 1753 (VIOLET, JOHNNY-JUMP-UP, PANSY)

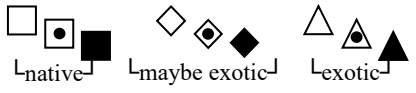
Contributed by Harvey E. Ballard, Jr., Bruce A. Sorrie, and Alan S. Weakley

A genus of about 525 species, herbs (rarely subshrubs, shrubs, or treelets), of temperate regions of the Old and New Worlds. References: Ballard & Wujek (1994); Ballard (1992a); Ballard (1994); Ballard () (in prep); Ballard et al. (1994); Ballard, Sytsma, & Kowal (1999); Gil-Ad (1997); Gil-ad (1998); Haines (2001); Little & McKinney (2015b) in FNA6 (2015); McKinney & Russell (2002); McKinney (1992); Russell (1955); Russell (1965).

Viola has presented numerous problems in taxonomy, distribution, and identification. Particularly troublesome are the so-called "acaulescent blue violets", including *V. sororia*, *V. sagittata*, *V. palmata*, *V. septemloba*, etc. They may be difficult to identify due to morphological overlap, or trying to key plants without mature leaves; in some instances hybridization may be suspect, or inadequate morphological characterization of the diversity found in nature and the herbarium continues (new taxa are being found on an annual basis). Leaf maturity is an important feature to recognize – the earliest 1-2 leaves produced in most of these taxa are generally ovate-cordate in outline and may not display characteristic lobing, toothing, or pubescence until more mature leaves are produced, 1-2 weeks later. Specimens thus collected early in the flowering period can present the botanist with a perplexing series of plants that do not key cleanly. A second troublesome group contains the small white violets, including *V. blanda*, *V. incognita*, and *V. minuscula*. These taxa have been dealt with in various ways, but resist a wholly satisfactory treatment, due to apparent hybridization (Russell 1954, 1955). However, recent reviews of these 3 species in the Southeast show that *V. blanda* and *V. minuscula* are quite distinct, with *V. incognita* less so (but this may be due to paucity of specimens from the area). A third difficult group contains *V. appalachiensis*, *V. conspersa/labrodorica*, and *V. walteri*. They have been treated recently by Ballard (1992, 1994) and McKinney & Russell (2002). Despite the problems present in the genus, the great majority of plants encountered in the field may be successfully keyed out, particularly by botanists working within an area of several counties. Violet species are usually quite faithful to one or a few plant community types, so once learned these habitats can be valuable indicators as to which species to expect. Botanists working in larger regions (state, floristic province), however, must be aware of increased morphological variation and potential hybridization. All species possess brownish or reddish nectar guide striae in the corolla throat; these are ignored in the key. Hairs of the corolla throat and on leaf surfaces are important key characters; several plants should be inspected with a 10× lens before deciding the character state. De novo hybrids can be frequent in *Viola*, but they do not reproduce by the chasmogamous flowers, as reported in several publications by Ezra Brainerd. Their general intermediacy and their proximity to both parents makes hybrids relatively easy to diagnose and to infer their parentage, once one becomes familiar with species in the local area. Hybrids between species of caulescent blue and white rostrate violets, and between species of acaulescent white species, are always sterile F1s and do not produce viable seeds from cleistogamous flowers. However, most hybrids between species of acaulescent blue violets are unusual in being at least subfertile through cleistogamous seeds. Cleistogamous capsules of a few hybrids abort or contain only abortive ovules, while those of most hybrids develop normally but produce a lower proportion of viable seeds (containing some abortive ovules) than the parental species; and very few hybrids (e.g., *V. fimbriatula* × *V. sagittata*) show no reduction in viable seed output relative to the parents. Nearly all acaulescent blue violet species (including the new species and some "variants" presented here) differ in size, shape and color pattern of the mature seeds of naturally dehisced capsules—best collected by enclosing developing capsules in a small mesh beg and allowing the capsules to open of their own accord. Brainerd demonstrated that seeds (and their germinated progeny) of F1 and later-generation acaulescent blue violet hybrids recombine morphological traits of the parental species within each cleistogamous capsule. Thus, it is relatively easy to infer hybrid status from a cleistogamous capsule of a suspected hybrid by noting the presence of diverse seed morphologies within it, and even to interpret the parentage when one is acquainted with seeds of other local species.

Identification Notes: Leaf length should be measured down the midrib to an imaginary line connecting the very bottom of the basal lobes (in a leaf blade with a cordate or truncate base), or to the end of blade tissue (on a blade with a rounded or cuneate base).

1 Plant caulescent (producing aerial stems bearing leaves and flowers at above-ground nodes).
  2 Corolla yellow, or white with a yellow center (sometimes fading or drying to lavender), ventral surface of petals commonly pink- or purple- to brown-tinged); stipules entire or erose ..... ***Key A***
  2 Corolla wholly cream-colored, or cream with a yellow center, or pale blue, violet to purple, or multicolored (violet to purple with orange or yellow); stipules fringed or deeply lobed ..... ***Key B***
1 Plant acaulescent (with leaves and flowers/fruits arising separately from the rootstock) at spring flowering (*V. rotundifolia* is acaulescent during spring flowering and is included here, but it produces a stolon-like prostrate stem in summer with 0-1 leaf and a cyme with 1-3 capsules).

Key to Map Symbology: 

* : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated

4 Plant producing stolons (stolons absent in *V. renifolia*); corolla violet, or white with greenish-white throat, mostly < 1 cm long in profile (> 1 cm, in *V. odorata* with white or purple corolla) ..... ***Key C***

4 Plant not producing stolons; corolla violet to purple (lower three or all five petals blue in *V. pedata*, white with grayish-violet eyespot around throat in *V. communis* [*V. priceana*], whitish in *V. floridana* ["peninsular Florida" variant], white in rare albinos of many species), > 1 cm long in profile

5 At least the largest leaf blades notched, incised, coarsely toothed, lobed or dissected, or bearing linear marginal processes..... ***Key D***

5 All leaf blades undivided, margins merely crenate or serrate (pectinately serrate in *V. pectinata*; occasional *V. edulis* in early chasmogamous flower without lobed leaf blades will key to *V. langloisii* but has ovate-triangular sepals with shorter broader auricles < 2 mm long). ..... ***Key E***

Key A - Caulescent violets with yellow or white flowers, and entire or erose stipules

1 Corolla white with a yellow center, ventral surface of petals pink- or violet-tinged, dorsal surface of aging flowers fading to pink or violet; stipules long-triangular, attenuate ..... ***Viola canadensis***

1 Corolla yellow, ventral surface of petals often brown-tinged; stipules ovate to narrowly ovate.

2 Leaf blades deeply 3-5-lobed ..... ***Viola tripartita***

2 Leaf blades unlobed.

3 Leaves as broad as long or broader than long.

4 Stems mostly 2 to several, decumbent proximally in flower, becoming erect in fruit; basal leaves (1) 2–5; cauline leaves distributed over much of stem length, ovate, cordate at base, acute to abruptly short-acuminate at apex; foliage glabrous or thinly pubescent on upper stem and leaves; upper surface of leaf blades medium green; [widespread in our region]..... ***Viola eriocarpa***

4 Stems 1 (2), erect in flower; basal leaves 0 (-2); cauline leaves clustered in uppermost 1/4 of stem length, broadly ovate to reniform, subcordate to broadly cuneate at base, broadly obtuse to rounded at apex; foliage densely pubescent throughout; upper surface of leaf blades gray-green; [montane in our region] ..... ***Viola pubescens***

3 Leaves distinctly longer than broad.

5 Leaf blades hastate, base subcordate to cordate; upper surface of leaf blades in life usually (but not always) variegated, with the main surface gray-green or silvery and the veins a contrasting darker green..... ***Viola hastata***

5 Leaf blades narrowly ovate or lance-triangular to rhombic-lanceolate, base cuneate to broadly rounded or truncate; leaf blade surfaces uniformly green. ..... ***Viola tenuipes***

Key B - Caulescent violets with purple, pale blue, cream, or multicolored flowers, and fringed or lobed stipules

1 Corolla strongly frontally flattened in life; flower 'throat' yellow; spur short, up to 3 mm long; stipules deeply pinnately lobed with few to many lateral segments, the terminal lobe resembling the leaf blades; leaf blades linear-lanceolate to elliptical, base cuneate to truncate; plants annual or biennial, without thickish rootstock; [of weedy habitats].

2 Petals shorter than the sepals or scarcely surpassing them by 1-2 mm, cream-white (slightly yellowish); sepals nearly or fully concealing capsule ..... ***Viola arvensis***

2 Petals well surpassing sepals, pale blue to violet (infrequently cream-white) or multicolored; sepals neither surpassing nor concealing capsule.

3 Petals uniformly pale blue or cream-white, concolorous distally; terminal lobe of stipules with 0-3 crenations on each margin; quadrate stems recurved-puberulent or -hispidulous on face directly above a leaf node but essentially glabrous on the other faces; leaves all cauline..... ***Viola rafinesquei***

3 Petals variously colored, commonly with the lower three petals cream-white and upper two purple-black; terminal lobe of stipule with 4 or more crenations on each side; quadrate stems recurved-puberulent on the angles; leaves cauline and commonly also basal.

4 Flowers < 1 cm long in profile; lower three petals cream-white, upper two purple-black at least in distal half; [occasional escape] ..... ***Viola tricolor***

4 Flowers > 1.5 cm long in profile; all petals variously colored, often with broad black border; [barely persistent following cultivation] ..... ***Viola ×wittrockiana***

1 Corolla not strongly frontally flattened in life; flower 'throat' white; stipules subentire to irregularly lacerate or laciniate but not deeply lobed with leaf-like terminal lobe; leaf blades ovate to reniform, base cordate; plants perennial, with thickish rootstock; [mainly of natural habitats].

5 Current year's stems ascending at chasmogamous flowering time, persistent through winter to become prostrate and root at the nodes, generating the following year's plants at their tips (plants thus mat-forming). ..... ***Viola walteri***

5 Stems ascending to erect at chasmogamous flowering time through fruiting, deciduous and not rooting at nodes (plants thus solitary).

7 Corolla wholly cream-colored; calyx ciliate; margins of leaf blades closely crenulate ..... ***Viola striata***

7 Corolla blue or pale violet; calyx eciliate; margins of leaf blades crenate or serrate.

8 Spur of basal petal 4-6 mm long; lateral petals bearded within; corolla uniformly blue ..... ***Viola labradorica***

8 Spur of basal petal 10-15 mm long; lateral petals beardless; corolla pale violet with a purple-black eyespot surrounding the throat ..... ***Viola rostrata***

Key C - Acaulescent violets with stolons and white flowers (flowers commonly purple in V. odorata)

2 Leaf blades distinctly longer than broad (1.5-15× as long as broad), ovate-lanceolate to ovate-triangular, or lanceolate to linear, often decurrent onto petiole.

3 Leaf blades ovate-lanceolate to ovate-triangular, 1.5–2× as long as broad, base broadly rounded to subcordate, not or slightly decurrent onto petiole ..... ***Viola primulifolia***

3 Leaf blades lanceolate to linear-lanceolate in early flower, narrowly lanceolate to linear in fruit, 3-15× as long as broad, base cuneate and somewhat decurrent onto petiole.

4 Largest leaf blades narrowly elliptical to lanceolate, 3-6 (-8)× as long as broad, (5-) 7-29 mm broad, often abruptly tapering to the petiole; gland of marginal teeth appressed to incurved, margins appearing subentire, low-serrate or (sub)crenate; summer plants producing surficial leafy stolons with cleistogamous capsules; lowest sepals of chasmogamous flowers narrowly triangular to ovate-triangular, acuminate; foliage glabrous (rarely sparsely hirtellous in extreme s. populations); [widespread but absent from parts of the se. Atlantic and Gulf Coastal Plain] ..... ***Viola lanceolata***

4 Leaf blades linear to linear-lanceolate, 8-15× as long as broad, (2-) 4-9 (-13) mm broad, tapering gradually to the petiole; gland of marginal teeth ascending to spreading, margins commonly appearing denticulate; summer plants rarely producing surficial stolons, these leafless and non-reproductive; lowest sepals of

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chasmogamous flowers linear-lanceolate to lance-triangular, acuminate to attenuate; foliage glabrous to moderately hirtellous; [se. Atlantic and Gulf Coastal Plain]..... ***Viola vittata***

2 Leaf blades usually as broad as long or broader than long (< 1.2 × as long as broad), ovate or orbicular to reniform, not conspicuously decurrent onto petiole. ..... ***Viola blanda***

Key D - Acaulescent violets lacking stolons, with lobed leaves, and blue, violet, or purple flowers (white in rare albinos, white with heavy blue-gray eyespot in V. communis [V. priceana], whitish with purple eyespot in V. floridana ["peninsular Florida" variant])

1 All petals glabrous within; corolla concolorous blue or lower three petals blue and upper pair purple-black; stipules long-adnate to petiole; rhizome erect, barrel-like; cleistogamous flowers absent. ..... ***Viola pedata var. pedata***

1 Lateral petals bearded within, sometimes the spurred petal also; corolla concolorous except for expanded white area from the throat in a few species; stipules free; rhizome horizontal or ascending, sometimes branching, not barrel-like; cleistogamous flowers produced.

4 Plant homophyllous, all blades lobed or dissected (plants with largest leaf blades shallowly lobed are frequent de novo hybrids between species producing deeply divided leaves and *V. sororia* and other species with unlobed leaf blades; they will not key readily and must be inferred by association with the parent species). ..... ***Viola subsinuata var. subsinuata***

4 Plant heterophyllous, producing leaf blades with lobes, coarse teeth or incisions during chasmogamous flowering and cleistogamous fruiting, and undivided leaf blades in very early spring and late autumn (often retaining one or more undivided blades).

15 Largest leaf blades distinctly longer than broad (blade length:width ratio > 1.3). ..... ***Viola sagittata***

15 Largest leaf blades slightly longer than broad to broader than long (blade length:width ratio < 1.3).

19 Foliage glabrate, puberulent or hirsute (occasionally essentially glabrous in *V. stoneana*); calyx eciliate or ciliate; lowest sepals various; auricles short and rounded and not elongating in fruit (prominent and weakly elongating in fruit in *V. stoneana*); cleistogamous capsule finely to heavily purple-spotted or -blotched, on initially prostrate peduncle arching upward just before dehiscence (peduncle suberect in *V. stoneana*).

20 Largest lobed leaf blades biternately divided, the terminal primary division with lateral lobes. ..... ***Viola palmata var. 3 ["Red Hills palmata" variant]***

20 Largest lobed leaf blades pedately divided, the terminal primary division lacking lateral lobes

23 Foliage glabrate or puberulent; [n. AL and n. GA, or w. Gulf Coast region and Lower Midwest]. ..... ***Viola palmata var. 2 ["glabrate palmata" variant]***

23 Foliage moderately to densely hirsute; [Ridge and Valley Province of w. VA, or widespread in eastern North America]. ..... ***Viola palmata var. palmata***

19 Foliage strictly or essentially glabrous; calyx eciliate; lowest sepals acute or acuminate; auricles short and not elongating in fruit, or prominent and elongating in fruit; cleistogamous capsule on erect or suberect peduncle (prostrate or arching upward in *V. edulis* "Gulf Coastal Plain" and *V. egglestonii*).

27 Largest leaf blades deeply biternately divided nearly to petiole summit into 7 or 9 lobes (biternately divided leaf blades occasionally produced by *V. septemloba*, which is keyed out in 21b), the terminal primary division narrowly lanceolate and not much broader than its lateral lobes or the lobes on the lateral primary divisions; lowest sepals oblong-lanceolate to ovate, obtuse to broadly rounded; auricles short and rounded, not elongating in fruit; spurred petal sparsely to densely bearded within; cleistogamous capsule unspotted, on prostrate to arching peduncle much shorter than petioles; seeds 2.2-2.7 × 1.5-1.7 mm, medium to dark brown, unspotted; [upland limestone cedar glades of Interior Highlands region, s. IN south to nw. GA and n. AL]..... ***Viola egglestonii***

27 Largest leaf blades shallowly to deeply pedately divided into 3-7 (-9) lobes (biternately divided leaf blades occasionally produced by *V. septemloba*), the terminal primary division broadly oblong to ovate or rhombic-ovate, distinctly to much broader than any intermediary lobes between the terminal and lateral divisions; lowest sepals lanceolate to ovate-triangular, acuminate (oblong-lanceolate to ovate and obtuse to rounded in *V. "Gulf Coastal Plain edulis"*); auricles prominent, weakly to strongly elongating to 3 mm in fruit; spurred petal glabrous within (sparsely bearded in *V. viarum*, densely bearded in *V. septemloba*); cleistogamous capsules unspotted, on peduncles as long as or longer than the petioles (capsule heavily spotted or blotched, on prostrate or arching peduncle shorter than the petioles in *V. "Gulf Coastal Plain edulis"*); seeds dark bronze and unspotted, or brown with minute black spots or reticulations; [either pine savannas (*V. septemloba*) or bottomland sites along streams and rivers, Atlantic and Gulf Coastal Plains and lower Midwest Missouri River drainage]

28 Largest leaf blades moderately to deeply (3-) 5-7 (-9)-lobed, lobes elliptical, lobes divergent on blades with 5 or more lobes, lowest lobe downward-pointing; blade margins entire or subentire; spurred petal densely bearded; cleistogamous capsule unspotted, on tall erect peduncle surpassing some petioles; seeds (1.5-) 1.9-2.5 × 1.4-1.6 mm, brownish-black, unspotted; [dry to seasonally moist sand of frequently burned long-leaf pine savannas] . ..... ***Viola septemloba***

28 Largest leaf blades shallowly to deeply 3- to 7-lobed, lobes linear or angulate, elliptical, ovate or rhombic-ovate, lobes ascending to spreading on blades with 5 or more lobes, lacking a distinct downward-pointing lobe; blade margins incurved-serrate; spurred petal glabrous within (sparsely bearded in *V. viarum*); cleistogamous capsule unspotted or finely to heavily spotted or blotched with red or purple, on ascending to erect peduncle surpassing some petioles or on prostrate peduncle much shorter than petioles; seeds various; [bottomland sites in diverse substrates along rivers and streams or swamps].

31 Auricles weakly elongating in fruit to 1.5–3 mm; cleistogamous capsule finely spotted with reddish-purple, on strongly ascending to erect peduncle equaling or surpassing shorter petioles; seeds 1.4-1.8 × 1.0-1.2 mm, dark bronze, unspotted; [known only from type area, Jacksonville, FL]..... ***Viola chalcosperma***

31 Auricles not elongating in fruit, ca. 1 mm; cleistogamous capsule heavily purple-spotted or -blotched, on short initially prostrate peduncle much shorter than petioles and arching upward just prior to dehiscence; seeds 1.7-2.4 × 1.3-1.7 mm, light brown with prominent brown streaks or blotches; [FL and Gulf Coastal Plain]..... ***Viola species 5 ["Gulf Coastal Plain edulis"]***

Key E - Acaulescent violets lacking stolons, with unlobed leaves

1 At least some petioles prominently winged; lowest sepals linear-lanceolate, acuminate (ovate-triangular, acute to obtuse in *V. villosa*); auricles prominent, elongating in fruit, erose; cleistogamous capsule unspotted, on declined or erect peduncle ..... ***Viola villosa***

1 Petioles not prominently winged; lowest sepals lanceolate to (more commonly) ovate-lanceolate, oblong or ovate, acuminate to rounded; auricles inconspicuous and remaining short and rounded, or prominent and elongating in fruit and often erose; cleistogamous capsule unspotted or spotted, on prostrate, declined or erect peduncle.

Key to Map Symbology:

←rare ←uncommon ←common (see introduction for more)

* : waif
EN : endemic
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N : no
P : planted
? : questionable

X : extirpated

5 All petals glabrous within (lateral petals densely bearded within in *V. inconspicua*); spur > 2× as long as thick, cylindrical or club-shaped; stipules at least half-adnate to petioles.
.....***Viola inconspicua***

5 Lateral petals bearded within, spurred petal in some species bearded; spur < 1.5× as long as thick, rounded; leaf blades variously shaped, inner edges of basal lobes not overlapping in life; stipules free.
7 Leaves spreading to prostrate on the substrate in life; upper leaf blade surface silvery- or gray-green with contrasting dark green or red-purple veins, lower blade surface purple-tinged; foliage glabrous except for conspicuous stiff ascending or spreading hairs uniformly distributed over upper surface of leaf blade; calyx eciliate; lowest sepals oblong to ovate, obtuse to rounded; spurred pet densely bearded; cleistogamous capsule purple-spotted, on initially prostrate peduncle shorter than petioles; seeds 1.5–2.1 × 1.1–1.4 mm, light brown, commonly with slightly darker streaks and spots..... ***Viola hirsutula***
7 Leaves held above the substrate (prostrate in *V. villosa*, at least outer leaves prostrate especially in fruit in *V. fimbriatula*); upper surface of leaf blades uniformly green, lower green or purple tinged; foliage glabrous or variously pubescent, if hairs confined to upper surface of leaf blade, then these very small, scattered and (sub)appressed.
9 Plant in chasmogamous flower.
10 Largest leaf blades approx. as broad as long to broader than long (length:width ratio < 1.2), broadly ovate or orbicular to deltate or reniform (one largest leaf blade often longer than broad in *V. floridana*, *V. latiuscula*, *V. septentrionalis*, these are keyed here).
15 Lowest sepals oblong to ovate, obtuse to rounded; auricles not prominent, short and rounded or truncate.
.....***Viola sororia var. sororia***
15 Lowest sepals linear-lanceolate to ovate-triangular, acuminate; auricles prominent, narrowly linear to trapezoidal.
.....***Viola cucullata***
10 Largest leaf blades distinctly longer than broad (length:width ratio > 1.2).
22 Spurred petal densely bearded within; foliage glabrous or sparsely to moderately hirtellous [naturally occurring in open sites]
23 Largest leaf blades narrowly elliptical, ovate-lanceolate, lance-triangular or sagittate; foliage glabrous or sparsely to moderately hirtellous; flowers overtopping leaves; auricles prominent and quadrate; [dry to moist sand of sand barrens and dry prairies, lakeshores, mostly east of the Great Plains].....***Viola sagittata***
23 Largest leaf blades narrowly ovate- to deltate-triangular; foliage glabrous or upper surface of leaf blades bearing scattered small subappressed hairs; flowers held among the leaves; auricles short and rounded.
.....***Viola affinis***
22 Spurred petal glabrous within; foliage strictly glabrous or upper surface of leaf blades with small to minute scattered subappressed hairs; [naturally occurring in forested sites, *V. cucullata* also in marshes and meadows].
26 Corolla violet with contrasting dark purple "eyespot" around throat; lowest sepals linear-lanceolate; lateral petal beards very short, with strongly clavate to reniform hairs; [widely distributed over e. North America, infrequent on Atlantic Coastal Plain]..... ***Viola cucullata***
26 Corolla violet lacking contrasting "eyespot" around throat but with flush of dark purple at base of lateral pet; lowest sepals lance- to ovate-triangular; lateral petal beards long, with slightly clavate hairs.
.....***Viola langloisii***
9 Plant in cleistogamous fruit.
28 Largest leaf blades substantially longer than broad (length:width ratio > 1.2), lance-triangular to sagittate..... ***Viola sagittata***
28 Largest leaf blades about as long as broad to broader than long (length:width ratio < 1.2), ovate or deltate-triangular to reniform.
29 Foliage (at least petioles and/or lower surface of leaf blades) hirsute; calyx ciliate.
.....***Viola sororia var. sororia***
29 Foliage strictly glabrous or upper surface of leaf blades with small to minute scattered subappressed hairs.
31 Capsule unspotted.
32 Peduncle declined.
.....***Viola langloisii***
32 Peduncle erect, or initially prostrate and coiled then elongating to become sinuous-erect.
.....***Viola cucullata***
31 Capsule finely spotted, or heavily purple-spotted or blotched.
.....***Viola affinis***

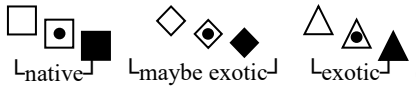
Viola affinis Leconte. LECONTE'S VIOLET, SAND VIOLET. **Hab:** Damp to saturated (less typically periodically inundated), often sandy soils bordering vernal pools, streams and rivers in mesic to wet forests, and on terraces in floodplains and swamp borders. **Dist:** ME to se. MN, south to GA and AR. **Syn:** = F, FNA6, G, GW2, Il, Mi, NE, Pa, RAB, S, Va, W, WV, Ballard () (in prep), Gil-ad (1998), Haines (2001); < *Viola affinis* Leconte – K3; < *Viola missouriensis* Greene – Tn; < *Viola sororia* Willdenow – C; < *Viola sororia* Willdenow var. *missouriensis* (Greene) L.E. McKinney – McKinney & Russell (2002).

* ***Viola arvensis*** Murray. EUROPEAN FIELD PANSY. **Hab:** Roadsides, fields, other disturbed habitats. **Dist:** Native of Europe, widely introduced. **Phen:** Mar-Jul. **Syn:** = C, F, FNA6, G, GrPl, Il, K1, K3, K4, Mi, NE, Pa, RAB, S, Tn, Va, W, WV, Ballard () (in prep), McKinney & Russell (2002). NatureServe GNR (Not Yet Ranked).

Viola blanda Willdenow. SWEET WHITE VIOLET. **Hab:** Moist microsites in mesic forests on slopes and along streams, often under conifers (e.g., *Tsuga*), northern, or at higher elevations southwards. **Dist:** NH and QC west to MN and ne. ND, south to DE, MD, w. NC, n. GA, e. TN, OH, IN, IL, and e. IA. **Phen:** Apr-Jun. **Syn:** = F, G, S, Tn, Va, WV; = *Viola blanda* var. *blanda* – K1, K3, K4, NE, Ballard () (in prep), Haines (2001); < *Viola blanda* Willdenow – C, FNA6, Pa, RAB, W, McKinney & Russell (2002), (also see V. incognita).

Viola canadensis Linnaeus. TALL WHITE VIOLET. **Hab:** Rich cove forests, other rich mesic situations, such as floodplains. **Dist:** NL (Newfoundland) to ON, south to GA, AL, TN, and AR. **Phen:** Apr-Jul. **Tax:** Other related species are more western and/or northern. **Syn:** = F, G, S; = *Viola canadensis* Linnaeus var. *canadensis* – Ar, C, FNA6, K1, K3, K4, NE, Va, Ballard () (in prep), Haines (2001); < *Viola canadensis* Linnaeus – Mi, Pa, Tn, W, McKinney & Russell (2002); > *Viola canadensis* Linnaeus var. *canadensis* – RAB; > *Viola canadensis* var. *rugulosa* (Greene) C.L. Hitchcock – RAB, misapplied as to plants in our area.

Viola chalcosperma Brainerd. JACKSONVILLE VIOLET. **Hab:** Moist soils bordering swamps. **Dist:** Jacksonville, FL (type locality); may be more widespread in ne. FL than the type locality suggests. **Tax:** Long subsumed under *V. edulis* but distinct in foliage, floral, fruit and seed features. **Syn:** < *Viola affinis* Leconte – K3.

Key to Map Symbology: 

* : waif
EN : endemic
H : historic
N : no
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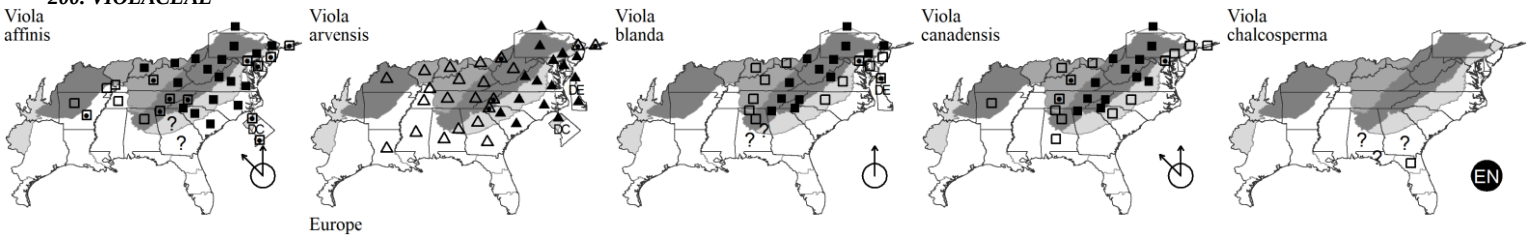


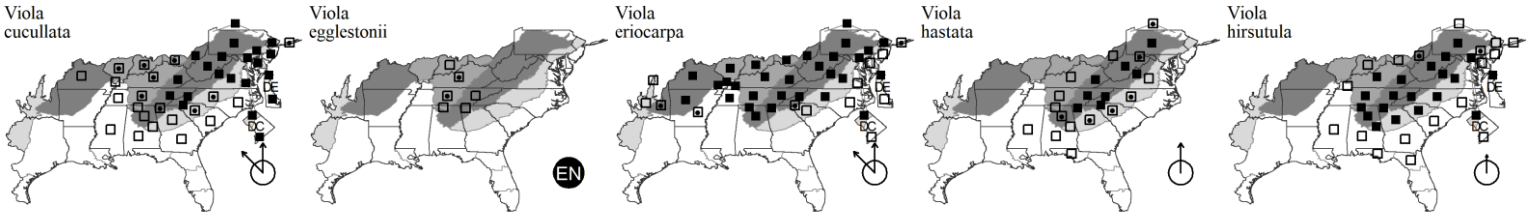
Viola cucullata Aiton. MARSH BLUE VIOLET, BOG VIOLET. **Hab:** Bogs, seeps, margins of spring branches. **Dist:** NL (Newfoundland) west to MN, south to SC, GA, AL, MS, and MO. **Phen:** Apr-Jun. **Syn:** = C, FNA6, G, GW2, Il, K1, K2, K4, NE, Pa, RAB, S, Tn, Va, W, Ballard () (in prep), Gil-ad (1998), Haines (2001), McKinney & Russell (2002); > *Viola cucullata* Aiton – WV; > *Viola cucullata* var. *cucullata* – F.

Viola egglestonii Brainerd. **Hab:** Calcareous barrens and glades, also in disturbed calcareous sites. **Dist:** Interior Highlands, s. IN s. to nw. GA and n. AL (Chester, Wofford, & Kral 1997), nw. GA (Jones & Coile 1988), IN, KY, and AL (Kartesz 1999). **Phen:** Apr-May. **Syn:** = FNA6, K1, K2, K4, Ballard () (in prep), Gil-ad (1998); = *Viola egglestoni* – F, G, orthographic variant; = *Viola septemloba* LeConte ssp. *egglestonii* (Brainerd) L.E. McKinney – McKinney & Russell (2002); = *Viola septemloba* LeConte var. *egglestonii* (Brainerd) R.J. Little & L.E. McKinney – Tn; < *Viola palmata* Linnaeus var. *pedatifida* (G. Don) Cronquist – C. NatureServe G4 (Apparently Secure).

Viola eriocarpa Schweinitz. SMOOTH YELLOW FOREST VIOLET. **Hab:** Mesic forests and floodplain terraces of brownwater rivers. **Dist:** QC west to MB south to DE, MD, w. NC, GA, AL, AR, and OK. **Phen:** Mar-May. **Syn:** = G, S; = *Viola eriocarpa* (Nuttall) Schweinitz var. *leiocarpa* Fernald & Wiegand – RAB; = *Viola pensylvanica* Michaux – Va, WV; = *Viola pubescens* var. *eriocarpa* – Il; = *Viola pubescens* Aiton var. *scabriuscula* Schweinitz ex Torrey – FNA6, K1, NE, Pa, Tn, Ballard () (in prep), Haines (2001), McKinney & Russell (2002); > *Viola pensylvanica* var. *leiocarpa* (Fernald & Wiegand) Fernald – F; > *Viola pensylvanica* Michaux var. *pensylvanica* – F; < *Viola pubescens* Aiton – C, GrPl, GW2, K3, K4, W; ? *Viola pubescens* var. *eriocarpa* – Tx. NatureServe G5T5 (Secure).

Viola hastata Michaux. SPEARLEAF VIOLET, SILVERLEAF VIOLET, HALBERD-LEAF VIOLET, HALBERD-LEAVED YELLOW VIOLET. **Hab:** Acidic coves, dry-mesic oak forests, bluff forests, bases of rock ledges. **Dist:** PA and OH south to GA, Panhandle FL, and AL. **Phen:** Late Mar-May. **Syn:** = C, F, FNA6, G, K1, K2, K4, Pa, RAB, S, Tn, Va, W, WV, Ballard () (in prep), McKinney & Russell (2002). NatureServe G5 (Secure).

Viola hirsutula Brainerd. WOOD VIOLET, SOUTHERN WOODLAND VIOLET. **Hab:** Bottomlands, moist slopes, dry forests and clearings. **Dist:** CT, NY, PA, OH, and s. IN, south to Panhandle FL, AL, and MS. **Phen:** Feb-Apr. **Comm:** Leaves usually mottled around the veins with silver-gray or purple, and also often purple beneath. **Syn:** = F, FNA6, G, K1, K3, K4, NE, Pa, RAB, S, Tn, Va, W, WV, Ballard () (in prep), Haines (2001), McKinney & Russell (2002); < *Viola villosa* Walter – C.



* ***Viola inconspicua*** Blume. **Hab:** Disturbed areas, parking lots, gardens, increasingly appearing in natural areas. **Dist:** Native of e. Asia. Probably considerably more widespread than currently mapped. **Phen:** Dec-Mar. **Syn:** = FoC, K4.

Viola labradorica Schrank. AMERICAN DOG-VIOLET. **Hab:** Moist alluvial woodlands and forests, seepage slopes, marl ravines, hammocks. **Dist:** NL (Labrador) west to AK, south to e. VA, nw. SC (Gaddy et al. 1984), n. GA, c. AL, and OH; disjunct in sw. GA and Panhandle FL. **Phen:** Late Mar-May. **Tax:** Ballard (1992) concluded that *V. conspersa* was not distinct from *V. labradorica*. **Syn:** = FNA6, Il, K1, K3, K4, NE, Pa, Tn, Va, WH3, Ballard () (in prep), Ballard (1992a), Haines (2001), McKinney & Russell (2002); > *Viola conspersa* Reichenbach – C, F, G, GW2, RAB, S, W, WV.

Viola lanceolata Linnaeus. LANCELEAF VIOLET, NARROW-LEAVED VIOLET. **Hab:** Bogs, seepage slopes, pitcher plant seepage bogs, streamheads and their margins, small swamp forests, depression ponds, interdune swales and ponds, other wet habitats. **Dist:** NB west to MN, south to Panhandle FL and e. TX. **Phen:** (Dec-) Mar-May. **Tax:** Taxonomists have generally subsumed *V. vittata* Greene under this taxon as a subspecies or variety, but preliminary study has confirmed their morphological, ecological and geographic distinctions; *V. vittata* is maintained as a separate species here. **Syn:** = G, S, WV; = *Viola lanceolata* ssp. *lanceolata* – GW2, Il, K1, K3, K4, NE, Tx; = *Viola lanceolata* Linnaeus var. *lanceolata* – C, F, Pa, Va, Ballard () (in prep), Haines (2001); < *Viola lanceolata* Linnaeus – Ar, FNA6, RAB, Tn, W, WH3, McKinney & Russell (2002).

Viola langloisii Greene. LANGLOIS'S VIOLET. **Hab:** Alluvial sand and silt of floodplains and bottomlands in close proximity to the flooding zone, along streams and rivers emptying into the Gulf Coast. **Dist:** MS to se. OK, south along the w. FL panhandle and to se. coastal TX. **Phen:** (Jan) Feb-Mar. **Tax:** Sometimes synonymized with *V. affinis* or *V. sororia* or confused with Viola missouriensis but expressing distinctly different leaf, flower and fruit morphologies. Nearly a Gulf Coastal Plain endemic and quite uniform across its range. Disjunct populations resembling *Viola langloisii* along the se. lower Atlantic Coastal Plain have been segregated as *Viola species 3*. **Syn:** = F, K1, K3, S, Tx; < *Viola missouriensis* Greene – FNA6, K4.

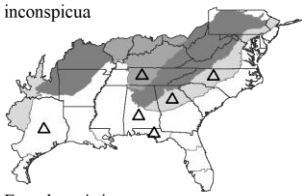
Viola palmata Linnaeus *var. **2 ["glabrate palmata" variant]***. ALABAMA THREE-LOBED VIOLET. **Hab:** Drier to dry sandy, sandy loam in dry oak and oak-pine woods and dry to dry-mesic savannas and closed forests, on slopes and bluffs. **Dist:** N. AL. **Phen:** Mar-Apr. **Syn:** < *Viola palmata* Linnaeus – K4.

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more)

* : waif
EN : endemic
H : historic

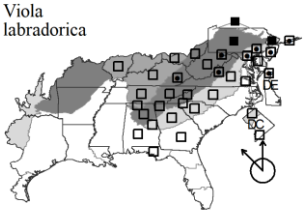
N : no
P : planted
? : questionable
X : extirpated

Viola inconspicua

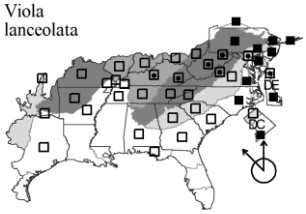


E. and se. Asia

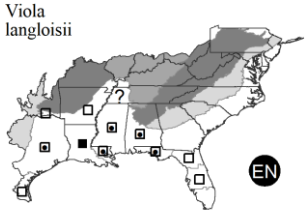
Viola labradorica



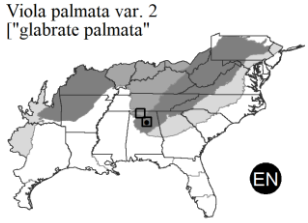
Viola lanceolata



Viola langloisii



Viola palmata var. 2 ["glabrate palmata"



Viola palmata Linnaeus *var.* ***3 ["Red Hills palmata" variant]***. RED HILLS VIOLET. **Hab:** Drier to dry sandy, sandy loam in dry oak and oak-pine woods and dry to dry-mesic savannas and closed forests, on slopes and bluffs. **Dist:** Coastal Plain, w. GA sc. AL, LA, and s. AR. **Phen:** (Feb-) Mar-Apr. **Syn:** < *Viola palmata* Linnaeus – K4.

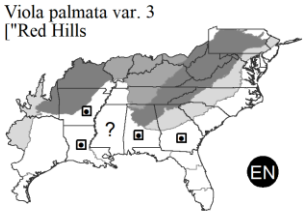
Viola palmata Linnaeus *var.* ***palmata***. SOUTHERN THREE-LOBED VIOLET, WOOD VIOLET. **Hab:** Drier to dry sandy, sandy loam in dry oak and oak-pine woods and dry to dry-mesic savannas and closed forests, on slopes and bluffs. **Dist:** ME west to WI, south to FL, AL, MS, LA, and TX. Widespread at lower elevations of Piedmont and Coastal Plain in southeastern U.S, and Lower Midwest. **Phen:** (Feb-) Mar-Apr. **Tax:** Nomenclature and typification have been problematic, but recent reexamination of the type of *V. palmata* unambiguously refers *V. palmata* sensu stricto to the common Piedmont and upper Coastal Plain with deeply dissected leaf blades; var. *dilatata* Elliott is rendered a synonym of var. *palmata*, and the widespread northern taxon previously treated as var. *palmata* must use the earliest available name var. *triloba*. Infrequent specimens identified as the latter from the main range of southeastern var. *palmata* are probable local hybrids involving *Viola sororia*. *V. palmata* in the broad sense is a polymorphic complex of potentially distinct evolutionary taxa diverging in foliage, flower and seed characters and requiring further study ("pseudo-stoneana", "avipes", "glabrate palmata" and "Red Hills"). While most variants are pedately dissected and occur at lower elevations, the rare and sporadic c. Appalachian "avipes" and "pseudo-stoneana" are distinctive in producing biternate leaf blades. Taxonomists have synonymized the Lower Midwest *V. falcata* under the present variety, but differences in leaf morphology, modal habitat and seeds suggest that the two may represent different evolutionary taxa. For reasons separating *V. stoneana* House, see that species. **Syn:** = Ballard () (in prep); = *Viola palmata* Linnaeus – Ar, NcTx, NE, Pa, Tn, Va, Haines (2001), McKinney & Russell (2002); < *Viola* ×*palmata* Linnaeus (pro sp.) – K1; < *Viola palmata* Linnaeus – WH3; >< *Viola palmata* Linnaeus – F, G, S, W; < *Viola palmata* Linnaeus var. *palmata* – C, FNA6, Il; > *Viola palmata* Linnaeus var. *palmata* – K3, RAB, Tx, WV; ? *Viola triloba* Schweinitz – S; > *Viola triloba* Schweinitz var. *triloba* – F, G.

Viola pedata Linnaeus *var.* ***pedata***. COMMON BIRD'S-FOOT VIOLET. **Hab:** Dry rocky or sandy forests, woodlands, glades, and roadbanks. **Dist:** NH, NY, MI, WI, MN, and ND south to s. GA, s. AL, s. MS, s. LA, and e. TX. **Phen:** Mar-May; May-Jun. **Syn:** = FNA6, K4, Va, McKinney & Russell (2002); = *Viola pedata* – C, Pa, W, Ballard () (in prep); < *Viola pedata* – Ar, GrPl, Il, K1, K3, NE, RAB, S, Tn, Tx, Haines (2001); > *Viola pedata* var. *linearilobа* A.P. de Candolle – F, G, WV; > *Viola pedata* Linnaeus var. *pedata* – F, G, WV.

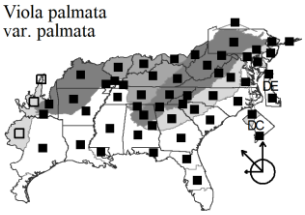
Viola primulifolia Linnaeus. PRIMROSE-LEAF VIOLET. **Hab:** Bogs, wet savannas, pocosins, sandhill streamhead ecotones, moist organic soils along small streams. **Dist:** NL (Newfoundland) to ON, south to s. FL, and west to TX and se. OK. **Phen:** Dec-May. **Syn:** = Ar, C, GW2, Il, K3, K4, NE, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV, Ballard () (in prep), Haines (2001), McKinney & Russell (2002); = *Viola* ×*primulifolia* Linnaeus (pro sp.) – K1; = *Viola primulifolia* var. *primulifolia* – FNA6; > *Viola primulifolia* var. *acuta* (Bigelow) Torrey & A. Gray – F; > *Viola primulifolia* var. *primulifolia* – F, G; > *Viola primulifolia* var. *villosa* Eaton – F, G.

Viola pubescens Aiton. HAIRY YELLOW FOREST VIOLET. **Hab:** Rich deciduous forests. **Dist:** ME and s. QC west to SD, south to DE, NC, TN, MO, NE, and TX. **Phen:** Mar-May. **Syn:** = Ar, G, NcTx, S, Va, WV; = *Viola eriocarpa* (Nuttall) Schweinitz var. *eriocarpa* – RAB; = *Viola pubescens* var. *pubescens* – FNA6, Il, K1, NE, Pa, Tn, Ballard () (in prep), Haines (2001), McKinney & Russell (2002); < *Viola pubescens* Aiton – C, GrPl, GW2, K3, K4, W; > *Viola pubescens* var. *peckii* House – F; > *Viola pubescens* var. *pubescens* – F.

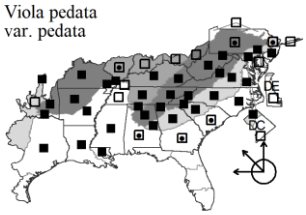
Viola palmata var. 3 ["Red Hills



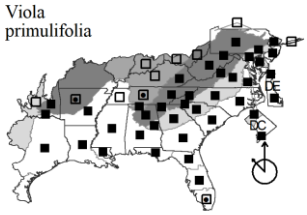
Viola palmata var. palmata



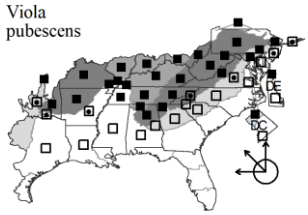
Viola pedata var. pedata



Viola primulifolia



Viola pubescens



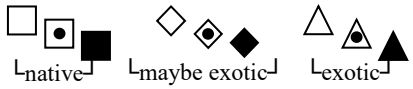
Viola rafinesquei Greene. WILD PANSY, FIELD PANSY, JOHNNY-JUMP-IP. **Hab:** Pastures, roadsides, lawns, other disturbed habitats, less commonly in dry rocky woodlands and barrens. **Dist:** MA and NY west to SD and CO, south to Panhandle FL, TX, and AZ. **Phen:** Mar-May (chasmogamous), May-Jul (cleistogamous). **Tax:** Under the ICN, the spelling of the epithet is corrected to '*rafinesquei*". **ID Notes:** Winter annual plants flower chasmogamously first, and then progressively reduce petal size until later flowers are all chasmogamous (with 0 petals and 1 stamen). **Syn:** = Ballard () (in prep); = *Viola bicolor* Pursh – Ar, FNA6, K1, K3, K4, NcTx, Pa, Tn, Va, WH3, McKinney & Russell (2002), later homonym; = *Viola kitaibeliana* J.A. Schultes var. *rafinesquii* (Greene) Fernald – F; = *Viola rafinesquii* Greene – C, G, GrPl, Il, RAB, S, Tx, W, WV, unacceptable orthographic variant. NatureServe G5 (Secure).

Viola rostrata Pursh. LONG-SPURRED VIOLET. **Hab:** Acidic cove forests, other mesic forests, often under *Tsuga canadensis*, but also in calcareous forests (as in n. AL). **Dist:** NH and QC west to WI, south to GA and AL. **Phen:** Apr-May. **Syn:** = F, FNA6, G, K1, K3, K4, NE, Pa, RAB, S, Tn, Va, W, WV, Ballard () (in prep), Ballard (1992a), Haines (2001), McKinney & Russell (2002). NatureServe G5 (Secure).

Viola sagittata Aiton. ARROWHEAD VIOLET. **Hab:** Dry to moist forests and woodlands. **Dist:** MA west to MN, south to GA and e. TX. **Phen:** Apr. **Syn:** = GrPl, S, Tx, W, WV, Gil-ad (1998); = *Viola sagittata* Aiton var. *sagittata* – FNA6, K1, K3, K4, NE, Pa, Tn, Va, Ballard () (in prep), Haines (2001), McKinney & Russell (2002); ? *Viola emarginata* – S; > *Viola emarginata* var. *acutiloba* Brainerd – F, G, RAB; > *Viola emarginata* (Nuttall) Leconte var. *emarginata* – F, G, RAB; < *Viola sagittata* Aiton – Ar, C, Il, NcTx.

Viola septemloba Leconte. SOUTHERN COASTAL VIOLET. **Hab:** Longleaf pine sandhills, other sandy pinelands and secondary habitats derived from them. **Dist:** Se. VA south to s. FL, west to LA, mainly on the Coastal Plain. **Phen:** Late Mar-early May. **Syn:** = F, FNA6, G, GW2, K1, K3, K4, S, W, Ballard () (in prep), Gil-ad (1998); < *Viola palmata* Linnaeus – WH3; < *Viola palmata* Linnaeus var. *palmata* – C; ? *Viola septemloba* Leconte – Tx; < *Viola septemloba* Leconte – RAB; ? *Viola septemloba* ssp. *septemloba* – McKinney & Russell (2002).

Key to Map Symbology:



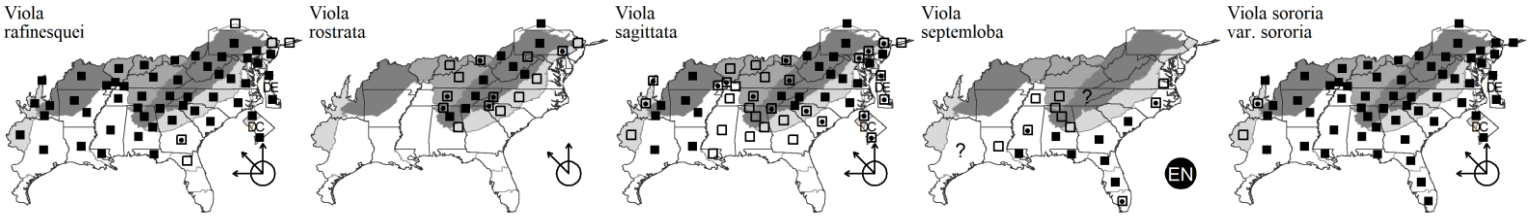
←rare ←uncommon ←common (see introduction for more)

* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable

X : extirpated

Viola sororia Willdenow *var. **sororia***. COMMON BLUE VIOLET. **Hab:** Loam or clay soils in dry-mesic to wet-mesic forests, higher ground and terraces or borders of bottomlands, and lawns and other anthropogenically modified sites formerly with native vegetation. **Dist:** NL (Newfoundland) west to MB, south to s. FL and TX. **Phen:** Feb-May. **Tax:** A heterogeneous complex of morphologically divergent but inadequately understood essentially glabrous taxa ("glabrous", "hirsutula-like") plus densely hirsute *V. sororia* sensu stricto; and two other uncertain taxa (*Viola domestica* E. P. Bicknell and *V. pratincola* Greene). The taxa share broad obtuse to rounded sepals and generally broad leaf blades, as well as a glabrous spurred petal, but they typically grow separately over the extensive zone of sympatry, occupy distinctly different microsites and maintain their distinctions when growing in the local area. Distinctions and geographic distributions are presently being interpreted. **Syn:** = Ar, McKinney & Russell (2002); = *Viola sororia* Willdenow – GrPl, K3, NcTx, NE, Va, W, Ballard () (in prep), Gil-ad (1998); > *Viola palmata* var. *sororia* (Willdenow) Pollard – RAB; > *Viola papilionacea* Pursh – F, RAB, S, WV, misapplied; > *Viola papilionacea* var. *papilionacea* – G, misapplied; > *Viola papilionacea* var. *priceana* (Pollard) Alexander – G, misapplied; > *Viola priceana* Pollard – S; < *Viola sororia* Willdenow – C, FNA6, K4, Tn, Tx, WH3, Haines (2001); > *Viola sororia* Willdenow – F, G, Il, K1, Pa, S.



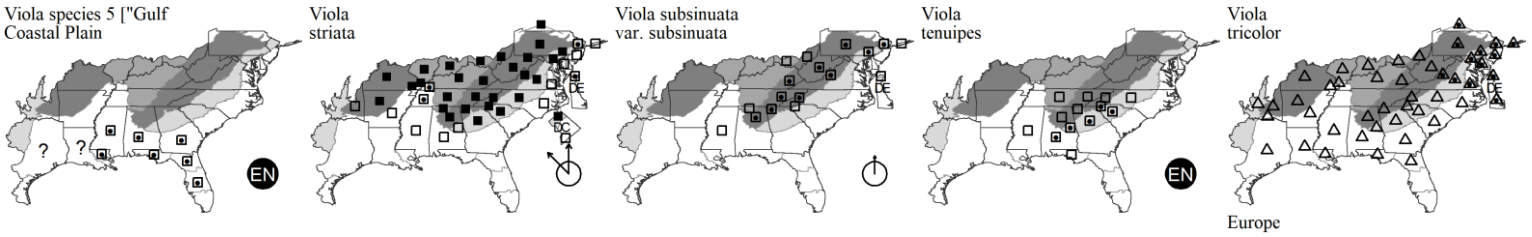
Viola species 5 ["Gulf Coastal Plain edulis"]. **Hab:** Moist loamy soils of floodplains, swamps and hammocks. **Dist:** Confirmed in FL, s. GA and s. AL; the range of this recently detected new species is currently being reinterpreted and is probably broader than presented here. **Phen:** (Jan) Feb-Mar. **Tax:** The *Viola edulis* complex consists of multiple distinct evolutionary species presently under study, the present taxon being one of them. **Syn:** < *Viola palmata* var. *heterophylla* – K4.

Viola striata Aiton. CREAM VIOLET, PALE VIOLET. **Hab:** Mesic forests and woodlands, disturbed areas. **Dist:** MA west to WI, south to GA, AR, and e. OK. **Phen:** Mar-Jun. **Syn:** = Ar, C, F, FNA6, G, GW2, Il, K1, K3, K4, NE, Pa, RAB, S, Tn, Va, W, WV, Ballard () (in prep), Ballard (1992a), Haines (2001), McKinney & Russell (2002). NatureServe G5 (Secure).

Viola subsinuata Greene *var. **subsinuata***. WAVY-LEAVED VIOLET. **Hab:** Rich, dry-mesic and dry upland forests, probably associated with mafic rocks. **Dist:** VT and c. PA south to NC, ne. AL, ne. MS and e. KY; slightly disjunct in e. OH (if these are not de novo hybrids involving *V. baxteri*) and in northern Piedmont from CT south to NJ. **Phen:** Apr-May; Apr-Jun (chasm.), May-Aug (cleist.). **Tax:** Formerly broadly delimited as highly polymorphic, but recent studies have shown this to be group of loosely morphologically similar homophyllous cut-leaved taxa, from which *Viola baxteri*, *Viola species 1*, and *Viola species 4* have now been segregated. Potentially distinct taxa under study are the "Chapel Hill" and Viola subsinuata sensu stricto as presented in the key. Brainerd's sole collection of a seemingly homophyllous cut-leaved violet from an unspecified location in FL is anomalous and well out of Appalachian/Western Allegheny Plateau distribution of the entire group. Populations outside the n. and c. Appalachian region require further study and may yield additional taxonomic diversity requiring recognition. **Comm:** ×. **Syn:** = *Viola subsinuata* Greene – FNA6, Il, NE, Pa, Tn, Va, Ballard () (in prep), Haines (2001), McKinney & Russell (2002); < *Viola* ×*subsinuata* Greene, pro – K4; > *Viola palmata* var. *dilatata* Elliott – Ballard () (in prep); < *Viola palmata* Linnaeus var. *palmata* – C; > *Viola subsinuata* Greene – Ballard () (in prep); ? *Viola triloba* Schweinitz var. *dilatata* (Elliott) Brainerd – F, G, Il, K1.

Viola tenuipes Pollard. SOUTHERN WEDGE-LEAF VIOLET. **Hab:** Rich dry to dry-mesic forests. **Dist:** Sw. NC and c. TN south to c. SC, w. GA, FL Panhandle, and c. and nw. AL. **Phen:** Feb-Mar. **Tax:** Resurrected from obscurity, preliminary study has demonstrated that this is distinct in a number of leaf features from the more northern *V. glaberrima*, occupies somewhat drier microsites, has a nearly allopatric distribution, and virtually never grows near the latter in the very small zone of sympatry. It is maintained as a distinct species here. **Syn:** < *Viola tripartita* Elliott – K4.

* ***Viola tricolor*** Linnaeus. PANSY, JOHNNY-JUMP-UP. **Hab:** Lawns, garden borders, railroad rights-of-way, commonly cultivated. **Dist:** Native of Europe. **Phen:** Mar-Jun (and sporadically later). **Syn:** = Ar, C, F, G, Il, K1, K3, K4, NE, Pa, RAB, WH3, Ballard () (in prep), Haines (2001); > *Viola tricolor* var. *tricolor* – FNA6. NatureServe GNR (Not Yet Ranked).



Viola tripartita Elliott. **Hab:** Moist slopes and bottomlands, especially over mafic or calcareous rocks. **Dist:** Sw. NC and se. TN south to w. SC, nc. GA, and ne. AL; disjunct in s. OH. **Phen:** Late Mar-May; Apr-Jun (chasm.), Jul-Sep (cleist.). **Syn:** = *Viola tripartita* var. *tripartita* – G, RAB, S, W, Ballard () (in prep); < *Viola tripartita* Elliott – C, F, FNA6, K1, K3, K4, Tn, Va, WH3, WV, McKinney & Russell (2002).

Viola villosa Walter. SOUTHERN WOOLLY VIOLET. **Hab:** Pocosin ecotones, other sites with moist soils. **Dist:** MD south to n. peninsular FL, west to TX and OK. Reported for VA by Kartesz (1999), on the basis of Massey (1961); report requiring additional documentation. **Phen:** (Late Dec-) Feb-early Apr. **Syn:** = Ar, F, FNA6, G, K1, K3, K4, NcTx, RAB, S, Tx, WH3, Gil-ad (1998), McKinney & Russell (2002); < *Viola villosa* Walter – C.

Viola vittata Greene. SOUTHERN WATER VIOLET, STRAP-LEAVED VIOLET. **Hab:** Depression ponds, Carolina bays, other wetlands lacking flowing water. **Dist:** Se. VA south to FL, west to e. TX; nw. IN and ne. IL. **Phen:** Jan-Dec. **Tax:** Although this taxon has long been subsumed under *V. lanceolata* as a subspecies or variety, it differs in several features of foliage and summer fruiting habit, and is confined to the se. Atlantic and Gulf Coastal Plains. The two maintain their morphological distinctions in the narrow zone of sympatry in the Carolinas and grow in different microsites there. They are maintained as distinct evolutionary species. **Syn:** = G, S, Ballard () (in prep); = *Viola lanceolata* ssp. *vittata* (Greene) Russell – GW2, Il, K1,

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more)

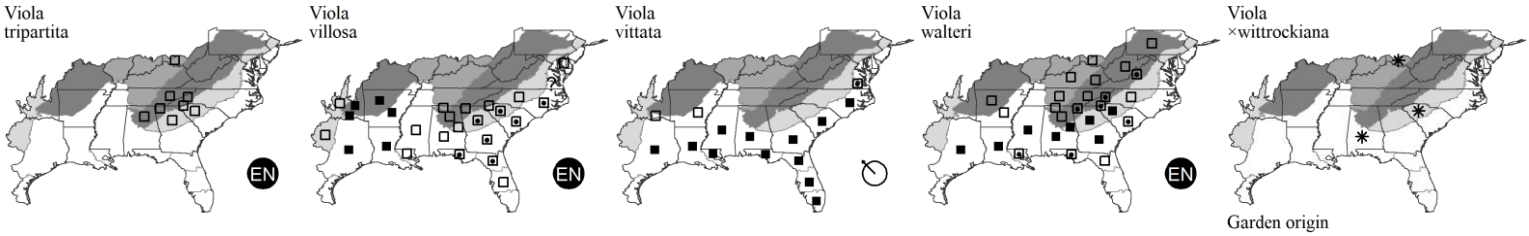
* : waif; EN : endemic; H : historic

N : no; P : planted; ? : questionable; X : extirpated

K3, K4, Tx; = *Viola lanceolata* Linnaeus var. *vittata* (Greene) Weatherby & Griscom – C, F, Va, Haines (2001); < *Viola lanceolata* Linnaeus – Ar, FNA6, RAB, Tn, W, WH3, McKinney & Russell (2002).

Viola walteri House. WALTER'S VIOLET, PROSTRATE BLUE VIOLET. **Hab:** Nutrient-rich woodlands and forests, dolomite bluffs and ledges especially on mafic or calcareous rocks to the north, sandy or rocky and often acidic soils in dry or dry-mesic forests southward. **Dist:** Sc. PA, ne. WV, and w. VA west to sc. OH and AR, south to n. peninsular FL and e. TX. **Phen:** (Late Jan-) Mar-May. **Syn:** = Ar, F, G, K1, K4, RAB, S, Tn, Tx, W, WH3, Ballard (1992a); = *Viola walteri* House var. *walteri* – FNA6, K3, Va, McKinney & Russell (2002). NatureServe G4G5 (Apparently Secure).

* ***Viola ×wittrockiana*** Gams. GARDEN PANSY. **Hab:** Cultivated, very sporadically persistent or remnant after planting. **Dist:** Native of Europe. **Phen:** May-Aug. **Comm:** {not keyed}. **Syn:** = FNA6, Il, K3, K4.



202a. PASSIFLORACEAE A.L. de Jussieu ex Roussel 1806 (PASSIONFLOWER FAMILY) [in MALPIGHIALES]

A family of about 27 genera and 935 species, vines, shrubs, trees, and herbs, of tropical and warm temperate regions, especially America and Africa. Here circumscribed to exclude Turneraceae, counter the recommendation of Angiosperm Phylogeny Group (2009); see comments under Turneraceae. References: Arbo in Kubitzki, Bayer, & Stevens (2007); Feuillet & MacDougal in Kubitzki, Bayer, & Stevens (2007); Goldman & MacDougal (2015) in FNA6 (2015); Tokuoka (2012).

1 Corona present, of several series of frills; stamens elevated on an androgynophore; herbaceous vine or woody liana ..... ***Passiflora***
1 Corona absent; stamens not elevated on an androgynophore; upright herb ..... ***Turneraceae***

Passiflora Linnaeus 1753 (PASSIONFLOWER)

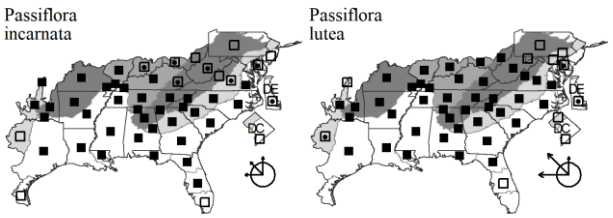
A genus of about 525 species, vines, shrubs, and trees, largely of tropical America, with a few species in warm temperate America and Asia. References: WI; Feuillet & MacDougal in Kubitzki, Bayer, & Stevens (2007); Goldman & MacDougal (2015) in FNA6 (2015); Killip (1938); Porter-Utley (2014); Ulmer & MacDougal (2004); Vanderplank (2000); Vanderplank (2013).

Identification Notes: *Passiflora* flowers are structurally striking. There are 5 sepals and either 0 or 5 petals; a corona of numerous linear structures is present, arranged in 1-several series. The ovary, 3 styles, and 5 stamens are basally adnate and elevated on an androgynophore. Most species have glands on the leaves which function as extrafloral nectaries; these can be seen as paired glands on the leaf petiole (in all our species except *P lutea*), and some species also have laminar glands on the leaf blade, near the margin.

7 Leaf margins entire; ripe fruits blue, purple, or black, 5-15 mm long; perianth segments 3-16 mm long; floral bracts (subtending the calyx) 0-3 mm long, setaceous to subulate. ..... ***Passiflora lutea***
7 Leaf margins serrate, at least on the lateral leaf lobes near the petiole junction; ripe fruits green, yellow, yellow-orange, or red, 30-60 mm long; perianth segments 18-40 mm long; floral bracts (subtending the calyx) 3-30 mm long, ovate, sometimes pinnatifid-lobed. ..... ***Passiflora incarnata***

Passiflora incarnata Linnaeus. MAYPOPS, PURPLE PASSIONFLOWER, PASIONARIA. **Hab:** Roadsides, fencerows, thickets, fields. **Dist:** S. NJ, DE, MD, sw. PA, OH, and OK, south to s. FL and s. TX. **Phen:** May-Jul (-later); Jul-Oct. **Comm:** Certainly one of our most interesting and beautiful flowers. **Syn:** = Ar, C, F, FNA6, G, GrPl, Il, K3, K4, NcTx, RAB, S, Tn, Tx, Va, W, WH3, WV, Ulmer & MacDougal (2004).

Passiflora lutea Linnaeus. YELLOW PASSIONFLOWER, LITTLE PASSIONFLOWER. **Hab:** Woodlands, forests, thickets, maritime forests. **Dist:** DE, PA, OH, IN, IL, MO, and e. KS, south to c. peninsular FL, s. AL, s. MS, s. LA, and s. TX. **Phen:** May-Sep; Aug-Oct. **Tax:** Sometimes divided into two varieties, the more eastern var. *lutea* (west to WV and AL) with pilose calyx, petioles, and stems, and more western var. *glabriflora* Fernald (east to WV and AL) with glabrous calyx, petioles, and stems; it is not clear that this is anything more than a minor polymorphism. **Syn:** = Ar, FNA6, K1, K3, K4, NcTx, Pa, RAB, S, Tn, Va, W, WH3, Killip (1938), Ulmer & MacDougal (2004); > *Passiflora lutea* var. *glabriflora* – C, F, G, GrPl, Il, Tx, WV; > *Passiflora lutea* var. *lutea* – C, F, G, Tx, WV.



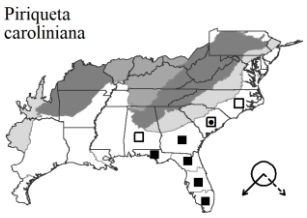
Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

202b. TURNERACEAE Kunth ex A.P. de Candolle 1828 (TURNERA FAMILY) [in MALPIGHIALES]

A family of about 10 genera and 200 species, herbs, of tropical and subtropical America and Africa. Angiosperm Phylogeny Group III (2009) and Angiosperm Phylogeny Group IV (2016) treated Turneraceae as included in Passifloraceae (along with Malesherbiaceae), but these 3 traditional families are each monophyletic and morphologically distinctive (Tokuoka 2012) and seem better retained at family rank. References: Arbo (2015) in FNA6 (2015); Tokuoka (2012).

Piriqueta Aublet 1775

A genus of about 20-50 species, herbs and shrubs, of tropical and subtropical America (Thulin et al. 2012). References: Arbo (1990); Arbo (1995); Arbo (2015) in FNA6 (2015); Maskas & Cruzan (2000).



Piriqueta caroliniana (Walter) Urban. CAROLINA PIRIQUETA. **Hab:** Longleaf pine sandhills, sandy soils of roadsides, woodland edges, and disturbed areas. **Dist:** Se. NC and SC south to s. FL; Cuba and Hispaniola; and in Central and n. South America. **Phen:** May-Sep. **Tax:** Arbo (1990; 1995) treats *P. caroliniana* (and without infrataxa) as a subspecies of *P. cistoides*, but the morphological distinctions seem strong and the two taxa have widely overlapping distributions in the Neotropics. Moreover, variation in morphology and habitat seems to warrant recognition of several taxa in the southeastern United States within Arbo's *P. cistoides* ssp. *caroliniana*. Maskas & Cruzan (2000) discuss variation and evolutionary taxa in this complex in the southeastern United States and the Bahamas. *P. tomentosa*, primarily of the Miami Ridge, is included here, but needs additional consideration. **Syn:** = *Piriqueta caroliniana* var. *caroliniana* – Bah; < *Piriqueta caroliniana* (Walter) Urban – RAB; > *Piriqueta caroliniana* (Walter) Urban – S; < *Piriqueta cistoides* (Linnaeus) Grisebach ssp. *caroliniana* (Walter) M.M. Arbo – Fl2, FNA6, K1, K3, K4, WH3, Arbo (1990), Arbo (1995); > *Piriqueta tomentosa* – S.

204. SALICACEAE Mirbel 1815 (WILLOW FAMILY) [in MALPIGHIALES]

Alan S. Weakley and Mac H. Alford

A family of 55 genera and about 1010 species (as circumscribed to include much of the Flacourtiaceae), trees, shrubs, and subshrubs, nearly cosmopolitan. References: Argus, Eckenwalder, & Kiger (2010) in FNA7 (2010); Li et al (2019b); Samarakoon & Alford (2019); Sleumer (1954); Sleumer (1975); Sleumer (1980); Yang & Zmarzty (2007).

4 Leaf blades 0.8-2 (-3)× as long as wide; stamens 5-80; buds covered by several, overlapping scales; flowering catkins arching or drooping ..... ***Populus***
4 Leaf blades (2-) 3-30× as long as wide; stamens 1-9; buds covered by a single scale; flowering catkins usually erect or ascending ..... ***Salix***

Populus Linnaeus 1753 (POPLAR, ASPEN, COTTONWOOD)

A genus of about 35 species, trees, largely north temperate. References: Eckenwalder (1977); Eckenwalder (1984); Eckenwalder (1996); Eckenwalder (2010) in FNA7 (2010); Hamzeh & Dayanandan (2004).

1 Winter buds not viscid; stamens 5-20.
  2 Stamens 12-20; scales of the catkins deeply fimbriate; petioles terete; [section *Leucoides*] ..... ***Populus heterophylla***
  2 Stamens 5-12; scales of the catkins dentate or with only 3-7 linear-triangular lobes; petioles strongly flattened laterally (90 degrees to the plane of the leaf blade), especially near the junction with the blade; [section *Populus*].
  ..... ***Populus alba***
1 Winter buds viscid (sticky and shiny as if recently varnished); stamens (15-) 20-80.
  8 Stigmas 3-4; stamens (30-) 40-80; [native tree, common]
  ..... ***Populus deltoides ssp. deltoides***
  8 Stigmas 2-3; stamens (15-) 20-30; [alien trees, rare out of cultivation].
  ..... ***Populus nigra***

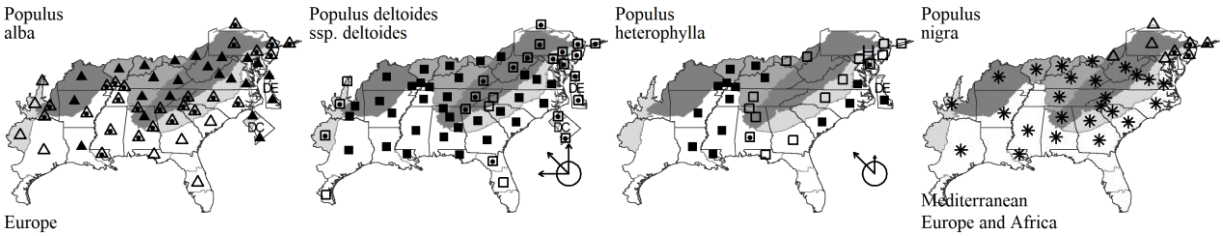
* ***Populus alba*** Linnaeus. SILVER POPLAR, WHITE POPLAR. **Hab:** Disturbed areas, roadsides, forest edges, suburban woodlands. **Dist:** Native of Europe. **Phen:** Mar-May. **Syn:** = Ar, C, F, Fl2, FNA7, G, GrPl, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV. NatureServe G5 (Secure).

Populus deltoides Bartram ex Marshall *ssp. **deltoides***. EASTERN COTTONWOOD. **Hab:** Riverbanks, bottomland forests (not found along blackwater streams), river bars, rarely weedy in upland situations. **Dist:** QC west to MN, south to n. peninsular FL, Panhandle FL, and TX. **Phen:** Mar-Apr. **Syn:** = FNA7, K1, K3, K4, Mi, NcTx, NY, Eckenwalder (1977); = *Populus balsamifera* Linnaeus – S, misapplied; = *Populus deltoides* – Tx; = *Populus deltoides* var. *deltoides* – C, GW2, NE, Va; < *Populus deltoides* – Fl2, G, Il, Pa, RAB, Tn, W, WH3, WV; > *Populus deltoides* var. *deltoides* – F; > *Populus deltoides* var. *missouriensis* (A. Henry) A. Henry – F.

Populus heterophylla Linnaeus. SWAMP COTTONWOOD. **Hab:** Blackwater and brownwater swamp forests, tidal swamp forests, depression ponds, interdune ponds. **Dist:** CT west to MI, south to Panhandle FL and LA, scattered and irregular in distribution, absent from the Appalachians. **Phen:** Mar-Apr. **Syn:** = Ar, C, FNA7, G, GW2, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Va, WH3. NatureServe G5 (Secure).

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

* ***Populus nigra*** Linnaeus. BLACK POPLAR, LOMBARDY POPLAR. **Hab:** Disturbed suburban areas. **Dist:** Native of s. Europe. Cultivated in various forms, especially the columnar 'Lombardy Poplar'; short-lived and weakly spreading to disturbed areas in the vicinity of plantings, especially by root sprouts (Diamond 2013). **Phen:** Mar-May; May-Jun. **Syn:** = C, F, FNA7, G, GrPl, K1, K3, K4, Mi, NcTx, NE, NY, Pa, Tx; > *Populus italica* (Du Roi) Moench – S; > *Populus nigra* var. *italica* Du Roi – WV.



Salix Linnaeus 1753 (WILLOW)

A genus of about 400 species, trees, shrubs, and subshrubs, mostly north temperate and boreal. References: Argus (1986); Argus (1997); Argus (2010) in FNA7 (2010); Belyaeva (2009); Chen et al (2010); Dorn (1995); Dorn (1998).

2 Bud apex sharp-pointed; bud scale margin free and overlapping; leaf blades 2.5-16× as long as wide; [subgenus *Protitea*].
  3 Leaf blades (4-) 7-10 (-16)× as long as wide; leaf undersurface glaucous or not; [section *Humboldtianae*].
    4 Leaves glaucous beneath; pistils borne on stipes averaging 2 mm long (range 1-5 mm); stipules usually prominent and persistent, to 15 mm long; leaf blades (4-) avg. 7.5 (-13)× as long as wide..... ***Salix caroliniana***
    4 Leaves not (or thinly) glaucous beneath; pistils borne on stipes averaging 1 mm long (range 0.5-1.5 mm); stipules usually small and caducous, to 12 mm long; leaf blades (4-) avg. 9 (-16)× as long as wide..... ***Salix nigra***
  3 Leaf blades 2.5-5 (-6)× as long as wide; leaf undersurface glaucous.
    ..... ***Salix floridana***
2 Bud apex blunt; bud scale margin fused; leaf blades 2-30× as long as wide.
  6 Leaves green or pale green beneath.
    7 Leaves linear, (7-) 11-19 (-30)× as long as wide; leaf margin distinctly glandular-denticulate; stomates present on the upper leaf surface; pistils pubescent to glabrescent; stamens 2, the staminate floral bracts tawny, the aments on leafy branches; [subgenus *Longifoliae*, section *Longifoliae*] ..... ***Salix interior***
    7 Leaves lanceolate or elliptic-lanceolate, 2-6× as long as wide; leaf margin serrate; stomates usually absent on the upper leaf surface; pistils glabrous; stamens 3, or if 2 (*S. eriocephala*), the staminate floral bracts dark brown, the aments sessile with a few leafy bracts.
      ..... ***Salix eriocephala***
  6 Leaves glaucous beneath.
    10 Leaf margin entire or crenate (to slightly and irregularly serrate); [subgenus *Vetrix*, section *Cinerella*].
      12 Leaf margin entire and undulate; pistillate aments 1-3.5 cm long; pistils borne on stipes mostly < 2 mm long; staminate aments 0.5-2 cm long; shrubs, < 2 m tall.
        13 Leaves stipulate; leaf blades (5-) avg. 7 (-13) cm long, (12-) avg. 17 (-35) mm wide; staminate aments 1-2 cm long; pistillate aments 2-3.5 cm long.....
        ..... ***Salix humilis***
        13 Leaves exstipulate; leaf blades (2.5-) avg. 4 (-5) cm long, (5-) avg. 7 (-10) mm wide; staminate aments 0.5-1.1 cm long; pistillate aments 1-2 cm long...
        ..... ***Salix occidentalis***
      12 Leaf margin crenate or irregularly serrate (rarely nearly entire); pistillate aments 3-8 cm long; pistils borne on stipes mostly > 2 mm long; staminate aments 2-5 cm long; shrubs to small trees, mostly 3-15 m tall.
        ..... ***Salix cinerea***
    10 Leaf margin serrulate or serrate.
      16 Shrubs to 6 m tall; leaves lacking stomates on the upper surface; [native to our area]; [subgenus *Vetrix*].
        17 Stipules prominent, 5-15 mm long; branches flexible; mature leaves glabrous or glabrescent beneath; staminate aments borne on short, leafy branches; [section *Cordatae*]..... ***Salix eriocephala***
        17 Stipules absent or of small glands (rarely to 4 mm long on vigorous shoots); branches brittle; mature leaves short-sericeous beneath; staminate aments sessile, sometimes with a few leafy bracts; [section *Griseae*]..... ***Salix sericea***
      16 Trees; leaves with stomates on the upper surface; [introduced in our area]; [subgenus *Salix*].
        19 Leaves long-sericeous beneath; branches ascending (rarely pendulous); leaves narrowly lanceolate, with length/width ratio of 5-6.5; petioles 3-6 mm long; petioles 3-6 mm long, sericeous; flowering branchlets 1-1.5 cm long; [section *Salix*] ..... ***Salix alba***
        19 Leaves glabrate beneath; branches normally pendulous; leaves very narrowly lanceolate, with length/width ratio of 6.5-13; petioles 7-12 mm long; petioles 7-12 mm long, tomentose; flowering branchlets ca. 0.3 cm long; [section *Subalbae*].
          20 Branches yellowish, yellow-green, or yellow-brown ..... ***Salix ×sepulcralis***
          20 Branches yellow-brown to red-brown, or gray-brown.
            21 Pistillate catkins on branchlets that are (0-) 2-4 mm long; ovary beak abruptly tapered to styles; anthers 0.4-0.5 mm long.....
            ..... ***Salix babylonica***
            21 Pistillate catkins on branchlets that are 3-14 mm long; ovary beak gradually tapered to styles; anthers 0.5-0.8 long.
              ..... ***Salix ×sepulcralis***

* ***Salix alba*** Linnaeus. EUROPEAN WHITE WILLOW. **Hab:** Disturbed bottomlands, other moist to wet disturbed areas. **Dist:** Native of Eurasia. **Phen:** Mar-May. **Syn:** = Ar, C, F, FNA7, G, K1, K3, Mi, NE, NY, Pa, RAB, S, Tn, Va, W, Argus (1986); > *Salix alba* var. *alba* – GrPl, Il; > *Salix alba* var. *caerulea* (J.E. Smith) J.E. Smith – Il; > *Salix alba* var. *vitellina* (Linnaeus) Stokes – GrPl, Il.

* ***Salix babylonica*** Linnaeus. WEEPING WILLOW. **Hab:** Disturbed bottomlands, streambanks, roadsides, impoundments, other disturbed areas. **Dist:** Native of Asia. Note that many trees identified as *S. babylonica* may actually be one of two commonly cultivated hybrids, *S.* × *pendulina* and *S.*

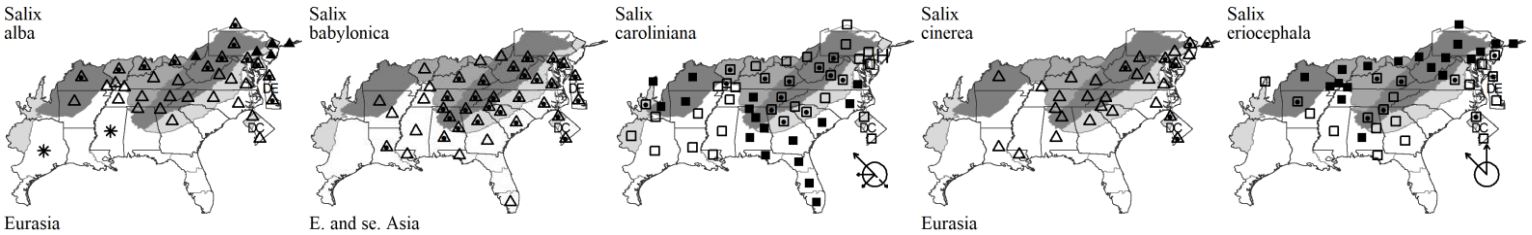
Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated

×*sepulchralis*, with *S. babylonica* as one parent. **Phen:** Mar-Apr. **Syn:** = Ar, C, F, Fl2, FNA7, G, Il, K1, NcTx, RAB, Va, W, WH3, WV, Argus (1986); > *Salix babylonica* Linnaeus – K3, K4; < *Salix babylonica* – Pa; > *Salix matsudana* Koidzumi – K4, Mi.

Salix caroliniana Michaux. CAROLINA WILLOW, COASTAL PLAIN WILLOW. **Hab:** Riverbanks, sandbars, interdune ponds, canal banks, other wet sites. **Dist:** Widespread in the Southeast, *S. caroliniana* has a peculiar range, with three main centers of distribution, the Coastal Plain from VA south to s. FL and west to s. AL and the FL Panhandle, the Interior Low Plateau of KY, TN, and n. AL, and an area of MO, AR, e. KS, and e. OK centered on the Ozark-Ouachita Highlands. **Phen:** Mar-May; May-Jun. **Syn:** = Ar, C, F, Fl2, FNA7, G, GrPl, GW2, Il, K1, K3, K4, NcTx, Pa, RAB, Tx, Va, WH3, WV, Argus (1986); > *Salix amphibia* Small – S; > *Salix longipes* Shuttleworth ex Andersson – S. NatureServe G5 (Secure).

* ***Salix cinerea*** Linnaeus. GRAY WILLOW. **Hab:** Streambanks, floodplains, bogs, other wet disturbed areas. **Dist:** Native of Eurasia. **Phen:** Apr-May. **Syn:** = FNA7, Il, K1, K3, K4, Mi, Pa; = *Salix cinerea* ssp. *cinerea* – NE, NY, Argus (1986); < *Salix cinerea* Linnaeus – C, F, G, RAB, WV, (circumscription uncertain but apparently including S. atrocinerea). NatureServe G5TNR (Not Yet Ranked).

Salix eriocephala Michaux. HEART-LEAVED WILLOW, DIAMOND WILLOW, MISSOURI WILLOW. **Hab:** Streambanks, riverbanks, calcareous fens and marshes, river-scour prairies, impoundments, and other disturbed wet areas. **Dist:** NL (Newfoundland) west to SK, south to w. FL, AR, s. KS, and ne. CO. **Phen:** Apr-early May; May-early Jun. **Syn:** = Ar, C, Fl2, FNA7, GrPl, Il, K1, K3, K4, Mi, NY, Pa, W, WH3, Argus (1986); = *Salix cordata* Michaux – S, misapplied; = *Salix eriocephala* ssp. *eriocephala* var. *eriocephala* – NE, Dorn (1995); > *Salix rigida* – WV; > *Salix rigida* var. *angustata* (Pursh) Fernald – F; > *Salix rigida* Muhlenberg var. *rigida* – F, G; > *Salix rigida* var. *vestita* (Andersson) Ball – G.



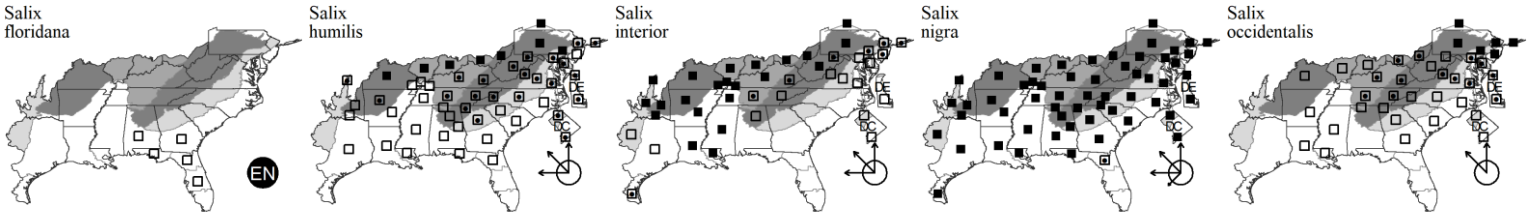
Salix floridana Chapman. FLORIDA WILLOW. **Hab:** Sphagnous seepages and along spring runs. **Dist:** C. GA and s. AL (north to Butler County) (Diamond 2013) south to c. peninsular and Panhandle FL. **Phen:** Mar-Apr. **Syn:** = Fl2, FNA7, GW2, K1, K3, K4, WH3, Argus (1986); = *Salix longipes* Shuttleworth ex Andersson – S. NatureServe G2G3 (Imperiled).

Salix humilis Marshall. UPLAND WILLOW, PRAIRIE WILLOW. **Hab:** Upland areas, often in open or semi-open sites, in barrens, fens, rocky woodlands, and grassy balds over mafic rocks (such as amphibolite) up to at least 1800m elevation, also in powerline rights-of-way, woodland borders, and other miscellaneous habitats. **Dist:** NL (Newfoundland) and MB, south to Panhandle FL and ne. TX. **Phen:** Mar-May; . **Syn:** = C, Fl2, G, NE, S, WH3; = *Salix humilis* var. *humilis* – Ar, FNA7, GrPl, K1, K3, K4, Mi, NY, Pa, W, Argus (1986); < *Salix humilis* Marshall – GW2, RAB; > *Salix humilis* var. *humilis* – F, Il, WV; > *Salix humilis* var. *hyporhysa* Fernald – F, Il, WV; > *Salix humilis* var. *rigidiuscula* (Andersson) B.L. Robinson – Tx.

Salix interior Rowlee. SANDBAR WILLOW. **Hab:** Sandbars, riverbanks, creekbanks, flood scours. **Dist:** NB west to BC, south to n. DE, n. VA, TN, MS, LA, TX, and NM. **Phen:** Mar-mid May; Jun-Aug. **Tax:** Sometimes interpreted as *S. exigua* var. *sericans* (Nees) Dorn (Nesom 2002). **Syn:** = Ar, FNA7, GW2, Il, K1, K3, K4, S, WV; = *Salix exigua* ssp. *interior* (Rowlee) Cronquist – GrPl, Argus (1986), Dorn (1998); < *Salix exigua* – NcTx, W; > *Salix exigua* ssp. *interior* (Rowlee) Cronquist var. *angustissima* (Andersson) Reveal & Broome – C, Pa; > *Salix interior* var. *angustissima* – Tx; > *Salix interior* Rowlee var. *interior* – F, G; > *Salix interior* var. *pedicellata* (Andersson) Ball – Tx.

Salix nigra Marshall. BLACK WILLOW. **Hab:** Riverbanks, sandbars, bottomland forests, floodplain pools, tidal swamps, impoundments, ditches, other moist areas. **Dist:** NB, MN, NE, and CO, south to ne. FL, Panhandle FL, LA, and TX. **Phen:** Mar-May; May-Jun. **Syn:** = Ar, F, Fl2, FNA7, G, GW2, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, Va, W, WH3, WV, Argus (1986); > *Salix marginata* Wimmers ex Andersson – S; < *Salix nigra* Marshall – GrPl; > *Salix nigra* Marshall – S; > *Salix nigra* var. *lindheimeri* Schneider – Tx; > *Salix nigra* var. *nigra* – C, Tx. NatureServe G5 (Secure).

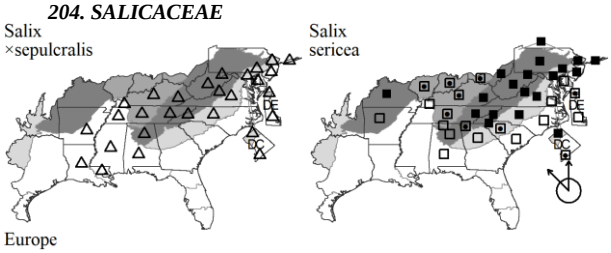
Salix occidentalis Walter. DWARF UPLAND WILLOW, DWARF PRAIRIE WILLOW. **Hab:** Barrens, glades, rocky or hardpan woodlands, prairies, powerline rights-of-way, rarely in depression ponds, especially over mafic (such as amphibolite), ultramafic (such as olivine), or calcareous rocks. **Dist:** This species is less widespread than the related *S. humilis*, with a distribution centered in the central Appalachians: ME to ND, south to GA, LA, and OK. **Phen:** Mar-May; Apr-early Jun. **Syn:** = C, NE, Va; = *Salix humilis* var. *microphylla* (Andersson) Fernald – F, GrPl, Il, W, Argus (1986); = *Salix humilis* var. *tristis* (Aiton) Griggs – Ar, FNA7, K1, K3, K4, Mi, NY, Pa; = *Salix tristis* Aiton – G, S, WV; < *Salix humilis* Marshall – GW2, RAB.



* ***Salix ×sepulcralis*** Simonkai. WEEPING WILLOW. **Hab:** Disturbed areas; a hybrid introduced from Europe. **Phen:** Mar-Apr. **Syn:** = FNA7, Il, K1, K3, NE; = *Salix alba* × *babylonica* – NY; < *Salix babylonica* – Pa, Tn.

Salix sericea Marshall. SILKY WILLOW. **Hab:** Bogs, fens, seeps, seepage swamps, peaty swamps, banks of small streams. **Dist:** NL, QC, MI, WI, and se. MN, south to w. NC, ne. GA, e. TN, sc. TN, n. AL, and n. AR. **Phen:** Mar-May. **Syn:** = Ar, C, FNA7, G, GW2, Il, K1, K3, K4, Mi, NY, Pa, RAB, S, Tn, Va, W, WV, Argus (1986); > *Salix coactilis* Fernald – F; > *Salix sericea* Marshall – F. NatureServe G5 (Secure).

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



207. EUPHORBIACEAE A.L. de Jussieu 1789 (SPURGE FAMILY) [in MALPIGHIALES]

A family of about 220 genera and 6500 species, trees, shrubs, vines, and herbs, nearly cosmopolitan in distribution. Molecular systematics suggests that various units traditionally included in the Euphorbiaceae should be segregated (Soltis et al. 2000; Chase et al. 2002); see Phyllanthaceae and Putranjivaceae. References: Govaerts, Frodin, & Radcliffe-Smith (2000); Levin & Gillespie (2016) in FNA12 (2016); Webster (1994); Webster (2014) in Kubitzki (2014).

2 Shrub or tree (woody).
  3 Leaves entire.
    4 Hairs of vegetative parts of the plant (especially the leaf undersurface) present and either 2-branched, stellate, or modified into lepidote scales (use 10× or more magnification); [subfamily Crotonoideae]. ..... ***Croton***
    4 Hairs of vegetative parts of the plant (especially the leaf undersurface) absent or unbranched (simple) (use 10× or more magnification).
      5 Flowers enclosed in a cyathium; plant with copious white latex; [subfamily Euphorbioideae]..... ***Euphorbia***
      5 Flowers not enclosed in a cyathium; plant either with or without white latex (the sap clear to whitish or absent).
        6 Leaf blades 1-1.5× as long as wide; [alien trees].
        ..... ***Triadica sebifera***
        6 Leaf blades 1.5-5× as long as wide; native or alien shrubs or, rarely, small trees.
        ..... ***Ditrysinia fruticosa***
  3 Leaves crenate, serrate, and/or palmately lobed.
    12 Leaves palmately lobed, margins entire or serrate.
      13 Petals absent; inflorescence a panicle; leaf lobe margins serrate; [subfamily Acalyphoideae]..... ***Ricinus communis***
      13 Petals present; inflorescence a cyme or dichasium; leaf lobe margins entire or serrate; [subfamily Crotonoideae].
      ..... ***Vernicia fordii***
    12 Leaves unlobed, margins crenate (obscurely crenate in *Hippomane* and *Adelia*) or serrate.
    ..... ***Stillingia aquatica***
2 Herb.
  19 Leaves palmately deeply divided into 3-many lobes.
    21 Leaves peltate; plant glabrous; stamens 100-1000; [subfamily Acalyphoideae] ..... ***Ricinus communis***
    21 Leaves cordate to truncate or rounded at base; plant glabrous, stellate, or with conspicuous stinging trichomes; stamens 8-15; [subfamily Crotonoideae].
      22 Plant with stinging trichomes; stamens connate..... ***Cnidoscolus***
      22 Plant lacking stinging trichomes; stamens separate.
      ..... ***Manihot***
  19 Leaves generally not lobed, entire or serrate (rarely pinnately lobed in *Euphorbia*).
    24 Plants hairy with stellate hairs and/or scales; [subfamily Crotonoideae]..... ***Croton***
    24 Plants glabrous or hairy with simple or 2-branched hairs.
      26 Flowers enclosed in a cyathium; plant with copious white latex; [subfamily Euphorbioideae]..... ***Euphorbia***
      26 Flowers not enclosed in a cyathium; plant with or without white latex.
        27 Flowers in terminal spikes; stout perennial with several to many stems arising from a subterranean crown [subfamily Euphorbioideae] .....
        ..... ***Stillingia***
        27 Flowers strictly axillary or both axillary and terminal, in small clusters, racemes, or spikes; finer perennial or annual, not typically with > 1 stem arising from a subterranean crown; [subfamily Acalyphoideae]
          28 Leaves opposite; carpels 2..... ***Mercurialis***
          28 Leaves alternate; carpels 3 (sometimes fewer by abortion).
            29 Pistillate flowers subtended by a conspicuous leafy bract..... ***Acalypha***
            29 Pistillate flowers lacking a leafy bract.
              30 Plant lacking stinging trichomes; styles deeply multifid; [wetland habitats]..... ***Caperonia***
              30 Plant with stinging trichomes; styles undivided; [upland habitats] ..... ***Tragia***

Acalypha Linnaeus 1753 (COPPERLEAF, THREE-SEEDED MERCURY)

A genus of about 430-462 species, shrubs, herbs, and trees, of primarily tropical and subtropical regions (rarely warm temperate). References: Govaerts, Frodin, & Radcliffe-Smith (2000); Levin (1999a); Levin (1999b); Levin (2016d) in FNA12 (2016); Webster (2014) in Kubitzki (2014).

Key based in large part on Levin in FNA (2016).

2 Plants with terminal inflorescences bright red, the flowers lacking ovaries and with 5-8 styles in place of stamens..... ***Acalypha herzogiana***
2 Plants with terminal or axillary inflorescences green, yellowish, red-tinged, with unisexual, functional flowers.
  3 Bracts of pistillate flowers either with linear tips or lobes longer then the broad basal portion, or the entire bract linear.

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

4 Pistillate inflorescences with the bracts densely crowded, completely hiding the inflorescence axis; bracts of pistillate flowers with lobes consisting of deltate bases bearing long linear tips, long-hirsute with nonglandular hairs to 2 mm long.
5 Hairs of the stems, petioles, and peduncles gland-tipped; pistillate inflorescences terminal, staminate inflorescences axillary; styles usually unbranched (rarely bifid)..... ***Acalypha alopecuroidea***
5 Hairs of the stems, petioles, and peduncles eglandular; pistillate, bisexual, and staminate inflorescences axillary; styles multi-branched..... ***Acalypha arvensis***
4 Pistillate inflorescences with the bracts loosely arranged, the axis visible between the bracts; bracts of pistillate flowers with the lobes linear throughout, glabrous or pubescence with nonglandular hairs < 0.25 mm long (glandular hairs may be longer).
6 Leaves cordate at base; fruit tuberculate, but not pubescent ..... ***Acalypha ostryifolia***
6 Leaves rounded to widely cuneate at base; fruit pubescent with pustular-based trichomes..... ***Acalypha setosa***
3 Bracts of the pistillate flowers with deltate or lanceolate tips or lobes.
11 Pistillate bracts 4-5 mm long..... ***Acalypha poiretii***
11 Pistillate bracts 6-15 (-20) mm long.
13 Leaves 3-6× as long as wide, the largest < 2 cm wide; pistillate bracts with sessile glands; pistillate bract lobes making up 10-25% of the overall bract length.
..... ***Acalypha gracilens***
13 Leaves 1.5-2.8× as long as wide, the largest > 2 cm wide; pistillate bracts lacking sessile glands; pistillate bract lobes making up 25-75% of the overall bract length.
15 Lower surfaces of pistillate bracts hirsute and sometimes also stipitate-glandular; stems hirsute; pistillate bracts (9-) 10-14 (16)-lobed ..... ***Acalypha virginica***
15 Lower surfaces of pistillate bracts sparsely pubescent (sometimes stipitate-glandular); stems with only short, incurved hairs; pistillate bracts (5-) 7-9 (-11)-lobed.
16 Fruit 2-seeded; seeds 2.4-3.2 mm long..... ***Acalypha deamii***
16 Fruit 3-seeded; seeds 1.2-2.0 mm long..... ***Acalypha rhomboidea***

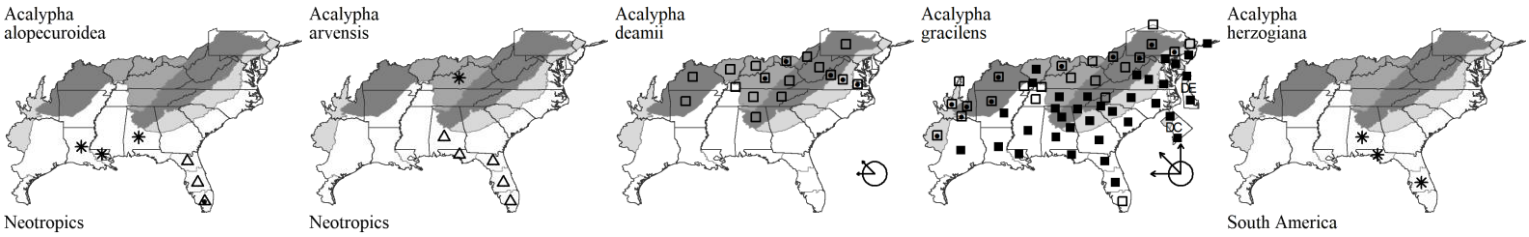
* ***Acalypha alopecuroidea*** Jacquin. FOXTAIL COPPERLEAF. **Hab:** Disturbed areas. **Dist:** Native of the Neotropics. **Phen:** Jan-Dec. **Syn:** = FNA12, K3, K4, WH3; = *Acalypha alopecuroides* – Bah, orthographic variant. NatureServe GNR (Not Yet Ranked).

* ***Acalypha arvensis*** Poeppig & Endlicher. **Hab:** Disturbed ground. **Dist:** Native of West Indies, Mexico, and Central America. Reported inside greenhouses in Madison County, KY (Adanick & Medley 2020). **Syn:** = FNA12, K1, K4, WH3; ? *Acalypha aristata* Kunth – K3, misapplied. NatureServe GNR (Not Yet Ranked).

Acalypha deamii (Weatherby) H.E. Ahles. BIG-SEEDED COPPERLEAF, TWO-SEEDED COPPERLEAF. **Hab:** Alluvial forests, especially on sandy levees. **Dist:** Sw. PA (Rhoads & Block 2007), s. OH, and s. IN south to w. TN (Chester, Wofford, & Kral 1997) and n. AR; apparently disjunct east of the Blue Ridge in VA (where now known from 23 counties, mainly in the Piedmont) and WV (Jefferson County, along the Potomac River), but perhaps only overlooked elsewhere. **Comm:** This plant is up to a meter tall and occurs in moist bottomland forests. **Syn:** = Ar, C, FNA12, Il, K1, K3, K4, Pa, Tn, Va, Levin (1999b); = *Acalypha rhomboidea* var. *deamii* (Weatherby) Weatherby – F, G; = *Acalypha virginica* Linnaeus var. *deamii* Weatherby – Govaerts, Frodin, & Radcliffe-Smith (2000). NatureServe G4? (Apparently Secure).

Acalypha gracilens A. Gray. SHORTSTALK COPPERLEAF, SLENDER COPPERLEAF. **Hab:** Woodlands, disturbed ground. **Dist:** ME west to WI, south to FL and TX. **Phen:** Late Jun-Nov. **Tax:** The related *A. monococca* (Engelmann ex A. Gray) Lillian W. Miller & Gandhi is of broadly Ozarkian distribution and warrants specific status (Levin 1999a, 1999b). Var. *fraseri* is generally more southern and is considered to differ in having more elongate staminate spikes, to 3-4 cm long (vs. 0.5-1.5 cm long). It may have merit, but was not recognized by Levin (1999a, 1999b). **Syn:** = Ar, FNA12, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, Va, W, WH3, Levin (1999b); = *Acalypha virginica* Linnaeus var. *gracilens* (A. Gray) Müller of Aargau – Govaerts, Frodin, & Radcliffe-Smith (2000); > *Acalypha virginica* A. Gray var. *delzii* L. Miller – Tx; > *Acalypha gracilens* var. *fraseri* (Müller of Aargau) Weatherby – C, F, G, Il; > *Acalypha gracilens* var. *gracilens* – C, F, G, Il, Tx. NatureServe G5 (Secure).

* ***Acalypha herzogiana*** Pax & K. Hoffmann. STRAWBERRY FIRETAILS, DWARF CATTAIL. **Hab:** Disturbed ground, grown as an ornamental, and escaping via vegetative growth. **Dist:** Native of South America. **Comm:** See Steinmann & Levin (2011) for additional information. **Syn:** = FNA12, K3, K4.



Acalypha ostryifolia Riddell ex J.M. Coulter. ROUGH-POD COPPERLEAF, HOP-HORNBEAM COPPERLEAF. **Hab:** Dry, sandy soil of woodlands, disturbed ground, ditches. **Dist:** NJ west to IN and NE, south to FL, TX, Mexico; West Indies. **Phen:** Late Jun-Nov. **Syn:** = Ar, Bah, FNA12, Il, K1, K3, K4, NcTx, Tn, Va, W, WH3, Govaerts, Frodin, & Radcliffe-Smith (2000); = *Acalypha ostryaefolia* – C, F, G, GrPl, RAB, S, Tx, orthographic variant. NatureServe G5 (Secure).

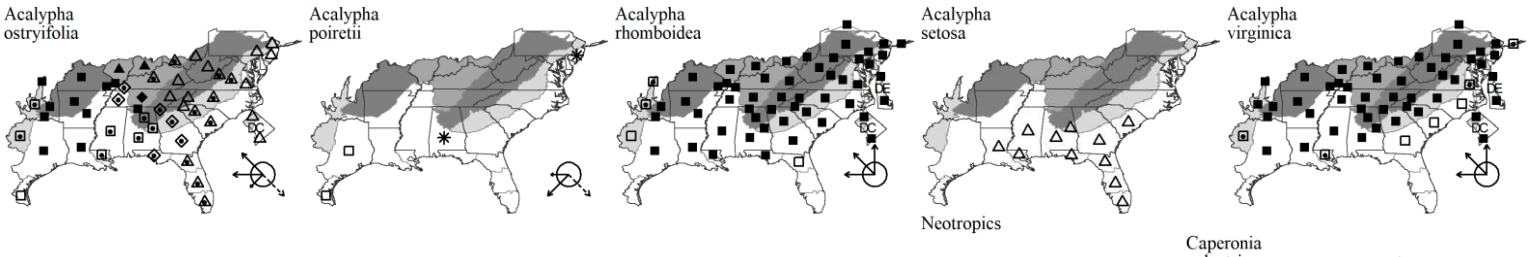
Acalypha poiretii Sprengel. **Hab:** Dry sandy or gravelly areas (s. TX); eastwards in our region as a waif on ballast, perhaps in other disturbed areas. **Dist:** S. TX, south into Mexico and beyond. Native of the Neotropics. **Syn:** = FNA12, K3, K4, Tx. NatureServe G4 (Apparently Secure).

Acalypha rhomboidea Rafinesque. RHOMBIC COPPERLEAF. **Hab:** Woodlands, disturbed ground. **Dist:** NS and ME west to ND, south to Panhandle FL and e. TX. **Phen:** Late Jun-Nov. **Syn:** = Ar, C, FNA12, G, GrPl, GW2, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, Levin (1999b); = *Acalypha rhomboidea* var. *rhomboidea* – F; = *Acalypha virginica* Linnaeus var. *rhomboidea* (Rafinesque) Cooperrider – Govaerts, Frodin, & Radcliffe-Smith (2000). NatureServe G5 (Secure).

* ***Acalypha setosa*** A. Richard. CUBAN COPPERLEAF. **Hab:** Disturbed ground. **Dist:** Native of West Indies, Mexico, Central America, and n. South America. **Phen:** Jun-Nov. **Syn:** = Bah, FNA12, K1, K3, K4, RAB, S, WH3, Govaerts, Frodin, & Radcliffe-Smith (2000). NatureServe GNR (Not Yet Ranked).

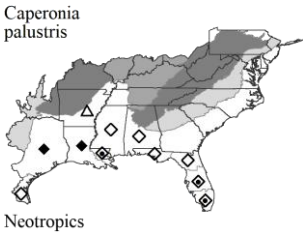
Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Acalypha virginica Linnaeus. VIRGINIA COPPERLEAF. **Hab:** Woodlands and disturbed ground. **Dist:** ME west to IN, IL, MO, and KS, south to c. GA and TX. **Phen:** Late Jun-Nov. **Syn:** = Ar, C, F, FNA12, G, GrPl, GW2, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, Levin (1999b); = *Acalypha virginica* Linnaeus var. *virginica* – Govaerts, Frodin, & Radcliffe-Smith (2000). NatureServe G5 (Secure).



Caperonia A. Saint-Hilaire 1826 (CAPERONIA)

A genus of about 34-40 species, annual and perennial herbs, mainly neotropical but also in Africa. References: Gillespie (2016b) in FNA12 (2016); Govaerts, Frodin, & Radcliffe-Smith (2000); Webster (2014) in Kubitzki (2014).



* ***Caperonia palustris*** (Linnaeus) A. Saint-Hilaire. SACATRAPO, TEXAS-WEED. **Hab:** Wet disturbed areas, a weed in rice fields. **Dist:** Native of the Neotropics. **Phen:** Jul-Nov. **Comm:** {add references Z}. **Syn:** = Ar, FNA12, K3, K4, Tx, WH3; < *Caperonia castaneaefolia* – S, orthographic variant. NatureServe GNR (Not Yet Ranked).

Chrozophora Necker ex A.H.L. de Jussieu 1824 (DYER'S CROTON)

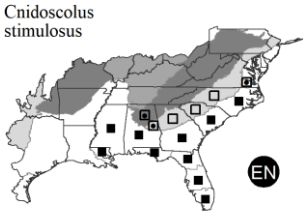
.

* ***Chrozophora tinctoria*** (Linnaeus) A.L. de Jussieu. DYER'S CROTON. **Syn:** = K4.

Cnidoscolus Pohl 1827 (SPURGE-NETTLE)

A genus of 50-75 species, perennial herbs, shrubs, and trees, of America (especially the tropics). References: Govaerts, Frodin, & Radcliffe-Smith (2000); Levin (2016e) in FNA12 (2016); Maya-Lastra & Steinmann (2018); McVaugh (1944); Webster (2014) in Kubitzki (2014).

Cnidoscolus stimulosus (Michaux) Engelmann & A. Gray. SPURGE-NETTLE, TREAD-SOFTLY, FINGER-ROT, BULL-NETTLE. **Hab:** Longleaf pine sandhills, dry sandy woodlands, other dry sandy soils. **Dist:** Se. VA south to s. FL, west to e. LA, mostly on the Coastal Plain, but farther inland southward. **Phen:** Late Mar-Aug; May-Sep. **Tax:** Substantial variation in leaf shape, habitat and likely other characters suggest that several taxa may be currently subsumed here. **Comm:** Beset with stinging trichomes. Our species is allied to *C. urens* of Mexico, Central America, and n. South America, and is sometimes treated as a variety of it. **Syn:** = C, F, FNA12, G, K1, K4, RAB, Va, W, WH3, Maya-Lastra & Steinmann (2018), McVaugh (1944); = *Bivonea stimulosa* (Michaux) Rafinesque – S; = *Cnidoscolus urens* (Linnaeus) Arthur var. *stimulosus* (Michaux) Govaerts – K3, Govaerts, Frodin, & Radcliffe-Smith (2000). NatureServe G5 (Secure).



Croton Linnaeus 1753 (CROTON, DOVEWEED, RUSHFOIL)

A genus of about 1250 species, herbs, shrubs, and (rarely) trees, of nearly cosmopolitan distribution (primarily tropical and warm-temperate). Webster (1992, 1993a) considered the 2 taxa traditionally treated as *Crotonopsis* to be closely related to sections within *Croton*, such as section *Gynamblosis*; his reasoning has been supported by molecular phylogenetic studies and all recent floristic treatments and is followed here. The subgenera and sections shown in the key follow van Ee, Riina, & Berry (2011). References: Govaerts, Frodin, & Radcliffe-Smith (2000); van Ee & Berry (2009); van Ee & Berry (2010); van Ee & Berry (2016) in FNA12 (2016); van Ee, Berry, & Ginzbarg (2011); van Ee, Riina, & Berry (2011); Ward (2012a); Webster (1992); Webster (1993a); Webster (2014) in Kubitzki (2014).

1 Plant an evergreen shrub, (1-) 2-3 m tall; pistillate flowers with well-developed, pale green petals; styles 3, unbranched (rarely 2-branched), the terminal segments therefore 3 (or 6); [subgenus *Quadrilobi*; section *Alabamenses*]
..... ***Croton alabamensis var. alabamensis***

1 Plant an annual or perennial herb or shrub, 0.1-2 m tall; pistillate flowers lacking petals (or sometimes with small, linear, and whitish petals in *C. linearis*); styles 2 or 3, 2-branched or several-branched, the terminal segments therefore 4, 6, or more; [subgenus *Geiseleria*].
3 Leaves with coarsely serrate or crenate margins; 1-2 cup-shaped glands present near the junction of the petiole and the leaf blade; [subgenus *Geiseleria*; section *Geiseleria*].
..... ***Croton glandulosus var. septentrionalis***
3 Leaves with entire margins; glands absent at the junction of the petiole and the leaf blade.
8 Lower leaf surface densely lepidote or stellate-lepidote, silvery.
9 Inflorescences unisexual (rarely bisexual); staminate petals 0; leaf blades 1-1.4× as long as wide; petioles 10-40 mm long; plant a fleshy shrub; [of coastal dunes]; [subgenus *Geiseleria*; section *Drepadenium*] ..... ***Croton punctatus***

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

9 Inflorescences bisexual; staminate petals 5; leaf blades 2-20× as long as wide; petioles 1-10 (-20) mm long; plants annual or perennial herbs.
10 Petioles 2-10 (-20) mm long, at least some of them > 1/3 al long as the leaf blades; fruit 3-locular, dehiscent; seeds 3 per fruit, 2.5-5 mm long; petals of the staminate flowers lepidote; [of dry longleaf pinelands]; [subgenus *Geiseleria*; section *Argyranthemi*]..... ***Croton argyranthemus***
10 Petioles 1-5 mm long, < 1/5 the length as the leaf blades; fruit 1-locular, indehiscent; seed 1 per fruit, 2-2.5 mm long; petals of the staminate flowers glabrous on the surfaces, villous on the margins; [subgenus *Geiseleria*; section *Crotonopsis*].
11 Inflorescences 1-4 cm long, with 3-6 pistillate flowers arranged loosely toward the base; staminate flowers usually > 1 mm in diameter; stellate-lepidote trichomes of the fruit numerous, with radii much longer than the fused portion and often ascending (giving the fruit a fuzzy appearance when viewed under magnification); stellate trichomes of the upper leaf surface sparse, the radii not overlapping the radii of nearby stellae, the radii 5-8 per trichome; leaves 1-3 mm wide..... ***Croton michauxii***
11 Inflorescences usually < 1 cm long, with 1-2 pistillate flowers crowded at the base (appearing sessile in the axil of the subtending leaf); staminate flowers usually < 1 mm in diameter; stellate-lepidote trichomes of the fruit sparse, with radii fused for all or most of their lengths, appressed; stellate trichomes of the upper leaf surface denser, the radii usually overlapping the radii of nearby stellae, the radii often only 1-3 per trichome (as viewed near the midvein); leaves 1.5-4 (-15) mm wide..... ***Croton willdenowii***
8 Lower leaf surface stellate-pubescent, not silvery.
15 Plants dioecious, the inflorescences therefore unisexual; staminate flowers lacking petals; capsules verrucose; [subgenus *Geiseleria*; section *Drepadenium*].
..... ***Croton texensis***
15 Plants monoecious, the inflorescences either bisexual or unisexual; staminate flowers with 3-5 petals; capsules smooth; [subgenus *Geiseleria*; section *Heptallon*].
17 Lower leaf surfaces appearing brown-dotted, because some of the stellate hairs have dark brown centers; terminal style segments 4; ovaries 2-locular, only 1 fertile..... ***Croton monanthogynus***
17 Lower leaf surfaces not brown-dotted (none of the stellate hairs with brown centers); terminal style segments 6-18 (-24); ovaries 3 locular, all 3 usually fertile.
19 Staminate flowers with sepals and petals 0.8-1.0 mm long; styles 2-3 mm long.
20 Leaves (the larger) 4-15 cm long, 1.5-6 cm wide (generally 2-3× as long as wide), lanceolate to elliptic, cordate at the base; hairs of 2 colors, the shorter gray, the longer tan; lobes of the calyx of the pistillate flowers (6-) 7-9 (-12); [alien, of disturbed habitats] ..... ***Croton capitatus***
20 Leaves (the larger) 2.5-6 cm long, 0.7-1.5 cm wide (generally 3-6× as long as wide), linear to linear-lanceolate, cuneate at the base; hairs of 1 color, all gray; lobes of the calyx of the pistillate flowers 5-6; [native, of Coastal Plain pondshores]..... ***Croton elliottii***
19 Staminate flowers with sepals and petals 1.0-2.0 mm long; styles 3-4 mm long.
..... ***Croton lindheimeri***

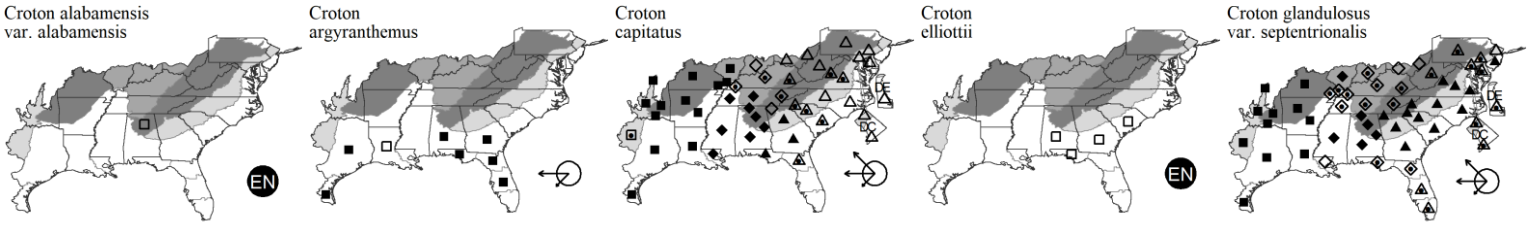
Croton alabamensis E.A. Smith ex Chapman *var*. ***alabamensis***. ALABAMA CROTON. **Hab:** Dry to mesic limestone and dolostone glades, woodlands, and wooded ravines. **Dist:** Endemic to scattered populations in c. AL; alleged populations in sc. TN (Chester, Wofford, & Kral 1997) are apparently based on mislabeled specimens (Wurdack 2006). **Phen:** Mar-Apr. **Comm:** Var. *texensis* S. Ginzbarg is endemic to c. TX (Ginzbarg 1992; Aplet et al. 1994), where it occurs in canyons in the Edwards Plateau. The species is most closely related to species of the West Indies, Central America, and South America; its distribution is obviously relictual. **Syn:** = FNA12, K1, K3, K4; < *Croton alabamensis* – S. NatureServe G3T3 (Vulnerable).

Croton argyranthemus Michaux. SILVER CROTON, SANDHILL CROTON, HEALING CROTON. **Hab:** Longleaf pine sandhills, other dry sands. **Dist:** C. GA and s. AL south to c. peninsular FL; w. LA and sw OK south through e. and c. TX to Nuevo León and Tamaulipas. **Syn:** = FNA12, K1, K3, K4, S, Tx, WH3. NatureServe G5 (Secure).

Croton capitatus Michaux. WOOLLY CROTON, HOGWORT, CAPITATE CROTON, GOATWEED. **Hab:** Glades, prairies, woodlands, fields, disturbed areas. **Dist:** Native of sc. United States, the exact limits of the original native distribution unclear, perhaps something like IL west to NE, south to AL, TX, and TAM. **Phen:** Jul-Oct. **Syn:** = Ar, F, FNA12, Il, K3, K4, NY, S, Tn, Va, van Ee & Berry (2010); = *Croton capitatus* Michaux var. *capitatus* – C, G, GrPl, K1, Mo2, NcTx, NE, Tx; < *Croton capitatus* Michaux – Pa, RAB, W, WH3. NatureServe G5T5? (Secure).

Croton elliottii Chapman. PONDSHORE CROTON, ELLIOTT'S CROTON. **Hab:** Shores and exposed drawdown zones of clay-based Carolina bays and limesink ponds (dolines). **Dist:** Se. SC south to Panhandle FL, west to se. AL. **Phen:** Jul-Sep. **Syn:** = FNA12, K1, K3, K4, S, WH3, van Ee & Berry (2010). NatureServe G3 (Vulnerable).

Croton glandulosus Linnaeus *var*. ***septentrionalis*** Müller of Aargau. DOVEWEED, TOOTH-LEAVED CROTON, SAND CROTON, NORTHERN CROTON. **Hab:** Fields, roadsides, disturbed areas. **Dist:** *C. glandulosus* is widespread in tropical and subtropical America; var. *septentrionalis* is the northernmost variety, distributed from PA west to MN, south to FL, TX, and ne. Mexico (its exact pre-Columbian range is speculative because of its weedy nature). See discussion by Atha, Hewitt, & Wang (2020) for discussion of northern records. **Phen:** May-Nov. **Tax:** Probably warranting species rank. **Syn:** = FNA12, GrPl, K4, NcTx, Tn, Tx, Va, van Ee, Berry, & Ginzbarg (2011); < *Croton glandulosus* – Mi, Pa, WV; > *Croton glandulosus* var. *angustifolius* – K1, K3, S; < *Croton glandulosus* var. *glandulosus* – WH3; ? *Croton glandulosus* Linnaeus var. *septentrionalis* Müller of Aargau – C, F, G, Il, RAB, W; > *Croton glandulosus* Linnaeus var. *septentrionalis* Müller of Aargau – K1, K3, S; > *Croton glandulosus* var. *simpsonii* – K1, S.



Croton lindheimeri (Engelmann & A. Gray) Alph. Wood. GOATWEED, LINDHEIMER'S CROTON. **Hab:** Disturbed areas. **Dist:** SC, IN, MO, e. KS, and south to c. peninsular FL, s. TX and Mexico (the adventive vs. native range somewhat unclear). **Phen:** May-Dec. **Syn:** = FNA12, K3, K4, Tn, van Ee & Berry (2010); = *Croton capitatus* Michaux var. *lindheimeri* (Engelmann & A. Gray) Müller of Aargau – GrPl, K1, Mo2, NcTx, Tx; = *Croton engelmannii* Ferguson – S; < *Croton capitatus* Michaux – WH3. NatureServe G5TNR (Not Yet Ranked).

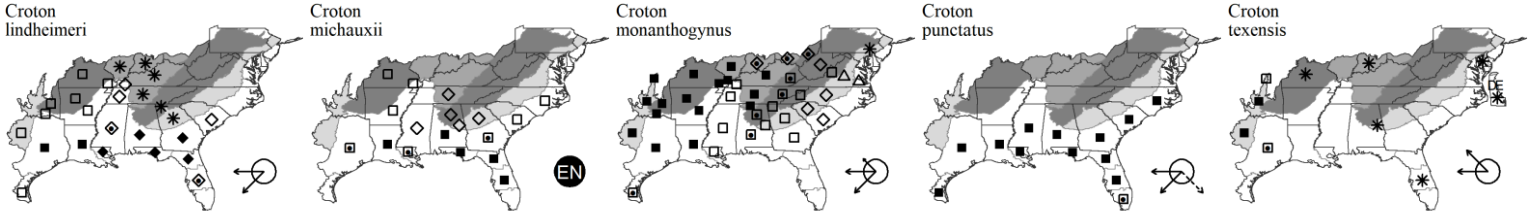
Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated

Croton michauxii G.L. Webster. SAND RUSHFOIL, MICHAUX'S CROTON, NARROWLEAF RUSHFOIL. **Hab:** Longleaf pine sandhills, disturbed sandy soils. **Dist:** Se. NC and SC south to s. FL, west to TX, north in the interior to MO, IL, and IA. Fernald (1950) alleges that this species extends as far north as VA, but the documentation is unknown to me. **Phen:** Jun-Oct. **Syn:** = Ar, K1, K4, NcTx, Tn, WH3, Webster (1992); = *Croton michauxii* G.L. Webster var. *michauxii* – FNA12, K3, van Ee & Berry (2009); = *Crotonopsis linearis* Michaux – C, F, G, Il, RAB, S, Tx.

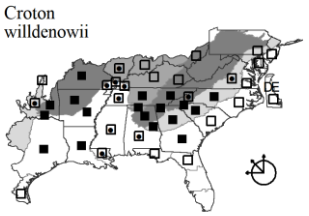
Croton monanthogynus Michaux. PRAIRIE-TEA, ONE-SEED CROTON. **Hab:** Limestone outcrops, blackland prairies, disturbed dry soil. **Dist:** Sw. VA, OH, IN, IA, NE, and CO, south to nw. GA, FL, TX, and Mexico; adventive as a weed at scattered locations east of the Blue Ridge. **Phen:** Jun-Oct. **Syn:** = Ar, C, F, FNA12, G, GrPl, Il, K1, K3, K4, Mi, NcTx, RAB, S, Tx, Va, W, WV, van Ee & Berry (2010). NatureServe G5 (Secure).

Croton punctatus Jacquin. SILVERLEAF CROTON, BEACH-TEA, GULF CROTON, HIERBA DE JABALI. **Hab:** Beach dunes, coastal grasslands, usually with *Uniola paniculata* and/or *Spartina patens*. **Dist:** NC (Dare County) south to s. FL, west to TX, and south through e. Mexico into Central and n. South America; West Indies. **Phen:** (Jan-) Late May-Nov (-Dec). **Syn:** = FNA12, K1, K3, K4, RAB, S, Tx, WH3. NatureServe G5 (Secure).

Croton texensis (Klotzsch) Müller of Aargau. TEXAS CROTON, SKUNKWEED. **Hab:** Sandy or sandy loam areas; eastwards in disturbed areas. **Dist:** W. MO, SD, WY, and UT south to TX, NM, AZ, and Mexico. **Phen:** Jun-Oct. **Syn:** = FNA12, GrPl, Il, NcTx, NE, Tx, WH3; > *Croton texensis* var. *texensis* – K1, K3, K4. NatureServe G5T5? (Secure).



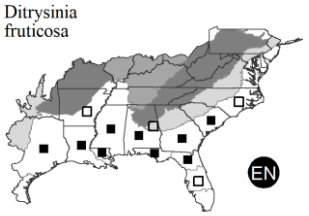
Croton willdenowii G.L. Webster. GLADE RUSHFOIL, OUTCROP RUSHFOIL, BROADLEAF RUSHFOIL, WILLDENOW'S CROTON. **Hab:** Granitic flatrocks, diabase barrens, calcareous barrens, thin soils around other rock outcrops, open woodlands, disturbed sandy soil. **Dist:** CT, se. PA (Rhoads & Block 2007), IL, and se. KS, south to ne. FL, Panhandle FL, and TX. **Phen:** Jun-Oct. **Tax:** Van Ee & Berry (2009) argued that this taxon is only varietally distinct from *Croton michauxii* (see synonymy). **Syn:** = Ar, K1, K4, Tn, Va, WH3, Webster (1992); = *Croton michauxii* G.L. Webster var. *elliptica* (Willdenow) van Ee & P.E. Berry – FNA12, K3, van Ee & Berry (2009); = *Crotonopsis elliptica* Willdenow – C, F, G, GrPl, Il, NE, Pa, RAB, S, Tx, W. NatureServe G5 (Secure).



Ditrysinia Rafinesque 1825 (SEBASTIAN-BUSH)

A monotypic genus, a shrub, of the Southeastern United States Coastal Plain. References: Govaerts, Frodin, & Radcliffe-Smith (2000); Webster (2014) in Kubitzki (2014); Wurdack (2016d) in FNA12 (2016).

Ditrysinia fruticosa (W. Bartram) Govaerts & Frodin. SEBASTIAN-BUSH. **Hab:** Swamp forests, other wet to moist, mostly shaded, habitats. **Dist:** Se. NC south to c. peninsular FL, west to e. TX and sw. AR. **Phen:** Apr-Jun; Jul-Oct. **Syn:** = Ar, FNA12, K3, K4, Govaerts, Frodin, & Radcliffe-Smith (2000); = *Sebastiana ligustrina* – S, orthographic variant; = *Sebastiania fruticosa* (W. Bartram) Fernald – GW2, K1, Tx, WH3; = *Sebastiania ligustrina* (Michaux) Müller of Aargau – RAB. NatureServe G5 (Secure).



Euphorbia Linnaeus 1753 (SPURGE)

A genus of over 2000 species, herbs, shrubs, and trees, nearly cosmopolitan in distribution. Infrageneric classification follows Yang et al. (2012), Dorsey et al. (2013), Riina et al. (2013), and Horn et al. (2012). It is debatable whether the very broad circumscription of *Euphorbia* used here (and following nearly all recent experts) is really the most serviceable. References: Berry et al (2016) in FNA12 (2016); Bradley & Sadle (2021) in Weakley et al (2021); Bridges & Orzell (2002); Burch (1966); Cacho, Monteverde-Suárez, & McIntyre (2019); Dorsey et al (2013); Dressler (1957); Govaerts, Frodin, & Radcliffe-Smith (2000); Horn et al (2012); Huft (1979); Mayfield (2013a); Park (1998); Riina et al (2013); Smith & Krings (2018); Webster (2014) in Kubitzki (2014); Yang et al (2012); Zimmermann, Ritz, & Hellwig (2010).

Unkeyed taxa: *Euphorbia hypericifolia, Euphorbia mendezii, Euphorbia ophthalmica*

3 Leaves strictly opposite, oblique or inequilateral at base; branches prostrate (less usually erect); [subgenus *Chamaesyce*; section *Anisophyllum*] ..... ***Key A***

3 Leaves alternate or opposite, not oblique or asymmetric at base; branches usually erect.

4 Bracteal leaves lobed or toothed (rarely linear), usually marked with red or white at the base or purple-spotted; glands of the cyathia usually 1 (rarely more), bilabiate, lacking petaloid appendages; [subgenus *Chamaesyce*; section *Poinsettia*] ..... ***Key B***

4 Bracteal leaves entire, not marked with red (white-margined in *E. marginata*); glands of the cyathia 4-5, flattish, not bilabiate, with or without petaloid appendages.

5 Glands of the cyathia 5 (or 7-10 on the central cyathium in *E. pubentissima*), with petaloid appendages 0.1-5.0 mm long (measured along a radius), these white, maroon, red, pink, or green; stipules present, glandlike, often minute; [subgenus *Chamaesyce*; section *Alectoroctonum*] ..... ***Key C***

5 Glands of the cyathia 4 (except 5 in *E. purpurea*), oval, reniform, or crescent-shaped, lacking petaloid appendages (the glands themselves yellowish or green); stipules absent or vestigial

6 Ovary and capsule subtended by a calyx-like structure; seeds without caruncles; involucral gland appendages absent; [subgenus *Euphorbia*; section *Nummulariopsis*] ..... ***Key D***

6 Ovary and capsule not subtended by a calyx-like structure; seeds with caruncles; involucral gland appendages hornlike or absent; [subgenus *Esula*] ..... ***Key E***

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Key A - subgenus *Chamaesyce*, section *Anisophyllum*, subsection *Hypericifoliae* {add to Key A: *E. blodgettii, E. hypericifolia, E. mesembrianthemifolia, E. ophthalmica, E. serpyllifolia var. serpyllifolia*}

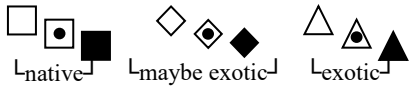
1 Young stems and leaves glabrous; leaves either entire or serrulate, at least at the apex (use 10× magnification).
  2 Leaves serrulate, at least at the apex (use 10× magnification); seeds with 2-4 transverse ridges. ..... ***Euphorbia hyssopifolia***
  2 Leaves absolutely entire; seeds smooth.
    4 Stipules united into a triangular scale-like structure (this often lobed or fringed), thus appearing as 2 stipules at each node ..... ***Euphorbia serpens***
    4 Stipules separate, lacerate, appearing as 4 stipules at each node.
      5 Mature seeds 1.0-1.2 (-1.4) mm long, angled; leaves either 1.5-2× or 4-5× as long as wide, not fleshy; [inland sandhills or coastal dunes]. ..... ***Euphorbia cordifolia***
      5 Mature seeds (1.3-) 1.5-2.6 mm long, rounded; leaves 2-3 (-5)× as long as wide, often somewhat fleshy; [of barrier island dunes and other sandy coastal habitats]. ..... ***Euphorbia bombensis***
1 Young stems and leaves pubescent (at least in lines along the stems); leaves serrulate, at least at the apex (use 10× magnification).
  8 Ovary and capsule glabrous.
    9 Seeds 0.8-1.0 mm long, light gray, the faces with 2-3 (-4) horizontal, low, blunt ridges, sometimes connected by 1-2 cross ridges; stems glabrous when young (uncommonly puberulent along 1 side of the branchlets); capsule 1.5-2.0 mm long ..... ***Euphorbia hyssopifolia***
    9 Seeds 1.0-1.3 mm long, dark gray, faces without ridges, though irregularly and finely wrinkled; stems puberulent when young on 1 side only; capsule 2.0-2.5 mm long. ..... ***Euphorbia nutans***
  8 Ovary and capsule pubescent.
    11 Stems with 2 types of trichomes, the longer 3-5 mm long; cyathia in axillary and terminal cymes, at least some of the peduncles > 10 mm long ..... ***Euphorbia hirta***
    11 Stems with 1 type of trichome, these < 2 mm long; cyathia solitary or several in axils, the peduncles < 5 mm long.
      12 Capsules spreading-villous, especially or solely on the angles; styles 0.2-0.3 mm long, bifid nearly to the base; seeds sharply quadrangular-angled, the faces with 3-4 transverse ridges ..... ***Euphorbia prostrata***
      12 Capsules minutely appressed-puberulent, on the entire surface (though sometimes primarily on the lower portion); styles 0.3-0.7 mm long, bifid only in the upper half or third; seeds quadrangular but not angled, the faces with inconspicuous transverse ridges or nearly smooth.
        13 Involucre cleft on 1 side half its length; leaves mostly obovate, 1.5-2× as long as wide; styles 0.5-0.7 mm long, filiform; seed faces nearly smooth; adventitious roots formed at middle nodes along the stem ..... ***Euphorbia humistrata***
        13 Involucre cleft on 1 side a fourth to a third its length; leaves mostly oblong, 2-3× as long as wide; styles 0.3-0.4 mm long, clavate; seed faces transversely ridged; adventitious roots not formed ..... ***Euphorbia maculata***

Key B - subgenus *Chamaesyce*, section *Poinsettia*

1 Principal stem leaves opposite, dentate, neither lobed nor linear; plant pubescent. ..... ***Euphorbia dentata***
1 Principal stem leaves alternate, either lobed or linear; plant usually glabrous.
  3 Cyathial gland with a circular opening; bracteal leaves wholly green or green and paler at base (sometimes purple-spotted); seeds angular, with a small caruncle and pronounced longitudinal dorsal ridge, but lacking a distinct transverse tubercular ridge near the middle ..... ***Euphorbia heterophylla***
  3 Cyathial gland 2-lipped, the opening elliptical and elongate; bracteal leaves wholly green, purple, white, pink, or red, or green or purplish towards the tip and white, pink, or red at the base; seeds cylindrical, lacking both a caruncle and longitudinal dorsal ridge, but with a distinct transverse tubercular ridge near the middle. ..... ***Euphorbia cyathophora***

Key C - subgenus *Chamaesyce*, section *Alectoroctonum* {add to Key C: *E. graminea*}

1 Upper stem leaves and/or dichasial bracts with white margins or entirely white; [alien, cultivated and rarely persisting or a waif]
  2 Upper dichasial bracts partly or entirely white; leaf surfaces strigillose ..... ***Euphorbia graminea***
  2 Upper leaves and dichasial bracts with white margins; leaf surfaces glabrous ..... ***Euphorbia marginata***
1 Upper stem leaves and bracteal leaves entirely green, obovate, elliptic, narrowly elliptic, or oblanceolate; [native].
  3 Petaloid appendages (0.5-) 1.0-4.4 mm long (measured along a radius), about as long as wide or longer, white; stems 1.4-9 (-11) dm tall, erect or ascending.
    4 Leaves broad, < 5.5× as long as wide; leaf blades slightly revolute or planar; glands green.
      5 Petioles 5-11 mm long; leaves with ciliate margins; cyathia across the appendages ca. 2.5 mm; nodes 7-11 below the umbels; [shady, mesic hardwood forest over limestone or in sand over limestone] ..... ***Euphorbia species 4***
      5 Petioles 0-3 (-10) mm long; leaves without ciliate margins; cyathia across the appendages (3.5-) 4–8 (-11) mm; nodes 20-75 nodes below the umbels; [habitats various, generally open, drier, and acidic, e.g., pine woods, sandhills, sandstone, ruderal sites]
        6 Plants (2-) 4-9 (-1.3) dm tall; aerial stems multiple, (1-) 3-10 stems from a crown, each (1.2-) 2.5-5 (-7) mm in diameter at the base; leaves ascending, leathery, sessile; primary bracts smaller than stem leaves; petaloid appendages oblong or spatulate, 2.5-4.4 mm long; seeds 2.6-3.2 mm long; [NH and MA west to s. ON, MI, WI, MN, and NE, south to se.VA, c. NC, n. GA, s. AL, and e. TX] ..... ***Euphorbia corollata***
        6 Plants 35-65 cm tall; aerial stems 1 (-3) from a crown, each 1.0-2.2 mm in diameter at the base; leaves usually reflexed, thin, petiolate or subpetiolate; primary bracts similar to stem leaves in size; petaloid appendages orbicular or oval, 0.9-2.2 mm long; seeds 1.8-2.3 mm long; [c. MD, VA, and c. and sw. TN, south to Panhandle FL and s. MS] ..... ***Euphorbia pubentissima***
    4 Leaves linear, > 8× as long as wide); leaf blades conspicuously revolute or involute; glands green or dark purple. ..... ***Euphorbia discoidalis***
  3 Petaloid appendages 0.05-0.6 mm long (measured along a radius), shorter than wide, green, red, white, or pink; stems (0.8-) 1.5-4.5 (-6) dm tall, erect, ascending or decumbent; leaves ciliate-margined (*E. mercurialina* and *E. curtisii*) or not.
    8 Leaf margins ciliate; cyathia 3.5-5.9 mm wide (across the appendages), green; leaves not fleshy, 1.7-2.2 (-3)× as long as wide, not especially variable; [of mesic forests with rich soils] ..... ***Euphorbia mercurialina***

Key to Map Symbology:  ←rare ←uncommon ←common (see introduction for more)

* : waif EN : endemic H : historic

N : no P : planted ? : questionable X : extirpated

8 Leaf margins not ciliate (except some marginal hairs in *E. curtisii*); cyathia 2.0-3.4 mm wide (across the appendages), green or maroon; leaves slightly to strongly fleshy, 0.7-20× as long as wide, often very variable in shape, even on the same plant; [of more or less xeric sandhill woodlands with acidic, sandy soils].
10 Cyathia and capsules green; petaloid appendages white or pink; leaves thin-textured, green, finely pubescent with appressed white hairs (0.1-0.3 mm long) on the lower surface and margins (visible at 10× or greater); branching primarily alternate; leaves primarily alternate (typically opposite or 3-whorled below the inflorescence); cyathia unisexual, plants usually unisexual (dioecious) ..... ***Euphorbia curtisii***
10 Cyathia and capsules maroon; petaloid appendages maroon-red; leaves slightly fleshy, somewhat blue-green, glabrous; branching primarily opposite; leaves primarily opposite (usually some alternate on upper branches); cyathia bisexual, plants bisexual ..... ***Euphorbia exserta***

Key D - subgenus *Euphorbia*, section *Nummulariopsis*

3 Peduncles 2-5 mm long (except that of the 1st cyathium at the base of the pleiochasium) and not exceeding the dichasial bracts; seeds depressed-globose, wider than long ..... ***Euphorbia floridana***
3 Peduncles 6-24 mm long, often exceeding the dichasial bracts; seeds ovoid-globose, longer than wide.
..... ***Euphorbia inundata var. inundata***

Key E - subgenus *Esula*

1 Principal stem leaves finely serrulate (especially toward the apex); [subgenus *Esula*, section *Helioscopia*].
2 Ovary and capsule smooth ..... ***Euphorbia helioscopia***
2 Ovary and capsule verrucose-roughened.
..... ***Euphorbia spathulata***
1 Principal stem leaves entire.
4 Stem leaves opposite, decussate (each succeeding pair turned by 90 degrees); seeds 4-6 mm long; [subgenus *Esula*, section *Lathyris*] ..... ***Euphorbia lathyris***
4 Stem leaves alternate (or mostly so); seeds 1-3 mm long.
5 Stem leaves linear to narrowly oblong, averaging ca. 10× as long as wide; [subgenus *Esula*, section *Esula*].
..... ***Euphorbia cyparissias***
5 Stem leaves oblanceolate, obovate, elliptic, or oblong, 1-10 cm long, 5-30 mm wide, averaging 1-5× as long as wide.
8 Seeds pitted only on one face, the inner face furrowed; [subgenus *Esula*, section *Tithymalus*] ..... ***Euphorbia peplus***
8 Seeds pitted on both the inner and outer faces.
..... ***Euphorbia commutata***

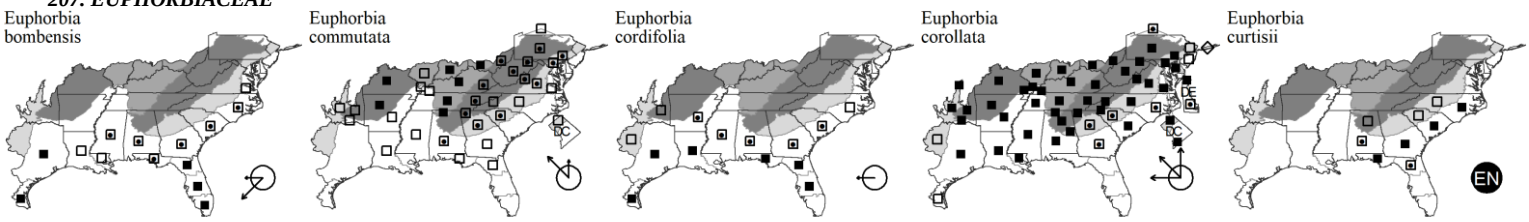
Euphorbia bombensis Jacquin. SOUTHERN SEASIDE SPURGE, DIXIE SANDMAT. **Hab:** Open sands of dunes, dune blowouts and overwashes, often growing with perennial grasses such as *Uniola paniculata*, but preferring open sands with little competition, sometimes mixed with the more common *E. polygonifolia*. Johnson (1992) contrasted the habitat of this species with that of the closely similar *E. polygonifolia*; *E. bombensis* preferring areas behind the foredune, while *E. polygonifolia* preferring the pioneer situation on the upper beach and foredune front. **Dist:** E. VA south to s. FL along the Atlantic, from s. FL to TX and Mexico along the Gulf of Mexico, and south into n. South America. **Phen:** Jun-Oct. **Syn:** = FNA12, K3, K4, Va, Govaerts, Frodin, & Radcliffe-Smith (2000); = *Chamaesyce bombensis* (Jacquin) Dugand – K1, WH3; = *Euphorbia ammannioides* Kunth – C, F, G, RAB, Tx; > *Chamaesyce ingallsii* Small – S. NatureServe G4G5 (Apparently Secure).

Euphorbia commutata Engelmann ex A. Gray. WOODLAND SPURGE, TINTED SPURGE. **Hab:** Rich forests and rock outcrops, over calcareous or mafic rocks. **Dist:** PA west to s. ON and MN, south to ne. and Panhandle FL and ne. TX. **Phen:** Mar-Jul. **Tax:** The southern var. *erecta* J.B.S. Norton may be worthy of recognition; we have both it and the typic var. *commutata* in our area. Var. *erecta* (ranging north to VA, KY, and MO) has all the cauline leaves oblanceolate and with petioles 5-12 mm long; var. *commutata* has leaves varying from oblanceolate to obovate or ovate, the upper leaves usually broad and sessile. **Syn:** = Ar, F, FNA12, Il, K1, K3, K4, Mi, Pa, RAB, Tn, Va, W, WH3, WV, Govaerts, Frodin, & Radcliffe-Smith (2000), Mayfield (2013a); > *Euphorbia commutata* var. *commutata* – C, G; > *Euphorbia commutata* var. *erecta* J.B.S. Norton – C, G; > *Galarhoeus austrinus* – S; > *Galarhoeus commutatus* (Engelmann) Small – S. NatureServe G5 (Secure).

Euphorbia cordifolia Elliott. HEARTLEAF SANDMAT. **Hab:** Open sands of very dry longleaf pine sandhills, Florida scrub, other dry, open habitats. **Dist:** Se. NC south to c. peninsular FL and west to se. OK (Singhurst, Buthod, & Holmes 2012) and s. TX. **Phen:** Jul-Oct. **Syn:** = Ar, FNA12, K3, K4, RAB, Tx, Govaerts, Frodin, & Radcliffe-Smith (2000); = *Chamaesyce cordifolia* (Elliott) Small – K1, NcTx, S, WH3. NatureServe G5 (Secure).

Euphorbia corollata Linnaeus. EASTERN FLOWERING SPURGE. **Hab:** Woodlands and forests. **Dist:** NH and MA west to s. ON, MI, WI, MN, and NE, south to se.VA, c. NC, n. GA, s. AL, and e. TX (some of the northern distribution may be by expansion northwards in disturbed areas). **Phen:** Jun-Sep. **Tax:** Huft (1979) considered *E. marilandica* a sporadic growth form of *E. corollata*. **Syn:** = Ar, FNA12, GrPl, K1, K3, K4, Mi, NcTx, NE, NY, Pa, Tn, Tx, Va, WV, Huft (1979), Park (1998); = *Euphorbia corollata* Linnaeus var. *corollata* – RAB; = *Tithymalopsis corollata* (Linnaeus) Klotzsch – S; >< *Euphorbia corollata* Linnaeus – G, W; < *Euphorbia corollata* Linnaeus var. *corollata* – Govaerts, Frodin, & Radcliffe-Smith (2000); > *Euphorbia corollata* Linnaeus var. *corollata* – C, F, Il; > *Euphorbia corollata* var. *mollis* Millspaugh – F, Il; > *Euphorbia marilandica* Greene – C, F, G.

Euphorbia curtisii Engelmann ex Chapman. WHITE SANDHILLS SPURGE, CURTIS'S SPURGE. **Hab:** Longleaf pine sandhills, other dry open areas, such as hardpan woodlands. **Dist:** Sc. and se. NC to ne. FL and w. Panhandle FL, on the Coastal Plain, and less typically the lower Piedmont. **Phen:** Late Mar-Jun. **ID Notes:** Less variable in leaf shape than *E. ipecacuanhae* or *E. exserta*. **Syn:** = FNA12, GW2, K1, K3, K4, RAB, WH3, Govaerts, Frodin, & Radcliffe-Smith (2000), Huft (1979), Park (1998); > *Tithymalopsis curtisii* (Engelmann) Small – S; > *Tithymalopsis eriogonoides* (Small) Small – S. NatureServe G3G5Q (Apparently Secure).



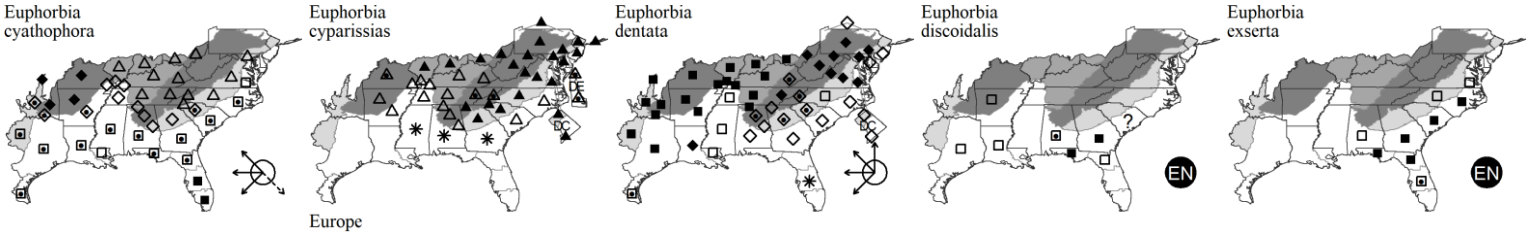
Euphorbia cyathophora Murray. PAINTED LEAF, FIRE-ON-THE-MOUNTAIN. **Hab:** Bottomland forests, dunes, streambanks, disturbed habitats. **Dist:** E. VA, KS, and CA south into the New World tropics, the original range obscure. **Phen:** May-Oct. **Syn:** = Bah, C, FNA12, GrPl, K1, K3, K4, NcTx, Tn, Tx, Va, Govaerts, Frodin, & Radcliffe-Smith (2000); = *Euphorbia heterophylla* Linnaeus – G, misapplied; = *Poinsettia cyathophora* (Murray) Klotzsch & Garcke – WH3, Burch (1966); > *Euphorbia heterophylla* var. *graminifolia* Engelmann – F, RAB; > *Euphorbia heterophylla* Linnaeus var. *heterophylla* – F, RAB, misapplied; > *Poinsettia cyathophora* (Murray) Klotzsch & Garcke – S; > *Poinsettia cyathophora* var. *cyathophora* – Il; > *Poinsettia cyathophora* var. *graminifolia* (Michaux) Mohlenbrock – Il; > *Poinsettia heterophylla* (Linnaeus) Klotzsch & Garcke ex Klotzsch – S, misapplied.

* ***Euphorbia cyparissias*** Linnaeus. CYPRESS SPURGE, GRAVEYARD SPURGE. **Hab:** Roadbanks, graveyards, waste places. **Dist:** Native of Europe. **Phen:** Mar-May (occasionally later). **Comm:** Rarely producing seeds, so a relatively "well-behaved weed", tending to spread only vegetatively from plantings. **Syn:** = Ar, C, F, G, GrPl, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, Tn, Va, W, WV, Govaerts, Frodin, & Radcliffe-Smith (2000); = *Galarhoeus cyparissias* (Linnaeus) Small ex Rydberg – S. NatureServe G5 (Secure).

Euphorbia dentata Michaux. PAINTED LEAF, WILD POINSETTIA, TOOTHED SPURGE. **Hab:** Bottomland forests, disturbed areas, hedgerows, thickets, railroad cinders. **Dist:** Native of sc. North America. The native distribution obscured by spread since, but apparently OH west to CO, south to LA, TX, NM, AZ, and Mexico. **Phen:** Jul-Oct. **Syn:** = Ar, C, F, FNA12, G, GrPl, Mi, NcTx, NE, Pa, RAB, Tn, Tx, Va, W, WV, Govaerts, Frodin, & Radcliffe-Smith (2000); = *Poinsettia dentata* (Michaux) Klotzsch & Garcke – S, WH3, Burch (1966); ? *Euphorbia dentata* var. *dentata* – K1, K3; > *Euphorbia dentata* var. *dentata* – K4; > *Euphorbia dentata* var. *lasiocarpa* Boissier – K4; > *Poinsettia dentata* var. *cuphosperma* (Engelmann) Mohlenbrock – Il; > *Poinsettia dentata* var. *dentata* – Il.

Euphorbia discoidalis Chapman. SUMMER SPURGE. **Hab:** Longleaf pine sandhills. **Dist:** E. and c. GA (or e. SC?) south and west to Panhandle FL and e. TX; disjunct in Ouachita Mountains of sw. AR (Theo Witsell, pers. Comm., 2019). **Comm:** Park (1998) includes in the synonymy of *E. discoidalis* the entity *E. corollata* var. *angustifolia* Elliott, which has a stated type locality in e. SC. **Syn:** = FNA12, K1, K3, K4, WH3, Huft (1979), Park (1998); = *Tithymalopsis discoidalis* (Chapman) Small – S; < *Euphorbia corollata* Linnaeus var. *corollata* – Govaerts, Frodin, & Radcliffe-Smith (2000).

Euphorbia exserta (Small) Coker. MAROON SANDHILLS SPURGE, COASTAL SAND SPURGE. **Hab:** Longleaf pine sandhills. **Dist:** Sc. NC south to c. peninsular and e. Panhandle FL; disjunct in se. VA (Sussex County) (Belden et al. 2004). **Phen:** Mar-Jun. **Tax:** The leaves are extremely variable in size and shape, from linear to rotund. Park (1998) recognizes *E. exserta* and *E. gracilior* as distinct from one another, differing in the involucre (purple in *E. exserta* and green in *E. gracilior*) and the appendages (rudimentary and purple in *E. exserta* and semicircular and white in *E. gracilior*). If separated, E. exserta is perhaps either an extinct species or possibly just a rare hybrid of . **Syn:** = FNA12, K1, K3, Va, WH3, Govaerts, Frodin, & Radcliffe-Smith (2000), Huft (1979); = *Euphorbia gracilior* Cronquist – RAB; > *Euphorbia exserta* (Small) Coker – Park (1998); > *Euphorbia gracilior* Cronquist – Park (1998); > *Tithymalopsis exserta* Small – S; > *Tithymalopsis gracilis* (Boissier) Small – S. NatureServe G4? (Apparently Secure).



Euphorbia floridana Chapman. FLORIDA SPURGE. **Hab:** Longleaf pine sandhills, Florida scrub. **Dist:** Panhandle FL and sw. GA west to s. AL. **Phen:** May-Sep. **Comm:** Reported for sw. GA by Bridges & Orzell (2002) and Jones & Coile (1988). **Syn:** = FNA12, K1, K3, K4, WH3, Bridges & Orzell (2002), Govaerts, Frodin, & Radcliffe-Smith (2000); = *Galarhoeus floridanus* (Chapman) Small – S. NatureServe G4? (Apparently Secure).

* ***Euphorbia graminea*** Jacquin. GRASSLEAF SPURGE, 'DIAMOND FROST', 'FROSTED FLAKES'. **Hab:** Landscaped areas, other disturbed areas. **Dist:** Native of tropical America (n. Mexico south to n. South America). Naturalized in FL Panhandle, FL peninsula, s. AL (Diamond 2014), and s. GA (Zomlefer et al. 2018). **Comm:** Much of its spread has been facilitated as a weed in nursery materials. **Syn:** = Ar, FNA12, K3, K4, WH3. NatureServe G3G5 (Apparently Secure).

* ***Euphorbia helioscopia*** Linnaeus. WARTWEED, MADWOMAN'S-MILK, SUN SPURGE, SUMMER SPURGE. **Hab:** Disturbed areas, roadsides, cultivated ground. **Dist:** Native of Europe. **Phen:** Late Mar-Jun. **Syn:** = C, F, FNA12, G, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, Tn, Tx, Va; = *Galarhoeus helioscopia* (Linnaeus) Haworth – S; > *Euphorbia helioscopia* ssp. *helioscopia* – Govaerts, Frodin, & Radcliffe-Smith (2000). NatureServe G5 (Secure).

Euphorbia heterophylla Linnaeus. FIDDLER'S SPURGE, MEXICAN FIREPLANT, CATALINA, JACOB'S-LADDER. **Hab:** Disturbed areas. **Dist:** VA, NC, SC, GA, TX, and NM south through Mexico, Central America, and South America; some of the distribution is likely by introduction. **Phen:** Jan-Dec. **Syn:** = Bah, FNA12, K1, K3, K4, Tx, Govaerts, Frodin, & Radcliffe-Smith (2000), Smith & Krings (2018); = *Poinsettia heterophylla* (Linnaeus) Klotzsch & Garcke ex Klotzsch – WH3, Burch (1966); > *Poinsettia geniculata* Ortega – S; > *Poinsettia heterophylla* (Linnaeus) Klotzsch & Garcke ex Klotzsch – S.

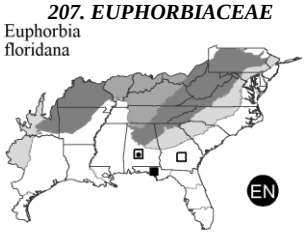
* ***Euphorbia hirta*** Linnaeus. PILLPOD SANDMAT. **Hab:** Fields, disturbed ground, waste areas, in and around greenhouses, perhaps only adventive in the northern part of our area. **Dist:** E. NC, c. SC, south to s. FL, west to TX, and south into Central and South America, the pre-Columbian distribution obscure. Reported for Goldsboro, NC and Abbeville, Abbeville County, SC (C.N. Horn, pers.comm. 2008). **Phen:** (Jan-) Jun-Oct (-Dec). **Syn:** = Ar, Bah, C, FNA12, G, K3, K4, Mi, NY, RAB, Tx, Govaerts, Frodin, & Radcliffe-Smith (2000); = *Chamaesyce hirta* (Linnaeus) Millspaugh – K1, NcTx, S, WH3. NatureServe G5 (Secure).

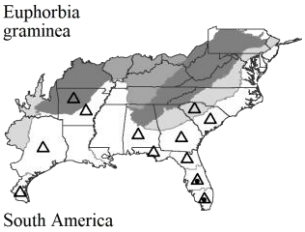
Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more)

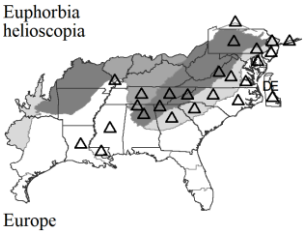
* : waif
EN : endemic
H : historic

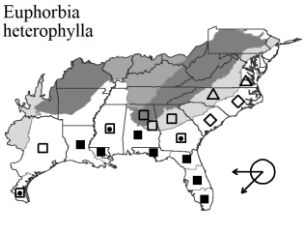
N : no
P : planted
? : questionable

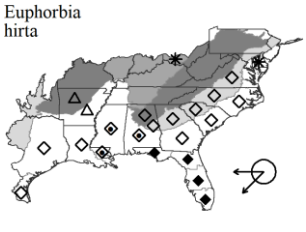
X : extirpated











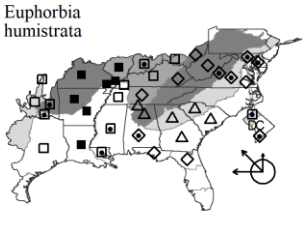
Euphorbia humistrata Engelmann. SPREADING SANDMAT. **Hab:** Floodplain forests, exposed river shores, rocky riverside gravel bars, disturbed areas, some of the easternmost occurrences apparently adventive from farther west. **Dist:** OH, IL, MO, and e. KS south to Panhandle FL and e. TX; scattered eastward, apparently as an adventive. **Phen:** Apr-Oct. **Syn:** = Ar, C, F, FNA12, G, GrPl, K3, Tn, Va, WV, Govaerts, Frodin, & Radcliffe-Smith (2000); = *Chamaesyce humistrata* (Engelmann) Small – GW2, Il, K1, S, WH3. NatureServe G4G5 (Apparently Secure).

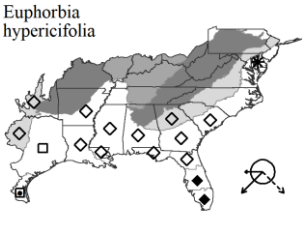
Euphorbia hypericifolia Linnaeus. **Hab:** Disturbed upland areas. **Dist:** FL west to TX, south into Mexico, Central America, South America; West Indies. Reported for SC (Kartesz 1999), FL, GA, LA (Q). The boundary between native and adventive distribution is uncertain. **Syn:** = Bah, FNA12, K3, K4, Tx, Govaerts, Frodin, & Radcliffe-Smith (2000); = *Chamaesyce hypericifolia* (Linnaeus) Millspaugh – K1, NcTx, S, WH3. NatureServe G5 (Secure).

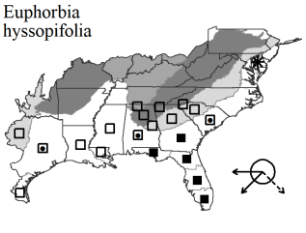
Euphorbia hyssopifolia Linnaeus. HYSSOPLEAF SANDMAT. **Hab:** Disturbed ground. **Dist:** SC south to s. FL, west to LA; also in w. TX, s. NM, and n. Mexico, and south to s. South America. **Phen:** May-Oct. **Comm:** Its status in our area has been muddled by confusion with *E. nutans*. **Syn:** = Bah, FNA12, K3, K4, NY, Tx, Govaerts, Frodin, & Radcliffe-Smith (2000); = *Chamaesyce hyssopifolia* (Linnaeus) Small – GW2, K1, WH3.

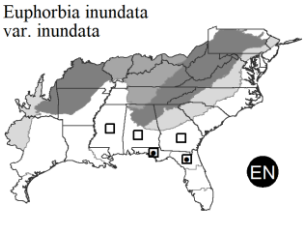
Euphorbia inundata Torrey ex Chapman *var*. ***inundata***. FLATWOOD SPURGE. **Hab:** Wet pine flatwoods, savannas, seepage slopes. **Dist:** Ne. FL and se. GA (Bridges & Orzell 2002); Panhandle FL west to s. MS. **Comm:** {not yet keyed; subgenus *Euphorbia*, section *Nummulariopsis*}. **Syn:** = K3, K4, WH3, Bridges & Orzell (2002); < *Euphorbia inundata* – K1, Govaerts, Frodin, & Radcliffe-Smith (2000); < *Galarhoeus inundatus* (Torrey ex Chapman) Small – S. NatureServe G4G5TNR (Not Yet Ranked).

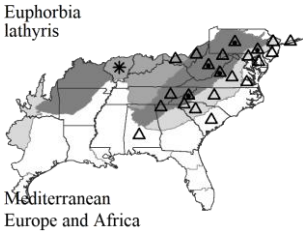
* ***Euphorbia lathyris*** Linnaeus. CAPER SPURGE, MYRTLE SPURGE, MOLE PLANT. **Hab:** Roadsides, disturbed areas. **Dist:** Native of Europe. **Phen:** May-Aug. **Syn:** = F, FNA12, Il, K1, K3, K4, NE, NY, Pa, RAB, Va, W, WV, Govaerts, Frodin, & Radcliffe-Smith (2000); = *Euphorbia lathyrus* – C, G, orthographic variant; = *Galarhoeus lathyrus* – S. NatureServe GNR (Not Yet Ranked).











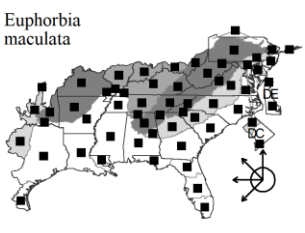
Euphorbia maculata Linnaeus. MILK-PURSLANE, SPOTTED SPURGE, SPOTTED SANDMAT. **Hab:** Gardens, fields, disturbed places, crevices in pavement or sidewalks. **Dist:** QC west to ND, south to s. FL and TX; introduced in various places worldwide. **Phen:** Jan-Dec. **Syn:** = Ar, Bah, C, FNA12, G, GrPl, K3, Mi, NE, NY, Pa, Tn, Tx, Va, W, Govaerts, Frodin, & Radcliffe-Smith (2000); = *Chamaesyce maculata* (Linnaeus) Small – GW2, Il, K1, NcTx, S, WH3; < *Euphorbia maculata* Linnaeus – K4; > *Euphorbia supina* Rafinesque – F, RAB, WV. NatureServe G5? (Secure).

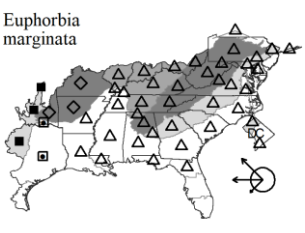
Euphorbia marginata Pursh. SNOW-ON-THE-MOUNTAIN. **Hab:** Upland sites (prairies, woodlands) over calcareous substrates; eastwards on roadsides and in disturbed areas. **Dist:** MN and MT south through the Great Plains to MO, TX, and NM. **Phen:** Jun-Nov. **Syn:** = Ar, C, F, FNA12, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, WH3, WV, Govaerts, Frodin, & Radcliffe-Smith (2000); = *Lepadena marginata* (Pursh) Nieuwland – S. NatureServe G5 (Secure).

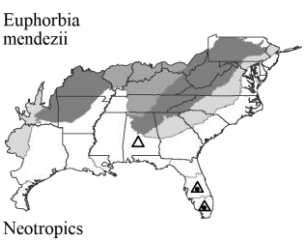
* ***Euphorbia mendezii*** Boissier. MENDEZ'S SANDMAT. **Hab:** Disturbed uplands. **Dist:** Native of the Neotropics. **Phen:** Jan-Dec. **Syn:** = Bah, FNA12, K3, K4; = *Chamaesyce mendezii* (Boissier) Millspaugh – WH3. NatureServe GNR (Not Yet Ranked).

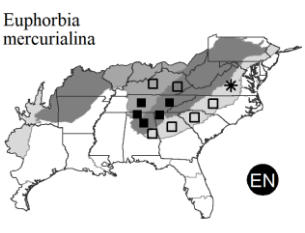
Euphorbia mercurialina Michaux. CUMBERLAND SPURGE, MERCURY SPURGE. **Hab:** Rich moist to dry forests over mafic or calcareous rocks. **Dist:** S. KY south through e. TN to nw. GA and n. AL; disjunct in sc. NC (where found in 1992). **Phen:** May-Jun. **Comm:** Apparently introduced in VA. **Syn:** = C, F, FNA12, G, K1, K3, K4, Tn, W, Govaerts, Frodin, & Radcliffe-Smith (2000), Huft (1979), Park (1998); = *Tithymalopsis mercurialina* (Michaux) Small – S. NatureServe G4 (Apparently Secure).

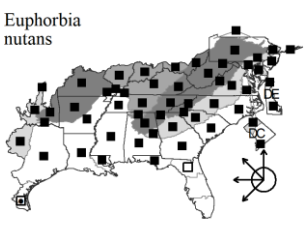
Euphorbia nutans Lagasca y Segura. EYEBANE, UPRIGHT SPOTTED SPURGE. **Hab:** Fields, gardens, waste places, disturbed ground. **Dist:** NH west to MI and ND, south to Panhandle FL and TX; introduced in various places worldwide. **Phen:** May-Oct. **ID Notes:** The leaves tend to fold late in the day. **Syn:** = Ar, C, FNA12, GrPl, K3, K4, Mi, NE, NY, Pa, Tn, Tx, Va, W, Govaerts, Frodin, & Radcliffe-Smith (2000); = *Chamaesyce hyssopifolia* (Linnaeus) Small – S, misapplied; = *Chamaesyce nutans* (Lagasca y Segura) Small – GW2, Il, K1, NcTx, WH3; = *Euphorbia maculata* Linnaeus – F, RAB, WV, misapplied; = *Euphorbia preslii* Gussone – G.











Euphorbia ophthalmica Persoon. FLORIDA HAMMOCK SANDMAT. **Hab:** Roadsides, flowerbeds, other disturbed areas, hammocks. **Dist:** GA and PA (Kartesz 1999), widespread in FL (WH), but not in North America (Q). **Phen:** Jan-Dec. **Comm:** See Barger et al. (2012) for discussion of AL

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more)

* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable

X : extirpated

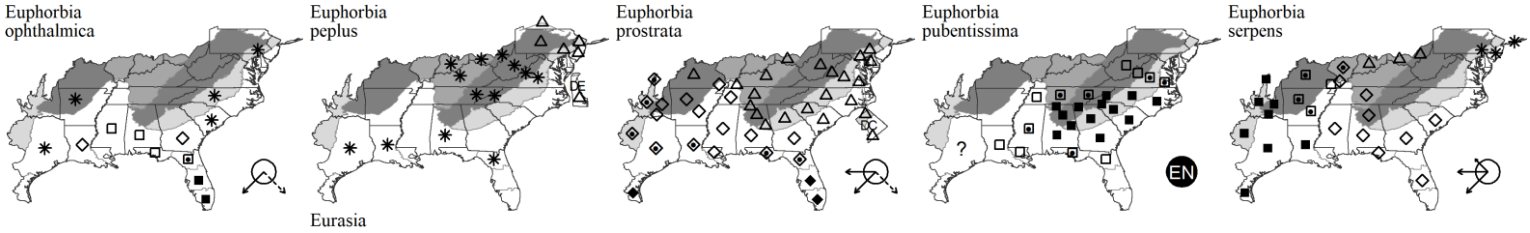
occurrences. {not yet keyed}. **Syn:** = Bah, FNA12, K3, K4, Govaerts, Frodin, & Radcliffe-Smith (2000); = *Chamaesyce ophthalmica* (Persoon) Burch – K1, WH3. NatureServe G5 (Secure).

* ***Euphorbia peplus*** Linnaeus. PETTY SPURGE. **Hab:** Disturbed areas. **Dist:** Native of Eurasia. Naturalized in Watauga County, NC (Poindexter, pers. comm.). **Phen:** Jun-Sep. **Syn:** = C, F, FNA12, G, Il, K1, K3, K4, Mi, NE, NY, Pa, Mayfield (2013a); = *Galarhoeus peplus* (Linnaeus) Haworth – S; > *Euphorbia peplus* var. *minima* A.P. de Candolle – Govaerts, Frodin, & Radcliffe-Smith (2000); > *Euphorbia peplus* var. *peplus* – Govaerts, Frodin, & Radcliffe-Smith (2000). NatureServe GNR (Not Yet Ranked).

* ***Euphorbia prostrata*** Aiton. PROSTRATE SANDMAT. **Hab:** Crevices of pavement or sidewalks, disturbed places. **Dist:** Probably native of tropical America and only naturalized in our area, but possibly native in the southern parts of the Southeastern United States. **Phen:** Jan-Dec. **Syn:** = Ar, Bah, C, FNA12, GrPl, K3, K4, Mi, NE, Tn, Tx, Va, Govaerts, Frodin, & Radcliffe-Smith (2000); = *Chamaesyce prostrata* (Aiton) Small – Il, K1, NcTx, S, WH3; = *Euphorbia chamaesyce* Linnaeus – F, G, RAB, misapplied. NatureServe G5 (Secure).

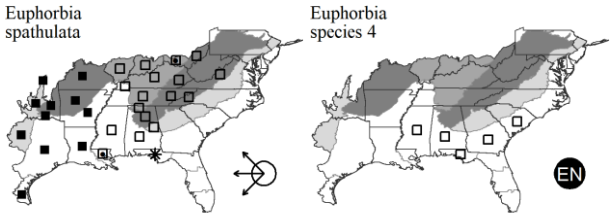
Euphorbia pubentissima Michaux. SOUTHEASTERN FLOWERING SPURGE. **Hab:** Dry woodlands, sandbars, cobblebars, rock outcrops, longleaf pine sandhills. **Dist:** C. MD, VA, and c. and sw. TN, south to Panhandle FL and s. MS. **Phen:** Apr-Sep. **Syn:** = Il, K1, K3, K4, Tn, Va, WH3, Huft (1979), Park (1998); = *Euphorbia corollata* var. *paniculata* Boissier – C, F, Govaerts, Frodin, & Radcliffe-Smith (2000); > *Euphorbia apocynifolia* Small – F; < *Euphorbia corollata* Linnaeus – G, W; >< *Euphorbia corollata* Linnaeus var. *corollata* – RAB; > *Euphorbia corollata* Linnaeus var. *zinniiflora* (Small) H.E. Ahles – RAB; > *Euphorbia zinniiflora* Small – F, WV; > *Tithymalopsis apocynifolia* (Small) Small – S; > *Tithymalopsis paniculata* (Boissier) Small – S; > *Tithymalopsis zinniiflora* (Small) Small – S.

Euphorbia serpens (Kunth) Small. HIERBA DE LA GOLONDRINA, ROUNDLEAF SANDMAT. **Hab:** Dry sandy hammocks, disturbed uplands. **Dist:** OH, IN, IA, ND, and MT south to TN, LA, TX, NM, AZ, and Mexico. Allegedly in se. PA as a waif (Rhoads & Klein 1993). **Phen:** (Jan-) Jul-Oct (-Dec). **Syn:** = Ar, C, F, FNA12, G, K3, K4, NE, NY, Pa, Tn, Tx, Govaerts, Frodin, & Radcliffe-Smith (2000); = *Chamaesyce serpens* (Kunth) Small – GrPl, Il, K1, NcTx, S, WH3. NatureServe G5 (Secure).



Euphorbia spathulata Lamarck. PRAIRIE SPURGE, WARTY SPURGE. **Hab:** Rocky woodlands, prairies, disturbed areas. **Dist:** MN and WA south to w. VA, AL, LA, TX, and Mexico. **Phen:** Mar-Jun. -Jun. **Syn:** = Ar, C, GrPl, Il, Mi, NcTx, Tn, Tx, Va, W, WH3; > *Euphorbia dictyosperma* Fischer & Meyer – F, G; < *Euphorbia spathulata* Lamarck – FNA12, GrPl, K1, K3, K4, Govaerts, Frodin, & Radcliffe-Smith (2000); > *Galarhoeus arkansanus* (Engelmann & A. Gray) Small ex Rydberg – S. NatureServe G5 (Secure).

Euphorbia species 4. **Hab:** Calcareous forests. **Dist:** S. SC south to Panhandle FL, west to s. MS. **Tax:** Under study by Mac Alford and Richard Carter. Possibly the same as or related to the type of *E. apocynifolia*.



Manihot P. Miller 1754 (CASSAVA)

A genus of about 100 species, trees, shrubs, and herbs, of tropical and subtropical America. References: Govaerts, Frodin, & Radcliffe-Smith (2000); Hayden (2016a) in FNA12 (2016); Webster (2014) in Kubitzki (2014).

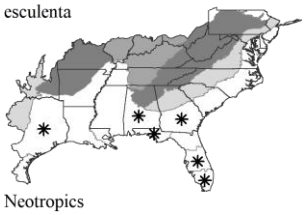
2 Leaf lobes 3-7, each broadest toward the tip, narrowing evenly toward the acuminate apex; calyx of male flowers < 10 mm long; fruit wing-angled ..... ***Manihot esculenta***

2 Leaf lobes 9-13, each constricted near the tip and then broadening again; calyx of male flowers 12-15 mm long; fruit not winged ..... ***Manihot grahamii***

* ***Manihot esculenta*** Crantz. MANIOC, TAPIOCA. **Hab:** Disturbed areas. **Dist:** Native of tropical America. **Phen:** Jan-Dec. **Syn:** = Bah, FNA12, K3, K4, WH3, Govaerts, Frodin, & Radcliffe-Smith (2000); = *Jatropha manihot* Linnaeus – S. NatureServe GNR (Not Yet Ranked).

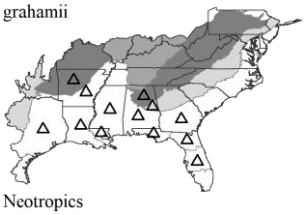
* ***Manihot grahamii*** Hooker. HARDY TAPIOCA, GRAHAM'S CASSAVA. **Hab:** Suburban forests, vacant lots, other disturbed areas, uncommonly grown as an ornamental, rarely naturalizing. **Dist:** Native of tropical America. Introduced in sw. GA (Jones & Coile 1988; Carter, Baker, & Morris 2009), FL Panhandle, peninsular FL, west to LA and TX (Aplaca 2012). **Phen:** Apr-Aug; Jun-Sep. **Syn:** = Ar, FNA12, K3, K4, WH3, Govaerts, Frodin, & Radcliffe-Smith (2000). NatureServe G5 (Secure).

Manihot esculenta



Neotropics

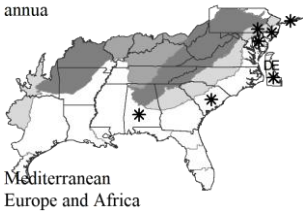
Manihot grahamii



Neotropics

Mercurialis Linnaeus 1753 (MERCURY)

Mercurialis annua

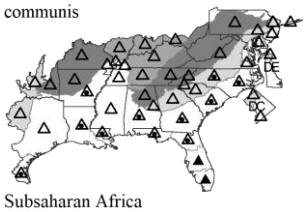


Mediterranean Europe and Africa

A genus of about 10 species, annual and perennial herbs, of the Old World. References: Gillespie (2016a) in FNA12 (2016); Govaerts, Frodin, & Radcliffe-Smith (2000); Webster (2014) in Kubitzki (2014).

* ***Mercurialis annua*** Linnaeus. ANNUAL MERCURY, BOYS-AND-GIRLS, HERB MERCURY. **Hab:** Disturbed areas, waif on ballast. **Dist:** Native of Mediterranean Europe. This species has been reported as a rare 'ballast weed' from Charleston, SC and Mobile, AL (Wiggins 1932); some of the occurrences presumably represent non-persistent waifs. **Phen:** Feb-Jun. **Comm:** {not yet keyed}. **Syn:** = Bah, C, F, FNA12, G, K1, K3, K4, NE, NY, S, Govaerts, Frodin, & Radcliffe-Smith (2000). NatureServe GNR (Not Yet Ranked).

Ricinus communis



Subsaharan Africa

Ricinus Linnaeus 1753 (CASTOR-BEAN)

A monotypic genus, a shrub or tree, native to w. Africa, now pantropical. References: Gillespie (2016a) in FNA12 (2016); Govaerts, Frodin, & Radcliffe-Smith (2000); Webster (2014) in Kubitzki (2014).

* ***Ricinus communis*** Linnaeus. CASTOR-BEAN, CASTOR-OIL PLANT, PALMA CHRISTI. **Hab:** Waste places, gardens. **Dist:** Native of ne. Africa. **Phen:** Jul-Oct (-May). **Comm:** The seeds are dangerously poisonous, formerly the source of an oil used as a purgative and machine lubricant. In FL and farther south in the tropics, *R. communis* is a small to medium tree. **Syn:** = Ar, Bah, C, F, FNA12, G, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, WH3, Govaerts, Frodin, & Radcliffe-Smith (2000). NatureServe GNR (Not Yet Ranked).

Stillingia Garden ex Linnaeus 1767 (QUEEN'S-DELIGHT, TOOTHLEAF)

Contributed by James W. Horn and Alan S. Weakley

A genus of about 33 species, herbs, shrubs, and small trees, of tropical to subtropical regions of America, Madagascar, and se. Asia. References: Govaerts, Frodin, & Radcliffe-Smith (2000); Huft (2016b) in FNA12 (2016); Rogers (1951); Webster (2014) in Kubitzki (2014).

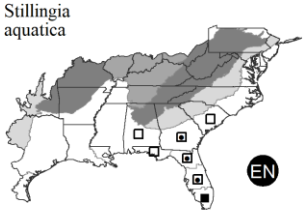
2 Stems woody, solitary at base, from a taproot; (aerial) stems freely sympodially branched in the upper half to third of the plant, the whole plant appearing candelabra-like with age; the aerial branch system perennially developing by extension growth; leaves linear to lanceolate or narrowly elliptic, widest at middle or towards the base, clustered toward the branch tips; caruncle of the seed (typically) minute, exposing an inverted U-shaped hilar scar; [of pineland ponds and other aquatic habitats where the soil is inundated for at least four months of the year] ..... ***Stillingia aquatica***

2 Stems herbaceous, several from the crown of a woody rhizome; aerial stems not or little (sympodially) branched; aerial branches persisting for only a single growing season; leaves linear, elliptic, oblancolate, or narrowly obovate, widest near the midpoint or towards the apex, stems appearing evenly leafy; caruncle of the seed white, broadly crescent-shaped, > 1 mm wide, largely concealing the hilar scar; [mostly of dry habitats, or mesic to wet pinelands that are only sporadically inundated].
..... ***Stillingia sylvatica***

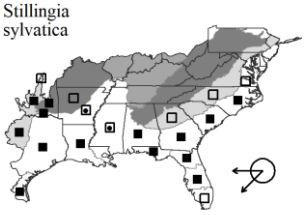
Stillingia aquatica Chapman. CORKWOOD, WATER TOOTHLEAF. **Hab:** Ponds in pine flatwoods, ponded interdune swales, marl prairies. **Dist:** Se. SC south to s. FL, west to sw. AL. **Phen:** Feb-Aug; (Feb-) Apr-Oct. **Tax:** Populations from the Panhandle and Big Bend regions of FL are genetically distinct from those of c. & s. FL, and they also differ in leaf width (wider leaves n. FL northward). Populations from Miami-Dade Co. (and now also Collier and Lee Cos.) that have vegetative parts and inflorescences heavily suffused with red pigment were included in *S. tenuis* by Small (1933). All three of these entities are under study and likely deserve taxonomic recognition. **Syn:** = FNA12, K1, K3, K4, RAB, WH3, Govaerts, Frodin, & Radcliffe-Smith (2000), Rogers (1951); > *Stillingia aquatica* Chapman – S; > *Stillingia tenuis* Small – S. NatureServe G4G5 (Apparently Secure).

Stillingia sylvatica Garden ex Linnaeus. QUEEN'S-DELIGHT. **Hab:** Longleaf pine sandhills, dryish Coastal Plain woodlands, other dry woodlands. **Dist:** Se. VA south to s. FL, west to s. TX, s. NM, and Mexico (COA, MIC, TAM), north in the interior to KS and se. CO. **Phen:** Apr-Jul (-Aug); May-Sep. **Tax:** *S. sylvatica* may contain an additional entity distributed in peninsular FL and s. GA, designated by Small (1933) as *S. spathulata*. *S. spathulata* putatively differs structurally from *S. sylvatica* in having smaller capsules, shorter seeds, and in having many individuals in a population with oblanceolate (common) to truly spatulate (infrequent) leaf blades. Nevertheless, individuals with narrowly elliptical leaves are present in most *S. spathulata* populations. The two entities occupy similar niches throughout their respective ranges, and are not genetically isolated. **Syn:** = Ar, C, G, GrPl, RAB, Tx; = *Stillingia sylvatica* ssp. *sylvatica* – K1, K3, Va, Govaerts, Frodin, & Radcliffe-Smith (2000), Rogers (1951); = *Stillingia sylvatica* var. *sylvatica* – F; > *Stillingia spathulata* (Müller of Aargau) Small – S; < *Stillingia sylvatica* Garden ex Linnaeus – FNA12, K4, WH3; > *Stillingia sylvatica* Garden ex Linnaeus – S. NatureServe G5T5 (Secure).

Stillingia aquatica



Stillingia sylvatica



Tragia Linnaeus 1753 (NOSEBURN)

A genus of about 170 species, herbs and shrubs, of tropical to warm temperate regions of the Old and New Worlds. Molecular and morphological studies suggest that section *Leptobotrys* (*T. smallii* and *T. urens*) should be accorded generic rank (Cardinal-McTeague & Gillespie 2016; Urtecho in FNA 2016). References: Cardinal-McTeague & Gillespie (2016); Govaerts, Frodin, & Radcliffe-Smith (2000); Miller & Webster (1967); Urtecho (2016) in FNA12 (2016); Webster (2014) in Kubitzki (2014).

1 Leaf bases cuneate to rounded; stamens 2; [section *Leptobotrys*].
  2 Leaf blades usually 1.5-3× as long as wide, broadest near the base (except narrower forms with margins relatively parallel through the middle part of the blade); leaf margins serrate to crenate, usually through the length of the blade..... ***Tragia smallii***
  2 Leaf blades usually 4-20× as long as wide, broadest at the middle or towards the apex; leaf margins entire or with a few, irregular teeth or undulations, these almost exclusively near the leaf blade apex..... ***Tragia urens***
1 Leaf bases cordate, subcordate, or truncate; stamens 3-6 (-10); [section *Tragia*].
  3 Larger leaf blades on a plant > 5 cm wide and > 8 cm long, deeply cordate at the base; capsules 11-13 mm wide; stamens 3; petioles 15-85 mm long..... ***Tragia cordata***
  3 Larger leaf blades on a plant < 3.5 cm wide and < 8 cm long, cuneate, rounded, truncate, or shallowly cordate at the base; capsules 4-11 mm wide; stamens 3-6 (-10); petioles 0-38 (-41) mm long. ***Tragia urticifolia***

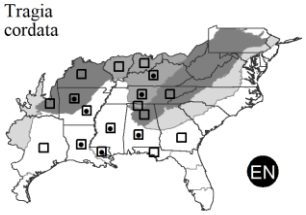
Tragia cordata Michaux. HEARTLEAF NOSEBURN. **Hab:** Rocky calcareous woodlands, calcareous prairies. **Dist:** C. KY, s. IN to s. MO, south through c. TN, rarely to e. TN (Meigs County, in the Ridge and Valley Province) (Chester, Wofford, & Kral 1997), n. AL (Jackson Co.) (D. Spaulding, pers. comm.) to sc. and sw. GA, Panhandle FL, and e. TX. **Phen:** Jul-Sep. **Syn:** = Ar, C, FNA12, Il, K3, K4, Tn, Tx, WH3, Govaerts, Frodin, & Radcliffe-Smith (2000), Miller & Webster (1967); = *Tragia macrocarpa* Willdenow – S. NatureServe G4 (Apparently Secure).

Tragia smallii Shinners. GULF COAST NOSEBURN. **Hab:** Longleaf pine sandhills, other dry woodlands. **Dist:** Sw. GA south to c. peninsular FL, west to e. TX and sw. AR. Reports of *T. betonicifolia* from GA are based on misapplication of that name to material representing *T. smallii*. **Phen:** May-Sep. **Syn:** = FNA12, K3, K4, Tx, WH3, Govaerts, Frodin, & Radcliffe-Smith (2000), Miller & Webster (1967); = *Tragia betonicaefolia* Nuttall – S, misapplied.

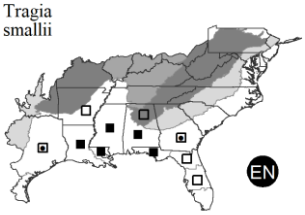
Tragia urens Linnaeus. SOUTHEASTERN NOSEBURN, WAVYLEAF NOSEBURN, SANDHILL NOSEBURN. **Hab:** Longleaf pine sandhills, sandy woodlands, pine rocklands, other dry woodlands. **Dist:** Se. VA south to s. FL and west to TX, mostly on the Coastal Plain, but ranging into the Piedmont and Mountains in NC, SC, GA, and AL. **Phen:** May-Oct. **Tax:** Tragia urens is variable in (at least) leaf form, and may represent a complex including *Tragia smallii*; the group needs additional study, as well as resolution about generic placement. **Syn:** = C, F, FNA12, G, K3, K4, RAB, S, Va, W, WH3, Govaerts, Frodin, & Radcliffe-Smith (2000), Miller & Webster (1967); = *Tragia linearifolia* Elliott – S. NatureServe G5 (Secure).

Tragia urticifolia Michaux. NETTLELEAF NOSEBURN. **Hab:** Dry woodlands and rock outcrops, particularly over mafic or calcareous rocks. **Dist:** Sc. VA west to n. AR, south to wc. peninsular FL, Panhandle FL, and c. TX. **Phen:** May-Oct. **Syn:** = Ar, F, FNA12, G, K3, K4, NcTx, RAB, Tx, Va, W, WH3, Govaerts, Frodin, & Radcliffe-Smith (2000), Miller & Webster (1967); = *Tragia urticaefolia* – S, orthographic variant. NatureServe G5 (Secure).

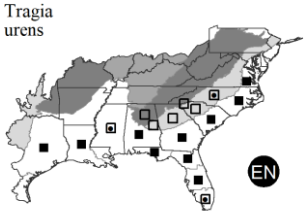
Tragia cordata



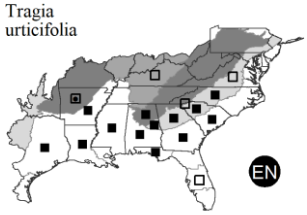
Tragia smallii



Tragia urens

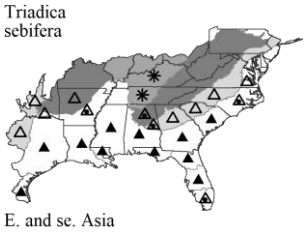


Tragia urticifolia



Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

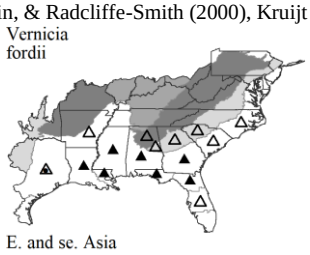
Triadica Loureiro 1790 (CHINESE TALLOW-TREE)



A genus of 3 species, native to tropical and subtropical Asia. The most recent monographers of *Sapium* and related genera (Kruijt 1996; Esser 2002) place our naturalized species in the genus *Triadica*, native to Asia; *Sapium* (excluding *Triadica*) is a genus of 21 species restricted to the neotropics. This conclusion is corroborated by molecular phylogenetic analysis (Wurdack, Hoffmann, & Chase 2005). References: Buthod, Hoagland, & Arbour (2019); DeBerry & Hunter (2018); Esser (2002); Govaerts, Frodin, & Radcliffe-Smith (2000); Kruijt (1996); Vogt et al (2021); Webster (2014) in Kubitzki (2014); Wurdack (2016a) in FNA12 (2016).

Identification Notes: With *Euphorbia* and *Cnidoscolus*, one of our few Euphorbiaceous genera with milky sap.

* ***Triadica sebifera*** (Linnaeus) Small. CHINESE TALLOW-TREE, POPCORN TREE. **Hab:** Marsh edges, swamps, riverbanks, shell deposits, upland forests, disturbed areas. *Triadica sebifera* has become a serious invasive weed from se. NC south and west to se. TX (Vogt et al. 2021). Reported for King and Queen County, VA (DeBerry & Hunter 2018), and McCurtain County, OK (Buthod, Hoagland, & Arbour 2019) showing its continued spread. **Dist:** Native of e. Asia. **Phen:** May-Jun; Aug-Nov. **Syn:** = Ar, FNA12, K1, K3, K4, S, Esser (2002), Govaerts, Frodin, & Radcliffe-Smith (2000), Kruijt (1996); = *Sapium sebiferum* (Linnaeus) Roxburgh – GW2, NcTx, RAB, Tx, WH3. NatureServe GNR (Not Yet Ranked).



Vernicia Loureiro 1790 (TUNG-OIL TREE)

A genus of 3-4 species, trees, native of se. Asia. References: Gillespie (2016c) in FNA12 (2016); Govaerts, Frodin, & Radcliffe-Smith (2000); Stuppy et al (1999); Webster (2014) in Kubitzki (2014).

* ***Vernicia fordii*** (Hemsley) Airy Shaw. TUNG-OIL TREE, TUNG TREE. **Hab:** Planted for the oil and for ornament, now extensively naturalized in moist to dry upland forests, bottomland forests, and disturbed areas. **Dist:** Native of c. and w. China. Naturalized on the Gulf Coastal Plain from former plantations; planted and showing a tendency to naturalize in the Coastal Plain of NC (Mount Olive, Wayne Co.; A.J. Bullard, pers. comm.). **Phen:** Mar-Apr; Apr-Aug. **Syn:** = Ar, FNA12, K3, K4, Govaerts, Frodin, & Radcliffe-Smith (2000), Stuppy et al (1999); = *Aleurites fordii* Hemsley – WH3. NatureServe GNR (Not Yet Ranked).

208. LINACEAE A.P. de Candolle 1818 (FLAX FAMILY) [in MALPIGHIALES]

A family of about 10-14 genera and 250-350 species, herbs, trees, vines, and shrubs, cosmopolitan. References: Dressler, Repplinger, & Bayer in Kubitzki (2014); McDill & Simpson (2011); McDill et al (2009); Morin (2006) in FNA12 (2016); Robertson (1971); Schneider et al (2016).

Linum Linnaeus 1753 (FLAX)

A genus of about 180 species, herbs, of temperate and subtropical areas. The traditional separation of *Linum*, its component sections, and related genera (*Sclerolinum*, *Hesperolinum*, *Cliococca*) appears to need reworking (McDill et al. 2009; McDill & Simpson 2011; Schneider et al. 2016). *Linum* could encompass the related genera into an ever more heterogeneous *Linum* sensu lato, or sections of *Linum* could be elevated to generic rank (some sections have been previously accorded such rank). References: Bradley & Weakley (2020) in Weakley et al (2020); Dressler, Repplinger, & Bayer in Kubitzki (2014); Morin (2006) in FNA12 (2016); Rogers (1963); Rogers (1984).

1 Petals blue, red, or pink (rarely white); capsule 5-10 mm long; [section *Linum*].
  2 Petals red or pink ..... ***Linum grandiflorum***
  2 Petals blue (rarely white). ..... ***Linum usitatissimum***
1 Petals predominantly light to dark yellow (sometimes also with other coloration, including orange, copper, salmon, brown, and red bands or blotches); capsules 1-4 mm long; [section *Linopsis*].
  6 Outer sepals entire (very rarely sparsely glandular-toothed), the inner sepals entire or sparsely to conspicuously glandular-toothed; leaves without red or brown stipular glands flanking the attachment to the stem.
    7 Fruit as long as broad or longer, its apex acute, apiculate, or obtuse, (2-) 2.2-3.2 (-3.3) mm long; leaves mostly 1.3-4.3 mm wide.
      10 Fruit 3.4-3.8 mm long, 3.2-3.4 mm in diameter ..... ***Linum macrocarpum***
      10 Fruit (2.0-) 2.3-3.2 (-3.3) mm long, 1.7-3.1 mm in diameter.
        11 Fruit ovoid, (2.8-) 3.0-3.2 (-3.3) mm long, 2.5-3.1 mm in diameter, the apex minutely apiculate, the exposed portions yellow; seeds 2.1-2.4 mm long; anthers averaging 1.2 mm long ..... ***Linum floridanum var. chrysocarpum***
        11 Fruit pyriform, (2.0-) 2.3-2.8 (-3.0) mm long, 1.7-2.6 mm in diameter, the apex rounded, the exposed portions purple; seeds (1.6-) 1.7-2.0 (2.1) mm long; anthers averaging 0.8 mm long ..... ***Linum floridanum var. floridanum***
    7 Fruit broader than long, its apex depressed, flattened, or broadly rounded, (1.3-) 1.5-2.1 (-2.3) mm long; leaves mostly 1.9-9.3 mm wide.
      12 Margins of the inner sepals with conspicuous stalked glands; mature fruits of dried specimens usually adhering to the plant ..... ***Linum curtissii***
      12 Margins of the inner sepals glandless, or with a few inconspicuous, sessile glands; mature fruits of dried specimens usually shattering and falling freely.
        14 Inflorescence paniculate, the lower inflorescence branches not elongate, their tips not nearly reaching the tips of the upper inflorescence branches; branchlets striate-ridged; leaves mostly opposite (usually to beyond the midpoint from the base of the plant to the first inflorescence branch) ..... ***Linum striatum***
        14 Inflorescence corymbose, some (at least) of the lower branches of the inflorescence elongate, their tips nearly equaling the tips of the upper inflorescence branches; branchlets terete or nearly so; leaves mostly alternate (usually the opposite leaves of the lower stem not extending beyond the midpoint from the base of the plant to the first inflorescence branch) ..... ***Linum virginianum***

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

6 Inner and outer sepals all very conspicuously glandular-toothed; leaves with 2 red or brown stipular glands flanking the attachment to the stem (these absent or obscure in *L. smallii* and *L. rigidum* var. *rigidum* – but check leaves on the upper and lower stem).
19 Sepals 2.3-3.5 mm long, acute; inflorescence consisting of 1 or more elongate and racemiform branches; dried plants dark, purple-dotted; {Coastal Plain of FL Panhandle,..... ***Linum harperi***
19 Sepals (3.1-) 3.6-5 (-7.3) mm long, acuminate; inflorescence an open panicle; dried plants pale green; [widespread, mainly inland provinces except westwards]..... ***Linum sulcatum***

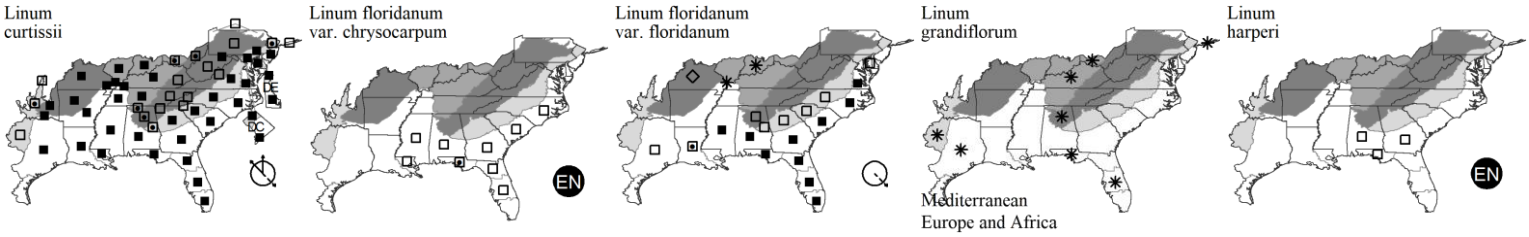
Linum curtissii Small. TEXAS YELLOW FLAX. **Hab:** Woodlands, other dry to moist places. **Dist:** S. ME, MI, and n. IL south to s. FL and TX; West Indies. **Phen:** Mar-Aug. **Syn:** = *Linum medium* ssp. *texanum* (Planchon) A. Haines – NE; = *Linum medium* (Planchon) Britton var. *texanum* (Planchon) Fernald – Ar, Bah, C, F, FNA12, GrPl, GW2, Il, K1, K3, K4, Mi, NcTx, NY, Tn, Tx, Va, W, WH3, WV, Rogers (1963), Rogers (1984); < *Cathartolinum medium* (Planchon) Small – S; < *Linum medium* (Planchon) Britton – G; > *Linum medium* var. *medium* – Pa; > *Linum medium* (Planchon) Britton var. *texanum* (Planchon) Fernald – Pa; < *Linum virginianum* var. *medium* Planchon – RAB.

Linum floridanum (Planchon) Trelease *var.* ***chrysocarpum*** C.M. Rogers. YELLOW-FRUITED YELLOW FLAX. **Hab:** Wet savannas. **Dist:** Se. NC south to s. FL and west to s. MS. **Phen:** Jun-Oct. **Tax:** Probably warranting species rank. **Syn:** = FNA12, K1, K3, K4, Rogers (1963), Rogers (1984); < *Cathartolinum floridanum* (Planchon) Small – S; < *Linum floridanum* – GW2, WH3; < *Linum virginianum* var. *floridanum* Planchon – RAB. NatureServe G5?T3? (Vulnerable).

Linum floridanum (Planchon) Trelease *var.* ***floridanum***. FLORIDA YELLOW FLAX. **Hab:** Pine savannas, sandhill seeps. **Dist:** E. MD south to s. FL and west to LA and e. TX, essentially limited to the Coastal Plain; West Indies (Jamaica). **Phen:** Jun-Oct. **Syn:** = FNA12, K1, K3, K4, Rogers (1963), Rogers (1984); < *Cathartolinum floridanum* (Planchon) Small – S; > *Cathartolinum macrosepalum* Small – S; < *Linum floridanum* – C, F, G, GW2, Il, WH3; < *Linum virginianum* var. *floridanum* Planchon – RAB, (also see L. floridanum var. chrysocarpum and L. intercursum). NatureServe G5?T5? (Secure).

* ***Linum grandiflorum*** Desfontaines. RED FLAX. **Hab:** Disturbed areas. **Dist:** Native of n. Africa. **Syn:** = F, FNA12, K1, K3, K4, NcTx, NY, WH3. NatureServe GNR (Not Yet Ranked).

Linum harperi Small. HARPER'S GROOVED FLAX. **Hab:** Dry to mesic longleaf pine savannas and flatwoods. **Dist:** FL Panhandle, s. GA, and s. AL. **Phen:** Jul-Aug. **Tax:** It is probably distinct from *L. sulcatum* at the species level (and is treated so her), but needs additional study. **Syn:** = *Cathartolinum harperi* (Small) Small – S; = *Linum sulcatum* Riddell var. *harperi* (Small) C.M. Rogers – K1, K3, K4, Rogers (1963), Rogers (1984); < *Linum sulcatum* Riddell – FNA12, WH3. NatureServe G5T2 (Imperiled).



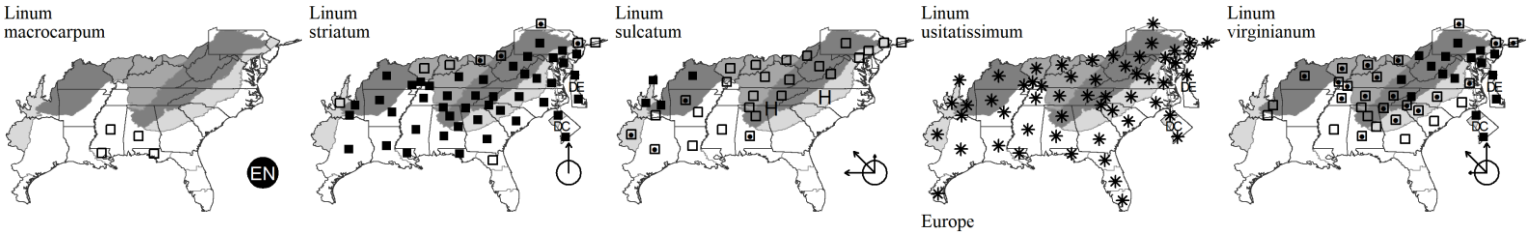
Linum macrocarpum C.M. Rogers. SPRING HILL FLAX. **Hab:** Pitcher plant bogs, wet savannas. **Dist:** FL Panhandle west through s. AL and s. MS to se. LA. **Phen:** May-Jul. **Syn:** = FNA12, K1, K3, K4, WH3, Rogers (1963), Rogers (1984). NatureServe G2 (Imperiled).

Linum striatum Walter. RIDGESTEM YELLOW FLAX. **Hab:** Bogs, seepages, other wet places, often growing in *Sphagnum*. **Dist:** MA, PA, MI, and IL south to Panhandle FL, LA, and e. TX. **Phen:** May-Oct. **Syn:** = Ar, C, FNA12, G, GW2, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, W, WH3, Rogers (1963), Rogers (1984); = *Cathartolinum striatum* (Walter) Small – S; > *Linum striatum* var. *striatum* – F.

Linum sulcatum Riddell. GROOVED YELLOW FLAX. **Hab:** Prairies; eastwards in dry rocky woodlands, barrens, and blackland prairies over calcareous, mafic, or ultramafic rocks (and sometimes also weedy in adjacent disturbed areas). **Dist:** Primarily a species of the Great Plains of WI, MN, and s. ON, s. MB, WI, MN, and ND, to LA and TX, *L. sulcatum* occurs farther east (to MA, VA, NC, and AL) as a rare disjunct on glades or barrens over rocks such as limestone or diabase. **Phen:** May-Oct. **Syn:** = Ar, C, F, FNA12, G, GrPl, Il, Mi, NcTx, NY, Pa, RAB, Tn, Tx, Va, W, WV; = *Cathartolinum sulcatum* (Riddell) Small – S; = *Linum sulcatum* Riddell var. *sulcatum* – K1, K3, K4, NE, Rogers (1963), Rogers (1984). NatureServe G5T5 (Secure).

* ***Linum usitatissimum*** Linnaeus. COMMON FLAX, CULTIVATED FLAX, LINAZA. **Hab:** Roadsides, other disturbed places, not long persisting after agricultural use. **Dist:** Native of Europe. **Phen:** Apr-Sep. **Comm:** This is the flax of commerce, used for its fiber for at least the last 25,000 years (the source of flax/linen), seeds, and the oil expressed from its seeds (linseed oil). **Syn:** = Ar, C, F, FNA12, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Tx, Va, WH3, WV, Rogers (1984). NatureServe GNR (Not Yet Ranked).

Linum virginianum Linnaeus. VIRGINIA YELLOW FLAX. **Hab:** Dry or moist places. **Dist:** MA, NY, ON, MI, and IL south to SC, GA, AL, and MO. **Phen:** Jun-Oct. **Syn:** = C, F, FNA12, G, GW2, Il, K1, K3, K4, Mi, NE, NY, Pa, Tn, Va, W, WV, Rogers (1963), Rogers (1984); = *Cathartolinum virginianum* (Linnaeus) Reichenbach – S; = *Linum virginianum* var. *virginianum* – RAB. NatureServe G4G5 (Apparently Secure).



211. PHYLLANTHACEAE Martinov 1820 (LEAF-FLOWER FAMILY) [in MALPIGHIALES]

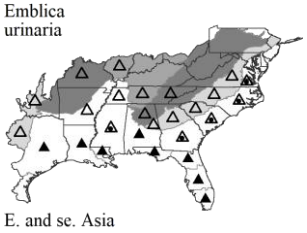
A family of about 60 genera and 2000 species, trees, shrubs, and herbs, mainly tropical and warm temperate. References: Chase et al (2002); Levin (2016f) in FNA12 (2016); Webster (1994); Webster (2014) in Kubitzki (2014).

Key to Map Symbology: □ native; ◇ maybe exotic; △ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

211. PHYLLANTHACEAE

2 Herbs.
  3 Plant with "normal" arrangement of branches and leaves (leaves uniformly distributed on the stem and branches, alternate and either distichous or spirally arranged, the ultimate branches not deciduous, flowers produced on ultimate and penultimate orders of branches).
  ..... ***Phyllanthus***
  3 Plant with "phyllanthoid" arrangement of branches, leaves, and flowers (leaves lacking on the main stem, the penultimate order of branches with scales arranged spirally, the ultimate (final) order of branches deciduous, bearing normal leaves alternately and distichously, flowers produced only on the ultimate, deciduous branches), the ultimate branches and their distichous small leaves resembling the rachis and leaflets of a once-pinnate compound leaf.
    5 Fruiting pedicels 0.5 mm long; seeds with 12-15 transverse ridges and sometimes 1-3 pits; male flowers borne toward the tip of the branchlets, female flowers toward the base ..... ***Emblica urinaria***
    5 Fruiting pedicels > 0.5 mm long; seeds either longitudinally ribbed or striate, or verrucose; female flowers borne toward the tip of the branchlets, male flowers toward the base..... ***Moeroris***
2 Shrubs or trees.
  7 Plant with "normal" arrangement of branches and leaves (leaves uniformly distributed on the stem and branches, alternate and either distichous or spirally arranged, the ultimate branches not deciduous, flowers produced on ultimate and penultimate orders of branches); staminate flowers lacking pistillodes.
  ..... ***Phyllanthopsis phyllanthoides***
  7 Plant with "phyllanthoid" arrangement of branches, leaves, and flowers (leaves lacking on the main stem, the penultimate order of branches with scales arranged spirally, the ultimate (final) order of branches deciduous, bearing normal leaves alternately and distichously, flowers produced either only on the ultimate branches [*Breynia disticha*, *Glochidion puber*], or on short shoots on old wood [*Cicca acida*]), the ultimate branches and their distichous small leaves resembling the rachis and leaflets of a once-pinnate compound leaf; staminate flowers with pistillodes
  ..... ***Glochidion puber***

Emblica Gaertner 1790

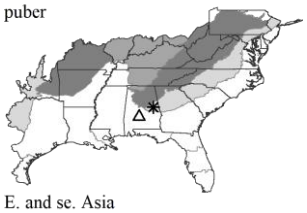


A genus of about 45 species, herbs (our introduced species), shrubs, and trees, native of tropical and subtropical Asia and Australia. Previously included in *Phyllanthus*; see Bouman et al. (2021, 2022). References: Bouman et al (2021); Bouman et al (2022).

Identification Notes: Our one alien species can be an aggressive weed in disturbed soils. The distichous leaves arrayed along the horizontal ultimate stems are very easily mistaken for the leaflets of a pinnately compound leaf. The leaves have a distinctive dark green color, typically grading to paler green near the pale green stem.

* ***Emblica urinaria*** (Linnaeus) R.W. Bouman. CHAMBER BITTER, GRIPEWEED. **Hab:** Gardens, roadsides, and other disturbed ground, apparently preferring nitrogen-rich or fertilized soils. **Dist:** Native of tropical South and Southeast Asia, now widespread in the tropics and subtropics of both hemispheres. This species appeared in the 1940s to 1960s in FL, GA, AL, LA, TX, and NC, and in the 1970s in TN (Kral (1981). Reported for MO by Freeman & Morse (2019). **Phen:** (Jan-) Mar-Nov (-Dec). **Tax:** Ssp. *nudicarpus* Rossignol & Haicour is e. Asian and not known to be introduced in our area; it is likely specifically distinct. **Syn:** = *Phyllanthus urinaria* Linnaeus ssp. *urinaria* – Ar, FNA12, NY, Govaerts, Frodin, & Radcliffe-Smith (2000), Rossignol, Rossignol, & Haicour (1987); < *Emblica urinaria* (Linnaeus) R.W. Bouman – Bouman et al (2022); < *Phyllanthus urinaria* – Fl2, GW2, Il, K1, K3, K4, NcTx, Tx, WH3, Webster (1970). NatureServe GNR (Not Yet Ranked).

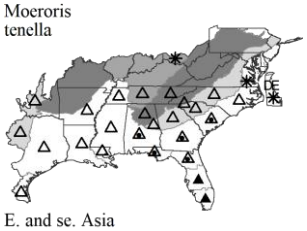
Glochidion J.R. Forster & G. Forster 1776 (NEEDLEBUSH, CHEESETREE)



A genus of 300 species, shrubs and trees, of Asia, Australia, and nearby islands. This genus is phylogenetically embedded in *Phyllanthus*, if that genus is interpreted broadly, but Bouman et al. (2022) argued for the retention of *Glochidion* and the splitting of *Phyllanthus* s.l. to maintain finer and monophyletic genera, including *Glochidion*. References: Bouman et al (2021); Levin (2016h) in FNA12 (2016); Webster (2014) in Kubitzki (2014).

* ***Glochidion puber*** (Linnaeus) Hutchinson. **Hab:** Disturbed areas. **Dist:** Native of China, Japan, and Taiwan. Fearn & Urbatsch (2001) discuss in detail its naturalization in s. AL (Mobile County), where it has now been found spreading at several locations (H. Horne, pers. comm., 2014). **Phen:** Apr-Aug; Jul-Nov. **Syn:** = *Glochidion puberum* (Linnaeus) Hutchinson – FNA12, K3, Bouman et al (2021), orthographic variant; = *Phyllanthus puber* (Linnaeus) Müller of Aargau – K4.

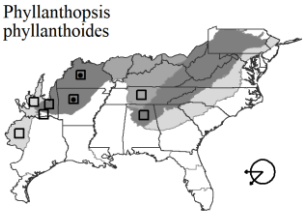
Moeroris Rafinesque 1838



A genus of 200 or more species, herbs (ours), shrubs, and trees, of the Americas and Africa. Previously included in *Phyllanthus*; see Bouman et al. (2021, 2022). The subgenera shown in the key are those of Bouman et al. (2022). References: Bouman et al (2021); Bouman et al (2022).

* ***Moeroris tenella*** (Roxburgh) R.W. Bouman. MASCARENE ISLAND LEAF-FLOWER. **Hab:** Disturbed areas, especially in and around greenhouses. **Dist:** Native of the Mascarene Islands. This species appeared in FL in the 1920s, s. GA in the 1940s, SC in the 1950s, NC in the 1960s, and TN in the 1970s (Kral 1981). Reported from a single collection from VA, as a "contaminant in a container plant" (Virginia Botanical Associates 2007). **Syn:** = Bouman et al (2022); = *Phyllanthus tenellus* Roxburgh – Ar, Bah, Fl2, FNA12, GW2, Il, K1, K3, K4, NcTx, Tn, WH3, Webster (1970); > *Phyllanthus amarus* Schumacher – RAB, misapplied (misidentified); ? *Phyllanthus lathyroides* Kunth – S, misapplied; > *Phyllanthus niruri* Linnaeus – RAB, misapplied (misidentified); > *Phyllanthus tenellus* var. *tenellus* – Govaerts, Frodin, & Radcliffe-Smith (2000).

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



Phyllanthopsis (Scheele) Vorontsova & Petra Hoffmann 2008 (MAIDENBUSH)

A genus of 2 species, shrubs, of sc. North America (United States and Mexico). Generic boundaries have been troublesome (see synonymy), but Vorontsova & Hoffmann (2008) clarified and presented a sensible taxonomy. References: Vorontsova & Hoffmann (2008); Vorontsova (2016) in FNA12 (2016); Webster (2014) in Kubitzki (2014); Wurdack et al (2004).

Phyllanthopsis phyllanthoides (Nuttall) Vorontsova & Petra Hoffman. MAIDENBUSH. **Hab:** Dry, rocky woodlands, glades, exposed bluffs, river scour; on limestone or other calcareous rock. **Dist:** C. MO, AR, and OK, south to c. TX; disjunct in c. AL and ec. TN; disjunct in NLE. **Phen:** May-Jun. **Syn:** = FNA12, K3, K4, Tn, Vorontsova & Hoffmann (2008); = *Andrachne phyllanthoides* (Nuttall) Coulter – F, G, Mo2, Tx; = *Leptopus phyllanthoides* (Nuttall) G.L. Webster – Ar, K1, NcTx. NatureServe G4 (Apparently Secure).

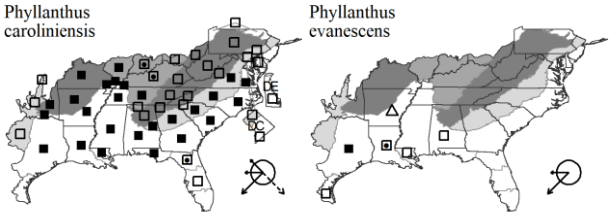
Phyllanthus Linnaeus 1753 (LEAF-FLOWER)

A genus of 800-900 species, trees, shrubs, and herbs, of tropical, subtropical and warm temperate regions of the Old and New Worlds. Phyllanthus, as recently treated very broadly was heterogeneous, paraphyletic with respect to other genera, and needed either to be divided or expanded even further. Bouman et al. (2021) stated "Based on the recognizability of the monophyletic groups, redefining them as genera (which was once the case) is the best option, as, in spite of the many name changes, it provides a better reflection of the evolutionary history of *Phyllanthus* s.l. and will in the future improve identifications greatly. Instead of one giant genus, where identification is difficult and evolution is only depicted by the various subgenera, it is more sensible and worthwhile to recognize separate genera that highlight the morphological variation within the tribes. Additionally, patterns of floral convergence can be discussed in the light of separate lineages, highlighting the complex diversity of tribe Phyllantheae." Bouman et al. (2022) implemented the taxonomic changes. The subgenera and sections shown in the key are those of Bouman et al. (2022). References: Bouman et al (2021); Bouman et al (2022); Govaerts, Frodin, & Radcliffe-Smith (2000); Levin (2016c) in FNA12 (2016); Levin, Wilder, & McCollom (2018); Rossignol, Rossignol, & Haicour (1987); Webster (1970); Webster (2014) in Kubitzki (2014).

2 Plant with "normal" arrangement of branches and leaves (leaves uniformly distributed on the stem and branches, alternate and either distichous or spirally arranged, the ultimate branches not deciduous, flowers produced on ultimate and penultimate orders of branches).
  4 Stems flattened and winged; filaments connate; seeds 1.3-1.5 mm long; [of e. LA westward] ..... ***Phyllanthus evanescens***
  4 Stems terete; filaments free; seeds 0.7-1.1 mm long; [widespread in our region].
  ..... ***Phyllanthus caroliniensis***
2 Plant with "phyllanthoid" arrangement of branches, leaves, and flowers (leaves lacking on the main stem, the penultimate order of branches with scales arranged spirally, the ultimate order of branches deciduous, bearing normal leaves alternately and distichously, flowers produced only on the ultimate, deciduous branches), the ultimate branches and their distichous small leaves resembling the rachis and leaflets of a once-pinnate compound leaf.
  8 Stamens 5, filaments free; fruiting pedicels capillary, 3-7 mm long, flexuous and pendent in fruit; seeds densely papillose; [subgenus *Kirganelia*].....
  ..... ***Moeroris tenella***
  8 Stamens 3, filaments connate into a column 0.1-0.15 mm long; fruiting pedicels thicker and often also shorter, spreading in fruit; seeds variously ribbed or striate.
    9 Fruiting pedicels 0.5 mm long; seeds with 12-15 transverse ridges and sometimes 1-3 pits; male flowers borne toward the tip of the branchlets, female flowers toward the base; [section *Urinaria*]..... ***Emblica urinaria***
    9 Fruiting pedicels > 0.5 mm long; seeds either longitudinally ribbed or striate, or verrucose; female flowers borne toward the tip of the branchlets, male flowers toward the base; [section *Phyllanthus*].
    ..... ***Moeroris***

Phyllanthus caroliniensis Walter. CAROLINA LEAF-FLOWER. **Hab:** Roadsides, moist woodlands, forests, and fields, often in seasonally wet, muddy places. **Dist:** PA and IL south to c. peninsular FL and TX, and south to Argentina and Paraguay, the original range not clear, and perhaps introduced in part of the area. **Phen:** Jun-Nov. **Syn:** = S; = *Phyllanthus caroliniensis* ssp. *caroliniensis* – Ar, FNA12, K1, K3, K4, Tx, Va, Govaerts, Frodin, & Radcliffe-Smith (2000), Webster (1970); = *Phyllanthus caroliniensis* var. *caroliniensis* – C, WH2; < *Phyllanthus carolinensis* – GW2, orthographic error; < *Phyllanthus caroliniensis* Walter – F, G, GrPl, Il, NcTx, Pa, RAB, W, Bouman et al (2022). NatureServe G5T5? (Secure).

Phyllanthus evanescens Brandegee. **Hab:** Coastal prairies, disturbed areas. **Dist:** AL (Macon County) (Diamond 2014), LA (St. Charles Parish) west to TX; south into Mexico and Central America. **Phen:** Mar-Nov. **Syn:** = FNA12, K3, K4, Bouman et al (2022); > *Phyllanthus pudens* – Ar, K1, Tx, Govaerts, Frodin, & Radcliffe-Smith (2000), Webster (1970). NatureServe G4 (Apparently Secure).



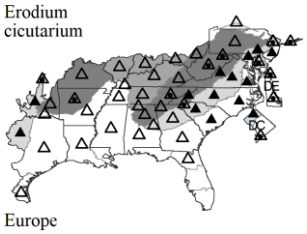
212. GERANIACEAE A.L. de Jussieu 1789 (GERANIUM FAMILY) [in GERANIALES]

A family of about 5-11 genera and 700-835 species, herbs and shrubs, mostly temperate. References: Albers & Van der Walt in Kubitzki, Bayer, & Stevens (2007).

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

1 Leaves pinnately cleft or compound; fertile stamens 5, staminodia 5 ..... ***Erodium***
1 Leaves palmately cleft or compound; fertile stamens 10 (except in *G. pusillum*, and note that anthers are readily deciduous in all species) ..... ***Geranium***

Erodium L'Héritier in Aiton 1789 (STORK'S-BILL, FILAREE)



A genus of about 60-80 species, herbs, mainly Old World. References: Albers & Van der Walt in Kubitzki, Bayer, & Stevens (2007).

* ***Erodium cicutarium*** (Linnaeus) L'Héritier ex Aiton. HERON'S-BILL, COMMON STORK'S-BILL, REDSTEM FILAREE, ALFILERIA, ALFILERILLO, PIN-CLOVER. **Hab:** Disturbed areas, fields, lawns. **Dist:** Native of Europe. **Phen:** Feb-Jun; Apr-Jul. **Syn:** = Ar, C, F, G, GrPl, Il, K3, K4, Mi, NcTx, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3; > *Erodium cicutarium* ssp. *cicutarium* – K1, NE. NatureServe GNRTNR (Not Yet Ranked).

Geranium Linnaeus 1753 (GERANIUM, CRANE'S-BILL)

A genus of about 350-430 species, mainly perennial herbs, also annuals and dwarf shrubs, mainly temperate. House plants called 'geranium' are members of the genus *Pelargonium*. References: Aedo (2012); Aedo (2017); Aedo, Aldasoro, & Navarro (1998); Albers & Van der Walt in Kubitzki, Bayer, & Stevens (2007); Yeo (1984).

Unkeyed taxa: *Geranium texanum*

1 Perennial, from a stout rhizome; [subgenus *Geranium*].
..... ***Geranium maculatum***
1 Annual, from a taproot.
8 Sepals blunt or acute, or terminating in a minute callus tip (mucro) < 0.3 mm long; [subgenus *Robertium*, section *Batrachioidea*].
9 Mericarps appressed pubescent across the surface, not ridged; stem pubescence of short (< 0.3 mm long), gland-tipped and eglandular hairs; stamens partly sterile (the inner 5 fertile, the outer 5 lacking anthers) ..... ***Geranium pusillum***
9 Mericarps glabrous across the surface (slightly to densely ciliate at the base), either reticulately ridged or not; stem pubescence an admixture of long eglandular hairs (1.0-1.7 mm long) and short (< 0.5 mm long) gland-tipped and eglandular hairs; stamens (all 10) fertile (note that anthers may fall readily).
..... ***Geranium molle***
8 Sepals awned or subulate, the subulate awn 0.7-3 mm long.
12 Mericarps with spreading hairs about 0.5 mm long, these often gland-tipped; [subgenus *Geranium*, section *Dissecta*] ..... ***Geranium dissectum***
12 Mericarps with long appressed hairs about 1 mm long, these not gland-tipped; [subgenus *Geranium*, section *Geranium*] ..... ***Geranium carolinianum***

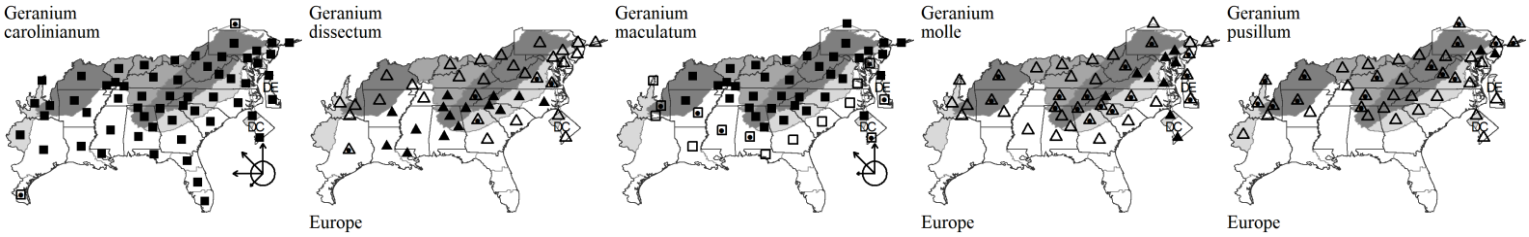
Geranium carolinianum Linnaeus. CAROLINA CRANE'S-BILL. **Hab:** Fields, roadsides, lawns, pastures, gardens, disturbed areas. **Dist:** MA, MI, WY, and BC south to FL, CA, and n. Mexico (and introduced in various places in the Old and New World). **Phen:** Mar-Jun (and sometimes later). **Tax:** Varieties are sometimes recognized, with two in our area: var. *carolinianum*, with the inflorescence diffusely corymbiform (because of long upper internodes), mostly 4-12-flowered, and pubescence of the stem mostly < 0.5 mm long, and var. *confertiflorum*, with the inflorescence a compact corymb (because of notably short upper internodes), mostly 5-25-flowered, and pubescence of the stem mostly >0.75 mm long. **Syn:** = Bah, Il, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV, Aedo (2012); > *Geranium carolinianum* var. *carolinianum* – Ar, C, F, G, GrPl, K1; > *Geranium carolinianum* var. *confertiflorum* – C, F, G, GrPl, K1.

* ***Geranium dissectum*** Linnaeus. CUTLEAF CRANE'S-BILL. **Hab:** Roadsides, pastures, disturbed areas. **Dist:** Native of Europe, c. Asia, n. Africa. **Phen:** Apr-Aug. **Syn:** = Ar, C, F, G, K1, K3, K4, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WV, Aedo (2012). NatureServe GNR (Not Yet Ranked).

Geranium maculatum Linnaeus. WILD GERANIUM. **Hab:** Cove forests, bottomland forests, other mesic, base-rich forests. **Dist:** ME west to MB, south to SC, GA, FL Panhandle (Gadsden County) (Kunzer et al. 2009) and ne. OK. **Phen:** Apr-Jun (and rarely later). **Comm:** Sometimes cultivated. **Syn:** = Ar, C, F, G, GrPl, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Va, W, WH3, WV, Aedo (2012). NatureServe G5 (Secure).

* ***Geranium molle*** Linnaeus. DOVE'S-FOOT CRANE'S-BILL. **Hab:** Roadsides, pastures, disturbed areas. **Dist:** Native of Europe and w. Asia. Reported for MS (Majure et al. 2011). **Phen:** Apr-Aug. **Syn:** = Ar, C, F, G, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Va, W, WV, Aedo (2012). NatureServe GNR (Not Yet Ranked).

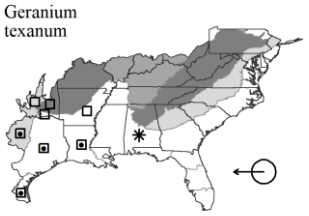
* ***Geranium pusillum*** Linnaeus. SMALL-FLOWERED CRANE'S-BILL. **Hab:** Roadsides, pastures, disturbed areas. **Dist:** Native of Europe, c. Asia, and n. Africa. **Phen:** Apr-Sep. **Syn:** = Ar, C, G, GrPl, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Va, W, WV, Aedo (2012). NatureServe GNR (Not Yet Ranked).



Key to Map Symbology: □ native; ◇ maybe exotic; △ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

212. GERANIACEAE

Geranium texanum (Trelease) A. Heller. TEXAS CRANE'S-BILL, TEXAS GERANIUM. **Hab:** Clayey or sandy soils; eastwards in disturbed areas. **Dist:** OK and sw. AR south to w. KA and c. and s. TX. See Diamond (2021) for discussion of its occurrence in Alabama. **Phen:** Mar-Apr. **Syn:** = Ar, K3, K4, NcTx, Tx. NatureServe G4 (Apparently Secure).



215. LYTHRACEAE J. Saint-Hilaire 1805 (LOOSESTRIFE FAMILY) [in MYRTALES]

A family of about 27-35 genera and about 600 species, herbs, shrubs, and trees, primarily tropical (a few warm temperate). References: Graham (1975); Graham in Kubitzki, Bayer, & Stevens (2007). Keys adapted, in large part, from Z. [including PUNICACEAE and TRAPACEAE].

1 Plant woody or suffrutescent, a shrub or a small tree 1-10 m tall; petals present, showy, 8-20 mm long.
  2 Aquatic shrubs with arching suffrutescent or woody stems; leaves opposite or whorled; [native] ..... ***Decodon***
  2 Terrestrial shrubs or small trees with erect woody stems; leaves alternate to subopposite; [aliens cultivated and sometimes persistent].
    3 Flowers in many-flowered terminal or axillary cymose panicles; fruit a loculicidal capsule ..... ***Lagerstroemia***
    3 Flowers solitary or several in terminal or axillary clusters; fruit a leathery berry (pomegranate) ..... ***Punica***
1 Plant not woody, an herb 0.1-1.2 m tall; petals absent or present, inconspicuous or showy, 1-10 mm long.
  5 Stems pubescent.
    6 Floral tube (hypanthium) swollen obliquely at its base; capsule dehiscing longitudinally along the upper surface ..... ***Cuphea***
    6 Floral tube (hypanthium) symmetrical; capsule dehiscing septicidally at the apex ..... ***Lythrum***
  5 Stems glabrous.
    7 Floral tube cylindric to turbinate, about 2× as long as wide ..... ***Lythrum***
    7 Floral tube campanulate to globose, about 1× long as wide.
      8 Flowers or fruits (1-) 3-10 in the leaf axils (at least some axils with 2 or more flowers or fruits on a given plant) ..... ***Ammannia***
      8 Flowers or fruits solitary in the leaf axils (never > 1 per axil).
        9 Capsule indehiscent; petals 0; sepals 4, broadly triangular, lacking intersepalary appendages; seeds spatulate or oblanceolate, about 1 mm long, minutely granular on one face and smooth on the other ..... ***Didiplis***
        9 Capsule dehiscing septicidally; petals 4; sepals 4 (-6), triangular, with intersepalary appendages of size about equal to the calyx lobes; seeds hemispheric, about 0.3 mm long, the surface very finely reticulate ..... ***Rotala***

Ammannia Linnaeus 1753 (TOOTHCUP)

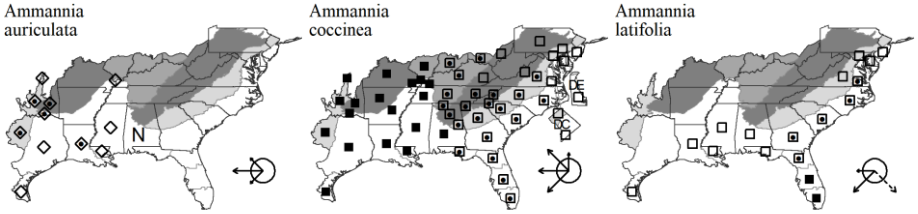
A genus of about 80 species, herbs, cosmopolitan. The circumscription of the genus here includes *Nesaea* and *Hionanthera*, following Graham, Diazgranados, & Barber (2011) and Graham (2007). References: Graham in Kubitzki, Bayer, & Stevens (2007); Graham (1975); Graham (1985); Graham (2021b) in FNA10 (2021).

2 Style included (when in fruit), thick, 0.5-1.0 mm long (much shorter than the ovary); calyx lobes obtuse, often with the apices minutely mucronate; petals 0, 1, or 4, pale pink to white, to 1 mm long and 1 mm wide ..... ***Ammannia latifolia***
2 Style exserted (when in fruit), filiform, 1.5-3.0 mm long (equal to or longer than the ovary); calyx lobes triangular, with acute apices; petals 4 (-5), deep rose-purple or pale lavender, ca. 2-3 mm long and 2-3 mm wide.
  4 Peduncles slender; cymes (3-) 7-15-flowered; capsules (1.0-) 1.5-2.5 (-3.5) mm in diameter ..... ***Ammannia auriculata***
  4 Peduncles stout; cymes (1-) 3-7 (-15)-flowered; capsules 3.5-5) mm in diameter ..... ***Ammannia coccinea***

* ***Ammannia auriculata*** Willdenow. EARED REDSTEM. **Hab:** Swamps, ditches, other wetlands. **Dist:** MS, LA, SD, NM, and AZ, south to TX, Mexico, Central America, and n. South America. Perhaps only native in the Old World. **Phen:** May-Jul (-Oct). **Syn:** = FNA10, GrPl, GW2, Il, K3, K4, Meso4.1, NcTx, Tx, Graham (1975), Graham (1985). NatureServe G5 (Secure).

Ammannia coccinea Rottbøll. SCARLET TOOTHCUP. **Hab:** Marshes, ditches, exposed muddy river shores and banks, wet pine flatwoods, other wet places. **Dist:** NJ, OH, IN, IL, IA, and SD south to s. FL and TX; disjunct in CA; south through Mexico and Central America to n. South America; West Indies. **Phen:** Jul-Oct. **Syn:** = Ar, Bah, C, Fl4, FNA10, GrPl, Il, K1, K3, K4, Meso4.1, NcTx, NY, Pa, RAB, Tn, Tx, Va, W, WH3, Graham (1985); < *Ammannia coccinea* Rottbøll – F, GW2, S, Graham (1975); > *Ammannia coccinea* ssp. *purpurea* (Lamarck) Koehne – G.

Ammannia latifolia Linnaeus. PINK REDSTEM. **Hab:** Brackish to fresh tidal marshes, wet places, ditches. **Dist:** NJ south to s. FL and west to TX (mostly on the Coastal Plain), and also in the West Indies, Yucatan, Central America, and South America. **Phen:** Jul-Sep. **Tax:** All plants in North America north of Florida have flowers with petals; most plants from FL south through the West Indies into Central and South America have flowers without petals. Graham (1985) considered these forms; additional study is warranted. The name *A. koehnei* Britton is available for the petaliferous North American plant should its recognition prove warranted. **Syn:** = C, Fl4, FNA10, GW2, K1, K3, K4, Meso4.1, NcTx, Va, W, WH3, Graham (1975), Graham (1985); > *Ammannia koehnei* Britton – S; > *Ammannia latifolia* Linnaeus – S; > *Ammannia teres* Rafinesque – G, RAB, Tx; > *Ammannia teres* var. *exauriculata* (Fernald) Fernald – F; > *Ammannia teres* var. *teres* – F. NatureServe G5 (Secure).



Key to Map Symbology: □ native; ◇ maybe exotic; △ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

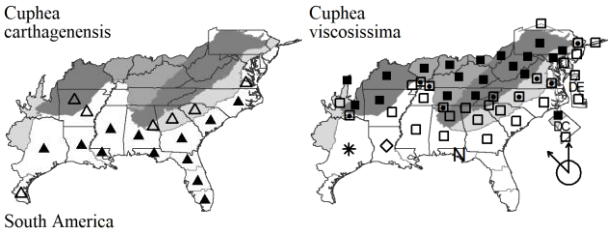
Cuphea P. Browne 1756 (WAXWEED)

A genus of about 260 species, herbs, of America, primarily tropical and subtropical. References: Graham in Kubitzki, Bayer, & Stevens (2007); Graham (1975); Graham (2021c) in FNA10 (2021).

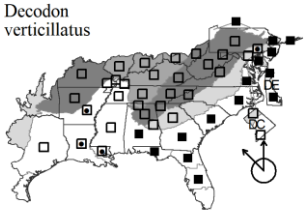
2 Floral tube 4-6 mm long, glabrous inside; stamens much shorter than the floral tube; petioles 0-2 mm long..... ***Cuphea carthagenensis***
2 Floral tube 5.5-12 mm long, villous or finely puberulent inside; stamens equal to or exceeding the floral tube; petioles 0-15 (-20) mm long.
..... ***Cuphea viscosissima***

* ***Cuphea carthagenensis*** (Jacquin) J.F. Macbride. COLOMBIAN WAXWEED. **Hab:** Marshes, ditches, floodplain forests, wet hammocks, other wet places. **Dist:** Native of South America; the northern boundary of the native distribution is unclear. **Phen:** Jun-Sep. **Syn:** = Ar, Fl4, FNA10, GW2, K1, K3, K4, Meso4.1, WH3, Graham (1975); = *Cuphea carthagensis* – RAB, Tx, misspelling; = *Parsonsia balsamona* (Chamisso & Schlechtendal) Standley – S. NatureServe G5? (Secure).

Cuphea viscosissima Jacquin. CLAMMY CUPHEA, BLUE WAXWEED. **Hab:** Dry or wet places, especially over mafic or calcareous rocks. **Dist:** NH west to IA and KS, south to c. GA, LA, and e. OK. **Phen:** Jul-Oct. **Syn:** = Ar, C, FNA10, GrPl, GW2, K1, K3, K4, NE, NY, Pa, RAB, Tn, Tx, Va, W, WV, Graham (1975); = *Cuphea petiolata* (Linnaeus) Koehne – F, G; = *Parsonsia petiolata* (Linnaeus) Rusby – S.

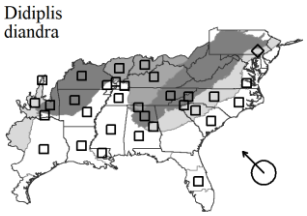


Decodon J.F. Gmelin 1791 (WATER-OLEANDER, WATER-WILLOW)



A monotypic genus, a weak shrub, endemic to e. North America (more widespread in the fossil record). References: Graham in Kubitzki, Bayer, & Stevens (2007); Graham (1975); Graham (2021d) in FNA10 (2021).

Decodon verticillatus (Linnaeus) Elliott. WATER-OLEANDER, WATER-WILLOW, SWAMP LOOSESTRIFE, PEATWEED. **Hab:** Natural lakes, limesink ponds, peatlands, peaty swamps. **Dist:** NS, ON, and MN south to c. peninsular FL and e. TX. **Phen:** Jul-Sep. **ID Notes:** The lower stems are spongy in texture. **Syn:** = Ar, Fl4, FNA10, GW2, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV, Graham (1975); > *Decodon verticillatus* var. *laevigatus* Torrey & Gray – C, F, G, Il; > *Decodon verticillatus* var. *verticillatus* – C, F, G, Il.

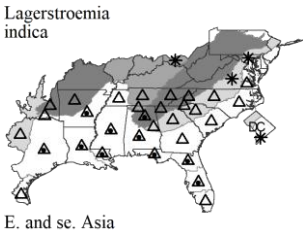


Didiplis Rafinesque 1833 (WATER-PURSLANE)

A monotypic genus, an herb, endemic to e. North America. *Didiplis diandra* is more closely related to *Rotala* than to *Peplis* (Morris 2007). References: Graham in Kubitzki, Bayer, & Stevens (2007); Graham (1975); Graham (2021e) in FNA10 (2021).

Identification Notes: See Horn (2011) for discussion of the submersed and emersed leaf forms of *Didiplis*, and how to distinguish them from superficially similar species.

Didiplis diandra (Nuttall ex A.P. de Candolle) Alph. Wood. WATER-PURSLANE. **Hab:** Stagnant water of pools, streams, and old beaverponds. **Dist:** Se. VA, IN, and WI south to NC, SC, MS, LA, and e. TX; disjunct in c. peninsular FL (Wunderlin, Hansen, & Franck 2017). Recently found in se. PA, where considered likely to be an accidental introduction (S. Grund, pers.comm., 2019). **Phen:** Apr-Oct. **Syn:** = Ar, C, Fl4, FNA10, G, GrPl, GW2, Il, K1, K3, K4, S, Tn, Va, WH3, Graham (1975); = *Peplis diandra* Nuttall ex A.P. de Candolle – F, RAB, Tx. NatureServe G5 (Secure).



Lagerstroemia Linnaeus 1759 (CRAPE-MYRTLE)

A genus of 53-56 species, trees and shrubs, of tropical se. Asia and Australia. References: Graham in Kubitzki, Bayer, & Stevens (2007); Graham (1975); Graham (2021f) in FNA10 (2021).

* ***Lagerstroemia indica*** Linnaeus. CRAPE-MYRTLE. **Hab:** Commonly cultivated, persistent around old plantings, spreading to roadsides, old fields, suburban woodlands, and natural areas. **Dist:** Native of Asia. Reported as escaping in DC (Steury 2011). **Phen:** Jun-Sep. **Syn:** = Ar, C, Fl4, FNA10, Il, K1, K3, K4, Meso4.1, NcTx, S, Tx, WH3, Graham (1975). NatureServe GNR (Not Yet Ranked).

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Lythrum Linnaeus 1753 (LOOSESTRIFE)

A genus of about 36 species, annual and perennial herbs, cosmopolitan. References: Graham in Kubitzki, Bayer, & Stevens (2007); Graham (1975); Graham (2021g) in FNA10 (2021); Haines (2010).

Unkeyed waifs: *Lythrum thymifolium*

1 Flowers numerous in terminal spike-like thyrses; stamens usually 12; leaves opposite or whorled on the lower stem. ..... ***Lythrum salicaria***

1 Flowers solitary or paired in axils; stamens usually (4-) 6; leaves either opposite throughout, or opposite to subopposite below and alternate above.

3 Leaves opposite throughout, mostly shorter than to about as long as the internodes, 1-6 mm wide ..... ***Lythrum lineare***

3 Leaves opposite or sub-opposite on the lower stem, alternate above

8 Leaves ovate to lanceolate, widest at a point 1/6 to 1/2 of the way from the base to the apex, the base rounded to subcordate; stems mostly slender, to 8 dm tall; bracteoles mostly at the base of the pedicel ..... ***Lythrum alatum***

8 Leaves lanceolate to linear-lanceolate, widest at a point 1/3 to 2/3 of the way from the base to the apex, the base cuneate, often narrowly so; stems stout, to 13 dm tall; bracteoles mostly on the upper pedicel, immediately below the floral tube ..... ***Lythrum lanceolatum***

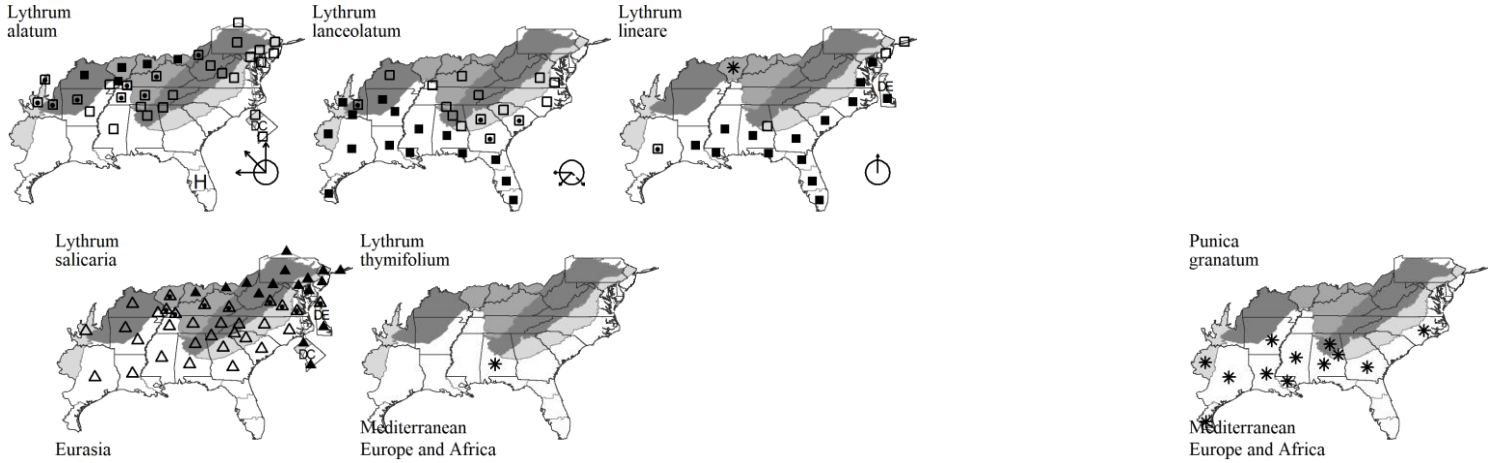
Lythrum alatum Pursh. NORTHERN WINGED LOOSESTRIFE. **Hab:** Calcareous meadows, marl fens, and disturbed wet calcareous places. **Dist:** ME, NY, MI, and ND south to sc. VA, e. TN, nw. GA, n. AL, n. AR, ne. OK, and CO; allegedly disjunct in Citrus County (Graham 1975; Wunderlin, Hansen, & Franck 2017). **Phen:** Jun-Sep. **Tax:** See discussion in Graham (1975) about unresolved issues of typification and southern records of *L. alatum* (as here treated). **Syn:** = F, Il, Mi, Pa, S, Va, W, WV; = *Lythrum alatum* ssp. *alatum* – NE, Haines (2010); = *Lythrum alatum* var. *alatum* – Ar, C, Fl4, FNA10, G, GrPl, GW2, K1, K3, K4, NY, Tn, WH3, Graham (1975); > *Lythrum dacotanum* Nieuwland – Tx. NatureServe G5T5 (Secure).

Lythrum lanceolatum Elliott. SOUTHERN WINGED LOOSESTRIFE. **Hab:** Pine flatwoods, blackland prairies, coastal prairies, marshes, swamps, other moist to wet places, ditches. **Dist:** Se. VA, se. NC, SC, GA, AL, MS, n. AR, s. MO, and OK south to s. FL, s. TX, VER, CHP; West Indies. **Phen:** May-Sep. **Tax:** Although Graham (1975) argues that *L. lanceolatum* should be reduced to a variety of *L. alatum*, her evidence can also be interpreted (and is here) as warranting specific status. **Syn:** = F, RAB, S, Tx, Va; = *Lythrum alatum* ssp. *lanceolatum* (Elliott) A. Haines – Haines (2010); = *Lythrum alatum* Pursh var. *lanceolatum* (Elliott) Torrey & A. Gray ex Rothrock – Ar, C, Fl4, FNA10, G, GrPl, GW2, K1, K3, K4, Meso4.1, NcTx, Tn, WH3, Graham (1975). NatureServe G5T5 (Secure).

Lythrum lineare Linnaeus. NARROWLEAF LOOSESTRIFE, WAND LOOSESTRIFE, SALTMARSH LOOSESTRIFE. **Hab:** Nearly fresh, brackish, and saline marshes. **Dist:** NJ south to s. FL and west to TX. **Phen:** Jul-Oct. **Syn:** = C, F, Fl4, FNA10, G, GW2, K1, K3, K4, NE, NY, RAB, S, Va, WH3, Graham (1975). NatureServe G5 (Secure).

* ***Lythrum salicaria*** Linnaeus. PURPLE LOOSESTRIFE. **Hab:** Swamps, marshes, other wet places. **Dist:** Native of Eurasia. An extremely noxious weed in the ne. United States, aggressively colonizing and coming to dominate a wide variety of freshwater wetlands, sometimes to the near exclusion of native vegetation. **Phen:** Jun-Sep. **Syn:** = Ar, C, FNA10, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, Tn, Va, W, WV, Graham (1975); > *Lythrum salicaria* var. *gracilior* Turczaninow – F; > *Lythrum salicaria* var. *salicaria* – F; > *Lythrum salicaria* var. *tomentosum* (P. Miller) A.P. de Candolle – F. NatureServe G5 (Secure).

* ***Lythrum thymifolium*** Linnaeus. THYMELAEF LOOSESTRIFE. **Hab:** On ballast. **Dist:** Native of Mediterranean Europe. **Tax:** The epithet in Linnaeus (1753) is not capitalized, indicating that it is used adjectivally, and should be corrected in spelling to "*thymifolium*". **Syn:** = *Lythrum thymifolia* – FNA10, K3, K4. NatureServe GNR (Not Yet Ranked).



Punica Linnaeus 1753 (POMEGRANATE)

A genus of 2 species, trees, of Mediterranean Europe and w. Asia. Sometimes treated in the monogeneric family Punicaceae; here included in Lythraceae, following Angiosperm Phylogeny Group (2003, 2009); *Punica* is deeply embedded phylogenetically in Lythraceae (Graham, Diazgranados, & Barber 2011). References: Graham in Kubitzki, Bayer, & Stevens (2007); Graham (2021h) in FNA10 (2021); Zohary & Hopf (1994).

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated

* ***Punica granatum*** Linnaeus. POMEGRANATE. **Hab:** Suburban areas, cultivated and at least persistent. **Dist:** Native of Mediterranean Europe. Reported as cultivated on Hatteras Island (Dare County, NC) (Brown 1959). **Comm:** This species has been cultivated in the Old World for at least five millennia. **Syn:** = Bah, FNA10, K1, K3, K4, Meso4.1, S. NatureServe GNR (Not Yet Ranked).

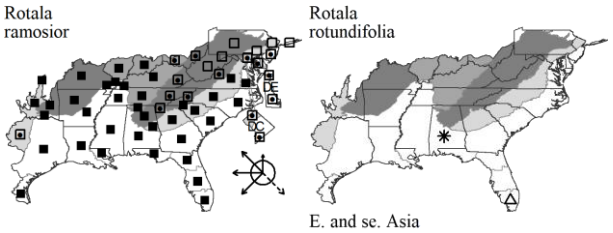
Rotala Linnaeus 1771 (TOOTHCUP)

A genus of about 50 species, wetland herbs, of temperate to tropical areas, closely related to *Didiplis*. References: Graham in Kubitzki, Bayer, & Stevens (2007); Graham (1975); Graham (2021i) in FNA10 (2021).

1 Leaves opposite or whorled, of two types, the aerial leaves larger and obovate to orbicular, < 1.5× as long as wide, the submersed leaves linear to orbicular; inflorescences terminal racemes or panicles ..... ***Rotala rotundifolia***
1 Leaves opposite, of one type, linear to oblanceolate or oblong, most > 3× as long as wide; inflorescences terminal racemes, axillary racemes, or axillary single flowers.
..... ***Rotala ramosior***

Rotala ramosior (Linnaeus) Koehne. TOOTHCUP. **Hab:** Marshes, ditches, exposed drawdown muds and silts. **Dist:** VT, NY, ON, MI, WI, MN, SD, MT, and BC, south to s. FL, TX, AZ, CA, and south through Mexico to Central America and South America; West Indies. **Phen:** Jun-Oct. **Syn:** = Ar, C, Fl4, GrPl, GW2, Il, K1, K3, K4, Meso4.1, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, Va, W, WH3, Graham (1975); > *Rotala ramosior* var. *interior* Fernald & Griscom – F, G, Tx; > *Rotala ramosior* var. *ramosior* – F, G, Tx. NatureServe G5 (Secure).

* ***Rotala rotundifolia*** (Buchanan-Hamilton) Koehne. DWARF ROTALA, ROUNDLEAF TOOTHCUP. **Hab:** Canals, other wet disturbed areas. **Dist:** Native of Asia. **Phen:** Mar-Aug. **Syn:** = Fl4, K3, K4, WH3. NatureServe GNR (Not Yet Ranked).



216. ONAGRACEAE A.L. de Jussieu 1789 (EVENING-PRIMROSE FAMILY) [in MYRTALES]

A family of about 22 genera and 664 species, herbs, shrubs, and rarely trees, cosmopolitan (especially of temperate and subtropical America). References: Crisci et al (1990); Munz (1965); Wagner & Hoch (2021) in FNA10 (2021); Wagner, Hoch, & Raven (2007).

1 Flowers 2-merous, the petals white; fruits with uncinate trichomes; leaves opposite, decussate, borne spreading at right angles to the stem, mostly ovate, on petioles mostly 0.5-8 cm long; [subfamily *Onagroideae*; tribe *Circaeeae*] ..... ***Circaea***
1 Flowers (3-) 4 (-7)-merous, the petals yellow, pink, or white (or absent); fruits lacking uncinate trichomes; leaves alternate (rarely opposite), not decussate, usually ascending or appressed (rarely spreading at right angles to the stem), mostly lanceolate, mostly sessile or subsessile.
2 Fruit indehiscent; seeds 1-6 per capsule, 1.5-3.5 mm long; [subfamily *Onagroideae*; tribe *Onagreae*] ..... ***Oenothera***
2 Fruit dehiscent; seeds (10-) 50-many per capsule, 0.3-2 mm long.
3 Seeds with an elongate coma at one end (wind-dispersed); petals pink or white; [subfamily *Onagroideae*; tribe *Epilobieae*].
..... ***Epilobium***
3 Seeds not comose (gravity-dispersed); petals yellow or absent (rarely white or pink).
5 Calyx tube not extended beyond the summit of the ovary; sepals persistent on the capsule (rarely deciduous); stamens 4, 8, or 10-14; petals yellow or absent; [primarily of wetlands]; [subfamily *Ludwigioideae*] ..... ***Ludwigia***
5 Calyx tube extended beyond the summit of the ovary; sepals deciduous; stamens 8; petals yellow (rarely pink or white); [primarily of uplands]; [subfamily *Onagroideae*; tribe *Onagreae*] ..... ***Oenothera***

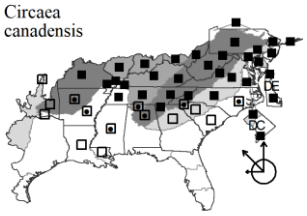
Circaea Linnaeus 1753 (ENCHANTER'S-NIGHTSHADE)

A genus of 8 species (14 taxa), herbs, of temperate and boreal regions of the Northern Hemisphere. References: Averett & Boufford (1985); Boufford (1983 [1982]); Boufford (2005); Boufford (2021b) in FNA10 (2021); Munz (1965); Skvortsov (1979); Wagner, Hoch, & Raven (2007); Xie et al (2009).

Identification Notes: Sometimes confused in vegetative condition with *Phryma*; the leaf teeth are quite different.

Circaea canadensis (Linnaeus) Hill. CANADA ENCHANTER'S-NIGHTSHADE. **Hab:** Mesic, nutrient-rich forests. **Dist:** NS and NB west to se. MB and ND, south to e. NC, c. SC, s. GA, LA, OK, and NE. **Phen:** Jun-Aug. **Tax:** The systematics of this taxon has been controversial, and treatments have changed over the years. Most recently, Xie et al. (2009) support species status for *C. canadensis*, a conclusion followed here. Previously, Boufford (2005) treated the complex as two species, *C. canadensis* and *C. lutetiana*, the former with two subspecies, ssp. *canadensis* of eastern North America and ssp. *quadrisulcata* of Asia. Before that, Boufford (1983) treated the complex as a circumboreal complex of three subspecies of *C. lutetiana*, including the North American ssp. *canadensis* (Linnaeus) Ascherson & Magnus, the primarily Asian ssp. *quadrisulcata* (Maximowicz) Ascherson & Magnus, and the European ssp. *lutetiana*. Other authors have preferred varietal status for the three entities, full species status, no formal status at all (*C. lutetiana* as a polymorphic complex), or associating the more similar pair (North American and Asian) as two subspecies

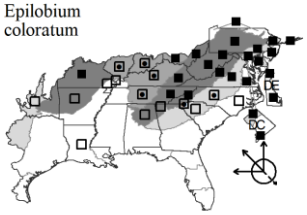
Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



separate from the European at specific rank. Boufford (1983) and Averett & Boufford (1985) show convincingly that separate taxonomic status for the three entities is warranted, and that ssp. *canadensis* is more closely related to ssp. *quadrisulcata*. The question of the appropriate taxonomic level remains. Boufford (1983) states that "although subspp. *canadensis* and *quadrisulcata* are placed in *C. lutetiana*, this might not ultimately prove to be the best treatment". Later, flavonoid data showed strong differences between the three taxa, stronger than the differences between many of the other species in the genus (Averett & Boufford 1985). Morphologic differences between the three taxa are fairly subtle but appear to be consistent. The complicated synonymy is perhaps an example of a too-zealous attempt to have nomenclature reflect subtleties of relationship and evolutionary divergence, our understanding of which is unclear and changeable. **Syn:** = K3, K4, NY, Xie et al (2009); = *Circaea canadensis* ssp. *canadensis* – Ar, Mi, NE, Pa, Va, Boufford (2005), Wagner, Hoch, & Raven (2007); = *Circaea latifolia* Hill – S; = *Circaea lutetiana* Linnaeus ssp. *canadensis* (Linnaeus) Ascherson & Magnus – FNA10, GrPl, Il, K1, RAB, Tn, W, Boufford (1983 [1982]), Munz (1965); = *Circaea lutetiana* var. *canadensis* Linnaeus – C; = *Circaea quadrisulcata* (Maximowicz) Franchet & Savatier var. *canadensis* (Linnaeus) Hara – G, Tx, WV; > *Circaea canadensis* var. *canadensis* – F; > *Circaea canadensis* var. *virginiana* Fernald – F. NatureServe G5T5 (Secure).

Epilobium Linnaeus 1753 (WILLOW-HERB) [ALSO SEE CHAMERION])

A genus of ca. 165 species (ca. 185 taxa), herbs, distributed primarily in boreal and alpine latitudes and elevations. Sections (indicated in the key) follow Hoch (2021). References: Hoch (2021c) in FNA10 (2021); Munz (1965); Wagner, Hoch, & Raven (2007).



Epilobium coloratum Biehler. BRONZE WILLOW-HERB, EASTERN WILLOW-HERB. **Hab:** Seepages, streambanks, other moist open places. **Dist:** ME west to MN, south to NC, n. GA, AL, AR, and TX; allegedly disjunct in Hispaniola. **Phen:** Jun-Oct. **Syn:** = Ar, C, F, FNA10, G, GrPl, GW2, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WV, Munz (1965), Wagner, Hoch, & Raven (2007). NatureServe G5 (Secure).

Ludwigia Linnaeus 1753 (SEEDBOX, WATER-PRIMROSE, WATER-PURSLANE)

A genus of about 82 species, herbs and shrubs, cosmopolitan. References: Duke (1955); Eyde (1977); Eyde (1978); Eyde (1981); Harper (1904a); Hoch (2021a) in FNA10 (2021); Munz (1938, 1944); Munz (1965); Nesom & Kartesz (2000); Peng & Tobe (1987); Peng (1984); Peng (1986); Peng (1988); Peng (1989); Raven & Tai (1979); Raven (1963); Wagner, Hoch, & Raven (2007); Ward (2012a); Zardini, Gu, & Raven (1991).

Identification Notes: Many natural hybrids are known. Hybrids are generally recognizable from their intermediate morphology and usual association with their two parents. However some hybrids resemble one parent much more than the other, and some hybrids are found in populations independent (and even disjunct) from one or both parents. Allopolyploidy may have had a major role in the evolution of this genus, especially section *Microcarpium*, which has a majority of polyploid species.

1 Leaves opposite; plants creeping (rooting at the nodes); [section *Isnardia*]..... ***Key A***
1 Leaves alternate; plants erect or ascending (not rooting at the nodes), or creeping (rooting at the nodes).
2 Stamens 8-14; sepals 4-7; petals 4-7; [of various habits, including annual and perennial herbs and shrubs, variously erect, ascending, creeping, or forming floating mats] ..... ***Key B***
2 Stamens 4; sepals 4; petals 0-4; [perennial herbs, with erect ascending flowering stems]..... ***Key C***

Key A - *Ludwigia* with opposite leaves (section *Isnardia*)

1 Pedicels of flowers and fruits 5-35 mm long.
..... ***Ludwigia arcuata***
1 Pedicels of flowers and fruits 0-3 mm long.
3 Stems, leaves, capsules, and calyx densely hirsute; seeds dark reddish-brown, 0.3-0.4 mm long..... ***Ludwigia spathulata***
3 Stems, leaves, capsules, and calyx glabrous to sparsely puberulent; seeds tan, 0.4-0.8 mm long.
4 Petals 0; floral tubes and capsules with 4 longitudinal dark green bands; bractlets (borne at or near the base of the floral tube) absent or 0-1 mm long .....
..... ***Ludwigia palustris***
4 Petals 4; floral tubes and capsules lacking green banding; bractlets (borne at or near the base of the floral tube) present, 2-4 mm long.....
..... ***Ludwigia repens***

Key B - *Ludwigia* with alternate leaves, 8-14 stamens, 4-7 sepals, and 4-7 petals (sections *Pterocaulon*, *Macrocarpon*, *Seminuda*, and *Jussiaea*)

1 Sepals 4 (or rarely 5); stamens 8 (or rarely 10); seeds in 2-several vertical series in each locule, free of endocarp tissue; annual or perennial herbs or a woody shrub below.
2 Capsule obconic, gradually broadening from base to apex, weakly angled; young stems and both surfaces of leaves shaggy-pubescent with tawny hairs; [section *Myrtocarpus*]..... ***Ludwigia peruviana***
2 Capsule narrowly cylindrical, nearly isodiametric, or, if obconic, sharply 4-angled and usually winged on the angles; young stems and both surfaces of leaves glabrous, sparsely short-pubescent, or sparsely villous.
3 Internodes of the stem not winged, weakly angled, usually villous or strigillose at least proximally (sometimes inconspicuous); capsules nearly terete, narrowly cylindrical, 1.7-5.0 cm long, often curved.
4 Petals (1.5-) 3-5 cm long; sepals ca. 10 mm wide at base..... ***Ludwigia bonariensis***
4 Petals 1-2 cm long; sepals 3-5 mm wide at base..... ***Ludwigia octovalvis***

Key to Map Symbology: □ native; ◇ maybe exotic; △ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

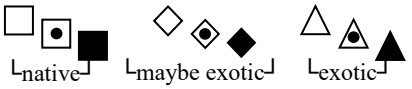
3 Internodes of the stem sharply 4-angled or 4-winged, glabrous; capsule sharply 4-angled, obconic, often winged on the angles, 1-2 cm long (rarely longer in *L. longifolia*); [section *Pterocaulon*].
..... ***Ludwigia decurrens***

1 Sepals 5 (-7); stamens 10 (-14); seeds in 1 vertical series in each locule, loosely embraced or embedded in endocarp tissue.
7 Stems erect; floral tube much longer than the pedicel; seeds loosely embraced by a corky, horseshoe-shaped segment of endocarp; [section *Seminudae*] .....
..... ***Ludwigia leptocarpa***
7 Stems (at least the lower portions) decumbent, creeping, or floating in mats (the flowering stems more-or-less erect in *L. grandiflora* and *L. hexapetala*); floral tube much shorter than the pedicel; seeds embedded in the woody endocarp; [section *Jussiaea*].
8 Flowering stems more-or-less erect; emergent leaves chartaceous, light to medium green, dull, mostly lanceolate or oblanceolate, petioles 0.1-2 (-2.5) cm; stems, sepals, ovaries, and emergent leaves (at least along veins) villous, hairs often viscid; bracteoles obovate, 1-1.8 mm long.
9 Sepals (6-) 8-11 (-14) mm long; emergent leaves 5-8.5 cm long, 7-11 mm wide, mostly linear-lanceolate, usually widest below the middle; petals (1.2-) 1.6-2.0 (-2.6) cm long; style 4.7-6.7 (-8.2) mm long; stems densely villous ..... ***Ludwigia grandiflora***
9 Sepals (8-) 12-19 mm long; emergent leaves 5.5-13 cm long, 9-18 mm wide, mostly oblanceolate, usually widest above the middle; petals (1.5-) 2.0-2.9 (-3) cm long; style (5.8-) 6-10 mm long; stems sparsely to densely villous (rarely glabrous) ..... ***Ludwigia hexapetala***
8 Flowering stems decumbent, floating, or creeping; stem and leaves glabrous or glabrescent; petals mostly 1-1.5 cm long; anthers 1-1.7 mm long.
..... ***Ludwigia peploides var. glabrescens***

Key C - *Ludwigia* with alternate leaves, 4 stamens, 4 sepals, and 0-4 petals (sections *Ludwigia* and *Microcarpium*)

1 Pedicels 2-15 mm long; capsules subglobose to spheric or cubic, about as long as wide, box-like, 4-angled, dehiscence by an apical pore (later sometimes also irregularly loculicidal); petals present, 4-15 mm long, persistent or caducous; roots fascicled, fusiform, tuberous; plants lacking basal, stoloniform shoots; [section *Ludwigia*].
2 Leaves cuneate at base; pedicels 2-5 mm long; nectary discs at base of style flattish, inconspicuous; [widespread in our area, in a wide variety of habitats] .....
..... ***Ludwigia alternifolia***
2 Leaves rounded or truncate at base; pedicels 4-15 mm long; nectary discs at base of style domed, prominent; [nearly restricted to the Coastal Plain, primarily of pinelands].
3 Styles 6-10 mm long; plants glabrous, glabrescent, or pubescent with very short hairs; sepals strongly reflexed in fruit ..... ***Ludwigia virgata***
3 Styles 1.5-3 mm long; plants glabrescent or pubescent with short to long, spreading to shaggy hairs; sepals strongly reflexed, spreading, or ascending in fruit.
4 Sepals narrowly deltoid, broadest at or near the base, 3-4× as long as wide, ascending or spreading in fruit; plants glabrescent to hirtellous with long spreading hairs ..... ***Ludwigia hirtella***
4 Sepals ovate, broadest near the middle, ca. 2× as long as wide, strongly reflexed in fruit; plants pubescent with relatively short, appressed to spreading hairs ..... ***Ludwigia maritima***

1 Pedicels 0-1 (-5) mm long; capsules subglobose, obconic, or obpyramidal, about as long as wide or longer than wide, circular to quadrangular in cross-section, dehiscence irregularly loculicidal; petals absent or present, if present (*L. linearis*, *L. linifolia*) then 0-6 mm long and caducous; roots fibrous or rhizomatous; plants frequently with basal, stoloniform shoots; [section *Isnardia*].
5 Capsules cylindrical, narrowly obconical, or narrowly obpyramidal, at least 2.5-5× as long as broad; petals present or absent.
6 Primary leaves of the flowering stems narrowly elliptical, 6-12 (-20) mm wide; petals absent.
..... ***Ludwigia glandulosa***
6 Primary leaves of the flowering stems linear, 1.5-5 mm wide; petals present.
8 Sepals (3.3-) 4-7 mm long; lateral and marginal veins obscure on lower leaf surface; seeds reddish brown; capsules cylindric, parallel-sided through most of their length, not grooved; anthers 0.5-1.1 mm long ..... ***Ludwigia linifolia***
8 Sepals 2.3-5 (-5.6) mm long; lateral and marginal veins distinct on lower leaf surface; seeds yellowish; capsules elongate obpyramidal, tapering through most or all of their length, with a shallow longitudinal groove on each face; anthers 1.1-2 mm long.
9 Sepals 2.3-4 mm long, acuminate, the surfaces densely and minutely papillose, the papillae 0.02-0.05 mm long and appressed; capsules 5-8.5 (-10) mm long, 2-4 (-5) mm in diameter; pedicels 0-0.4 mm long; seed surface cells elongate parallel to the seed length (as seen at 20× or more); anthers 1.1-1.6 mm long ..... ***Ludwigia linearis var. linearis***
9 Sepals 3-5 (-5.6) mm long, elongate-acuminate to cuspidate, the surfaces densely minutely strigillose, the hairs 0.06-0.10 mm long and appressed to ascending; capsules 5-10 (-12) mm long, 3-5.5 mm in diameter; pedicels 0-3.5 (-5) mm long; seed surface cells elongate transverse to the seed length, or irregular (as seen at 20× or more); anthers (1.1-) 1.3-2 mm long ..... ***Ludwigia linearis var. puberula***
5 Capsules subglobose, obovoid, or broadly obpyramidal, 1-1.5 × as long as broad; petals absent.
10 Flowers in compact, headlike or elongate spikes, the inflorescence lacking well-developed leaves; stems rarely branched; rhizomes often present .....
..... ***Ludwigia suffruticosa***
10 Flowers axillary in the axils of well-developed leaves; stems usually much branched; rhizomes absent.
11 Plants densely pubescent throughout.
12 Sepal apex elongate-acuminate or subcuspidate, reflexed; pubescence of stems and leaves hirtellous (the hairs spreading); seed surface cells suborbicular (as seen at 20× or more); anthers 0.6-0.9 (-1.3 mm long; style 1-2 mm long ..... ***Ludwigia pilosa***
12 Sepal apex acuminate, ascending; pubescence of stems and leaves strigillose (the hairs appressed) or hirtellous (the hairs spreading); seed surface cells elongate; anthers 0.3-0.8 mm long; style 0.25-1 (-1.25) mm long.
..... ***Ludwigia sphaerocarpa***
11 Plants glabrous or subglabrous throughout.
14 Primary leaves of the flowering stems 4-17 mm long, 1.5-10 mm wide, mostly obovate-spatulate and 1.5-3× as long as wide; capsules 1-1.5 (-2) mm long, containing 10-20 dark reddish-brown seeds; plants typically 1-4 dm tall; nectary disc nearly flat on ovary apex ..... ***Ludwigia microcarpa***
14 Primary leaves of the flowering stems (18-) 30-110 mm long, 2-10 (-20) mm wide, mostly elliptic, lanceolate, oblanceolate, or linear and 4-20× as long as wide; capsules 1.8- 2-7 mm long, containing 40-500 light brown, yellowish, or tan seeds; plants typically 3-10 dm tall; nectary disc distinctly raised on ovary apex.
15 Capsules obpyramidal, the corners narrowly winged with wings 0.3-0.9 mm wide.
..... ***Ludwigia alata***
15 Capsules oblong-ovoid or subglobose, the corners not winged.
18 Bracteoles 3.5-6.5 (-8) mm long; sepals green, the apex long-acuminate, reflexed; capsules oblong-obovoid; seed surface cells elongate parallel to the seed length ..... ***Ludwigia polycarpa***

Key to Map Symbology: 
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18 Bracteoles 0.5-1.5 mm long; sepals yellowish, the apex acuminate, ascending capsules subglobose; seed surface cells in patches, some patches with cells elongate parallel to seed length, others with cells transverse to seed length, others with cells diagonal (rather resembling a badly laid-out parque floor) ..... ***Ludwigia sphaerocarpa***

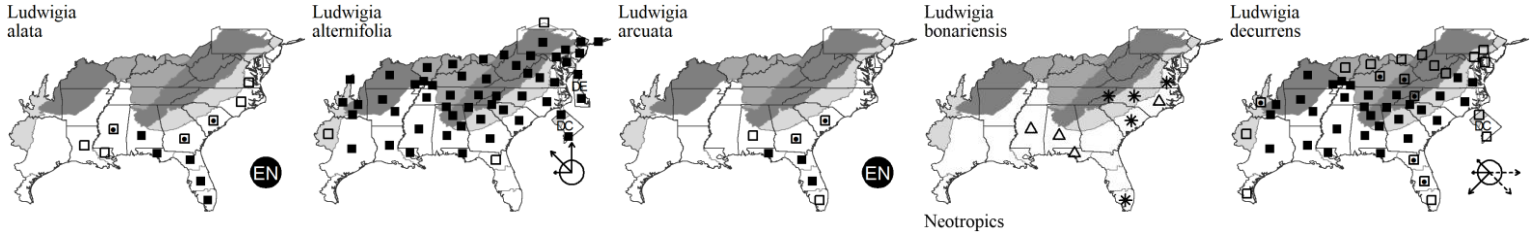
Ludwigia alata Elliott. WINGED SEEDBOX. **Hab:** Interdune ponds, freshwater to slightly brackish (oligohaline) marshes, cypress swamps. **Dist:** Se. VA south to s. FL, west to se. LA; disjunct in Jamaica, where apparently introduced. **Phen:** Jun-Oct. **Tax:** This species is a hexaploid (n = 24). One third of the genome of *L. alata* is apparently derived from *L. microcarpa* or its ancestor (Peng 1988). **Syn:** = C, F, Fl4, FNA10, G, K1, K3, K4, RAB, S, Va, WH3, WI, Peng (1989), Wagner, Hoch, & Raven (2007); < *Ludwigia alata* Elliott – GW2.

Ludwigia alternifolia Linnaeus. ALTERNATE-LEAVED SEEDBOX. **Hab:** Freshwater tidal marshes, ditches, other marshes, open wet places, disturbed wet places. **Dist:** MA west to s. ON, s. MI, IA, and KS, south to n. FL and e. TX. **Phen:** May-Oct. **Syn:** = Ar, Fl4, FNA10, G, GrPl, GW2, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, Wagner, Hoch, & Raven (2007); > *Ludwigia alternifolia* var. *alternifolia* – C, F, Il, WV; > *Ludwigia alternifolia* var. *linearifolia* Britton – WV; > *Ludwigia alternifolia* var. *pubescens* E.J. Palmer & Steyermark – C, F, Il.

Ludwigia arcuata Walter. PONDSHORE SEEDBOX. **Hab:** Marshes or submerged in water of natural Coastal Plain ponds. **Dist:** ne. SC south to s. FL, west to Panhandle FL and s. AL. **Phen:** Jun-Sep. **Tax:** A tetraploid species (2n=32). **Syn:** = Fl4, FNA10, GW2, K1, K3, K4, RAB, WH3, Wagner, Hoch, & Raven (2007); = *Ludwigiantha arcuata* (Walter) Small – S. NatureServe G4G5 (Apparently Secure).

* ***Ludwigia bonariensis*** (M. Micheli) Hara. **Hab:** Freshwater tidal marshes and adjacent disturbed areas. **Dist:** Apparently native of tropical America. Locally abundant in disturbed edges of freshwater tidal marshes near Wilmington, NC, perhaps introduced on ship's ballast. **Phen:** Jun-Sep. **Comm:** Material from Wilmington apparently has larger flowers than material of *L. bonariensis* elsewhere; its source and appropriate taxonomic treatment remain uncertain and need further study. First reported for SC by Leonard (1971b). **Syn:** = Fl4, FNA10, GW2, K1, K3, K4, RAB, WH3, Wagner, Hoch, & Raven (2007); = *Jussiaea neglecta* Small – S. NatureServe GNR (Not Yet Ranked).

Ludwigia decurrens Walter. WINGSTEM WATER-PRIMROSE. **Hab:** Swamp forests, marshes, ditches. **Dist:** MD, w. VA, WV, s. IN, s. IL, and MO, south to s. FL and TX; West Indies; Mexico, Central America and South America; Africa and Asia. **Phen:** Jun-Oct. **Syn:** = Ar, C, FNA10, GW2, Il, K1, K3, K4, Meso4.1, NcTx, Pa, RAB, Tn, Tx, Va, W, WH3, WI, Wagner, Hoch, & Raven (2007); = *Jussiaea decurrens* (Walter) A.P. de Candolle – F, G, S, WV. NatureServe G5 (Secure).



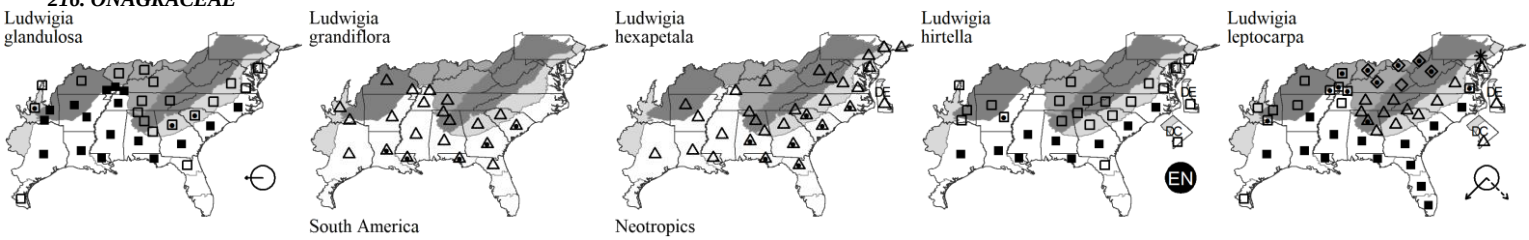
Ludwigia glandulosa Walter. SMALL-FLOWERED SEEDBOX. **Hab:** Low forests, marshes, ditches. **Dist:** E. MD south to n. FL, west to e. TX, north in the interior to c. TN, w. KY, s. IN, s. IL, se. MO, c. AR, and se. OK, primarily on the Southeastern Coastal Plain. **Phen:** Jun-Sep. **Tax:** A related species, treated by Peng as *L. glandulosa* ssp. *brachycarpa* (Torrey & A. Gray) Peng, ranges from sw. LA north and west to s. OK and c. TX. This species is tetraploid (n = 16). **Syn:** = Va; = *Ludwigia glandulosa* ssp. *glandulosa* – FNA10, K1, K3, Peng (1989), Wagner, Hoch, & Raven (2007); < *Ludwigia glandulosa* Walter – C, F, G, GrPl, GW2, Il, NcTx, RAB, S, Tn, Tx, WH3. NatureServe G5T5 (Secure).

* ***Ludwigia grandiflora*** (Michaux) Zardini, H.Y. Gu, & Raven. SHOWY WATER-PRIMROSE. **Hab:** Ponds, lakes, sluggish waters of ditches or streams. **Dist:** Se. SC south to FL, west to TX; disjunct in MO, Guatemala, and in s. South America. **Phen:** May-Sep. **Tax:** This taxon is hexaploid (n= 24). See Zardini, Gu, and Raven (1991) and Nesom & Kartesz (2000) for additional information. **Syn:** = FNA10, Meso4.1, WI, Wagner, Hoch, & Raven (2007), Zardini, Gu, & Raven (1991); = *Jussiaea michauxiana* Fernald – F; = *Ludwigia grandiflora* (Michaux) Greuter & Burdet ssp. *grandiflora* – K3, K4, Nesom & Kartesz (2000); = *Ludwigia grandiflora* var. *grandiflora* – Ward (2012a); < *Ludwigia grandiflora* (Michaux) Zardini, H.Y. Gu, & Raven – Fl4, WH3; < *Ludwigia uruguayensis* (Cambessedes) Hara – C, GW2, K1, RAB, Tx. NatureServe GUTNR (Not Yet Ranked).

* ***Ludwigia hexapetala*** (Hooker & Arnott) Zardini, H.Y. Gu, & Raven. COMMON WATER-PRIMROSE. **Hab:** Ponds, lakes, sluggish waters of ditches or streams. **Dist:** NC south to FL, west to OK and TX; also in CA, Europe, South America, Mexico; also introduced farther north in North America. **Phen:** May-Sep. **Comm:** This taxon is decaploid (n = 40). See Zardini, Gu, and Raven (1991) and Nesom & Kartesz (2000) for additional information. Reported for DE and MD (Longbottom, Naczi, & Knapp 2016). **Syn:** = FNA10, Meso4.1, NY, Wagner, Hoch, & Raven (2007), Zardini, Gu, & Raven (1991); = *Ludwigia grandiflora* (Michaux) Greuter & Burdet ssp. *hexapetala* (Hooker & Arnott) Nesom & Kartesz – Ar, K3, K4, Tn, Va, Nesom & Kartesz (2000); = *Ludwigia grandiflora* var. *hexapetala* (Hooker & Arnott) D.B. Ward – Ward (2012a); < *Jussiaea uruguayensis* Cambessedes – F, G, WV; < *Ludwigia grandiflora* (Michaux) Zardini, H.Y. Gu, & Raven – Fl4, WH3; < *Ludwigia uruguayensis* (Cambessedes) Hara – C, GW2, K1, Pa, RAB, W. NatureServe GUTNR (Not Yet Ranked).

Ludwigia hirtella Rafinesque. RAFINESQUE'S SEEDBOX, SPINDLEROOT, HAIRY SEEDBOX. **Hab:** Pine savannas, rarely inland in boggy seepage in barrens and oak flatwoods. **Dist:** S. NJ south to Panhandle FL, west to e. TX, north in the interior to KY, c. TN, AR, and se. OK. **Phen:** Jun-Sep. **Syn:** = Ar, C, F, Fl4, FNA10, G, GW2, K1, K3, K4, RAB, S, Tn, Tx, Va, W, WH3, Wagner, Hoch, & Raven (2007). NatureServe G5 (Secure).

Ludwigia leptocarpa (Nuttall) Hara. WATER-WILLOW. **Hab:** Riverbanks, marshes, swamps, and ditches, often on logs or tree bases in deep swamps. **Dist:** VA south to c. peninsular FL, west to e. TX, north in the interior along the Mississippi and Ohio rivers to se. MO, s. IL, and w. WV; and in tropical America. **Phen:** Jun-Oct. **Tax:** Morphologically variable and of different ploidies (tetraploid and hexaploid) (Hoch 2021). **Syn:** = Ar, C, Fl4, FNA10, GW2, Il, K1, K3, K4, Meso4.1, NcTx, RAB, Tn, Tx, Va, W, WH3, Wagner, Hoch, & Raven (2007); = *Jussiaea leptocarpa* Nuttall – F, G, S, WV; > *Ludwigia leptocarpa* ssp. *leptocarpa* – WI. NatureServe G5 (Secure).



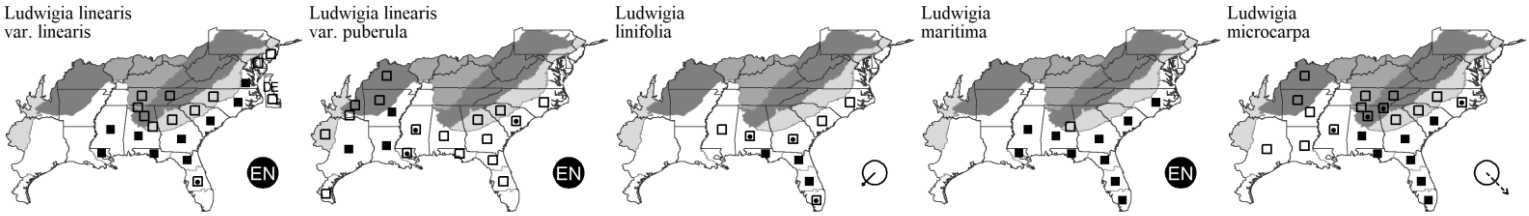
Ludwigia linearis Walter *var*. ***linearis***. EASTERN NARROWLEAF SEEDBOX. **Hab:** Pine savannas, swamps, marshes. **Dist:** Var. *linearis* ranges from s. NJ south to c. peninsular FL, west to se. LA, extending inland to the Cumberland Plateau of nc. AL and c. TN. **Phen:** Jun-Sep. **Tax:** Var. *linearis* is here interpreted to be equivalent to Peng's subglabrous morph. Peng (1989) declined to recognize infraspecific taxa in *L. linearis*, but his discussion makes clear that two distinctive entities are present, as characterized by orientation of seed surface cells and characters of leaves, bracteoles, pedicels, sepals, stigmas, and styles (see key). The orientation of seed surface cells, recognized as a distinctive character in other difficult species pairs (such as *L. alata* and *L. lanceolata*) is the most reliable character separating the 2 varieties. This species is diploid (n = 8). **Syn:** < *Ludwigia linearis* – C, F, Fl4, FNA10, G, GW2, K1, K3, K4, RAB, S, Tn, Va, W, WH3, Peng (1989), Wagner, Hoch, & Raven (2007).

Ludwigia linearis Walter *var*. ***puberula*** Engelmann & A. Gray. WESTERN NARROWLEAF SEEDBOX. **Hab:** Pine savannas, prairies, interdunal swales, ditches. **Dist:** Var. *puberula* ranges primarily from c. AL west to c. AR and e. MO, south to e. TX, with intergradational material extending as far north and east as n. FL and e. NC. **Phen:** Jun-Sep. **Tax:** Var. *puberula* is here interpreted to include Peng's intermediate morph, densely strigillose morph, and completely glabrous morph (Peng 1989). As pointed out by Peng (1989), the glabrous morph is exactly like the densely strigillose morph except for the absence of pubescence. They often grow together, have essentially the same distribution, and may differ only at a single allele. Peng's intermediate morph is heterogeneous; some likely being truly intermediate between (and possibly hybrid derivatives of) the two varieties here recognized, while others clearly belong to var. *puberula* (based on surface cell orientation and floral characteristics) and merely have an amount of pubescence intermediate between the densely strigillose and completely glabrous morphs. **Syn:** < *Ludwigia linearis* – Ar, C, F, Fl4, FNA10, G, GW2, K1, K3, K4, NcTx, RAB, S, Tx, W, WH3, Peng (1989), Wagner, Hoch, & Raven (2007).

Ludwigia linifolia Poiret. FLAXLEAF SEEDBOX. **Hab:** Limesink ponds (dolines) and *Taxodium ascendens* savannas. **Dist:** Nc. NC south to s. FL, west to s. MS; disjunct in Mexico (TAB). **Phen:** Jun-Sep. **Tax:** This species is diploid (n = 8). **Syn:** = Fl4, FNA10, GW2, K1, K3, K4, Meso4.1, RAB, S, WH3, Peng (1989), Wagner, Hoch, & Raven (2007). NatureServe G4 (Apparently Secure).

Ludwigia maritima R.M. Harper. HARPER'S SEEDBOX. **Hab:** Pine savannas, pine flatwoods, bogs. **Dist:** E. NC south to s. peninsular FL, west to e. LA. **Phen:** Jun-Sep. **Syn:** = Fl4, FNA10, GW2, K1, K3, K4, RAB, S, WH3, Wagner, Hoch, & Raven (2007).

Ludwigia microcarpa Michaux. SMALL-FRUITED SEEDBOX. **Hab:** In circumneutral or alkaline soils of moist places, over calcareous rock, mafic rock, shell hash, or brackish sands, such as in maritime wet grasslands, savannas and adjacent ditches over coquina limestone ('marl'), and wet clay flats over diabase, often in roadside ditches, and inland in calcareous fens and wet calcareous glades. **Dist:** Ne. NC south to s. FL, west to se. TX (Brown & Marcus 1998); disjunct inland on calcareous or mafic rocks in nc. NC, nc. SC, n. GA, n. AL, c. and e. TN, sc. MO, and nc. AR; also in the Bahamas, Cuba, and Jamaica. **Phen:** Jul-Oct. **Tax:** This species is diploid (n = 8). **Syn:** = Ar, Bah, F, Fl4, FNA10, GW2, K1, K3, K4, RAB, S, Tn, W, WH3, Peng (1989), Wagner, Hoch, & Raven (2007). NatureServe G5 (Secure).



Ludwigia octovalvis (Jacquin) Raven. MEXICAN PRIMOSE-WILLOW. **Hab:** Marshes, disturbed areas. **Dist:** Se. NC south to s. FL, west to TX; and widespread in tropical America; Old World tropics and subtropics. **Phen:** May-Sep. **Syn:** = Ar, Bah, Fl4, FNA10, GW2, K3, K4, Meso4.1, NcTx, Tx, WH3, Wagner, Hoch, & Raven (2007); > *Jussiaea angustifolia* Lamarck – S; > *Jussiaea scabra* Willdenow – S; > *Ludwigia octovalvis* ssp. *octovalvis* – K1; > *Ludwigia octovalvis* ssp. *sessiliflora* (M. Micheli) Raven – K1.

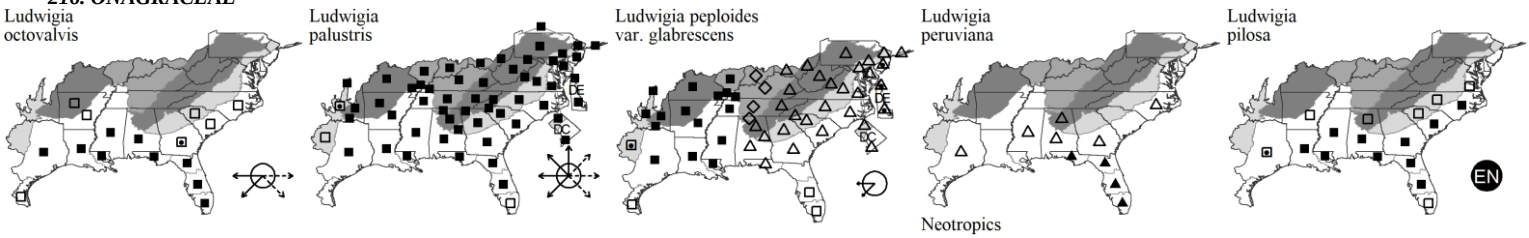
Ludwigia palustris (Linnaeus) Elliott. COMMON WATER-PURSLANE. **Hab:** In a wide range of natural and altered moist to wet disturbed areas. **Dist:** Widespread in North America, West Indies, Central America, South America, Central Eurasia, Africa, and Asia. **Phen:** May-Nov. **Syn:** = Ar, C, FNA10, GrPl, GW2, K1, K3, K4, Meso4.1, Mi, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, W, WH3, Wagner, Hoch, & Raven (2007); = *Isnardia palustris* Linnaeus – S; > *Ludwigia palustris* var. *americana* (A.P. de Candolle) Fernald & Griscom – F, G, Il, WV; > *Ludwigia palustris* var. *nana* Fernald & Griscom – F.

Ludwigia peploides (Kunth) Raven *var*. ***glabrescens*** (Kuntze) Shinners. FLOATING PRIMROSE-WILLOW. **Hab:** Pools, ditches, disturbed places. **Dist:** PA, VA and NC south and west to FL and AZ; Venezuela. Doubtfully native in the eastern parts of our area. **Phen:** May-Oct. **Syn:** = C, Il, RAB, Va; = *Jussiaea repens* – G, misapplied; = *Jussiaea repens* Linnaeus var. *glabrescens* Kuntze – F, misapplied; = *Ludwigia peploides* ssp. *glabrescens* (Kuntze) Raven – Ar, Fl4, FNA10, K1, K3, K4, NY, Pa, Tn, WH3, Wagner, Hoch, & Raven (2007); > *Jussiaea diffusa* Forsskål – S; > *Jussiaea grandiflora* Michaux – S; < *Ludwigia peploides* – GrPl, NcTx, W; ? *Ludwigia peploides* ssp. *peploides* – GW2.

* ***Ludwigia peruviana*** (Linnaeus) Hara. PRIMROSE-WILLOW. **Hab:** Swamps, pondshores. **Dist:** Native of the Neotropics. In s. GA (Jones & Coile 1988). Reported for NC (Kartesz 1999). All or part of the Southeastern distribution is as an alien species. **Phen:** Jan-Dec. **Syn:** = Fl4, FNA10, GW2, K1, K3, K4, Meso4.1, WH3, Wagner, Hoch, & Raven (2007); = *Jussiaea peruviana* Linnaeus – S. NatureServe G5 (Secure).

Ludwigia pilosa Walter. HAIRY SEEDBOX. **Hab:** Swamps, ditches, other wet places. **Dist:** Se. VA south to n. FL, west to se. TX, restricted to the Coastal Plain except for disjunct occurrences inland in NC, VA, and n. AL. **Phen:** Jun-Oct. **Tax:** This species is tetraploid (n= 16). **Syn:** = Ar, Fl4, FNA10, K1, K3, K4, Va, W, WH3, Peng (1989), Wagner, Hoch, & Raven (2007); < *Ludwigia pilosa* Walter – C, F, G, GW2, RAB, S, Tx.

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated



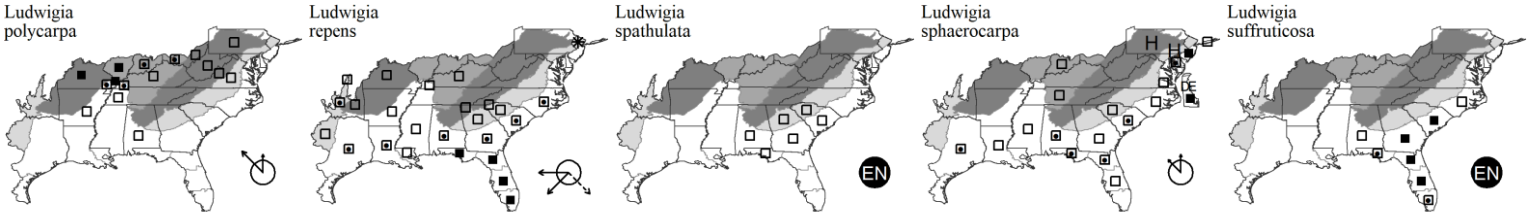
Ludwigia polycarpa Short & R. Peter. MANYFRUIT SEEDBOX. **Hab:** Wet meadows, swales. **Dist:** MA, CT, and w. VT west to s. ON, MI, WI, MN, and c. NE, south to c. VA, KY, s. IL, s. MO, and e. KS. **Phen:** Jun-Sep; Jul-Oct. **Tax:** This species is tetraploid (n = 16). **Syn:** = C, F, FNA10, G, GrPl, GW2, Il, K1, K3, K4, Mi, NE, Pa, S, Peng (1989), Wagner, Hoch, & Raven (2007). NatureServe G4 (Apparently Secure).

Ludwigia repens J.R. Forster. CREEPING SEEDBOX. **Hab:** Ditches, pools, and streams. **Dist:** Se. VA south to s. FL, west to TX, CA, and n. Mexico, north in the interior to TN, MO, and OK; Bermuda; West Indies; Central and South America. **Phen:** Jun-Sep. **Comm:** Reveal et al. (2003) proposed the name *L. repens* for nomenclatural conservation with a conserved type; if this proposal had not ben accepted, *L. natans* Elliott would have become the name of this species. **Syn:** = Fl4, FNA10, GrPl, GW2, K1, K3, K4, NcTx, RAB, Tx, WH3, Wagner, Hoch, & Raven (2007); = *Isnardia repens* – S; = *Ludwigia natans* Elliott – F, G. NatureServe G5 (Secure).

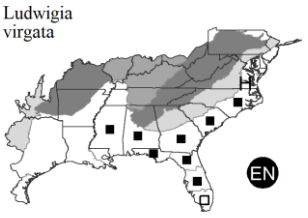
Ludwigia spathulata Torrey & A. Gray. SOUTHERN WATER-PURSLANE. **Hab:** Sinkhole ponds, cypress-gum ponds, depression meadows, boggy shores. **Dist:** SC south to Panhandle FL and s. AL. **Phen:** May-Oct. **Tax:** A tetraploid species (2n=32). **Syn:** = Fl4, FNA10, GW2, K1, K3, K4, RAB, WH3, Wagner, Hoch, & Raven (2007); = *Isnardia spathulata* (Torrey & A. Gray) Small – S. NatureServe G2 (Imperiled).

Ludwigia sphaerocarpa Elliott. GLOBE-FRUITED SEEDBOX. **Hab:** Boggy areas, pools, ditches, river marshes, interdune swales, river and pondshores. **Dist:** E. MA south to n. FL, west to e. TX, primarily on the Coastal Plain, spottily distributed in that range, and also disjunct in w. NY, sc. TN, s. IN, and nw. IN and ne. IL. **Phen:** Jun-Sep. **Tax:** This species is tetraploid (n = 16). Peng (1989) considers it likely that *L. sphaerocarpa* is of allopolyploid origin, one or both of its parents now extinct. **Syn:** = C, Fl4, FNA10, GW2, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Va, WH3, Peng (1989), Wagner, Hoch, & Raven (2007); > *Ludwigia sphaerocarpa* var. *deamii* Fernald & Griscom – F, G, Il; > *Ludwigia sphaerocarpa* var. *jungens* Fernald & Griscom – F, G; > *Ludwigia sphaerocarpa* var. *macrocarpa* Fernald & Griscom – F, G; > *Ludwigia sphaerocarpa* var. *sphaerocarpa* – F, G. NatureServe G5 (Secure).

Ludwigia suffruticosa Walter. SHRUBBY SEEDBOX. **Hab:** Periodically to seasonally flooded portions of limesink ponds (dolines) and clay-based Carolina bays. **Dist:** Se. NC south to s. peninsular FL, west to Panhandle FL and se AL. **Phen:** Jun-Oct. **Tax:** This species is tetraploid (n = 16). **Comm:** Peng (1989) reports that "with its whitish creamy sepals, which are very showy in the dense flower aggregates, the cross-pollinating *L. suffruticosa* successfully attracts many insects, mostly bumblebees, honeybees, and wasps". **ID Notes:** Easily distinguished by the clustered flowers, lacking petals but with showy sepals (usually white, cream, pale green, pink, or mixtures of those colors). **Syn:** = Fl4, FNA10, GW2, K1, K3, K4, RAB, S, WH3, Peng (1989), Wagner, Hoch, & Raven (2007). NatureServe G5 (Secure).



Ludwigia virgata Michaux. SAVANNA SEEDBOX. **Hab:** Wet pine savannas and pine flatwoods. **Dist:** Se. VA south to s. peninsular FL, west to Panhandle FL and se. AL. **Phen:** Jun-Sep. **Syn:** = C, F, Fl4, FNA10, GW2, K1, K3, K4, RAB, S, Va, WH3, Wagner, Hoch, & Raven (2007).



Oenothera Linnaeus 1753 (EVENING-PRIMROSE)

Contributed by John Kees & Alan Weakley

A genus of about 145 or more species (188 or more taxa), herbs, of America (especially temperate regions). This treatment provisional, with further revision likely, especially in the *O. fruticosa* complex. References: Dietrich & Wagner (1988); Dietrich, Wagner, & Raven (1997); Munz (1965); Sorrie, LeBlond, & Weakley (2018b) in Weakley et al (2018b); Straley (1977); Towner & Raven (1970); Wagner (2014); Wagner (2021) in FNA10 (2021); Wagner, Hoch, & Raven (2007); Wagner, Hoch, & Zarucchi (2015); Wagner, Krakos, & Hoch (2013).

Identification Notes: The key requires flowering or fruiting material. Mature fruits can usually be found lower down on the inflorescence axis in flowering material. Frequent reference is made to different types of pubescence on plant surfaces; a hand lens is helpful. Some definitions – strigillose: covered in short, straight, stiffly incurved or appressed hairs; hirtellous: covered in short, soft, spreading hairs; glandular-puberulent: covered in tiny stalked glands (will be sticky to the touch); hirsute: covered in long, stiff hairs; villous: covered in long, flexible, sometimes shaggy hairs; pilose: covered in soft, straight, long hairs. The presence or absence of hairs with pustular (swollen, blister-like) bases is sometimes used to distinguish closely related species. Free sepal tips refer to the horn-like tips of the sepals that project at the apex of flower buds.

1 Flowers zygomorphic (except *O. curtiflora* and *O. glaucifolia*), white to pink; petals distinctly clawed, blades elliptic to narrowly obovate, rounded at apex; fruits indehiscent; seeds 1-6 (-8) per capsule, 1.5-3.5 mm long; [section *Gaura*] ..... ***Key A***

1 Flowers actinomorphic, yellow or white to pink; petals not notably clawed, elliptic to broadly obcordate; fruit dehiscent; seeds (10-) 50-many per capsule, 0.3-2 mm long.

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

2 Capsules lanceoloid to cylindric (roughly isodiametric or thickest below middle), nearly terete except for shallow grooves along valves, often curved or contorted; ovary essentially terete (note: buds may be 4-angled).
6 Stigmas peltate, disc-shaped or shallowly 4-lobed; leaves linear to narrowly lanceolate or oblanceolate, stiff, spinulose-serrate to subentire, less than 1 cm wide; plants perennials less than 6 dm tall, often suffrutescent, stems several to many, branching from near base (*O. capillifolia* var. *capillifolia* may be annual and single-stemmed); [MO, s. IL, TX, and OK westward, or disjunct in MS and AL in calcareous soils]; [section *Calylophus*]..... ***Oenothera capillifolia ssp. capillifolia***
6 Stigmas deeply divided into 3-4 linear lobes; leaves narrowly to broadly lanceolate to oblanceolate, subentire to deeply sinuate-lobed, up to 6+ cm wide; plants annuals, biennials, or short-lived perennials, stems to 30 dm tall; [collectively widespread]; [section *Oenothera*]
7 Capsules lanceoloid, thickest below the middle, tapering to the apex; inflorescence spicate or racemose, dense; plants 3-30 dm tall, erect or ascending..... ***Key C***
7 Capsules linear, nearly isodiametric, sometimes very slightly thickened distally; inflorescence lax, appearing to consist of solitary axillary flowers; plants to 4 dm tall, often decumbent; [subsection *Raimmania*]
8 Nonflowering portion of stems stiff, densely and uniformly strigillose, sometimes also sparsely villous; leaves thick, gray-green, densely strigillose, subentire, shallowly dentate, or occasionally lyrate; [coastal dunes and barrier islands]. ..... ***Oenothera humifusa***
8 Nonflowering portion of stem not stiff, sparsely to moderately strigillose, often villous, sometimes densely so; leaves green (sometimes gray-green in *O. falfurriae* and *O. mexicana* of inland s. TX), sparsely to moderately strigillose and usually villous, mostly deeply sinuate-lobed or dentate; [sandy soils inland, often disturbed]
10 Petals 1.3-4.5cm long, sepals 1-3cm long; styles 3.5-7.5cm long, the stigma lobes slightly to strongly elevated above anthers at anthesis. ..... ***Oenothera grandis***
10 Petals 0.5-1.5cm long (sometimes -2.2cm in O. laciniata), sepals 0.5-1.5cm long; styles 2-5 cm long, the stigma lobes surrounded by the anthers at anthesis. ..... ***Oenothera laciniata***
2 Capsules clavate, ellipsoid, or oblong (thickest at or above the middle), strongly 4-8-ribbed or -winged (weakly in *O. linifolia*); ovary 4-angled or 4-winged.
13 Flowers pink or white. ..... ***Oenothera speciosa***
13 Flowers yellow, sometimes fading orange or reddish.
17 Leaves all basal, pinnatifid; [section *Lavauxia*, subsection *Lavauxia*]..... ***Oenothera triloba***
17 Leaves all or partly cauline, entire or toothed.
20 Cauline leaves linear, < 1 mm wide; petals 3-5 (-7) mm long; floral bracts shorter than the ovaries they subtend; mature fruits ellipsoid-rhomboid, 4-6 mm long, bluntly angled; annual; [section *Peniophyllum*]..... ***Oenothera linifolia***
20 Cauline leaves lanceolate to ovate, > 1 mm wide; petals 5-30 mm long; floral bracts longer than the ovaries they subtend; mature fruits clavate to oblong-elliptic, 3.5-20 mm long, mostly narrowly winged; perennial (*O. spachiana* annual); [section *Kneiffia*]..... ***Key D***

Key A - section (or genus) *Gaura*

1 Pedicels 2-4 mm long; fruit with a slender stipe (0.5-) 2-10 mm long at maturity; clumped or mat-forming perennials from woody rhizomes or rootstocks [subsection *Stipogaura*].
5 Plants aggressively rhizomatous (also with a taproot), mat-forming; stems, leaves, and inflorescences glabrous or inconspicuously strigillose..... ***Oenothera sinuosa***
5 Plants single-stemmed or cespitose, taprooted; plants glabrate to densely strigillose, sometimes also villous or glandular-puberulent. ..... ***Oenothera filipes***
1 Pedicels 0-1 mm long; fruit sessile or with thick cylindric base 0.2-2.2 mm long; annuals or biennials (*O. hispida*, *O. suffrutescens*, and *O. lindheimeri* perennial).
7 Flowers small, with sepals 2-3.5 mm long, petals 1.5-3 mm long; anthers ellipsoid, ca. 1 mm long; inflorescences long, densely spicate, flexuous and conspicuously nodding apically (stiffening in fruit); [subsection *Schizocarya*]..... ***Oenothera curtiflora***
7 Flowers larger, with sepals 2.5-12 mm long, petals 2.5-15 mm long; anthers linear, 1.5-6 mm long; inflorescences erect, not as above.
11 Plants perennial, branched from base; sepals spreading-villous, stems spreading-villous at least proximally, usually stipitate-glandular in inflorescence, not strigillose; flowers large, opening at sunrise, with petals 10-15 mm long, rhombic-obovate or broadly elliptic, sepals 9-17 mm long; [native in coastal prairies of sw. LA and e. TX, widely cultivated, sometimes naturalizing]..... ***Oenothera lindheimeri***
11 Plants annual or biennial (rarely monocarpic perennial); sepals glabrous to strigillose (rarely short hirtellous), stem pubescence various, but often strigillose; flowers opening at sunset (except *O. demareei*), petals 3.5-15 mm long, often narrower, sepals 2.5-18 mm long.
14 Flowers small, often 3-merous or a mixture of 3-4-merous, with sepals 2.5-8 mm long, petals 3.5-8 mm long; fruits 3-4-angled; stems mostly branching from near the base, often from persistent rosettes, the inflorescence of relatively few, narrow, ±spicate branches; [acid sandy soils; TX and OK, or FL and outer coastal plain from NC to se. MS]. ..... ***Oenothera simulans***
14 Flowers larger, 4-merous, with sepals 5-20 mm long, petals 6-17 mm long; fruits 4-angled; plants usually copiously branched at and above the middle, the inflorescence open and diffuse; [of a variety of substrates, often calcareous; widespread inland]
16 Stems and leaves conspicuously spreading-villous at least proximally, lacking strigillose hairs, and also glandular-puberulent in inflorescence (rarely glabrate); pollen 35-65% fertile; [Northeast and Upper Midwest south to n. AL and GA, absent from the Coastal Plain southward] ..... ***Oenothera gaura***
16 Stems and leaves densely and finely appressed-strigillose nearly throughout, sometimes also sparsely villous or short-hirtellous, glandular-puberulent or not in inflorescence; pollen 90-100% fertile; [mostly west of the MS river, eastward to AL, TN, KY]. ..... ***Oenothera filiformis***

Key C - section *Oenothera*, subsections *Oenothera* and *Candela*

1 Petals rhombic-ovate to elliptic, widest near midlength, acute to broadly rounded; seeds ellipsoid, regularly pitted, borne ascending in locules; leaf margins deeply sinuate-lobed to subentire; [subsection *Candela*].
2 Petals 5-17 mm long; stigmas surrounded by anthers at anthesis; pollen ca. 50% fertile. ..... ***Oenothera curtissii***
2 Petals 15-35mm; stigmas exserted well beyond anthers at anthesis; pollen 85-100% fertile. ..... ***Oenothera heterophylla ssp. orientalis***

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

1 Petals obcordate, widest near the apex, deeply to shallowly emarginate (rarely truncate); seeds prismatic and angled, irregularly pitted, borne horizontally in locules; leaf margins remotely dentate to subentire, or weakly sinuate-dentate near base; [subsection *Oenothera*].
 7 Stigma well-elevated above the anthers at anthesis; petals (2.5-) 3-5 cm long; anthers 8-22 mm long; pollen 90-100% fertile (except *O. glazioviana*).
  10 Upper stems, ovaries, and floral tubes often appearing glabrous to unaided eye, sometimes glandular-puberulent, rarely somewhat strigillose; pustulate-based hairs absent or scattered and translucent; sepals yellow-green ..... ***Oenothera grandiflora***
  10 Upper stems, ovaries, and floral tubes conspicuously strigillose and villous, also sometimes glandular-puberulent; pustulate-based hairs reddish-based (when fresh), often abundant; sepals often reddish-striped or flushed with red ..... ***Oenothera glazioviana***
 7 Stigma surrounded by or below the anthers at anthesis; petals 0.7-2.5(-3) cm long; anthers 3-10 mm long; pollen ca. 50% fertile.
  12 Free sepal tips subterminal in bud, 0.5-5 mm long, usually divergent; inflorescences often curved at apex; capsules rusty brown or greenish black when dry; [primarily of the Northeast and Upper Midwest, south to n. GA and nw. SC in the mountains]. ..... ***Oenothera nutans***
  12 Free sepal tips terminal in bud, 0.5-3mm long, erect or slightly divergent; inflorescences erect at apex; capsules dull greenish or gray-green when dry; [collectively widespread].
   15 Stems appearing nearly glabrous in inflorescence (sepals, ovaries, and corolla tubes often strigillose and/or glandular-puberulent), strigose and villous below with translucent (at least in fresh material) hairs ..... ***Oenothera nutans***
   15 Stems conspicuously and often densely strigillose, villous, and/or glandular-puberulent throughout, hairs with reddish pustular bases often abundant.
    16 Stems, leaves, ovaries, capsules, and corolla tubes sparsely to moderately strigillose and glandular puberulent, usually also with abundant spreading, pustular-based hairs; leaves green; sepals usually green or yellowish; [mostly east of the Mississippi River] ..... ***Oenothera biennis***
    16 Stems, leaves, ovaries, capsules, and corolla tubes densely strigillose, appearing exclusively appressed-pubescent without magnification (also with some appressed or subappressed pustular-based hairs and rarely glandular-puberulent in the inflorescence); leaves grayish-green; sepals usually red-striped or flushed red; [mostly west of the Mississippi River, scattered eastward as an introduction] ..... ***Oenothera villosa ssp. villosa***

Key D - section *Kneiffia*

1 Plants taprooted annuals, 1-3 dm tall; leaves linear-spatulate or linear-oblanceolate, erect-ascending; flowers borne in leaf axils throughout upper 1/2 of plant ..... ***Oenothera spachiana***
1 Plants fibrous-rooted or rhizomatous perennials, 1-12 dm tall; leaves broader; flowers borne only in uppermost few nodes of branches.
 2 Stems, leaves, and free sepal tips (but often not sepal bodies) coarsely pilose-hirsute with spreading, whitish hairs 1-3 mm long; free sepal tips 1-4 mm long, widely divergent; leaf blades mostly elliptic or elliptic-lanceolate, rugose ..... ***Oenothera pilosella***
 2 Plants sparsely to densely strigillose, glandular, pilose, and/or villous pubescence, not pilose-hirsute (hairs mostly shorter or appressed); sepal tips various; leaf blades various.
  4 Stigmas surrounded by anthers at anthesis; petals 5-10 mm; flowers spaced out along an elongate inflorescence axis, axis nodding distally in bud; capsules narrowly obovoid, glandular-pubescent initially, often glabrate at maturity ..... ***Oenothera perennis***
  4 Stigmas elevated above anthers at anthesis; petals (8-) 12-35 mm long; inflorescences erect, mostly more compact; capsules various; [*Oenothera fruticosa* complex].
   5 Leaves 1-4 cm wide, lanceolate to ovate, margins dentate to remotely denticulate; petals (20-) 25-35 mm long; ovaries and capsules moderately glandular-puberulent to glabrous, oblong or oblong-ellipsoid; vegetative parts mostly inconspicuously pubescent (sometimes villous proximally, or sparsely strigillose distally). ..... ***Oenothera tetragona***
   5 Leaves 0.5-1.0 (1.2) cm wide, various, entire or remotely denticulate; petals (8-) 12-20 (-25) mm long; ovaries and capsules densely to sparsely pubescent, hairs eglandular or a mixture of glandular and eglandular (sometimes glabrate at maturity), clavate; vegetative parts densely strigose, strigillose, or pilose.
    9 Capsules oblong or oblong-ellipsoid, widest near the middle, usually abruptly contracted to a stipitate base 0.1-3 (-7) mm long; ovary and capsule vestiture usually exclusively glandular, rarely with a few eglandular hairs; leaves mostly lanceolate or narrowly lanceolate, widest below the middle; [VA and e. KY northward] ..... ***Oenothera tetragona***
    9 Capsules clavate (ellipsoid in *O. species 2*), widest near the tip, gradually tapered to a slender stipitate base 3-15 mm long; ovary and capsule densely to sparsely strigillose, strigose, hirtellous, or pilose, sometimes mixed with glandular hairs.
     10 Leaves and stems densely velutinous (long, soft hairs); cauline leaves mostly 2-4× as long as wide, lance-oblong or lanceolate, remotely denticulate. ..... ***Oenothera species 2***
     10 Leaves finely strigose or strigillose, hairs closely appressed, stems strigillose to pilose; leaves linear-oblanceolate, linear-lanceolate, oblanceolate, elliptic, or lanceolate, mostly 5-10× as long as wide, nearly entire (remotely denticulate in *O. riparia* and *O. unguiculata*).
      14 Capsule body 3-5 mm long, subglobose; capsules and ovaries strigose-pilose or strigillose; [of the Piedmont or outer Atlantic Coastal Plain]. ..... ***Oenothera fruticosa var. subglobosa***
      14 Capsule body 6-11 mm long, obovoid; capsules and ovaries short-pilose, strigillose, hirtellous, and/or glandular-puberulent; [widespread in the southeast] ..... ***Oenothera fruticosa var. 1***

Oenothera biennis Linnaeus. COMMON EVENING-PRIMROSE. **Hab:** Fields, pastures, roadsides, disturbed areas. **Dist:** Ranging widely in e. North America and Europe, and scattered in w. North America. **Phen:** Jun-Sep (-Oct). **Syn:** = Ar, Fl4, FNA10, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, Tn, W, WH3, Dietrich, Wagner, & Raven (1997), Wagner, Hoch, & Raven (2007); = *Oenothera biennis* var. *biennis* – C; < *Oenothera biennis* Linnaeus – G, RAB, S, Va, WV; > *Oenothera biennis* ssp. *caeciarum* Munz – Munz (1965); > *Oenothera biennis* ssp. *centralis* Munz – Tx, Munz (1965); > *Oenothera biennis* var. *biennis* – F; > *Oenothera biennis* var. *pycnocarpa* (Atkinson & Bartlett) Wiegand – F.

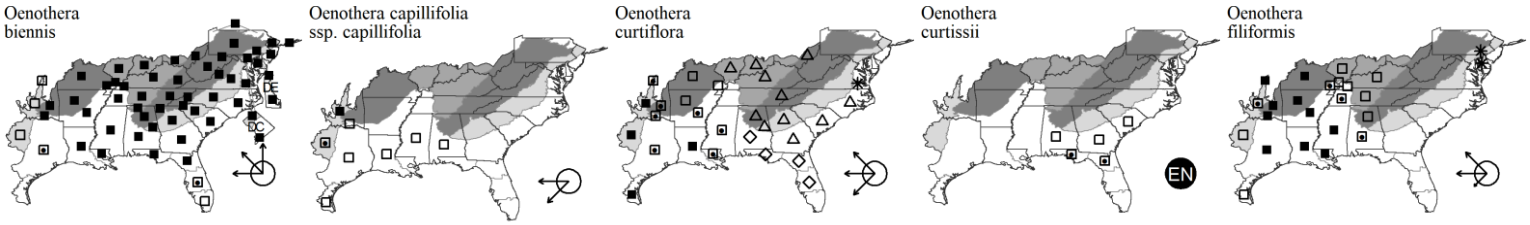
Oenothera capillifolia Scheele *ssp. **capillifolia***. **Hab:** Prairies and oak savannas, in sandy and rocky areas, especially calcareous. **Dist:** OK and NM south through s. LA and s. TX to Mexico; disjunct eastward in MS and AL. **Phen:** Mar-Sep. **Syn:** = FNA10, K4, Wagner, Krakos, & Hoch (2013); = *Calylophus berlandieri* ssp. *pinifolius* (Engelmann ex A. Gray) Towner – GrPl, K2, NcTx; = *Calylophus drummondianus* Spach ssp. *drummondianus* – Tx; = *Oenothera berlandieri* (Spach) Steudel ssp. *pinifolia* (Engelmann ex A. Gray) W.L. Wagner & Hoch – K3, Wagner, Hoch, & Raven (2007). NatureServe G5T4T5 (Apparently Secure).

Oenothera curtiflora W.L. Wagner & Hoch. SMALL-FLOWERED GAURA, VELVETY GAURA, LIZARDTAIL GAURA. **Hab:** Sandy fields, disturbed areas, and clearings. **Dist:** IN and IL west to WA, south to MS, and Mexico; apparently introduced eastward to MA, TN, GA, and SC (the exact eastern edge of the native distribution uncertain). **Phen:** May-Jul. **Tax:** Kartesz's (1999) adoption of *Gaura mollis* as the name for this taxon has been

rejected (Wagner & Hoch 2000; Brummitt 2001). **Syn:** = Fl4, FNA10, K3, K4, NE, Wagner, Hoch, & Raven (2007); = *Gaura mollis* James – K1; = *Gaura parviflora* Douglas ex Lehmann – Ar, F, G, GrPl, Il, NcTx, RAB, S, Tx, WH3; > *Gaura parviflora* var. *lachnocarpa* Weatherby – Munz (1965); > *Gaura parviflora* var. *parviflora* – Munz (1965). NatureServe G4G5 (Apparently Secure).

Oenothera curtissii Small. **Hab:** Longleaf pine sandhills, sandy fields, other dry disturbed areas. **Dist:** Se. SC south to n. peninsular FL, west to s. AL. **Phen:** May-Sep. **Tax:** Closely related to *O. rhombipetala*, which is restricted to the Great Plains, with scattered occurrences east to MI, IL, AR, and LA. **Syn:** = FNA10, K1, K3, K4, WH3, Dietrich & Wagner (1988), Wagner, Hoch, & Raven (2007); = *Raimannia curtissii* (Small) Rose ex Small – S; < *Oenothera rhombipetala* Nuttall ex Torrey & A. Gray – RAB, Munz (1965), misapplied.

Oenothera filiformis (Small) W.L. Wagner & Hoch. LARGE-FLOWERED GAURA, BIENNIAL GAURA, TALL GAURA. **Hab:** Glades, prairies, woodlands, shell middens and calcareous hammocks, openings in bottomland forests, disturbed areas, especially over calcareous soils. **Dist:** MI, WI, MN, SD, and NE, south to AL, MS, LA, TX, and Mexico. **Phen:** Jun-Oct. **Syn:** = FNA10, K3, K4, Mi, NE, Wagner, Hoch, & Raven (2007); = *Gaura biennis* Linnaeus var. *pitcheri* Torrey & A. Gray – C, F, G, Munz (1965); = *Gaura filiformis* ssp. *filiformis* – Tx; = *Gaura longiflora* Spach – Ar, GrPl, Il, K1, NcTx, Tn, preoccupied name; > *Gaura filiformis* Small – S; > *Gaura longiflora* Spach – S. NatureServe G4G5 (Apparently Secure).



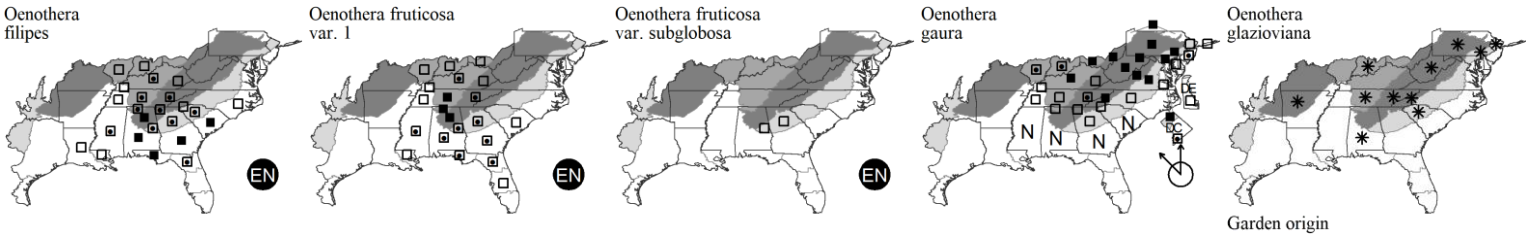
Oenothera filipes (Spach) W. L. Wagner & Hoch. THREADSTALK GAURA. **Hab:** Longleaf pine sandhills, pine flatwoods, barrens, prairies, sandy fields, disturbed areas, and clearings. **Dist:** SC west to n. TN and s. IN, south to ne. FL and e. and w. LA. **Phen:** Apr-Jul. **Syn:** = Fl4, K3, K4, Wagner, Hoch, & Raven (2007); = *Gaura filipes* Spach – C, G, Il, K1, RAB, Tn, W, WH3; = *Gaura michauxii* Spach – S; > *Gaura filipes* var. *filipes* – F, Munz (1965); > *Gaura filipes* var. *major* Torrey & A. Gray – F, Munz (1965). NatureServe G5 (Secure).

Oenothera fruticosa* var. *1. GLANDULAR SUNDROPS. **Hab:** Calcareous barrens, post oak savannahs and flatwoods, other dry to mesic, rocky or sandy woodlands. **Dist:** S. SC west to MS and north to IL and OH. **Phen:** May-Aug. **ID Notes:** This is the more western component of *O. fruticosa*, distinguished by predominantly glandular pubescence (also with sparse eglandular hairs intermixed) on capsules, floral tubes, and sepals.

Oenothera fruticosa Linnaeus *var.* ***subglobosa*** (Small) Munz. FLATROCK SUNDROPS. **Hab:** Granite flatrocks and domes. **Dist:** GA to e. AL. **Phen:** Apr-Aug. **Tax:** Probably warranting specific rank. **Syn:** = Munz (1965); = *Kneiffia subglobosa* Small – S; < *Oenothera fruticosa* – C, RAB; < *Oenothera fruticosa* Linnaeus ssp. *fruticosa* – FNA10, K1, K3, K4, Straley (1977), Wagner, Hoch, & Raven (2007).

Oenothera gaura W.L. Wagner & Hoch. BIENNIAL GAURA, NORTHEASTERN GAURA. **Hab:** Barrens, glades, woodlands, roadsides, streambanks, fields, disturbed areas. **Dist:** MA and NY west to WI, se. MN, and IA, south to sw. NC, c. GA (Jones & Coile 1988), sc. TN, and c. IL. **Phen:** Jun-Oct. **Syn:** = FNA10, K3, K4, Mi, NE, NY, Va, Wagner, Hoch, & Raven (2007); = *Gaura biennis* Linnaeus – Il, K1, Pa, RAB, S, Tn, W, WV; > *Gaura biennis* var. *biennis* – C, F, G, Munz (1965). NatureServe G5 (Secure).

* ***Oenothera glazioviana*** Micheli. GARDEN EVENING-PRIMROSE. **Hab:** Disturbed areas. **Dist:** This species apparently arose as a garden hybrid, and has been widely cultivated and naturalized nearly worldwide. **Phen:** Aug-Oct. **Syn:** = Ar, FNA10, Il, K1, K3, K4, Mi, NE, NY, Pa, Tn, Dietrich, Wagner, & Raven (1997), Wagner, Hoch, & Raven (2007); = *Oenothera erythrosepala* Borbás – Munz (1965); < *Oenothera biennis* Linnaeus – Va.



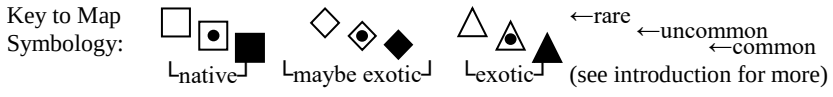
Oenothera grandiflora L'Héritier ex Aiton. **Hab:** Woodlands, river-banks, disturbed areas. **Dist:** Apparently native to Panhandle FL, AL, and MS; scattered elsewhere as a horticultural plant. **Phen:** Jun-Oct. **Syn:** = F, Fl4, FNA10, K1, K3, K4, NE, Pa, S, Tn, WH3, Dietrich, Wagner, & Raven (1997), Munz (1965), Wagner, Hoch, & Raven (2007). NatureServe G3G5 (Apparently Secure).

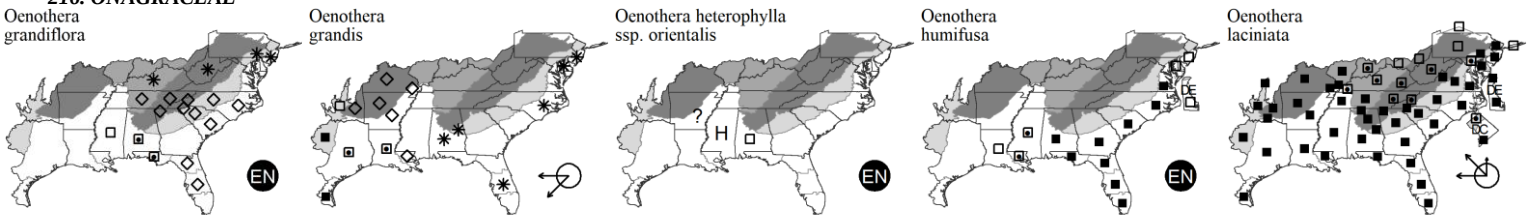
Oenothera grandis (Britton) Smyth. SHOWY RAGGED EVENING-PRIMROSE. **Hab:** Upland prairies, roadsides, other disturbed (especially sandy) areas. **Dist:** IL, MO, and NE south to LA, TX, NM, and Mexico. **Phen:** Mar-Jul (-Sep). **Syn:** = Ar, FNA10, GrPl, Il, K1, K3, K4, NcTx, NY, Tx, WH3, Dietrich & Wagner (1988), Munz (1965), Wagner, Hoch, & Raven (2007); = *Oenothera laciniata* Hill var. *grandiflora* (S. Watson) B.L. Robinson – F, G, RAB. NatureServe G5? (Secure).

Oenothera heterophylla Spach *ssp.* ***orientalis*** W. Dietrich, Raven, & W.L. Wagner. ALABAMA EVENING-PRIMROSE. **Hab:** Sandy, open areas. **Dist:** Endemic to w. AL (Pickens and Sumter counties), sw. AR, and MS (Tombigbee barrens, J. Kees, pers.comm. 2021). **Phen:** May-Jul. **Syn:** = Ar, FNA10, K3, K4, Wagner, Hoch, & Raven (2007). NatureServe G4TU (Unrankable).

Oenothera humifusa Nuttall. SEABEACH EVENING-PRIMROSE, SPREADING EVENING-PRIMROSE. **Hab:** Coastal sand dunes. **Dist:** S. NJ south to s. FL, west to s. LA, along the coast. **Phen:** (Jan-) May-Oct (-Dec). **Syn:** = C, F, Fl4, FNA10, G, K1, K3, K4, RAB, Va, WH3, Dietrich & Wagner (1988), Munz (1965), Wagner, Hoch, & Raven (2007); > *Raimannia humifusa* (Nuttall) Rose – S; > *Raimannia mollissima* (Linnaeus) Sprague & Riley – S, misapplied. NatureServe G5 (Secure).

Oenothera laciniata Hill. CUTLEAF EVENING-PRIMROSE. **Hab:** Disturbed areas. **Dist:** ME west to ND, south to s. FL and TX; also in CA. **Phen:** (Feb-) Apr-Sep (-Nov). **Syn:** = Ar, Fl4, FNA10, GrPl, Il, K1, K3, K4, Meso4.1, Mi, NcTx, NE, NY, Pa, Tn, Tx, Va, W, WH3, WV, Wagner, Hoch, & Raven (2007); = *Oenothera laciniata* ssp. *laciniata* – Munz (1965); = *Oenothera laciniata* var. *laciniata* – C, F, G, RAB; = *Raimannia laciniata* (Hill) Rose – S. NatureServe G5 (Secure).





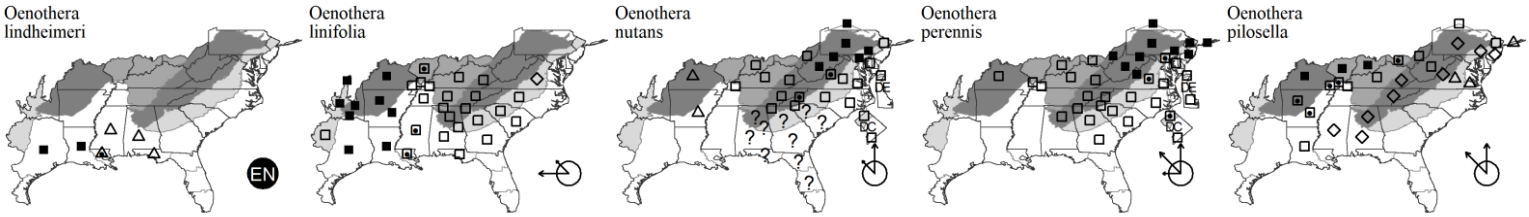
Oenothera lindheimeri (Engelmann & A. Gray) W.L. Wagner & Hoch. LINDHEIMER'S BEEBLOSSOM. **Hab:** Coastal prairies; eastwards on roadsides and in other disturbed areas. **Dist:** W. LA and TX; scattered eastwards (perhaps only as introductions) in e. LA (the Florida parishes), s. MS, s. AL, and Panhandle FL. **Phen:** Late Apr-Jul (-Aug). **Syn:** = Fl4, FNA10, K3, K4, Wagner, Hoch, & Raven (2007); = *Gaura lindheimeri* Engelmann & A. Gray – K1, NcTx, Tx, WH3. NatureServe G3G5 (Apparently Secure).

Oenothera linifolia Nuttall. THREADLEAF SUNDROPS, FLAXLEAF SUNDROPS. **Hab:** Barrens, glades, dry openings, and fields. **Dist:** C. VA west to s. IL and se. KS, south to Panhandle FL and se. TX. Occurrences east of the Mississippi River may be mainly or entirely adventive. Belden et al. (2004) discuss the Virginia occurrence. **Phen:** May-Jul. **Syn:** = Ar, C, F, Fl4, FNA10, G, GrPl, Il, K1, K3, K4, NcTx, RAB, Tn, Tx, Va, W, WH3, Munz (1965), Straley (1977), Wagner, Hoch, & Raven (2007); = *Peniophyllum linifolium* (Nuttall) Pennell – S. NatureServe G5 (Secure).

Oenothera nutans Atkinson & Bartlett. NODDING EVENING-PRIMROSE. **Hab:** Roadsides, openings, forest edges, pastures. **Dist:** ME west to MI, south to n. FL, s. AL, and s. MO. **Phen:** Jun-Oct. **Syn:** = Fl4, FNA10, K1, K3, K4, NE, NY, Pa, Tn, WH3, Dietrich, Wagner, & Raven (1997), Wagner, Hoch, & Raven (2007); = *Oenothera austromontana* (Munz) Raven, Dietrich, & Stubbe – W; = *Oenothera biennis* ssp. *austromontana* Munz – Munz (1965); = *Oenothera biennis* Linnaeus var. *austromontana* (Munz) Cronquist – C; = *Oenothera biennis* var. *nutans* (Atkinson & Bartlett) Wiegand – F; < *Oenothera biennis* Linnaeus – G, RAB, S, Va, WV.

Oenothera perennis Linnaeus. LITTLE SUNDROPS. **Hab:** Bogs, sphagnous seeps, moist fields. **Dist:** NS west to MB, south to w. NC, nw. SC, KY, and MO. **Phen:** May-Aug. **Syn:** = C, FNA10, G, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, Tn, Va, W, WV, Munz (1965), Wagner, Hoch, & Raven (2007); = *Kneiffia perennis* (Linnaeus) Pennell – S; > *Oenothera perennis* var. *perennis* – F.

Oenothera pilosella Rafinesque. MIDWESTERN EVENING-PRIMROSE. **Hab:** Fens, marshes, swamps, moist fields, disturbed areas. **Dist:** NH west to ON, south to s. VA, KY, n. AL, c. MS, and c. LA; widely cultivated, many occurrences eastward and southward likely represent introductions. **Phen:** May-Jul. **Comm:** *O. sessilis* (Pennell) Munz, treated by Straley (1977) as *O. pilosella* ssp. *sessilis* (Pennell) Straley, is best recognized as a species; it is restricted to West Gulf Coastal Plain. **Syn:** = F, FNA10, G, Il, K4, Mi, Pa, Tn, Va, WV, Munz (1965); = *Oenothera pilosella* ssp. *pilosella* – Ar, C, K1, K3, NE, NY, Straley (1977), Wagner, Hoch, & Raven (2007); > *Kneiffia pratensis* Small – S. NatureServe G5T5? (Secure).



Oenothera simulans (Small) W.L. Wagner & Hoch. SOUTHEASTERN GAURA, SOUTHERN BEE-BLOSSOM. **Hab:** Longleaf pine sandhills, other open woodlands, sandy fields, roadsides, primarily in the outer Coastal Plain. **Dist:** E. NC (Dare County) south to s. FL, west to e. TX, endemic to the Coastal Plain. **Phen:** May-Sep. **Syn:** = Fl4, FNA10, K3, K4, Wagner, Hoch, & Raven (2007); = *Gaura angustifolia* Michaux – Bah, K1, RAB, S, WH3; > *Gaura angustifolia* var. *angustifolia* – Munz (1965). NatureServe G5 (Secure).

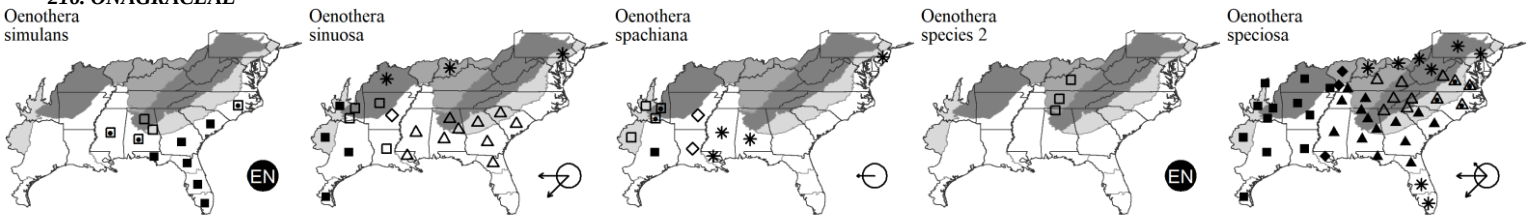
Oenothera sinuosa W.L. Wagner & Hoch. TEXAS GAURA. **Hab:** Sandy fields, disturbed areas, and clearings. **Dist:** Native of farther west. AR and OK south to s. TX, introduced eastward to SC and FL. **Phen:** Apr-Oct. **Syn:** = Fl4, FNA10, K3, K4, Wagner, Hoch, & Raven (2007); = *Gaura sinuata* Nuttall ex Seringe – Ar, GrPl, K1, NcTx, RAB, Tx, WH3, Munz (1965). NatureServe G4G5 (Apparently Secure).

Oenothera spachiana Torrey & A. Gray. SPACH'S EVENING-PRIMROSE. **Hab:** Prairies, open woodlands, sandy areas. **Dist:** Sw. AR and OK south to w. LA and e. TX; disjunct eastwards in MS and AL. **Phen:** Apr-May. **Comm:** {not yet keyed}. **Syn:** = Ar, FNA10, K3, K4, NcTx, Tx, Wagner, Hoch, & Raven (2007). NatureServe G5 (Secure).

Oenothera species 2. **Hab:** Cumberland Plateau oak savannas and prairies. **Dist:** Known from the Eastern Highland Rim of TN, AL, and KY. **Syn:** = *Oenothera tetragona* ssp. *tetragona* var. *sharpii* – Munz (1965); < *Oenothera fruticosa* Linnaeus ssp. *fruticosa* – FNA10, K1, K3, K4, W, Straley (1977), Wagner, Hoch, & Raven (2007); < *Oenothera fruticosa* ssp. *tetragona* (Roth) W.L. Wagner – Wagner (2014); < *Oenothera tetragona* Roth – C, RAB, Tn; < *Oenothera tetragona* Roth var. *tetragona* – G.

Oenothera speciosa Nuttall. WHITE EVENING-PRIMROSE, PINK-LADIES. **Hab:** Grasslands, prairies, glades, roadsides and fields, also cultivated as an ornamental. **Dist:** The original distribution obscured by subsequent cultivation and spread, but apparently something like IA and NE south to LA, TX, NM, and Mexico. **Phen:** (Feb-) Apr-Jul (-Oct). **Tax:** Substantial variation in ploidy (n= 7, 14, 21), color (white, pink), and flower-opening time (morning, evening) is here included uncomfortably in one taxon. Great Plains Flora Association (1986) discussed "Most of our plants are diploid, with white flowers that open in the evening. In se. KS rare roadside colonies are tetraploid, with rose-purple flowers that open in the morning". **Syn:** = Ar, C, F, Fl4, FNA10, G, GrPl, Il, K1, K3, K4, NcTx, Pa, RAB, Tn, Tx, Va, W, WH3, Munz (1965), Wagner, Hoch, & Raven (2007); = *Hartmannia speciosa* (Nuttall) Small – S. NatureServe G5 (Secure).

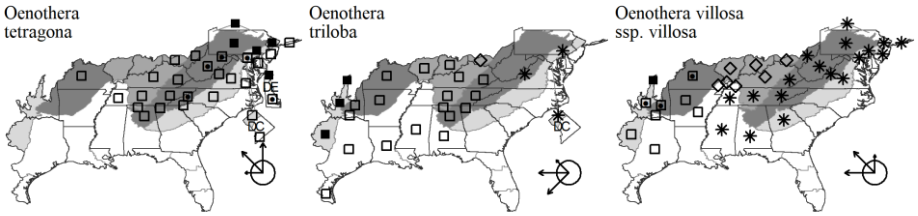
Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



Oenothera tetragona Roth. NORTHERN SUNDROPS. **Hab:** Moist to wet meadows, woodlands, stream margins, river-scours, rocky shoals. **Dist:** NL (Newfoundland) west to MI, south to e. VA and MO. **Phen:** May-Aug. **Tax:** Pubescence and leaf shape vary widely in this species, approaching both *O. fruticosa* var. *fruticosa* (see notes under that species) and *O. hybrida*; as here circumscribed *O. tetragona* may include multiple entities. **Syn:** > *Kneiffia latifolia* Rydberg – S; > *Kneiffia tetragona* (Roth) Pennell – S; > *Kneiffia velutina* Pennell – S; < *Oenothera fruticosa* Linnaeus ssp. *glauca* (Michaux) Straley – FNA10, K1, K3, Pa, W, Straley (1977), Wagner, Hoch, & Raven (2007); < *Oenothera fruticosa* ssp. *tetragona* (Roth) W.L. Wagner – K4, NY, Wagner (2014); < *Oenothera tetragona* Roth – C, RAB, Tn, Va; > *Oenothera tetragona* ssp. *tetragona* var. *tetragona* – Munz (1965); > *Oenothera tetragona* ssp. *tetragona* var. *velutina* (Pennell) Munz – Munz (1965); > *Oenothera tetragona* var. *latifolia* (Rydberg) Fernald – F, WV; > *Oenothera tetragona* Roth var. *tetragona* – F.

Oenothera triloba Nuttall. STEMLESS EVENING-PRIMROSE. **Hab:** Limestone glades, blackbelt prairies, playas, floodplains; eastwards also in disturbed areas. **Dist:** MO and KS south through AR, OK, and e. NM to ne. LA, TX, and Mexico; also scattered east of the Mississippi River in both native and apparently introduced populations. **Phen:** (Feb-) Mar-Jun (-Jul). **Syn:** = Ar, C, F, FNA10, G, GrPl, Il, K1, K3, K4, NcTx, NY, Pa, Tn, Tx, Munz (1965), Wagner, Hoch, & Raven (2007); = *Lavauxia triloba* (Nuttall) Spach – S. NatureServe G4 (Apparently Secure).

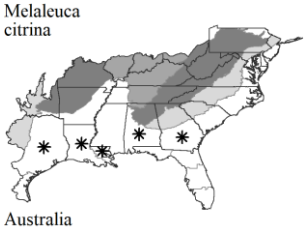
Oenothera villosa Thunberg *ssp. **villosa***. **Hab:** Prairies, eastwards naturalized in fields, roadsides, other disturbed areas. **Dist:** ON west to AB, south to AR and TX. **Phen:** Jun-Oct. **Syn:** = Ar, FNA10, GrPl, K1, K3, K4, NE, NY, Dietrich, Wagner, & Raven (1997), Wagner, Hoch, & Raven (2007); < *Oenothera biennis* Linnaeus – Va; ? *Oenothera biennis* var. *canescens* Torrey & A. Gray – C, F; ? *Oenothera strigosa* (Rydberg) Mackenzie & Bush – G; ? *Oenothera strigosa* (Rydberg) Mackenzie & Bush ssp. *canovirens* (Steele) Munz – Munz (1965); < *Oenothera villosa* – Il, Mi, Pa, Tn.



218. MYRTACEAE A.L. de Jussieu 1789 (MYRTLE FAMILY) [in MYRTALES]

A family of about 100-142 genera and 3500-5500 species, trees and shrubs, nearly worldwide in tropical and subtropical areas. References: Wilson in Kubitzki (2011); Wilson (1960c).

Melaleuca Linnaeus 1767 (CAJEPUT, BOTTLEBRUSH, PUNKTREE)



A genus of about 300 species (if circumscribed, as here, to include *Callistemon*), trees and shrubs, of tropical and subtropical Australia and nearby Asia and Pacific Islands. References: Craven (2021) in FNA10 (2021); Wilson in Kubitzki (2011); Wilson (1960c).

* ***Melaleuca citrina*** (Curtis) Dumont de Courset. CRIMSON BOTTLEBRUSH. **Hab:** Disturbed areas. **Dist:** Native of Australia. **Phen:** Apr-May. **Syn:** = FNA10, K3, K4. NatureServe GNR (Not Yet Ranked).

219. MELASTOMATACEAE A.L. de Jussieu 1789 (MELASTOME FAMILY) [in MYRTALES]

A family of about 150-200 genera and about 5000 species, trees, shrubs, vines, and herbs, of tropical, subtropical , and warm temperate areas. References: Nesom (2021d) in FNA10 (2021).

Rhexia Linnaeus 1753 (MEADOW-BEAUTY)

Contributed by Richard J. LeBlond

A genus of about 13 species, herbs, of North America. *Rhexia* is the only genus of the Melastomataceae to occur in North America north of s. FL. References: Bounds (1987); Kral & Bostick (1969); Nesom (2012a); Snyder (1996); Wurdack & Kral (1982).

Identification Notes: Measurements of the hypanthium are to the base of the calyx lobes.

1 Anthers 1-3.5 (-4) mm long, straight to slightly curved.

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

2 Petals white (rarely pale lavender); anthers (2-) 3-3.5 (-4) mm long, usually longer than the filaments; [pond margins in sw. GA and Panhandle FL]; [section *Rhexia*] ..... ***Rhexia parviflora***
2 Petals either yellow or lavender-rose to pink; anthers 1-2.5 mm, usually shorter than the filaments; [collectively more widespread].
3 Stem internodes with at least some hairs; leaves oblong, linear, or spatulate; petals yellow; [section *Luteorhexia*] ..... ***Rhexia lutea***
3 Stem internodes glabrous; leaves ovate, suborbicular, or widely elliptic; petals lavender-rose to pink; [section *Brevianthera*].
..... ***Rhexia petiolata***
1 Anthers 5-11 mm long, distinctly curved.
5 Stem nodes and internodes glabrous; stem and foliage blue-green; [section *Cymborhexia*] ..... ***Rhexia alifanus***
5 Stem nodes and usually also the internodes hirsute; stem and foliage green; [section *Rhexia*].
6 Sepal lobes aristate, the awn-tip 0.5-1.5 mm long, and also with flaring, yellowish, stiff hairs 3-5 mm long ..... ***Rhexia aristosa***
6 Sepal lobes obtuse to acuminate, not aristate, the hairs shorter and not yellowish or stiff.
7 Leaves 1-5 (-8) mm wide, linear, linear-elliptic, narrowly oblong, or narrowly spatulate.
8 Leaves twisted at base, borne in a vertical plane; four stem faces subequal, the angles narrowly winged; mature hypanthium neck shorter than body; calyx lobes 1.5-2 mm long; anthers 4-5 mm long ..... ***Rhexia salicifolia***
8 Leaves not twisted at base, borne more or less horizontally; four stem faces markedly unequal, the angle wings inconspicuous or absent; mature hypanthium neck as long as or longer than body; calyx lobes 2-4 mm long; anthers 5-10 mm long.
9 Petals lavender-rose, (1-) 1.5-2.7 cm long; mature hypanthium 10-14 mm long, with glandular hairs; marginal nerves of leaf abaxial surface either absent or obscure and discontinuous; anthers 7-10 mm long ..... ***Rhexia cubensis***
9 Petals white to pink (-rose-purple), (7-) 0.9-1.4 cm long; mature hypanthium 6-10 mm long, glabrous or sparsely glandular-hairy; marginal nerves of leaf abaxial surface prominent; anthers 5-8 mm long ..... ***Rhexia mariana var. exalbida***
7 Leaves (5-) 7-20 (-35) mm wide, lanceolate, elliptic, or ovate.
10 Four stem faces at mid-stem markedly unequal, one pair of opposite faces broader, convex, darker green, the narrower pair concave or flat, pale, the arrangement of broader and narrower faces alternating at each subsequent internode.
11 Mature hypanthium 6-10 (-11) mm long, glandular-setose; petals 12-15 (-18) mm long, glabrous on the lower surface; anthers 5-8 mm long .....
..... ***Rhexia mariana var. mariana***
11 Mature hypanthium (9-)10-15 (-20) mm long, glabrous or glabrate; petals (18-) 20-25 mm long, glandular-hairy on the lower surface (best seen in bud); anthers 8-11 mm long ..... ***Rhexia nashii***
10 Four stem faces at mid-stem about equal, almost flat, the angles sharp or winged.
12 Roots tuberous; stem angles at mid-stem conspicuously winged; hypanthium 7-10 mm long, the neck shorter than the body ..... ***Rhexia virginica***
12 Roots not tuberous; stem angles sharp to narrowly winged; hypanthium 10-13 mm long, the neck as long as or longer than the body.
..... ***Rhexia interior***

Alternate Key - based largely on vegetative characters

1 Stem internodes glabrous.
2 Stem nodes as well as internodes glabrous, leaf margins entire or remotely low-toothed apically, glabrous ..... ***Rhexia alifanus***
2 Stem nodes hirsute, leaf margins toothed, the teeth often tipped with hairs.
3 Longest leaves 1.5 (-2) cm long, ovate or suborbicular
..... ***Rhexia petiolata***
3 Longest leaves > 2 cm long, lanceolate, elliptic, or ovate.
6 Stem leaves gradually reduced upward ..... ***Rhexia virginica***
6 Stem leaves gradually lengthening from the base to mid-stem ..... ***Rhexia aristosa***
1 Stem internodes (and nodes) hirsute or glandular-hairy.
7 Leaves lanceolate, elliptic, or ovate, broadest at or below the middle.
8 Four stem faces at mid-stem markedly unequal, one pair of opposite faces broader, convex, darker green, the narrower pair concave or flat, pale.
9 Mature hypanthium 6-10 mm long, glandular-hairy; petals 1.2-1.5 cm long, glabrous on the lower surface ..... ***Rhexia mariana var. mariana***
9 Mature hypanthium 10-15 mm long, glabrous or glabrate; petals 2.0-2.5 cm long, glandular-hairy on lower surface (best seen in bud) .....
..... ***Rhexia nashii***
8 Four stem faces at mid-stem about equal, almost flat, the angles sharp or winged.
10 Roots not rhizome-like; roots tuberiferous or spongy-thickened ..... ***Rhexia virginica***
10 Some roots rhizome-like, with adventitious buds; roots not tuberiferous or spongy-thickened.
..... ***Rhexia interior***
7 Leaves linear, narrowly elliptic, or broadest above the middle.
12 Plant bushy-branched ..... ***Rhexia lutea***
12 Plant simple below the cymose inflorescence.
13 Leaves twisted at base, borne in a vertical plane; four stem faces subequal, the angles narrowly winged ..... ***Rhexia salicifolia***
13 Leaves not twisted at base, borne more or less horizontally; four stem faces markedly unequal, the angle wings inconspicuous or absent.
14 Mature hypanthium 10-14 mm long, with glandular hairs; petals lavender-rose, 1.5-2.0 cm long ..... ***Rhexia cubensis***
14 Mature hypanthium 6-10 mm long, glabrous or sparsely glandular-hairy; petals white, 1.2-1.5 cm long ..... ***Rhexia mariana var. exalbida***

Rhexia alifanus Walter. SMOOTH MEADOW-BEAUTY. **Hab:** Pine flatwoods and savannas, pocosin borders, more able to tolerate merely moist soils than other *Rhexia* species. **Dist:** A Southeastern Coastal Plain species: e. NC south to n. peninsular FL and west to se. Texas (Singhurst, Mink, & Holmes 2010). **Phen:** May-Sep. **ID Notes:** Our tallest and showiest *Rhexia*: the unbranched (unless injured), wand-like stems, with strongly ascending, bluish-green, waxy-smooth, and generally entire leaves make this species unmistakable. **Syn:** = Fl4, FNA10, GW2, K1, K3, K4, RAB, S, WH3, Kral & Bostick (1969), Nesom (2012a). NatureServe G5? (Secure).

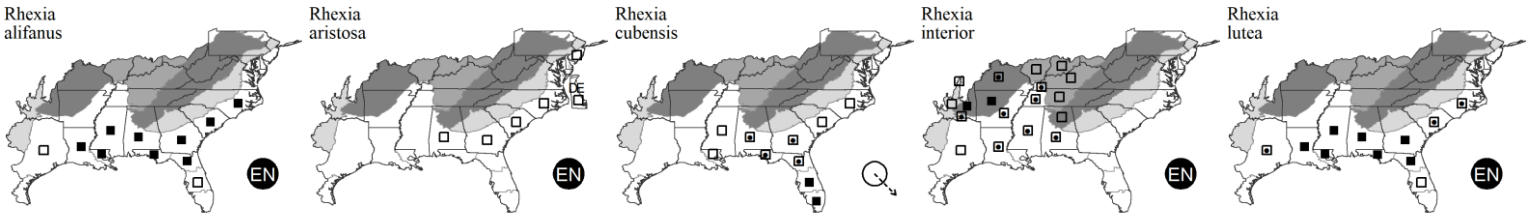
Rhexia aristosa Britton. AWNED MEADOW-BEAUTY, BRISTLY MEADOW-BEAUTY. **Hab:** Clay-based Carolina bays, depression meadows, and limesink ponds (dolines). **Dist:** This species has a very local and disjunct range extending (strictly on the Coastal Plain) from NJ south to AL. **Phen:** Jun-Sep. **Tax:** *R. aristosa* × *virginica* is known from the Coastal Plain of NJ (Snyder 1996). **ID Notes:** The long yellowish bristles at the summit of the calyx/hypanthium are diagnostic. **Syn:** = C, F, FNA10, G, GW2, K1, K3, K4, RAB, S, Kral & Bostick (1969), Nesom (2012a). NatureServe G3G4 (Vulnerable).

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated

Rhexia cubensis Grisebach. WEST INDIAN MEADOW-BEAUTY. **Hab:** Limesink ponds (dolines). Drawdown zones of depression ponds such as Carolina bays or limesink ponds (dolines), Pond-cypress savannas and depression meadows; farther south (especially in FL) in wet pine flatwoods, dome swamps, hammock edges, pond and lake margins, pine savannas, ditches, and moist roadsides. **Dist:** Se. NC south to s. FL and west to sw. MS; also in the West Indies. **Phen:** Jun-Sep. **Syn:** = Fl4, FNA10, GW2, K1, K3, K4, RAB, S, WH3, Kral & Bostick (1969), Nesom (2012a). NatureServe G4G5 (Apparently Secure).

Rhexia interior Pennell. OZARK MEADOW-BEAUTY. **Hab:** Moist to wet areas, ditches, prairies. **Dist:** S. IN, s. IL, s. MO, and se. KS south to c. AL, c. MS, n. LA, and se. OK. **Phen:** Jun-Oct. **Syn:** = F, FNA10, G, Tx, Nesom (2012a); = *Rhexia mariana* Linnaeus var. *interior* (Pennell) Kral & Bostick – Ar, GrPl, GW2, K1, K3, K4, Tn, Kral & Bostick (1969); < *Rhexia interior* Pennell – C. NatureServe G5T4T5 (Apparently Secure).

Rhexia lutea Walter. YELLOW MEADOW-BEAUTY, GOLDEN MEADOW-BEAUTY. **Hab:** Wet pine flatwoods and savannas, seepage slopes, and bogs. **Dist:** A Southeastern Coastal Plain species: e. NC south to ne. FL and Panhandle FL, and west to se. TX. **Phen:** Apr-Jul (-Sep). **ID Notes:** The only yellow-flowered *Rhexia* and also our most bushy-branched species. **Syn:** = Fl4, FNA10, GW2, K1, K3, K4, RAB, S, Tx, WH3, Kral & Bostick (1969), Nesom (2012a). NatureServe G5 (Secure).



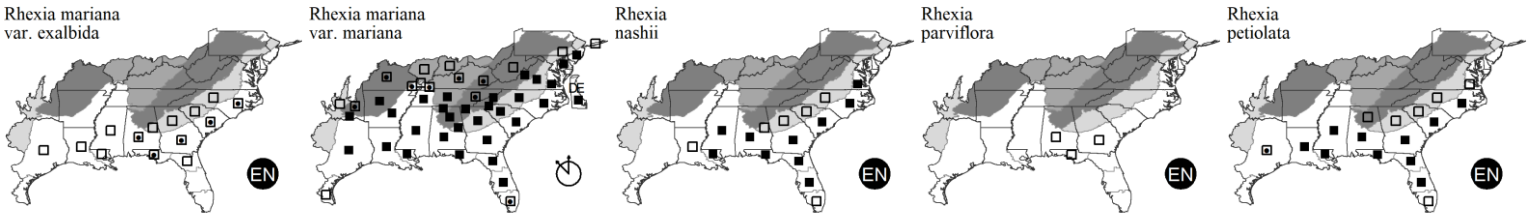
Rhexia mariana Linnaeus *var*. ***exalbida*** Michaux. WHITE MEADOW-BEAUTY. **Hab:** Wet pine flatwoods and savannas, wet meadows, ditches, and wet roadsides. **Dist:** NC south to FL and west to e. TX. **Phen:** Jun-Sep. **Tax:** Reported to merge into *R. mariana* var. *mariana* from FL westward, but var. *exalbida* appears quite distinct at species rank. **ID Notes:** The white flowers and linear leaves are diagnostic. **Syn:** = FNA10, RAB, Tx; = *Rhexia lanceolata* Walter – S; < *Rhexia mariana* – Fl4, WH3; < *Rhexia mariana* Linnaeus var. *mariana* – GW2, K1, K3, K4, Kral & Bostick (1969).

Rhexia mariana Linnaeus *var*. ***mariana***. MARYLAND MEADOW-BEAUTY, DULL MEADOW-BEAUTY, PALE MEADOW-BEAUTY. **Hab:** Pine flatwoods, wet meadows, bog margins, ditches, wet roadsides, often weedy. **Dist:** E. MA south to s. FL, west to TX, and north to s. IN and IL. **Phen:** Early Mar-Oct. **Syn:** = Ar, FNA10, G, NcTx, NE, NY, RAB, Tn, Tx, Va, W; > *Rhexia delicatula* Small – S; < *Rhexia mariana* – Fl4, Il, Mi, Pa, WH3, WV; > *Rhexia mariana* – S; > *Rhexia mariana* var. *leiosperma* Fernald & Griscom – F; < *Rhexia mariana* Linnaeus var. *mariana* – F, GW2, K1, K3, K4, Kral & Bostick (1969).

Rhexia nashii Small. HAIRY MEADOW-BEAUTY, MAID MARIAN. **Hab:** Wet pine flatwoods and savannas; pond shores, bogs, marshes, ditches, wet roadsides. **Dist:** Primarily a Southeastern Coastal Plain species: e. VA south to s. FL and west to se. LA. **Phen:** May-Oct. **Syn:** = Fl4, FNA10, GW2, K1, K3, K4, S, Va, WH3, Kral & Bostick (1969), Nesom (2012a); = *Rhexia mariana* var. *purpurea* Michaux – F, G, RAB. NatureServe G5 (Secure).

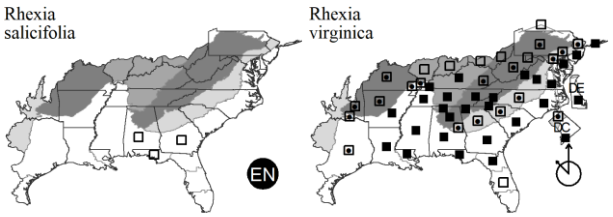
Rhexia parviflora Chapman. SMALL-FLOWERED WHITE MEADOW-BEAUTY, APALACHICOLA MEADOW-BEAUTY. **Hab:** Limesink pond margins. **Dist:** Sw. GA (Mitchell County) and se. AL south into Panhandle FL. **Syn:** = Fl4, FNA10, GW2, K1, K3, K4, S, WH3, Kral & Bostick (1969), Nesom (2012a). NatureServe G2G3 (Imperiled).

Rhexia petiolata Walter. CILIATE MEADOW-BEAUTY, SHORT MEADOW-BEAUTY, FRINGED MEADOW-BEAUTY. **Hab:** Wet pine flatwoods and savannas, pocosin borders, and ditches. **Dist:** A Southeastern Coastal Plain endemic: se. VA south to s. FL and west to se. TX. **Phen:** May-Oct. **Comm:** The flowers are sessile, the petals ascending. **Syn:** = C, Fl4, FNA10, G, GW2, K1, K3, K4, RAB, Tx, Va, WH3, Kral & Bostick (1969), Nesom (2012a); = *Rhexia ciliosa* Michaux – F, S. NatureServe G5? (Secure).



Rhexia salicifolia Kral & Bostick. WILLOWLEAF MEADOW-BEAUTY, PANHANDLE MEADOW-BEAUTY. **Hab:** Drawdown zones of Coastal Plain depression ponds and interdune swales. **Dist:** Sw. GA and FL Panhandle west to s. AL (Jensen 2007). **Syn:** = Fl4, FNA10, GW2, K1, K3, K4, WH3, Kral & Bostick (1969), Nesom (2012a). NatureServe G3 (Vulnerable).

Rhexia virginica Linnaeus. VIRGINIA MEADOW-BEAUTY, DEERGRASS, HANDSOME HARRY, WING-STEM MEADOW-BEAUTY. **Hab:** Wet pine flatwoods and savannas, pond shores, bogs, and ditches. **Dist:** E. Canada and WI south to ne. FL, Panhandle FL, and TX. **Phen:** May-Oct. **Syn:** = Ar, C, Fl4, FNA10, G, GW2, Il, K1, K3, Mi, NcTx, NE, NY, Pa, Tn, Tx, Va, W, WH3, WV, Kral & Bostick (1969), Nesom (2012a); = *Rhexia stricta* Pursh – S; > *Rhexia virginica* var. *purshii* (Sprengel) C.W. James – RAB; > *Rhexia virginica* var. *septemnervia* (Walter) Pursh – F; > *Rhexia virginica* var. *virginica* – F, RAB. NatureServe G5 (Secure).

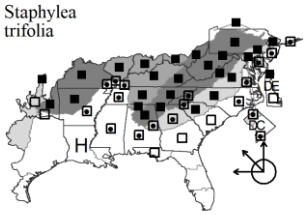


Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

226. STAPHYLEACEAE Martinov 1820 (BLADDERNUT FAMILY) [in CROSSOSOMATALES]

A family of 2 genera and about 45 species, trees and shrubs, of mainly temperate Northern Hemisphere, especially e. Asia. References: Brouillet (2014) in FNA9 (2014); Simmons in Kubitzki, Bayer, & Stevens (2007); Spongberg (1971).

Staphylea Linnaeus 1753 (BLADDERNUT)



A genus of 23 species, trees and shrubs, mainly of temperate Eurasia and e. North America, but extending into Central and South America. References: Brouillet (2014) in FNA9 (2014); Simmons in Kubitzki, Bayer, & Stevens (2007).

Identification Notes: *Staphylea* is readily recognized as a shrub or small tree with opposite, trifoliolate leaves with serrulate margins.

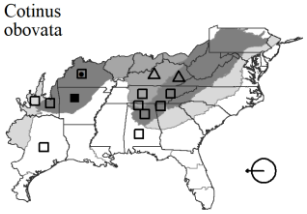
Staphylea trifolia Linnaeus. BLADDERNUT. **Hab:** Nutrient-rich bottomland forests, extending upslope over calcareous or mafic rocks. **Dist:** QC west to MN, south to sw. GA, Panhandle FL, n. AL, n. MS, and OK. **Phen:** Apr-May; Aug-Oct. **Syn:** = Ar, C, F, Fl4, G, GrPl, GW2, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Va, W, WH3, WV, Spongberg (1971). NatureServe G5 (Secure).

239. ANACARDIACEAE R. Brown 1818 (CASHEW FAMILY) [in SAPINDALES]

A family of about 70-81 genera and about 800-875 species, trees, shrubs, lianas, and rarely herbs, of tropical, subtropical, and temperate regions. Our representatives are all classed in subfamily Anacardioideae (Pell et al. 2011). References: Barkley (1937); Pell et al. in Kubitzki (2011).

1 Leaves simple
..... ***Cotinus***
1 Leaves compound.
3 Leaves 3-foliolate.
4 Terminal leaflet sessile; fruit red, glandular-pubescent; foliage and stems lacking contact poisons..... ***Rhus***
4 Terminal leaflet distinctly petiolulate; fruit white or greenish, glabrous or with scattered trichomes; foliage and stems containing contact poisons .....
..... ***Toxicodendron***
3 Leaves pinnately compound, with (3-) 5-41 leaflets (at least the larger and better-developed on a plant with 5 or more leaflets).
5 Leaf rachis winged (with a flange of leaf tissue, often irregular in width and terminating at each leaflet attachment).
6 Fruits glandular-pubescent; stamens 5; inflorescence a terminal panicle, the central axis upright as a continuation of the stem..... ***Rhus***
6 Fruits glabrous; stamens 10; inflorescence of axillary panicles, the central axis angled from the main stem..... ***Schinus terebinthifolia***
5 Leaf rachis not winged.
7 Inflorescence *either* a terminal panicle (the central axis stiff and upright) or of axillary or terminal clusters of short spikes..... ***Rhus***
7 Inflorescence of axillary or cauliflorous panicles, the central axis lax and often dangling.
8 Leaves all or mostly even-pinnate (sometimes some leaves with an apparently terminal or obliquely subterminal leaflet)..... ***Pistacia chinensis***
8 Leaves odd-pinnate.
..... ***Toxicodendron vernix***

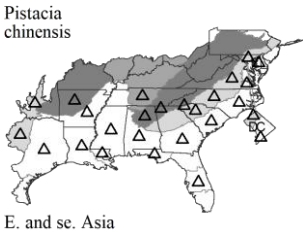
Cotinus P. Miller 1754 (SMOKETREE)



A genus of 4-8 species, of se. and sc. North America and temperate Eurasia. References: Barkley (1937); Mitchell & Pell (2019) in Naczi & collaborators (2019); Pell et al. in Kubitzki (2011).

Cotinus obovata Rafinesque. AMERICAN SMOKETREE. **Hab:** Glades, exposed bluffs, and dry upland woodlands over calcareous soils and rock outcrops. **Dist:** Se. TN (Cumberland Plateau) (Chester, Wofford, & Kral 1997), nw. GA, and n. AL west to OK and e. and sc. TX. **Comm:** A small tree of limestone woodlands and glade margins, occasionally planted as an ornamental tree. **Syn:** = *Cotinus americanus* Nuttall – S, Barkley (1937); = *Cotinus obovatus* Rafinesque – Ar, K1, K3, K4, Mo2, NcTx, Tn, Tx, orthographic variant. NatureServe G4 (Apparently Secure).

Pistacia Linnaeus 1753 (PISTACHIO)



A genus of about 12 species, trees and shrubs, of tropical and temperate Asia, n. Africa. Mediterranean Europe, and s. North America and c. America. References: Pell et al. in Kubitzki (2011).

* ***Pistacia chinensis*** Bunge. CHINESE PISTACHIO. **Hab:** Uncommonly planted, but now naturalizing freely in suburban areas. **Dist:** Native of China, the Philippines, and Taiwan. Krings (2011) documents its occurrence in the Piedmont of NC (Wake County). Serviss & Serviss (2020) reported its naturalization in Arkadelphia, AR (Clark County). Reported for Marengo and Montgomery counties, AL (Diamond & Keener 2021). **Phen:** Mar-Apr. **Comm:** This species is a major new invasive species in the Southeast. **Syn:** = K1; = n/a – RAB; > *Pistacia chinensis* ssp. *subintegerrima* (Stewart) Rechinger f. – K3, K4. NatureServe GNR (Not Yet Ranked).

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Rhus Linnaeus 1753 (SUMAC)

A genus of about 35 species, trees, shrubs, and lianas, temperate and subtropical, of Eurasia, Hawaii, North America, and n. Central America. The subgenera and sections follow Andrés-Hernández et al. (2014). There is some merit to the idea that *Rhus* should be split into two genera, *Rhus s.s.* and *Schmaltzia*. References: Andrés-Hernández et al (2014); Barkley (1937); Greene (1905); Hardin & Phillips (1985a); Miller, Young, & Wen (2001); Mitchell & Pell (2019) in Naczi & collaborators (2019); Pell et al. in Kubitzki (2011); Yi, Miller, & Wen (2007).

Identification Notes: Two hybrids have been documented to occur naturally in our area: *Rhus* ×*borealis* Greene (*glabra* × *typhina*) and *Rhus* ×*ashei* (Small) Greene (*glabra* × *michauxii*). They are intermediate between their parents. For instance, *R.* ×*ashei* has sparsely pubescent leaves and stems, slight winging of the rachis between the terminal leaflets, greater potential stature than *R. michauxii*, and leaflets with a length/width ratio of 2.5-3. Hardin & Phillips (1985b) discuss other natural and artificial hybrids in *Rhus*.

1 Leaves 3-foliolate; shrub to 4 m tall; inflorescence of small lateral and terminal clusters; pedicels < 1 mm long, with bracteoles; [subgenus *Lobadium*; section *Lobadium*].
  4 Terminal leaflet rhombic to ovate, toothed, acute at the tip; flowers produced before expansion of the leaves; pedicels 1-2 mm long, glabrous; petals glabrous on the inner surface; fruits 4-5 mm in diameter; [widespread in our area] ..... ***Rhus aromatica var. aromatica***
  4 Terminal leaflets broadly rhombic or obovate, 3-lobed, and also scalloped or toothed, rounded or angled at the tip; flowers produced at or after the expansion of the leaves; pedicels 2-3 mm long, glabrous to densely woolly; petals usually hairy on the inner surface; fruits 5-6 mm in diameter; [west of the Mississippi River and disjunct eastwards in KY, TN, and AL] ..... ***Rhus aromatica var. serotina***
1 Leaves (3-) 5-31-foliolate; shrub or small tree, to 12 m tall; inflorescence either of dense, terminal panicles or small lateral and terminal clusters; pedicels 1.5-2.5 mm long, lacking bracteoles.
  7 Rachis of the leaf winged between each pair of adjacent leaflets; stems and petioles puberulent; leaflets entire to remotely toothed.
    9 Leaflets 11-25, attenuate to base, 2-9 cm long, 1-2 cm wide, either >3× as long as wide or < 4 cm long; leaflet margins entire (rarely serrate); leaflet apex rounded, obtuse, acute, or acuminate (often at least the more basal leaflets with an obtuse tip) ..... ***Rhus copallinum var. copallinum***
    9 Leaflets 5-13, rounded to base on the upper side, 4-9 cm long, 1.5-5 cm wide, > 2.5× as long as wide; leaflet margins entire or serrate; leaflet apex acute or acuminate tip ..... ***Rhus copallinum var. latifolia***
  7 Rachis of the leaf not winged between each pair of adjacent leaflets (sometimes winged between the last 1 or 2 pairs of leaflets on each side of the rachis); stems and petioles either densely villous or essentially glabrous; leaflets sharply and rather coarsely serrate.
    11 Stems essentially glabrous; pubescence of the fruit short and blunt-tipped ..... ***Rhus glabra***
    11 Stems densely long-pubescent; pubescence of the fruit long and pointed ..... ***Rhus typhina***

Rhus aromatica Aiton *var.* ***aromatica***. FRAGRANT SUMAC, SQUAWBUSH. **Hab:** Dry to dry-mesic upland forests and woodlands, glade margins, stream banks, bluffs, and pastures, eastwards primarily in rocky, rather dry, woodlands, usually over mafic rocks (such as gabbro or diabase) or calcareous rocks, less commonly in sandy soils. **Dist:** The species (if interpreted to include *Rhus trilobata* at varietal rank) ranges throughout much of temperate North America. Var. *aromatica* is the most eastern component of the complex, distributed from NH, ON, and MN south to Panhandle FL and TX. **Phen:** Late Feb-early May; late Apr-Jun. **ID Notes:** The foliage of *Rhus aromatica* bears some superficial resemblance to *Toxicodendron pubescens*. *Rhus aromatica* has sessile terminal leaflets, while *Toxicodendron* has a prominent petiolule. **Syn:** = Ar, GrPl, GrPl, K1, K3, Mo2, NE, NY, Pa, Va, WV; = *Rhus aromatica* – Barkley (1937); = *Schmaltzia crenata* (P. Miller) Greene – S; < *Rhus aromatica* – Fl4, Mi, RAB, Tn, W, WH3, Mitchell & Pell (2019) in Naczi & collaborators (2019); < *Rhus aromatica* Aiton var. *aromatica* – K4; > *Rhus aromatica* Aiton var. *aromatica* – C, F, G, Il; > *Rhus aromatica* var. *illinoensis* (Greene) Rehder – C, F, G, Il; > *Schmaltzia aromatica* (Aiton) Small – Greene (1905); > *Schmaltzia crenata* (P. Miller) Greene – Greene (1905); > *Schmaltzia illinoensis* Greene – Greene (1905). NatureServe G5T5 (Secure).

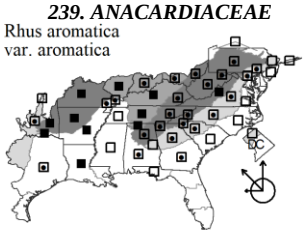
Rhus aromatica Aiton *var.* ***serotina*** (Greene) Rehder. MIDWESTERN FRAGRANT SUMAC. **Hab:** Dry to dry-mesic upland forests and woodlands, glade margins, and bluffs. **Dist:** S. WI, IA, and sc. SD south to s. IL, MO, AR, and e. TX. Some populations east of the Mississippi River in TN, KY, and AL may represent this taxon (D. Estes, pers. comm., 2012). **Phen:** Apr-May. **Syn:** = Ar, C, GrPl, Il, K3, K4, Mo2, NcTx, Tx; = *Rhus trilobata* Nuttall var. *serotina* (Greene) Barkley – Barkley (1937); = *Schmaltzia serotina* Greene – Greene (1905); < *Rhus aromatica* – Tn, Mitchell & Pell (2019) in Naczi & collaborators (2019). NatureServe G5TNR (Not Yet Ranked).

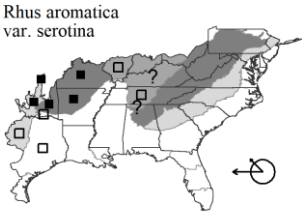
Rhus copallinum Linnaeus *var.* ***copallinum***. EASTERN WINGED SUMAC, EASTERN FLAMELEAF SUMAC. **Hab:** Longleaf pine sandhills, dry woodlands, maritime thickets (especially from VA northward), old fields, roadsides. **Dist:** S. NY south to s. FL, west to e. TX, mainly on the Coastal Plain and lower Piedmont. **Phen:** Jul-Sep; Aug-Oct. **Tax:** The recognition of two or more varieties is problematic (the variation in leaflet size, shape, and number clinal), yet the degree of variation makes a monolithic *Rhus copallinum* uncomfortable. **Comm:** The Linnaean epithet "*Copallinum*" (traditionally capitalized) is grammatically a noun in apposition rather than an adjective, and therefore does not change grammatical gender. **Syn:** = K1, NY, Va; = *Rhus copallina* var. *copallina* – F, orthographic variant; < *Rhus copallina* – Pa, RAB, Tx, W, orthographic variant; < *Rhus copallina* var. *copallina* – Mitchell & Pell (2019) in Naczi & collaborators (2019), orthographic variant; >< *Rhus copallina* var. *copallina* – Barkley (1937), orthographic variant; > *Rhus copallina* var. *leucantha* (Jacquin) A.P. de Candolle – Barkley (1937), orthographic variant; < *Rhus copallinum* – Ar, C, Fl4, G, K3, K4, WH3; >< *Rhus copallinum* – S; > *Rhus leucantha* Jacquin – S; > *Rhus obtusifolia* (Small) Small – S. NatureServe G5T5 (Secure).

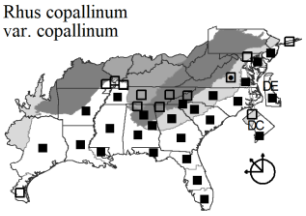
Rhus copallinum Linnaeus *var.* ***latifolia*** Engler. EASTERN WINGED SUMAC. **Hab:** Rocky glades, dry woodlands. **Dist:** S. ME to WI, south to c. GA, AL, LA, and e. TX. **Phen:** Jul-Sep; Aug-Oct. **Syn:** = K1, NcTx, NE, NY, Va; = *Rhus copallina* var. *latifolia* – F, orthographic variant; < *Rhus copallina* – GrPl, Il, Mi, Pa, RAB, Tx, W, orthographic variant; < *Rhus copallina* var. *copallina* – Barkley (1937), Mitchell & Pell (2019) in Naczi & collaborators (2019), orthographic variant; < *Rhus copallinum* – Ar, C, G, K3, K4, Mo2, Tn; >< *Rhus copallinum* – S. NatureServe G5T5 (Secure).

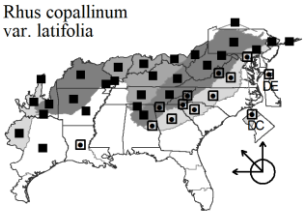
Rhus glabra Linnaeus. SMOOTH SUMAC. **Hab:** Disturbed areas, clearings, roadsides, woodlands. **Dist:** ME west to BC, south to Panhandle FL, TX, CA, and beyond. **Phen:** Late May-Jul; Jun-Oct. **Syn:** = Ar, C, Fl4, G, GrPl, Il, K1, K3, K4, Mi, Mo2, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV, Naczi & collaborators (2019); > *Rhus glabra* var. *glabra* – F, Barkley (1937); > *Rhus glabra* var. *laciniata* Carrière – Barkley (1937). NatureServe G5 (Secure).

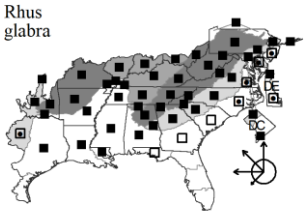
Key to Map Symbology: □⊙■ └native┘ ◇◈◆ └maybe exotic┘ △◬▲ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated



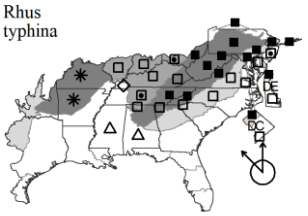








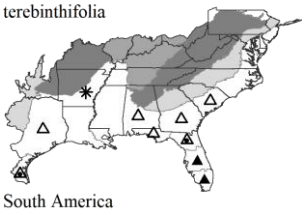
Rhus typhina Linnaeus. STAGHORN SUMAC. **Hab:** Roadsides, old pastures, thickets, clearings, rock outcrops, barrens. **Dist:** NS and NB west to MN, south to n. GA, AL, MS, and KS. **Phen:** May-Jun; Jun-Sep. **Tax:** The apparently older epithet "*hirta*" was formally rejected in 1999 (see Gandhi 2016 for summary). **Comm:** The species, especially in its cut-leaved forms, forma *laciniata* (Wood) Rehder and forma *dissecta* Rehder, is very popular in Europe as a cultivated ornamental. **Syn:** = C, F, G, K1, K3, K4, Mi, Mo2, NY, Pa, RAB, Tn, Va, W, WV, Naczi & collaborators (2019); = *Rhus hirta* (Linnaeus) Sudworth – Il, NE, S; > *Rhus typhina* var. *laciniata* Alph. Wood – Barkley (1937); > *Rhus typhina* var. *typhina* – Barkley (1937). NatureServe G5 (Secure).



Schinus Linnaeus 1753 (BRAZILIAN-PEPPER)

A genus of about 15 species, shrubs and trees of the tropics. References: Pell et al. in Kubitzki (2011); Serviss & Peck (2022).

* ***Schinus terebinthifolia*** Raddi. BRAZILIAN-PEPPER, CHRISTMASBERRY TREE. **Hab:** Disturbed areas, and an aggressive invader of pine savannas, hammocks, and other natural areas. **Dist:** Native of Brazil and Paraguay. A noxious invasive in the FL peninsula. Reported for Beaufort County, SC (Bradley et al. [in prep.]). Reported as seeding down in 1990 from adult plants that were removed, in Ouachita County, AR (Serviss & Peck 2022). **Syn:** = Fl4, WH3; = *Schinus terebinthifolius* Raddi – Bah, GW2, orthographic variant; > *Schinus terebinthifolia* var. *raddianus* Engler – K4, orthographic variant; > *Schinus terebinthifolia* var. *rhoifolius* (Martius) Engler – K4, orthographic variant; > *Schinus terebinthifolius* var. *raddianus* Engler – K3, orthographic variant. NatureServe G4 (Apparently Secure).



Toxicodendron P. Miller 1754 (POISON IVY, POISON OAK, POISON SUMAC)

A genus of about 10-15 species, trees and shrubs, primarily temperate, of North America, n. South America, Indonesia, and e. Asia. References: Gillis (1971); Greene (1905); Pell et al. in Kubitzki (2011).

1 Leaflets 7-13, entire; small tree ..... ***Toxicodendron vernix***
1 Leaflets 3, toothed, lobed, or entire; shrub or vine.
  3 Leaves sparsely pubescent (rarely pilose beneath), the apex and the lobes (if present) generally acute to acuminate; drupes papillose, scabrous or puberulent; plant a high-climbing vine or stoloniferous shrub; [of mesic, swampy, or dry habitats] ..... ***Toxicodendron radicans var. radicans***
  3 Leaves velvety puberulent (sometimes becoming glabrate in age), the apex and the lobes (if present) generally obtuse to broadly acute; drupes pubescent (becoming glabrate); plant a stoloniferous shrub; [of dry habitats, especially sandhills] ..... ***Toxicodendron pubescens***

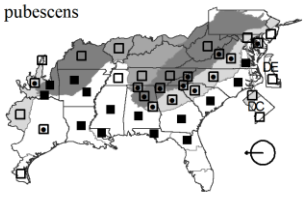
Toxicodendron pubescens P. Miller. POISON OAK, SOUTHEASTERN POISON OAK. **Hab:** Longleaf pine sandhills, dry upland woodlands, around dry rock outcrops in the Piedmont and Mountains, barrens. **Dist:** Primarily Southeastern: s. NJ south to n. FL, west to e. TX, inland to WV, e. TN, c. TN, se. MO, and s. KS. **Phen:** Late Apr-May; Aug-Oct. **Tax:** The nomenclatural confusion may still not be resolved. **Syn:** = Ar, C, Fl4, Il, K1, K3, K4, Mo2, NcTx, Tn, Va, WH3, Naczi & collaborators (2019); = *Rhus toxicodendron* – F, G, RAB; = *Rhus toxicodendron* Linnaeus var. *toxicodendron* – Tx; = *Toxicodendron toxicarium* Gillis – GrPl, W, Gillis (1971); = *Toxicodendron toxicodendron* (Linnaeus) Britton – S; > *Toxicodendron pubescens* P. Miller – Greene (1905); > *Toxicodendron quercifolium* (Michaux) Greene – Greene (1905). NatureServe G5 (Secure).

Toxicodendron radicans (Linnaeus) Kuntze *var*. ***radicans***. EASTERN POISON IVY. **Hab:** In a wide range of habitats, including mesic forests, rock outcrops, swamp forests, brackish marshes, open areas, disturbed ground, usually in more mesic to hydric sites than *T. pubescens*, and particularly common in areas with fertile soils, such as bottomlands or over calcareous rocks or calcareous sands (as in maritime forests). **Dist:** NS south to s. FL (and the Bahamas), west to e. TX, inland to VT, c. PA, WV, KY, and AR. **Phen:** Late Apr-May; Aug-Oct. **Tax:** Var. *radicans* is the typical poison ivy of the Atlantic and Gulf Coastal Plain, rarely found west of the Appalachians. **Comm:** It is normally a vine, climbing by adventitious roots, and can attain diameters of 10 cm and climb to the crowns of forest trees. It can also resemble *T. pubescens* in habit, producing numerous meter-high upright stems from rhizomes. *T. radicans* var. *radicans* is ubiquitous in our area, absent only from the high mountains of NC. **Syn:** = C, Va; = *Toxicodendron radicans* ssp. *radicans* – K1, K3, K4, Mo2, NE, NY; < *Rhus radicans* Linnaeus – Bah, RAB; > *Rhus radicans* var. *radicans* – F, G, WV; < *Rhus radicans* var. *vulgaris* (Michaux) A.P. de Candolle – Tx; > *Rhus radicans* var. *vulgaris* (Michaux) A.P. de Candolle – WV; > *Rhus radicans* var. *vulgaris* (Michaux) A.P. de Candolle – F, G; < *Toxicodendron radicans* – Ar, Fl4, GW2, Mi, Pa, S, Tn, W, WH3; < *Toxicodendron radicans* (Linnaeus) Kuntze var. *radicans* – Il. NatureServe G5T5 (Secure).

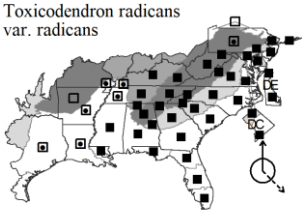
Toxicodendron vernix (Linnaeus) Kuntze. POISON SUMAC, THUNDERWOOD. **Hab:** In peaty habitats, in the Coastal Plain frequent in streamhead pocosins and sandhill seepage bogs, in the mountains in bogs. **Dist:** NS west to MN, south to c. peninsular FL and TX. **Phen:** May-Jun; Aug-Sep. **Comm:** The leaf rachis and leaflet petiolules are usually a dark red or maroon color. The leaves turn a very attractive shade of orange-red in autumn. **Syn:** = C, Fl4, GW2, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, S, Tn, Va, W, WH3, Naczi & collaborators (2019); = *Rhus vernix* Linnaeus – F, G, RAB, Tx, WV. NatureServe G5 (Secure).

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

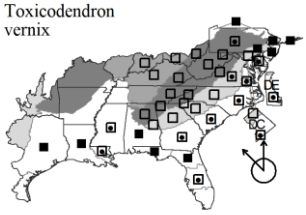
Toxicodendron pubescens



Toxicodendron radicans var. radicans



Toxicodendron vernix



240a. ACERACEAE A.L. de Jussieu 1789 (MAPLE FAMILY) [in SAPINDALES]

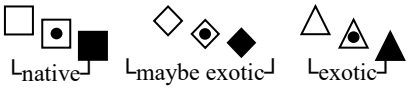
A family of 2 genera and about 130 species, trees and shrubs of the northern hemisphere. The Aceraceae has traditionally been accorded family rank, but in recent decades usually included in Sapindaceae as an early-diverging subfamily and/or tribe, as by APG IV (2016) and Buerki et al. (2021). A counter-case for family rank was made by Buerki et al. (2010). Buerki et al (2021) meekly followed APG IV, stating "while there is strong justification for these familial delimitations... and the decision to recognize one or four families is a matter of preference, the Angiosperm Phylogeny Group (APG IV, 2016) adopted a single, broadly defined family, and the classification presented here is aligned with their interpretation." References: Acevedo-Rodríguez et al (2011) in Kubitzki (2011); Buerki et al (2010); Buerki et al (2021).

Acer Linnaeus 1753 (MAPLE)

A genus of about 111-126 species, trees and shrubs, primarily north temperate.References: Acevedo-Rodríguez et al (2011) in Kubitzki (2011); Desmarais (1952); Harris et al (2017); Murray (1970); Saeki et al (2011); Suh, Heo, & Park (2000); van Gelderen, de Jong, & Oterdoom (1994).

Section *Parviflora*, Series *Caudata*: *spicatum*
Section *Palmata*, Series *Palmata*: *palmatum*
Section *Negundo*, Series *Negundo*: *negundo var. negundo*
Section *Rubra*: *drummondii, rubrum, saccharinum*
Section *Macrantha*: *pensylvanicum*
Section *Platanoidea*: *platanoides, campestre*
Section *Acer*, Series *Acer*: *pseudoplatanus*
Section *Acer*, Series *Saccharodendron*:
Section *Ginnala*: *ginnala*

1 Leaves pinnately compound, divided into 3-7 (-9) leaflets; [section *Negundo*]
.....***Acer negundo var. negundo***
1 Leaves simple, generally shallowly to deeply 3-5 (-7) lobed.
3 Leaves not toothed, or often with a few rounded, coarse, and irregular teeth on the principal lobes, these teeth 0-5 per principal lobe; sinuses between the principal leaf lobes generally broadly rounded, the sinus broader than deep.
7 Leaves green beneath, moderately to densely pubescent across the surface; leaf sinuses on either side of the terminal lobe shallow, the two sides of each sinus forming an angle of > 90 degrees (the terminal lobe typically broadly triangular); leaves sometimes planar, more usually with drooping lobe tips.
8 Leaves small, (3-) avg. 6 (-11) cm broad; small trees, often multi-trunked and crooked; bark whitish (in part because of dense growth of crustose lichens), becoming cracked and blackened on larger stems; [primarily of the Piedmont, extending into the lower Mountains in w. SC and n. GA].....
.....***Acer leucoderme***
8 Leaves large, (8-) avg. 15 (-20) cm broad; large trees, single-trunked; bark dark brown or blackish, becoming furrowed in large individuals; [primarily of the Mountains and westward] ..... ***Acer nigrum***
7 Leaves pale, grayish, silvery-gray, or strongly glaucous beneath, glabrous, pubescent on the veins, or pubescent across the surface; leaf sinuses on either side of the terminal lobe deep, the two sides of each sinus forming an angle of < 70 degrees (the terminal lobe typically with parallel margins, or even narrower toward the base than toward the tip); leaves usually planar, but sometimes with drooping lobe tips, especially in sun-exposed individuals.
9 Leaves small, (3.5-) avg. 8 (-11) cm broad; leaf undersurface usually pubescent; fruits 20-25 mm long; medium to large trees; bark gray, smooth and beech-like, becoming irregularly furrowed or plated in large individuals; [primarily of the Coastal Plain and Piedmont, extending into the lower Mountains].....***Acer floridanum***
9 Leaves large, (8-) avg. 15 (-20) cm broad; leaf undersurface glabrous, pubescent only on the veins, or pubescent across the surface; fruits 25-30 mm long; large trees; bark grayish-brown, with loose-edged plates; [primarily of the Mountains and upper Piedmont].
10 Leaves glabrous or pubescent only along the veins, the hairs appressed and straight; leaves strongly lobed and sublobed, the lobes with more attenuated (but ultimately rounded) tips ..... ***Acer saccharum var. saccharum***
10 Leaves pubescent across the surface, often densely so, the hairs typically upright or tangled; leaves sparingly lobed and with more rounded lobe tips .....
.....***Acer saccharum var. schneckii***
3 Leaves finely to coarsely toothed, the toothing often regular, the teeth 8-50 per principal lobe; sinuses between the principal leaf lobes generally sharp, forming a definite angle (or if rounded, then the sinus much deeper than broad).
11 Leaves deeply lobed, the two sinuses on either side of the central lobe deep and narrow, approaching the midrib, the terminal lobe thus narrower at its base than at its middle; flowers either with petals (*A. palmatum*) or without petals (*A. saccharinum*).
.....***Acer saccharinum***
11 Leaves shallowly lobed, the two sinuses on either side of the central lobe broadly wedge-shaped, not approaching the midrib, the terminal lobe thus broadest at its base and progressively (though often irregularly) narrowing toward the tip; flowers with petals.

Key to Map Symbology: 

* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable
X : extirpated

18 Mature leaves densely white tomentose (felty-pubescent) beneath; petioles usually with white tomentum; mature samaras 2.7-5 cm long ..... ***Acer rubrum var. drummondii***

18 Mature leaves glabrous to densely pubescent (but not white-tomentose) beneath; petioles usually glabrous; mature samaras 1.5-3 cm long.

19 Leaves (3-) 5 (-9)-lobed, the central lobe 4-8 cm long, the 2 upper lateral lobes 2-5 cm long; leaf base generally cordate (rarely rounded); leaves 7-18 cm wide; [widespread, in nearly all habitats]..... ***Acer rubrum var. rubrum***

19 Leaves unlobed or 3 (-5)-lobed, the central lobe 1-5 cm long, the lateral lobes (if present) 0.5-2 (-3) cm long; leaf base broadly cuneate to rounded or subcordate; leaves 2-10 cm wide; [primarily of wetlands, especially in the Coastal Plain] ..... ***Acer rubrum var. trilobum***

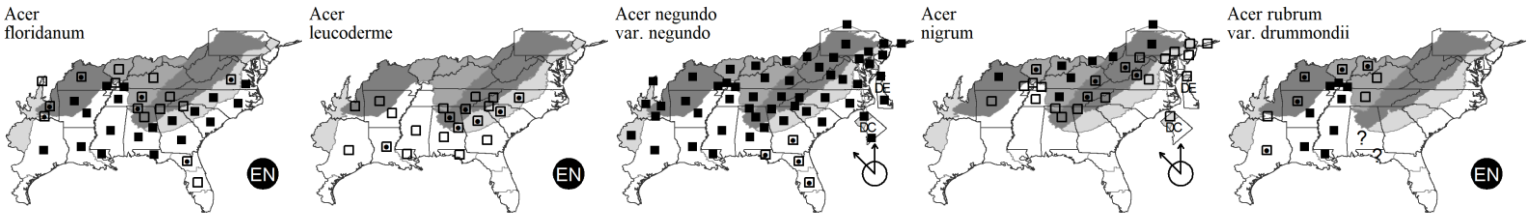
Acer floridanum (Chapman) Pax. SOUTHERN SUGAR MAPLE, FLORIDA MAPLE. **Hab:** Bottomland forests, mesic slopes, especially common over mafic or calcareous rocks, but not at all limited to such situations. **Dist:** S. VA, w. KY, se. MO, e. OK, c. OK, and n. TX, south to c. peninsular FL and e. TX. **Phen:** Apr-May; Jun-Oct. **Comm:** It is widely planted in southern cities and towns as a street tree. Ward (2004b) discusses the reasons for accepting *A. floridanum* as the correct name for this species; the Michauxian name *A. barbatum* is associated with specimens that are demonstrably *A. saccharum*. **Syn:** = K3, K4, Va; = *Acer barbatum* Michaux – C, Il, K1, Tx, misapplied; = *Acer saccharum* ssp. *floridanum* (Chapman) Desmarais – Fl4, Mo2, RAB, Tn, WH3, Desmarais (1952), Murray (1970); = *Acer saccharum* Marshall var. *floridanum* (Chapman) Small & A. Heller – Ar; = *Saccharodendron floridanum* (Chapman) Nieuwland – S; > *Acer barbatum* var. *barbatum* – F, G, misapplied; > *Acer barbatum* var. *longii* (Fernald) Fernald – F, G, misapplied. NatureServe G4G5 (Apparently Secure).

Acer leucoderme Small. CHALK MAPLE. **Hab:** Rocky slopes and bluffs, particularly over mafic or calcareous rock, on the Gulf Coast in floodplains. **Dist:** A species of se. North America, primarily of the Piedmont from NC to AL, less commonly in the Ridge and Valley of se. TN (Chester, Wofford, & Kral 1997), low Blue Ridge of w. NC and adjacent TN and GA, Coastal Plain of Panhandle FL, GA, AL, MS, LA, and se. TX, and in sw. AR and se. OK. **Phen:** Mar-Apr; May-Sep. **Comm:** The leaves, at least those on lower and inner branches, tend to dry a tawny color and remain on the tree until spring, reminiscent of beech. **Syn:** = K1, K3, K4, W; = *Acer saccharum* ssp. *leucoderme* (Small) Desmarais – Fl4, RAB, WH3, Desmarais (1952), Murray (1970); = *Acer saccharum* Marshall var. *leucoderme* (Small) Sargent – Ar; = *Saccharodendron leucoderme* (Small) Nieuwland – S. NatureServe G5 (Secure).

Acer negundo Linnaeus *var*. ***negundo***. EASTERN BOX ELDER, ASH-LEAVED MAPLE, RIVER MAPLE, ARCE, FRESNO DE GUAJUCO. **Hab:** Riverbanks, swamps, bottomlands, also upslope on calcareous substrates. **Dist:** The species ranges nearly across North America, including well into the arid west along rivers. Var. *negundo* occurs from NB west to MB, south to c. peninsular FL and TX. **Phen:** Mar-Apr; May-Oct. **ID Notes:** *Acer negundo* often grows on the banks of rivers, leaning out over the water at a 45° angle. The leaves can resemble poison ivy (*Toxicodendron radicans*), which has alternate leaves. The coarse toothing (approaching lobing) distinguishes it readily from any of our ashes (*Fraxinus*). **Syn:** = K3, NY, Tx, Va; < *Acer negundo* – Fl4, GW2, Mi, Pa, RAB, Tn, W, WH3; < *Acer negundo* Linnaeus var. *negundo* – K4; > *Acer negundo* Linnaeus var. *negundo* – Ar, C, F, G, GrPl, Il, K1, K3, Mo2, NcTx, NE, Murray (1970); > *Acer negundo* Linnaeus var. *texanum* Pax – Ar, C, F, G, Il, K1, Mo2, NcTx, Murray (1970); > *Acer negundo* Linnaeus var. *violaceum* (Kirchner) Jaeger – F, G, GrPl, Il, K1, K3, NE, Murray (1970); < *Negundo negundo* (Linnaeus) Karsten – S.

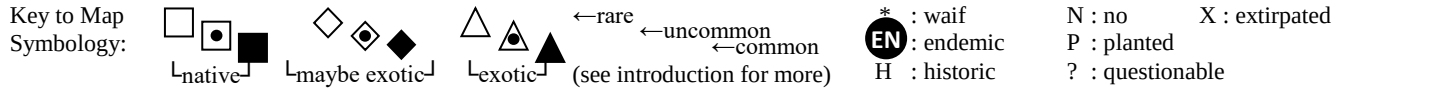
Acer nigrum F. Michaux. BLACK MAPLE. **Hab:** Riverbanks, streambanks, cove forests, river slope forests, especially over calcareous rocks. **Dist:** NH west to MN, south to NC, GA, AL, AR, and KS, primarily west of the Appalachians. **Phen:** May-Jun; Jun-Sep. **Syn:** = C, F, G, GrPl, K1, K3, K4, Mi, NE, NY, Pa, Va, W; = *Acer saccharum* Marshall ssp. *nigrum* (Michaux f.) Desmarais – Mo2, RAB, Tn, Desmarais (1952), Murray (1970); = *Acer saccharum* Marshall var. *nigrum* (Michaux f.) Britton – Ar; = *Saccharodendron nigrum* (Michaux f.) Small – S; > *Acer nigrum* var. *nigrum* – Il; > *Acer nigrum* var. *palmeri* Sargent – Il.

Acer rubrum Linnaeus *var*. ***drummondii*** (Hooker & Arnott ex Nuttall) Sargent. DRUMMOND'S MAPLE, SWAMP RED MAPLE, DRUMMOND'S RED MAPLE. **Hab:** Swamps and floodplains, often in deeply flooded situations. **Dist:** *A. rubrum* var. *drummondii* is probably limited to the Mississippi River basin and its immediate tributaries; reports from more eastern areas likely represent pubescent extremes of *Acer rubrum* var. *trilobum*. **Phen:** Jan-Mar; Mar-Jun. **Comm:** Saeki et al. (2011) show some (chloroplast) gene exchange between *Acer rubrum* var. *drummondii* and *A. saccharinum*. Additional study of the *Acer rubrum* complex is needed. **Syn:** = Ar, F, G, K1, K3, K4, Mo2, Tx; = *Acer drummondii* Hooker & Arnott ex Nuttall – Il, Tn; = *Acer rubrum* ssp. *drummondii* (Nuttall) A.E. Murray – Murray (1970); = *Rufacer drummondii* (Hooker & Arnott ex Nuttall) Small – S; < *Acer rubrum* – C, GW2, NcTx, RAB, Va, WH3. NatureServe G5T5 (Secure).



Acer rubrum Linnaeus *var*. ***rubrum***. EASTERN RED MAPLE. **Hab:** Upland deciduous forests, up to at least 1500m elevation, moist bottomlands and slopes. **Dist:** This variety is the most widespread and common in our area; indeed it is one of the most ubiquitous and common trees of e. North America. **Phen:** Jan-Mar; Feb-Jul. **Comm:** It is probably more abundant than formerly, because of its weedy abilities. Overall, it ranges throughout e. North America. Whether the varieties of *A. rubrum* are worthy of recognition is a matter of disagreement; I choose here to try to distinguish them. **Syn:** = F, Il, K1, K3, K4, NY, Tx, Murray (1970); = *Rufacer rubrum* (Linnaeus) Small – S; < *Acer rubrum* – C, Fl4, GW2, Mi, NcTx, NE, Pa, RAB, Tn, Va, W, WH3; < *Acer rubrum* Linnaeus var. *rubrum* – Ar, G, Mo2. NatureServe G5T5 (Secure).

Acer rubrum Linnaeus *var*. ***trilobum*** Torrey & A. Gray ex K. Koch. CAROLINA RED MAPLE. **Hab:** Wetlands, especially peaty, acid sites. **Dist:** Primarily a Southeastern Coastal Plain variety, the range of var. *trilobum* is unclear, possibly extending well inland and northward. **Phen:** Jan-Mar; Feb-Jun. **Tax:** Var. *trilobum* (as broadly defined) has greatly increased in abundance in the Coastal Plain of our area because of fire suppression and mechanical disturbance of peaty wetlands. Former large pocosin tracts, such as the Dismal Swamp, are now largely dominated by this tree. Molecular studies (Saeki et al. 2011) show a strong signal of a Floridian molecular entity, probably correlated morphologically with densely pubescent leaf undersurfaces and small, elongate, barely even trilobed leaves, centered in the Florida peninsula and extending northwards to an unknown degree, but apparently strictly Coastal Plain and deeply southeastern. An apparent second entity, somewhat intermediate between the Floridian entity and var. *rubrum*, has a more extensive distribution northwards, and a strong but not complete association with wetland habitats. The

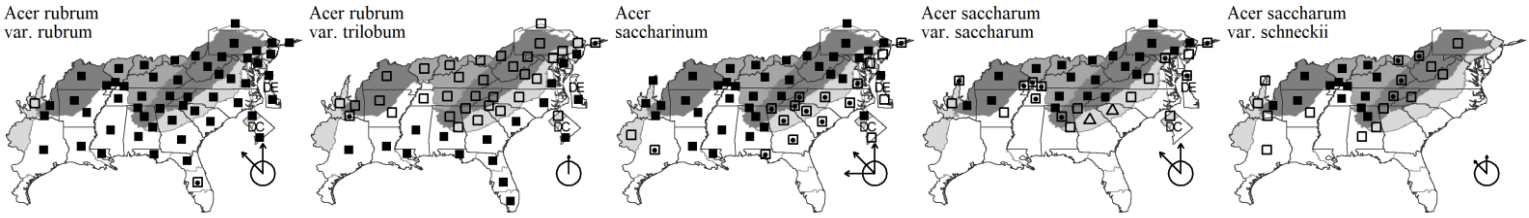


appropriate taxonomic treatment of (and nomenclature to apply to) these entities remains uncertain. **Syn:** = F, Il, K1, K3, K4, NY, Tx, Murray (1970); = *Rufacer carolinianum* (Walter) Small – S; < *Acer rubrum* – C, GW2, NcTx, NE, Pa, RAB, Tn, Va, WH3; < *Acer rubrum* Linnaeus var. *rubrum* – Ar, G, Mo2.

Acer saccharinum Linnaeus. SILVER MAPLE, SOFT MAPLE. **Hab:** Bottomlands, riverbanks, and disturbed areas. **Dist:** NS west to SK, south to Panhandle FL, LA, and OK, rare and mostly introduced east of the Appalachians and south of VA. **Phen:** Feb-Apr; Apr-Jul. **Comm:** This is an abundant tree along major rivers in the Piedmont of VA. In our area (particularly from c. NC south), the species is more common as a street tree or an escape from cultivation than as a native tree. On the Coastal Plain of NC and SC, *A. saccharinum* is largely confined to the banks and levees of large brownwater rivers, such as the Roanoke and Congaree. The silvery undersides of the leaves are obvious in windy conditions. The hybrid *Acer* ×*freemanii* A.E. Murray [*A. rubrum* × *saccharinum*] has been collected at scattered locations in our area. **Syn:** = Ar, C, F, Fl4, G, GrPl, GW2, Il, K1, K3, K4, Mi, Mo2, NcTx, NE, NY, Pa, RAB, Va, W, WH3, Murray (1970); = *Argentacer saccharinum* (Linnaeus) Small – S. NatureServe G5 (Secure).

Acer saccharum Marshall *var.* ***saccharum***. SUGAR MAPLE, HARD MAPLE, SUGAR-TREE. **Hab:** Cove forests, other rich forests, especially over mafic and calcareous rocks, on calcareous soils common and typical in dry-mesic forests and dry woodlands as well, less typically extending to high elevation northern hardwood forests where sometimes in acidic situations (as in Highlands County, VA), in parts of the Piedmont perhaps more common as an introduction by ornamental planting than as a native, at least south of VA. **Dist:** Var. *saccharum* is distributed from NS west to ND, south to n. GA, n. AL, and MO. *A. saccharum* var. *saccharum* is the primary source of maple sugar and maple syrup; formerly, commercial sugaring was done in w. NC and w. VA. Large individuals of this species are the favorite substrate of a number of lichens, including *Lobaria pulmonaria*. The brown, platy bark is often similar to that of *Aesculus flava*. For its bright orange fall color, *A. saccharum* var. *saccharum* is one of our most prized ornamental trees. In NC, it is most common northward and on mafic rocks, thus reaching perhaps its best development in the amphibolite peaks of Ashe, Watauga, Avery, and Mitchell counties; it is more general in more northern and more calcareous portions of our region. **Phen:** Apr-Jun; Jun-Sep. **Syn:** = Il, K1, K3, K4; = *Acer saccharum* ssp. *saccharum* – Mo2, Desmarais (1952); < *Acer saccharum* Marshall – C, GrPl, Mi, NY, Pa, Va; < *Acer saccharum* ssp. *saccharum* – RAB, Tn, W; < *Acer saccharum* Marshall var. *saccharum* – Ar; < *Saccharodendron barbatum* (Michaux) Nieuwland – S. NatureServe G5T5 (Secure).

Acer saccharum Marshall *var.* ***schneckii*** Rehder. SCHECK'S MAPLE, SUGAR MAPLE, SOUTHERN HARD MAPLE. **Hab:** Dry, dry-mesic, and mesic forests over calcareous substrates. **Dist:** *Acer saccharum* var. *schneckii* Rehder is poorly understood, and may be distributed from sw. PA, s. OH, s. IN, s. IL, MO, south to nw. GA, n. AL, n. MS, sw. AR, and e. OK. **Phen:** Apr-Jun; Jun-Sep. **Tax:** The taxonomy of this entity (recognition and appropriate rank) and distribution remain unclear. It appears to be a taxon distributed mostly or strictly below the glacial boundary, and overlapping but extending further south than *A. saccharum* var. *saccharum*. The two co-occur, seem to be phenologically offset, and morphologically relatively, though semi-cryptically, differentiated – suggesting that they may be semi-cryptic species. They need assessment rangewide, and using the suite of modern tools. It is hoped that the provisional recognition of this taxon will trigger research. **Syn:** = K1, K3, K4; = *Acer saccharum* ssp. *schneckii* (Rehder) Desmarais – Mo2, Desmarais (1952); < *Acer saccharum* Marshall – C, GrPl, Pa, Tx, Va; < *Acer saccharum* ssp. *saccharum* – Tn, W; > *Acer saccharum* var. *rugelii* (Pax) Rehder – Il; < *Acer saccharum* Marshall var. *saccharum* – Ar; > *Acer saccharum* Marshall var. *schneckii* Rehder – Il.



240b. HIPPOCASTANACEAE A. Richard 1823 (HORSE-CHESTNUT FAMILY) [in SAPINDALES]

A family of 3 genera and about 16 species, trees and shrubs, of North America, Asia, Europe, and Mexico to South America. The Hippocastanaceae has traditionally been accorded family rank, but in recent decades usually included in Sapindaceae as an early-diverging subfamily and/or tribe, as by APG IV (2016) and Buerki et al. (2021). A counter-case for family rank was made by Buerki et al. (2010). Buerki et al (2021) meekly followed APG IV, stating "while there is strong justification for these familial delimitations... and the decision to recognize one or four families is a matter of preference, the Angiosperm Phylogeny Group (APG IV, 2016) adopted a single, broadly defined family, and the classification presented here is aligned with their interpretation." References: Acevedo-Rodríguez et al (2011) in Kubitzki (2011); Buerki et al (2010); Buerki et al (2021); Du, Harris, & Xiang (2020).

Aesculus Linnaeus 1753 (BUCKEYE)

A genus of about 13 species, trees and shrubs, of temperate e. North America, w. North America, e. Asia, and se. Europe. Sectional classification shown in the key follows Du, Harris, & Xiang (2020). References: Du, Harris, & Xiang (2020); Hardin (1957a); Hardin (1957b); Harris, Xiang, & Thomas (2009); Wyatt & Lodwick (1981).

Identification Notes: The following hybrids are known from our area and can be locally common: *Aesculus* ×*neglecta* Lindley [*flava* × *sylvatica*], *Aesculus* ×*mutabilis* (Spach) Scheele [*pavia* × *sylvatica*], and *Aesculus* ×*bushii* Schneider [*glabra* × *pavia*]. They can be recognized by their intermediate morphology.

1 Petals usually 5, white with a reddish mark near the cordate base of the petal blade; buds glutinous (sticky); fruit spiny; leaflets 7 (-9) per leaf; [alien, uncommonly planted, rarely naturalized]; [section *Aesculus*]..... ***Aesculus hippocastanum***
1 Petals 4 (or 4-5 in *A. parviflora*), cream-colored, yellow, red; or white (and then lacking a red blaze); buds not glutinous; fruit smooth (or with some prickles in *A. glabra* var. *glabra*); leaflets 5 (-7) per leaf; [native].
  2 Petals white, unmarked with red; stamens exserted, 2-4× as long as the petals; inflorescence 2-5 dm long; [section *Macrothyrsus*] ..... ***Aesculus parviflora***
  2 Petals cream-colored, yellow, or red; stamens included or exserted, 1-2× as long as the petals; inflorescence 1-2.5 dm long; [section *Pavia*].

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

3 Stamens about 2× as long as the petals, well-exserted beyond the corolla; petals only slightly unequal in size; fruit spiny with short prickles (rarely essentially smooth).
..... ***Aesculus glabra var. glabra***
3 Stamens about 1× as long as the petals, included or barely exserted beyond the corolla; petals markedly unequal in size; fruit smooth.
5 Petal margins stipitate-glandular; petals scarlet or yellow; fruits 3-6 cm in diameter.
..... ***Aesculus pavia var. pavia***
5 Petal margins villous, not glandular; petals yellow (or with salmon tint); fruits 2-8 cm in diameter.
7 Calyx and pedicels stipitate-glandular; large tree; petiolules 2-3 (-4) mm long; fruits 5-8 cm in diameter..... ***Aesculus flava***
7 Calyx and pedicels puberulent; shrub to small tree; petiolules 3-12 mm long; fruits 2-4 cm in diameter..... ***Aesculus sylvatica***

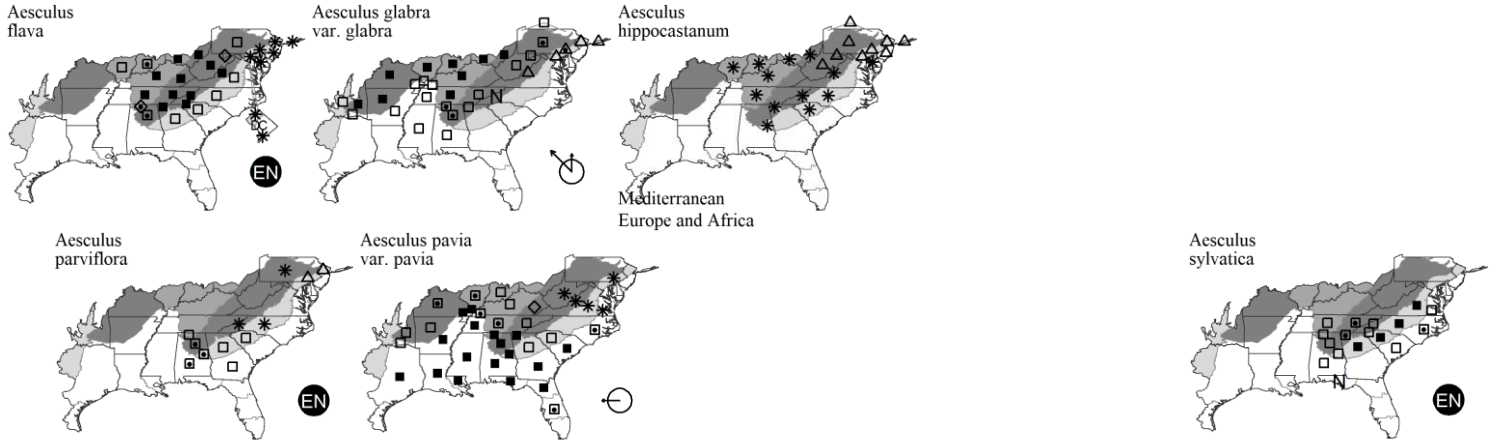
Aesculus flava Solander. YELLOW BUCKEYE. **Hab:** Moist forests, up to nearly 2000 m, especially prominent in seepy cove forests, in the Piedmont only in 'montane' habitats. **Dist:** A broad Southern Appalachian endemic: sw. PA, s. OH, s. IN, and s. IL south through KY, WV, sw. VA, and TN to n. AL, n. GA, nw. SC, and w. NC. **Phen:** Late Apr-mid Jun; Aug-Sep. **Tax:** Meyer & Hardin (1987) discuss the nomenclatural issues relating to the names '*A. flava*' and '*A. octandra*'. **ID Notes:** *Aesculus flava* is one of the largest, most massive, and commonest trees in Southern Appalachian coves, recognizable in winter by the bark of large plate-like slabs, thick twigs, and massive form. **Syn:** = C, Il, K1, K3, K4, Pa, Tn, Va, W, Du, Harris, & Xiang (2020); = *Aesculus octandra* Marshall – F, G, RAB, Hardin (1957a), Hardin (1957b); < *Aesculus octandra* Marshall – S. NatureServe G5 (Secure).

Aesculus glabra Willdenow *var. **glabra***. OHIO BUCKEYE, CHALKY BUCKEYE. **Hab:** Mesic upland and riparian forests, bluffs, ravines, stream banks; usually over calcareous substrates. **Dist:** Largely midwestern, but ranges east to sw. PA, e. TN, and nw. GA (Jones & Coile 1988); it is also sometimes introduced eastward of its native distribution. It occurs in TN counties adjacent to VA. Reported as likely planted and weakly naturalizing in Shenandoah County, VA (Domangue & McMullen 2013). **Phen:** Apr-May. **Syn:** = Ar, C, F, G, K1, K3, K4, NY, Du, Harris, & Xiang (2020), Hardin (1957a), Hardin (1957b); = *Aesculus glabra* – Tx; < *Aesculus glabra* – Mi, NE, Pa, S, Tn, WV; > *Aesculus glabra* Willdenow var. *glabra* – Il; > *Aesculus glabra* Willdenow var. *leucodermis* Sargent – Il.

* ***Aesculus hippocastanum*** Linnaeus. HORSECHESTNUT. **Hab:** Urban and suburban areas, perhaps not definitely naturalized, but fairly often planted as a street tree and escaping as seedlings in the vicinity of plantings. **Dist:** Native of se. Europe. **Phen:** May. **Syn:** = C, F, G, Il, K1, K3, K4, Mi, NE, NY, Pa, Du, Harris, & Xiang (2020), Hardin (1957a), Hardin (1957b). NatureServe GNR (Not Yet Ranked).

Aesculus parviflora Walter. BOTTLEBRUSH BUCKEYE. **Hab:** Mesic forests on bluffs and in ravines (the SC occurrence is on Fall Line river bluffs, with shaley, subcalcareous soils). **Dist:** Wc. GA west to nc. AL, south to sw. GA and sw. AL; disjunct in wc. SC (Aiken County). See Wyatt (1985) for a discussion of the interesting, relictual occurrence in SC. Sometimes planted outside its native range, where it may persist and spread clonally. **Phen:** May-Jul. **Syn:** = K1, K3, K4, NY, Pa, S, Du, Harris, & Xiang (2020), Hardin (1957a), Hardin (1957b). NatureServe G3 (Vulnerable).

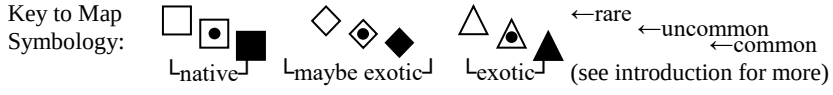
Aesculus pavia Linnaeus *var. **pavia***. RED BUCKEYE. **Hab:** Coastal Plain marl forests (wet, calcareous flats), hardwood bluffs, rich floodplains of brownwater and blackwater rivers, basic-mesic forests, shell hammocks and shell middens, calcium-rich sandy soils in maritime forests. **Dist:** Var. *pavia* ranges from se. NC south to c. peninsular FL and west to e. TX, extending north in the Mississippi Embayment to se. MO and s. IL, and in scattered occurrences off the Coastal Plain, as in sc. TN; also it is sometimes cultivated inland and persistent or slightly naturalizing. Fernald (1950) reports *A. pavia* from VA and WV, but there is likely taxonomic or nomenclatural confusion. **Phen:** Apr-early May; Jul-Aug. **Tax:** Var. *flavescens* (Sargent) Correll occurs in the Edwards Plateau of c. TX. **Syn:** = K1, K3, K4, NcTx, Tx, Hardin (1957a), Hardin (1957b); > *Aesculus discolor* Pursh – F; < *Aesculus pavia* – C, Fl4, G, Il, RAB, S, Tn, W, WH3, Du, Harris, & Xiang (2020); > *Aesculus pavia* – F. NatureServe G5T5 (Secure).



Aesculus sylvatica Bartram. PAINTED BUCKEYE. **Hab:** In the Piedmont in mesic, nutrient-rich forests, on bottomlands, lower slopes, and in ravines, in the Coastal Plain primarily on floodplains of brownwater (alluvium-carrying) rivers (most notably the Roanoke River in NC), in the Mountains only at low elevations. **Dist:** Primarily a Southeastern Piedmont endemic, occurring primarily in the Piedmont from sc. VA south through c. NC, c. SC, and nc. GA to nc. AL, with an extension north into e. TN. **Phen:** Apr-mid May; Jul-Aug. **Syn:** = C, F, K1, K3, K4, RAB, Tn, Va, W, Du, Harris, & Xiang (2020), Hardin (1957a), Hardin (1957b); = *Aesculus neglecta* Lindley – G, misapplied; < *Aesculus octandra* Marshall – S. NatureServe G5 (Secure).

240c. SAPINDACEAE A.L. de Jussieu 1789 (SOAPBERRY FAMILY) [in SAPINDALES]

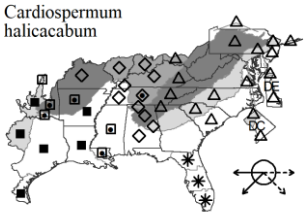
A family of about 133-141 genera and 1465-1900 species, trees, shrubs, vines, and herbs, primarily of tropical (rarely temperate) regions of the Old World and New World. APG III (2009), Acevedo-Rodríguez et al. (2011), APG IV (2016), Buerki et al. (2021), and others have recently included Hippocastanaceae and Aceraceae in the Sapindaceae; though Buerki et al. (2009, 2010) made a well-reasoned case for recognition of the segregate



families Xanthocerataceae, Aceraceae, Hippocastanaceae, Sapindaceae, and as more diagnosable families with long traditional usage (except Xanthocerataceae). References: Acevedo-Rodríguez et al (2011) in Kubitzki (2011); Brizicky (1963); Buerki et al (2009); Buerki et al (2010); Buerki et al (2021).

1 Leaves opposite; leaves either palmately compound, or simple (and then palmately lobed and/or toothed), or pinnately compound.
  2 Leaves either simple (and palmately lobed and/or toothed) or pinnately compound; flowers radially symmetrical; fruit a schizocarp of 2 samaroid mericarps; [family Aceraceae; or subfamily Hippocastanoideae, tribe Acereae] ..... ***Acer***
  2 Leaves palmately compound; flowers bilaterally symmetrical; fruit a capsule, usually with single large "nut-like" seed; [family Hippocastanaceae; or subfamily Hippocastaoideae, tribe Hippocastaneae] ..... ***Aesculus***
1 Leaves alternate; leaves compound (if unifoliolate and thus appearing simple [*Dodonaea*], then unlobed and with entire margins).
..... ***Cardiospermum***
  8 Fruits dehiscent, a capsule with papery, membranaceous, coriaceous, or woody valves.
..... ***Koelreuteria***
  8 Fruits indehiscent, with a leathery exterior.
    12 xxxx
    12 yyyy

Cardiospermum Linnaeus 1753 (BALLOON VINE)



A genus of about 14-15 species, vines, of tropical America. References: Acevedo-Rodríguez et al (2011) in Kubitzki (2011); Brizicky (1963).

Cardiospermum halicacabum Linnaeus. BALLOON VINE, HEARTSEED, LOVE-IN-A-PUFF. **Hab:** Thickets, riverbanks, cultivated or abandoned fields, other disturbed areas. **Dist:** Probably native in at least the southwestern part of our area, south through tropical America. Its native distribution is obscured by later cultivation and spread. André Michaux collected in the region of Illinois in the 1790s, an earlier period to assume that it was non-native. **Phen:** (Jan-) Jun-Sep (-Dec). **Syn:** = Ar, Bah, F, Fl4, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, WH3; = *Cardiospermum halicababum* – C, orthographic error; = *Cardiospermum halicacabum* var. *halicacabum* – Brizicky (1963). NatureServe G5 (Secure).

Koelreuteria Laxmann 1772 (GOLDEN RAIN TREE)

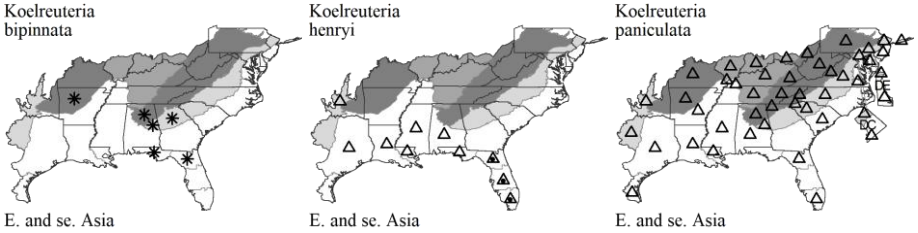
A genus of 4 species, trees, of temperate China, Taiwan, and Japan. References: Acevedo-Rodríguez et al (2011) in Kubitzki (2011); Meyer (1976).

1 Leaves pinnate (rarely bipinnate in part), the leaflets coarsely crenate to lobulate; capsule valves ovate, ca. 2 × as long as wide; capsules greenish to tawny when young, aging to dark brown ..... ***Koelreuteria paniculata***
1 Leaves bipinnate, the leaflets entire to shallowly serrate; capsule valves orbicular, 0.9-1.4 × as long as wide; capsules rose-purple when young, aging to tawny-brown.
  2 Leaflets weakly oblique, acute to short-acuminate, entire to uniformly serrate; leaflet upper surfaces dull-green, matte; petals 4 (-5).....
..... ***Koelreuteria bipinnata***
  2 Leaflets strongly oblique, long acuminate to caudate, entire to irregularly crenate-serrate; leaflet upper surfaces smooth and shiny; petals (4-) 5 .....
..... ***Koelreuteria henryi***

* ***Koelreuteria bipinnata*** Franchet. BOUGAINVILLEA GOLDEN RAIN TREE. **Hab:** Disturbed areas, roadsides. **Dist:** Native of s. China. Becoming popular horticulturally, and producing abundant seedlings near the planted specimens; potentially invasive. **Syn:** = Ar, K4, Meyer (1976).

* ***Koelreuteria henryi*** Dümmer. FLAMEGOLD. **Hab:** Disturbed areas, roadsides. **Dist:** Native of Taiwan. **Tax:** This taxon appears to be distinct morphologically and geographically from *K. elegans*, and warrants recognition at the species level. Becoming popular horticulturally, and producing abundant seedlings near the planted specimens; potentially invasive, and becoming established in various areas in the Deep South. **Syn:** = *Koelreuteria elegans* (Seemann) A.C. Smith ssp. *formosana* (Hayata) F.G. Meyer – Fl4, K1, K3, K4, WH3, Meyer (1976). NatureServe GNRTNR (Not Yet Ranked).

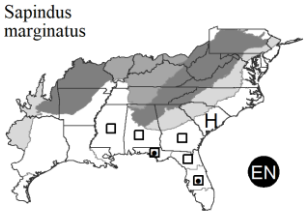
* ***Koelreuteria paniculata*** Laxmann. GOLDEN RAIN TREE. **Hab:** Disturbed areas, roadsides, frequently cultivated as an ornamental tree, rarely escaped. **Dist:** Native of n. China. **Phen:** May-Aug; Sep-Oct. **Syn:** = Ar, C, F, G, Il, K1, K3, K4, NE, NY, Pa, RAB, Meyer (1976). NatureServe GNR (Not Yet Ranked).



Sapindus Linnaeus 1753 (SOAPBERRY)

A genus of about 10-13 species, trees, of tropical and warm temperate regions of the Old and New World. References: Acevedo-Rodríguez et al (2011) in Kubitzki (2011); Brizicky (1963); McNair & Andresen (2020).

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



Sapindus marginatus Willdenow. FLORIDA SOAPBERRY. **Hab:** Coastal marsh hammocks, shell middens. **Dist:** Se. SC and e. GA south to c. peninsular FL (Lee and Brevard counties), and on the Gulf Coast in s. MS. **Phen:** May-Jun. **Tax:** Although sometimes combined with the tropical *Sapindus saponaria*, I follow most Florida authors (Clewell 1985, Tomlinson 1986, Godfrey 1988, Nelson 1994, Nelson 1996) in maintaining it as distinct. *S. marginatus* is a species of n. FL, e. GA, and possibly SC and has wingless rachises, acuminate leaflets, and globose fruits; *S. saponaria* is a species of s. FL and tropical America and has winged rachises, rounded leaflet tips, and ovoid to globose fruits. **Comm:** Small (1933) reports this species from SC, based on collections by Mellichamp at Bluffton; there are no recent records. **Syn:** = K4, RAB, S, Brizicky (1963); < *Sapindus saponaria* – Fl4, WH3; < *Sapindus saponaria* Linnaeus var. *saponaria* – K1, K3.

241. RUTACEAE A.L. de Jussieu 1789 (CITRUS FAMILY) [in SAPINDALES]

A family of about 154-156 genera and 1800-2100 species, trees, shrubs, vines, and rarely herbs, cosmopolitan (but mainly tropical and subtropical). Subfamily classification follows Appelhans et al. (2021). References: Appelhans et al (2018); Appelhans et al (2021); Kubitzki, Kallunki, Duretto, & Wilson in Kubitzki (2011).

3 Leaves either simple, or unifoliolate and appearing simple.
..... ***Citrus***
3 Leaves pinnately or palmately compound (1-foliolate leaves sometimes also present).
6 Leaves 1-pinnate, either odd-pinnate and (3-) 5-19-foliolate or even-pinnate and (4-) 6-8 (-14)-foliolate.
..... ***Zanthoxylum***
6 Leaves palmately 3-foliolate.
12 Branches armed with axillary spines; fruit a hesperidium; [subfamily Aurantioideae].
..... ***Citrus trifoliata***
12 Branches unarmed; fruit a drupe, few-seeded berry, or samara.
..... ***Ptelea***

Citrus Linnaeus 1753

(Citrus, Orange, Grapefruit, Lemon, Lime, Citron, Pummelo, Kumquat, Trifoliate Orange). References: Araújo, Queiroz, & Machado (2003); Kubitzki (2011); Mabberley (1997); Nesom (2014a); Pfeil & Crisp (2008).

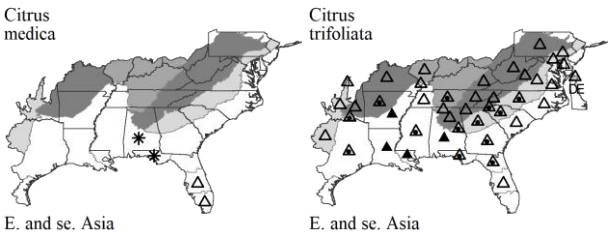
A genus of about 27-35 species, trees, of s. and se. Asia. Recent studies (followed here) provide compelling arguments in favor of a broad circumscription including *Poncirus* and *Fortunella*, based on DNA analyses and other considerations (Bayer et al. 2009; Araújo, Queiroz, & Machado 2003; Mabberley 1997). The recognition of *Poncirus* and other segregate genera would render *Citrus* paraphyletic because of the position of *Citrus medica* (the type species of *Citrus*) as basal to these genera and the rest of *Citrus*.

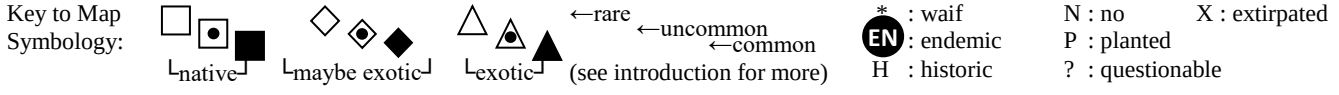
Identification Notes: *Citrus* has simple to trifoliolate, evergreen, coriaceous, acuminate, glossy green leaves, and the familiar spherical fruits. *Citrus ×limon* (Linnaeus) Burman f., Lemon, *C. ×paradisi* Macfadyen in Hooker (pro sp.), Grapefruit, and *C. ×sinensis* (Linnaeus) Osbeck, Orange, have been grown on the Outer Banks of North Carolina in Buxton, Dare County, NC (Brown 1959). They are apparently not naturalized there, being killed outright or severely damaged by occasional colder winters, and are not keyed or otherwise treated here.

1 Leaves trifoliolate; fruit densely pubescent, 3-6 cm long..... ***Citrus trifoliata***
1 Leaves unifoliolate; fruit glabrous, 4.5-25 cm long.
..... ***Citrus medica***

* ***Citrus medica*** Linnaeus. CITRON. **Hab:** Disturbed hammocks. **Dist:** Native of se. Asia. Apparently naturalized in the FL Panhandle (Franklin County) (Wunderlin & Hansen 2003). **Syn:** = Fl4, K3, K4, S, WH3. NatureServe GNR (Not Yet Ranked).

* ***Citrus trifoliata*** Linnaeus. TRIFOLIATE ORANGE, HARDY ORANGE. **Hab:** Bottomland and riparian forests, mesic upland forests, stream banks, spring runs, fencerows, roadsides, becoming common especially in suburban areas. **Dist:** Native of temperate China. See Nesom (2014a) for a detailed discussion of various aspects of this species in the se. United States. **Phen:** Mar-Jun; Sep-Oct. **Tax:** *Citrus trifoliata* is often placed in a separate genus, *Poncirus*, but differs very little from *Citrus* morphologically, has been shown to be phylogenetically nested within *Citrus* (Araújo, Queiroz, & Machado 2003), and thus seems best included in *Citrus*. **Comm:** Planted in our area as an ornamental, as a "living fence", and also used as a grafting stock for citrus, *C. trifoliata* is a small tree or shrub that seems to be made up almost entirely of "thorns" (actually, stipular spines). The fruits closely resemble an orange, but are small (ca. 4 cm in diameter), densely pubescent, and sour. **Syn:** = Ar, K3, Tx, Va, Araújo, Queiroz, & Machado (2003), Nesom (2014a); = *Poncirus trifoliata* (Linnaeus) Rafinesque – F, Fl4, G, Il, K1, NcTx, Pa, RAB, S, Tn, WH3. NatureServe GNR (Not Yet Ranked).





Ptelea Linnaeus 1753 (HOP-TREE, WAFER-ASH, STINKING ASH)

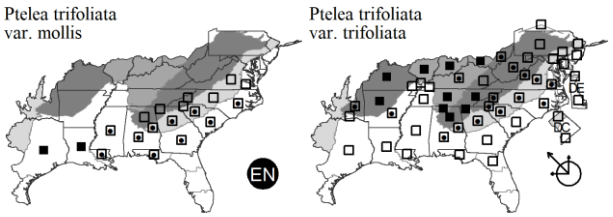
A genus of 3-11 species, shrubs and small trees, of North America (south into Mexico). References: Bailey (1962); Bailey, Herlin, & Bailey (1970); Kubitzki (2011); Skornia, Yang, & Applequist (2015).

1 Lower leaf surface and petiole densely to moderately pubescent throughout, usually more or less villous. ..... ***Ptelea trifoliata var. mollis***

1 Lower leaf surface and petiole glabrous to sparsely pubescent. ..... ***Ptelea trifoliata var. trifoliata***

Ptelea trifoliata Linnaeus *var*. ***mollis*** Torrey & A. Gray. HAIRY WAFER-ASH. **Hab:** Moist to dry forests, woodlands, and outcrops over calcareous or mafic substrates. **Phen:** Apr-Jun; Jun-Aug. **Syn:** = F, Il; = *Ptelea trifoliata* ssp. *trifoliata* var. *mollis* Torrey & A. Gray – C, K1, K3, NcTx, Tx, Bailey (1962), Skornia, Yang, & Applequist (2015); = *Ptelea trifoliata* var. *tomentosa* – S; < *Ptelea trifoliata* Linnaeus – Fl4, RAB, Va, WH3; < *Ptelea trifoliata* ssp. *trifoliata* – K4; > *Ptelea trifoliata* var. *deamiana* Nieuwland – G.

Ptelea trifoliata Linnaeus *var*. ***trifoliata***. COMMON WAFER-ASH. **Hab:** Rocky hillsides, glades, and barrens, especially over calcareous or mafic rocks, prairies, prairie woodlands. **Dist:** NY west to WI, south to FL and TX. **Phen:** Apr-Jun; Jun-Aug. **Syn:** = F, G, Il, NY; > *Ptelea microcarpa* Small – S; > *Ptelea serrata* Small – S; < *Ptelea trifoliata* Linnaeus – Ar, Fl4, Mi, Pa, RAB, Tn, Va, WH3; < *Ptelea trifoliata* ssp. *trifoliata* – GrPl, K4; < *Ptelea trifoliata* ssp. *trifoliata* var. *trifoliata* – C, K1, K3, NE, Tx, Bailey (1962), Skornia, Yang, & Applequist (2015); > *Ptelea trifoliata* Linnaeus var. *trifoliata* – S.



Zanthoxylum Linnaeus 1753 (PRICKLY-ASH, TOOTHACHE TREE)

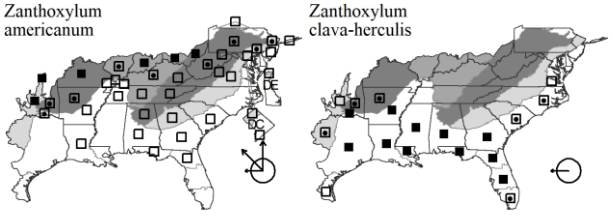
A genus of about 225-250 species, trees, of America, Africa, Asia, and Australia. References: Appelhans et al (2018); Kubitzki (2011); Porter (1976).

5 Leaves thin in texture, pubescent; flowers and fruits borne in small axillary clusters; [mainly in inland physiographic provinces, but also rare and scattered in the Coastal Plain] ..... ***Zanthoxylum americanum***

5 Leaves coriaceous in texture, glabrous and waxy, the lateral leaflets oblique at the base (asymmetrical across the midvein); flowers and fruits borne in large terminal and subterminal paniculate compound cymes; [mainly Coastal Plain, but extending northwards into inland provinces in n. AL, AR, OK, and TX] ..... ***Zanthoxylum clava-herculis***

Zanthoxylum americanum P. Miller. NORTHERN TOOTHACHE TREE, NORTHERN PRICKLY-ASH. **Hab:** Woodlands, forests, and glade margins over calcareous or mafic rocks, often forming extensive colonies near outcrops. **Dist:** S. QC west to e. ND, south to e. SC (a single site known in the state), c. GA, Panhandle FL, e. TN, c. TN, and OK. **Phen:** Mar-May; Jul-Aug. **Comm:** Sometimes planted. **Syn:** = Ar, C, Fl4, G, GrPl, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Va, W, WH3, WV, Porter (1976); = *Xanthoxylum americanum* – F, orthographic variant. NatureServe G5 (Secure).

Zanthoxylum clava-herculis Linnaeus. SOUTHERN TOOTHACHE TREE, HERCULES'-CLUB, SEA-ASH, SOUTHERN PRICKLY-ASH, PEPPER-BARK, TICKLE-TONGUE. **Hab:** Maritime forests, dunes, shell middens, shell hammocks, maritime scrub, inland (in FL and GA) in hammocks. **Dist:** A Southeastern Coastal Plain endemic: se. VA south to s. FL and west to TX, AR, and OK. In the northern part of its distribution, it is restricted to the outer Coastal Plain, nearly entirely on barrier islands. **Phen:** Apr-May; Jun-Sep. **Comm:** Many of the common names come from the numbing effect on the mouth of chewing the leaf or twig, the flavor, smell, and effect being very similar to *Ctenium aromaticum*, Toothache Grass. **ID Notes:** The compound leaves are armed with stout prickles along the rachis. The twigs are also spiny. On the larger branches and trunks, the spines become elevated on conical, pyramidal, or cylindrical corky bases up to 5 cm long and 4 cm in diameter, giving the trunk a very peculiar appearance. Although normally a small tree, it can reach considerable size, up to about 60 cm DBH. **Syn:** = Ar, C, Fl4, G, K1, K3, K4, NcTx, RAB, S, Tx, Va, WH3, Porter (1976); = *Xanthoxylum clava-herculis* – F, orthographic variant. NatureServe G4 (Apparently Secure).



Key to Map Symbology: □ native ◇ maybe exotic △ exotic ←rare ←uncommon ←common (see introduction for more)

* : waif
EN : endemic
H : historic

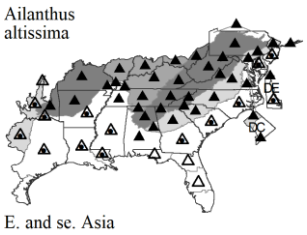
N : no
P : planted
? : questionable

X : extirpated

242. SIMAROUBACEAE A.P. de Candolle 1811 (QUASSIA FAMILY) [in SAPINDALES]

A family of about 13-22 genera and 110-115 species, trees and shrubs of primarily tropical areas of the New World and Old World. The Leitneriaceae has been traditionally considered to be a monotypic family, endemic to se. North America; a variety of recent studies have suggested its inclusion in the Simaroubaceae (Angiosperm Phylogeny Group 2009, 2016; Bogle in FNA 1997). References: APG (2009); APG (2016); Bogle (1997) in FNA3 (1997); Clayton in Kubitzki (2011).

Ailanthus Desfontaines 1788 (TREE-OF-HEAVEN)



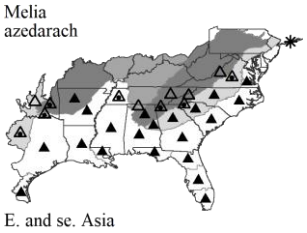
A genus of 5 species, trees, native to Asia and Australia. References: Clayton in Kubitzki (2011); Hu (1979).

* ***Ailanthus altissima*** (P. Miller) Swingle. TREE-OF-HEAVEN, COPAL TREE, STINK-TREE. **Hab:** Roadsides, forests, disturbed areas, including cities, especially in moist, fertile soils. **Dist:** Native of e. Asia. In our area, this tree is now an aggressive and noxious weed, colonizing even undisturbed forests and outcompeting the native vegetation. **Phen:** Apr-Jun; Jul-Oct. **ID Notes:** *Ailanthus altissima* can be recognized vegetatively by its large pinnately compound leaves, very stout twigs (often over 1 cm thick), and the characteristic and unpleasant odor of the crushed foliage. **Syn:** = Ar, C, F, Fl4, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3. NatureServe GNR (Not Yet Ranked).

243. MELIACEAE A.L. de Jussieu 1789 (MAHOGANY FAMILY) [in SAPINDALES]

A family of about 50 genera and 565-575 species, trees and shrubs, of tropical and subtropical areas. References: Mabberley in Kubitzki (2011).

Melia Linnaeus 1753 (CHINABERRY)



A genus of 3 species, trees, of the Old World tropics. References: Mabberley in Kubitzki (2011); Miller (1990).

* ***Melia azedarach*** Linnaeus. CHINABERRY, CAROLINA MAHOGANY, UMBRELLA-TREE, PRIDE-OF-INDIA, WHITE CEDAR, PERSIAN LILAC. **Hab:** Disturbed areas, abandoned rural yards and fields; commonly cultivated in our area (mainly in the Coastal Plain) and commonly escaped. **Dist:** Native of se. Asia (Indomalesia). **Phen:** Apr-May; Sep-Oct. **Comm:** The fruits are sometimes used as beads; they are very poisonous if ingested. **Syn:** = Bah, C, F, Fl4, G, K1, K3, K4, NcTx, RAB, S, Tn, Tx, Va, WH3, Miller (1990). NatureServe GNR (Not Yet Ranked).

247. MALVACEAE A.L. de Jussieu 1789 (MALLOW FAMILY) [in MALVALES]

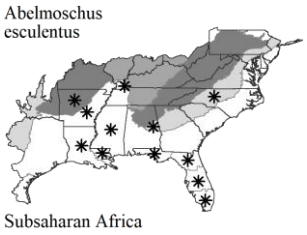
A family of about 243 genera and 4000-4500 species, herbs, shrubs, and trees, of cosmopolitan distribution, but especially diverse in the tropics and subtropics. Malvaceae has always been difficult to circumscribe cleanly, relative to members of such families as Sterculiaceae and Tiliaceae. Molecular evidence now adds to morphologic evidence that traditional circumscriptions of these families are highly polyphyletic. Bayer et al. (1999) present a classification of an expanded Malvaceae, with 9 subfamilies recognized. This family includes several economically important species, including cotton (*Gossypium* spp.), cacao or chocolate (*Theobroma cacao* Linnaeus), and cola (*Cola acuminata* R. Brown). References: Bayer & Kubitzki in Kubitzki & Bayer (2003); Bayer et al (1999); Fryxell (1988); Hanes (2015) in FNA6 (2015).

1 Petals absent; carpels 5, whorled, each expanding into a stalked and papery structure which bears 1-4 pea-sized seeds along its margins; tree; leaves 10-40 cm wide, 3-5 lobed, the lobes acute, the margins entire; [subfamily *Sterculioideae*] ..... ***Firmiana***
1 Petals present; carpels 1, 5, or many, united or separate, but not as above; tree, shrub, or herb; leaves< 15 cm wide, lobed or unlobed, but if lobed then also serrate.
2 Epicalyx of bracts (immediately subtending the calyx) absent.
3 Stamens 3 or 5; [subfamily *Byttnerioideae*].
5 Ovary with 5 carpels and 5 styles; capsule with 5-10 seeds; corolla pink, purple, or white ..... ***Melochia***
5 Ovary with 1 carpel and 1 style; capsule with 1 seed; corolla orange to yellow ..... ***Waltheria***
3 Stamens >10.
6 Stamens free.
7 Tree; fruit a woody drupe; [subfamily *Tilioideae*] ..... ***Tilia***
7 Herb or shrub; fruit a capsule; [subfamily *Grewioideae*, tribe *Apeibeae*].
8 Leaves rounded or subcordate at base, acute at apex; fruit much longer than broad, unarmed ..... ***Corchorus***
8 Leaves cuneate at base, acuminate at apex; fruit subglobose, with hooked spines ..... ***Triumfetta***
6 Stamens united into a staminal column adnate to the corolla at its base; [subfamily *Malvoideae*; tribe *Malveae*].
9 Seeds 2 or more per carpel ..... ***Abutilon***
9 Seed 1 per carpel.
10 Leaves palmately and deeply cleft (> 9/10s of the way to the midrib) into linear segments ..... ***Callirhoe***
10 Leaves unlobed or lobed (if lobed , < 4/5's of the way to the midrib and the lobes broad).
12 Corolla blue to purple; lateral walls of the carpels disintegrating at maturity of the fruit ..... ***Anoda***
12 Corolla yellow or white; lateral walls of the carpels persistent ..... ***Sida***
2 Epicalyx of bracts (immediately subtending the calyx) present.
14 Fruit a loculicidal capsule or fleshy and berry-like.

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

15 Fruit fleshy and berry-like; [subfamily *Malvoideae*; tribe *Hibisceae*]..... ***Malvaviscus***
15 Fruit a loculicidal capsule.
16 Calyx spathe-like, soon falling after anthesis; [subfamily *Malvoideae*; tribe *Hibisceae*]..... ***Abelmoschus***
16 Calyx radially symmetrical, 5-lobed.
17 Style branches short, erect, the stigmas nearly sessile; epicalyx bracts 3, large, foliaceous, and incised; seeds bearing long white fibers; [subfamily *Malvoideae*; tribe *Gossypiae*]..... ***Gossypium***
17 Style branches elongate, spreading; epicalyx bracts 6-15, linear to lanceolate and untoothed; seeds sometimes pubescent but not with long white fibers; [subfamily *Malvoideae*; tribe *Hibisceae*].
18 Locules of the fruit several-seeded; capsule longer than broad, the apex pointed or rounded; petals yellow, white, red, or pink (if pink, then > 4 cm long, or the plant a shrub)..... ***Hibiscus***
18 Locules of the fruit 1-seeded; capsule depressed-globose, indented at the apex; petals pink, 2-4 cm long ..... ***Kosteletzkya***
14 Fruit of radially disposed, 1- to several-seeded, dry carpels that split apart at maturity.
19 Bracts of the epicalyx 5 or more.
20 Shrubs or woody herbs, with leaves not basally disposed; flowers in axils of well-developed leaves; fruit spiny (or lacking spines in *Pavonia hastata*); [of SC southward]; [subfamily *Malvoideae*; tribe *Hibisceae*].
21 Bracts of the epicalyx 5-15, distinct; fruit with 0-3 spines per carpel; leaves lacking foliar nectaries..... ***Pavonia***
21 Bracts of epicalyx 5, fused basally; fruit covered with numerous glochidiate spines; leaves with 1-3 foliar nectaries (glands) on undersurface near base..... ***Urena***
20 Herbs, with leaves basally disposed; flowers in terminal bracteates spikes or racemes; fruit lacking spines; [collectively widespread]; [subfamily *Malvoideae*; tribe *Malveae*].
..... ***Alcea***
19 Bracts of the epicalyx 2-3; [subfamily *Malvoideae*; tribe *Malveae*].
23 Ovules and seeds 2 or more per carpel.
..... ***Modiola***
23 Ovules and seeds 1 per carpel.
25 Leaf blades 1.5-8× as long as wide.
26 Style branches filiform, the stigmatic surface elongate along the inner side of the branches ..... ***Callirhoe***
26 Style branches truncate, the stigmatic surface terminal and capitate..... ***Malvastrum***
25 Leaf blades orbicular, about as wide as long.
27 Leaves deeply palmately cleft..... ***Callirhoe***
27 Leaves unlobed or shallowly lobed..... ***Malva***

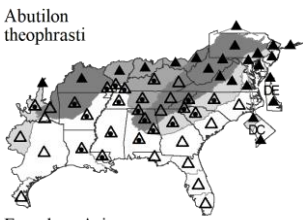
Abelmoschus Medikus 1787 (OKRA, GUMBO)



A genus of about 15 species, herbs, of the Old World tropics. Perhaps better included in a broadly circumscribed *Hibiscus* (Pfeil & Crisp 2005). References: Bates (2015a) in FNA6 (2015); Bayer & Kubitzki in Kubitzki & Bayer (2003).

* ***Abelmoschus esculentus*** (Linnaeus) Moench. OKRA, GUMBO. **Hab:** Frequently cultivated in gardens, rarely persistent or self-seeding the year following. **Dist:** Native of Africa. Reported for AR (Serviss & Peck 2017). **Phen:** Jun-Sep. **Comm:** The young capsules are a famous component of southern cooking. **Syn:** = Bah, Fl4, FNA6, Il, K1, K3, K4, Mi, NcTx, NE, S, WH3; = *Hibiscus esculentus* Linnaeus – F; = n/a – RAB. NatureServe GNR (Not Yet Ranked).

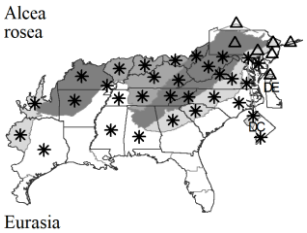
Abutilon P. Miller 1754 (ABUTILON, INDIAN-MALLOW, INDIAN-HEMP)



A genus of about 100-160 species, herbs, of tropical and warm temperate areas. References: Bayer & Kubitzki in Kubitzki & Bayer (2003); Fryxell & Hill (2015a) in FNA6 (2015); Fryxell (2002).

* ***Abutilon theophrasti*** Medikus. VELVETLEAF, PIE-MARKER, BUTTERPRINT, CHINA-JUTE. **Hab:** Crop fields, roadsides, disturbed areas. **Dist:** Native of s. Asia. **Phen:** Jun-Oct. **Syn:** = Ar, Bah, C, F, Fl4, FNA6, G, GrPl, K3, K4, Mi, NcTx, NE, NY, Tn, Tx, Va, W, WH3, WI, Fryxell (2002); = *Abutilon abutilon* (Linnaeus) Rusby – S; = *Abutilon theophrastii* – Il, Pa, RAB, orthographic variant. NatureServe GNR (Not Yet Ranked).

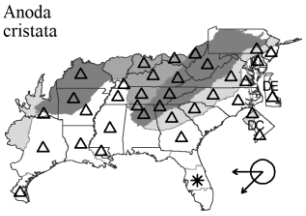
Alcea Linnaeus 1753 (HOLLYHOCK)



A genus of about 50-60 species, warm temperate Eurasian (Mediterranean Europe to c. Asia). References: Bayer & Kubitzki in Kubitzki & Bayer (2003); Hill (2015a) in FNA6 (2015).

* ***Alcea rosea*** Linnaeus. HOLLYHOCK, AMAPOLA GRANDE. **Hab:** Roadsides, dumps, frequently cultivated, less commonly escaped or persistent. **Dist:** Native of Eurasia. Reported for AR (Serviss & Peck 2017). **Phen:** May-Sep. **Syn:** = FNA6, Il, K1, K3, K4, Mi, NcTx, NE, NY, Tn, Va; = *Althaea rosea* (Linnaeus) Cavanilles – C, F, G, GrPl, RAB, Tx. NatureServe GU (Unrankable).

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated



Anoda Cavanilles 1785 (ANODA)

A genus of about 24 species, herbs, of sw. North America, Central America, and South America. References: Bayer & Kubitzki in Kubitzki & Bayer (2003); Fryxell & Hill (2015b) in FNA6 (2015).

* ***Anoda cristata*** (Linnaeus) Schlechtendal. SPURRED ANODA, VIOLETA. **Hab:** Cultivated and fallow fields, other disturbed areas. **Dist:** Native of sw. United States, Mexico, and Central and South America. **Phen:** Jun-Oct. **Syn:** = Fl4, FNA6, G, Il, K1, K3, K4, NE, NY, RAB, Tn, Va, WH3; = *Anoda crista* – C, orthographic variant; > *Anoda cristata* var. *brachyanthera* (Reichenbach) Hochreutiner – F; > *Anoda cristata* var. *cristata* – F. NatureServe G5 (Secure).

Callirhoe Nuttall 1821 (POPPY-MALLOW)

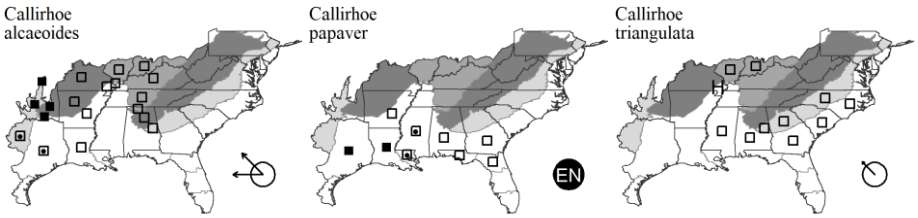
A genus of about 9 species, herbs, of North America. References: Bayer & Kubitzki in Kubitzki & Bayer (2003); Dorr (1990); Dorr (2015c) in FNA6 (2015).

1 Calyx not subtended by an epicalyx.
..... ***Callirhoe alcaeoides***
1 Calyx subtended by an epicalyx of 3 bractlets.
4 Bractlets of the epicalyx linear, 0.1-1.7 mm wide; peduncles 1-flowered; calyx lobes lanceolate, 7-15.4 mm long; mericarps indehiscent; leaves cordate or ovate in outline, palmately deeply divided into 5-7 lobes ..... ***Callirhoe papaver***
4 Bractlets of the epicalyx obovate, 2.5-4.6 mm wide; peduncles several-flowered; calyx lobes deltoid, 2-5 (-6.5) mm long; mericarps dehiscent; leaves triangular, not lobed or only slightly so ..... ***Callirhoe triangulata***

Callirhoe alcaeoides (Michaux) A. Gray. PALE POPPY-MALLOW, PLAINS WINECUP. **Hab:** Calcareous prairies, glades, and other open habitats. **Dist:** E. NE south through e. and OK to c. TX; disjunct and scattered eastward in IA, MO, AR, nw. LA, IL, s. IN, c. KY, c. TN, and c. AL (Dorr 1990). **Phen:** (Apr-) May-Sep (-Nov). **Syn:** = Ar, C, F, FNA6, G, GrPl, Il, K1, K3, K4, NcTx, Tn, Tx, Dorr (1990); = *Callirrhoë alceoides* – S, orthographic variant. NatureServe G5? (Secure).

Callirhoe papaver (Cavanilles) A. Gray. WOODS POPPY-MALLOW. **Hab:** Longleaf pine woodlands, dry hammocks, glades, barrens, prairies, forest openings. **Dist:** N. peninsular FL, Panhandle FL, and sw. GA (Carter, Baker, & Morris 2009) west to e. TX and s. AR (Dorr 1990). **Phen:** May-Jul. **Syn:** = F, Fl4, FNA6, G, K1, K3, K4, Tx, WH3, Dorr (1990); = *Callirrhoë papaver* – S, orthographic variant. NatureServe G5 (Secure).

Callirhoe triangulata (Leavenworth) A. Gray. SAND POPPY-MALLOW, CLUSTERED POPPY-MALLOW. **Hab:** Longleaf pine sandhills, sandy scrub, and other dry, open habitats. **Dist:** Sc. NC south to GA (and n. FL?), and west to ec. MS; also sw. WI and ne. IA south to s. IN, s. IL, and se. MO. **Phen:** Jul-Aug. **Syn:** = C, F, Fl4, FNA6, G, Il, K1, K3, K4, WH3, Dorr (1990); = *Callirrhoë triangulata* – S, orthographic variant. NatureServe G3 (Vulnerable).



Corchorus Linnaeus 1753 (JUTE)

A genus of 40-100 species, shrubs and herbs, broadly tropical and subtropical in distribution. References: Bayer & Kubitzki in Kubitzki & Bayer (2003); Nesom (2015c) in FNA6 (2015).

1 Capsule 1-2 cm long, angular, winged; seeds < 1 mm long ..... ***Corchorus aestuans***
1 Capsule 2.5-7 cm long, subterete, not winged; seeds ca. 1 mm long.
..... ***Corchorus hirtus***

* ***Corchorus aestuans*** Linnaeus. JUTE. **Hab:** Roadsides, other disturbed ground. **Dist:** Native of Asia. Reported for Thomas County, GA (Carter, Baker, & Morris 2009). **Phen:** Jan-Dec. **Syn:** = Bah, Fl4, FNA6, K3, WH3, WI; > *Corchorus acutangulus* Lamarck – S. NatureServe GNR (Not Yet Ranked).
* ***Corchorus hirtus*** Linnaeus. HAIRY JUTE, RED JUTE, ORINOCO JUTE, MORALIA. **Hab:** Disturbed areas. **Dist:** Native of E. Indies. **Phen:** Jan-Dec. **Syn:** = Fl4, FNA6, K3, K4, Tx, WH3, WI; > *Corchorus orinocensis* Kunth – S.

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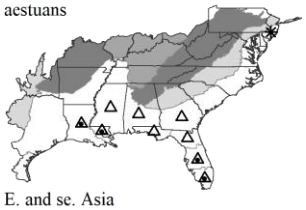
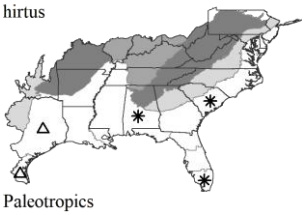
Corchorus aestuans



E. and se. Asia

Corchorus hirtus

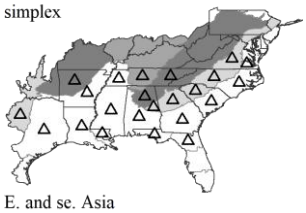


Paleotropics

Firmiana Marsili 1786 (CHINESE PARASOL-TREE, PHOENIX TREE)

A genus of about 12 species, trees, of Africa and Asia. References: Bayer & Kubitzki in Kubitzki & Bayer (2003); Brizicky (1966); Dorr (2015a) in FNA6 (2015); Whetstone (1983).

Firmiana simplex



E. and se. Asia

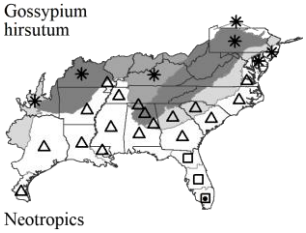
* ***Firmiana simplex*** (Linnaeus) W. Wight. CHINESE PARASOL-TREE, PHOENIX TREE. **Hab:** Planted and naturalized nearby. **Dist:** Native of se. Asia, probably China. **Phen:** May-Aug; Jun-Oct. **Syn:** = C, Fl4, FNA6, K1, K3, K4, NcTx, WH3, Brizicky (1966), Whetstone (1983); = *Firmiana platanifolia* (Linnaeus f.) Schott & Endlicher – RAB, S. NatureServe GNR (Not Yet Ranked).

Gossypium Linnaeus 1753 (COTTON)

A genus of about 40-50 species, herbs, shrubs, and trees, of warm temperate to tropical areas. References: Bayer & Kubitzki in Kubitzki & Bayer (2003); Fryxell & Hill (2015f) in FNA6 (2015); Fryxell (1969); Fryxell (1976); Fryxell (1979); Fryxell (1992); Wendel & Grover (2015).

Identification Notes: Agricultural cotton is now a complex set of cultivars, some involving cross-breeding between *Gossypium barbadense* and *Gossypium hirsutum*, and some plants may not be readily identifiable to species.

Gossypium hirsutum



Neotropics

Gossypium hirsutum Linnaeus. UPLAND COTTON, SHORT-STAPLE COTTON. **Hab:** Coastal hammocks, rockland hammock edges, coastal rock barrens (in FL peninsula), disturbed areas, a frequently cultivated crop, especially in sandy soils of the Coastal Plain, rarely adventive or a waif where grown. **Dist:** Native of Central America, South America, the West Indies, and s. FL. **Phen:** Jul-Sep. **Tax:** Plants in the FL Keys have larger and creamy white to pinkish flowers and petals with a maroon blotch near the base, while those from mainland s. FL have smaller flowers and uniformly pale yellowish petals, perhaps reflecting different races (R. Hammer, pers.comm., 2019). Several varieties were invalidly named based on FL material (Fryxell (1976). **Comm:** Probably first domesticated in the Yucatan Peninsula. **Syn:** = Ar, C, Fl4, FNA6, G, Il, K4, NcTx, NY, Tx, WH3, Fryxell (1969), Fryxell (1992); = *Gossypium herbaceum* Linnaeus – F, misapplied; > *Gossypium herbaceum* Linnaeus – S; > *Gossypium hirsutum* Linnaeus – S, misapplied; > *Gossypium hirsutum* var. *hirsutum* – K1, K3, NE. NatureServe G4G5T4T5 (Apparently Secure).

Hibiscus Linnaeus 1753 (HIBISCUS, ROSE-MALLOW)

A genus of about 200-300 species, trees, shrubs, and herbs, of tropical to warm temperate areas. References: Bayer & Kubitzki in Kubitzki & Bayer (2003); Blanchard (2008); Blanchard (2015a) in FNA6 (2015); Craven et al (2011); Murray, Craven, & de Lange (2008); Shiller (1960); Wise & Menzel (1971).

Unkeyed waifs: *Hibiscus mutabilis*

1 Woody shrub, the stems usually solitary from a creeping rhizome; [section *Hibiscus*] ..... ***Hibiscus syriacus***
1 Herb (sometimes robust and to as tall as 3.5 m), often several from ground level, from a crown or taproot.
  2 Annual from a taproot, to 0.5 m tall; calyx inflated at maturity; capsule 1.0-1.3 cm long; petals 1.5-3 (-4) cm long; leaves 2-6 cm long, deeply cleft; [section *Trionum*] ..... ***Hibiscus trionum***
  2 Perennial from a crown, usually 0.7-3.5 m tall; calyx not inflated at maturity; capsule 1.7-3.5 cm long; petals 4-14 cm long; leaves 4-25 cm long, deeply cleft, hastate-lobed, or not at all lobed or cleft.
    3 Leaves and stems harshly scabrous; calyx lobes each with an elongate purplish nectary on the back; [of pine savannas and dry sandy soils of maritime forest edges, from se. NC southward]; [section *Furcaria*] ..... ***Hibiscus aculeatus***
    3 Leaves and stems glabrous, softly pubescent, or slightly scabrous; calyx lobes lacking nectaries; [of marshes and swamps (sometimes cultivated in drier soils), collectively widespread in our area]; [section *Muenchhusia*].
      4 Stem glabrous; leaves glabrous; leaves either palmately 3-5-lobed, or prominently halberd-lobed at the base (uncommonly unlobed).
        5 Leaves either palmately 3-5-lobed; petals bright scarlet ..... ***Hibiscus coccineus***
        5 Leaves halberd-lobed at the base (uncommonly unlobed); petals pink or white with a purplish base ..... ***Hibiscus laevis***
      4 Stem pubescent at least when young; leaves pubescent on at least one surface; leaves unlobed or slightly lobed toward the tip (except *H. grandiflorus*).
        6 Staminal column 6.2-9.5 cm long, > ⅔ × as long as the petals; petals 8.5-14 cm long; [e. GA southward] ..... ***Hibiscus grandiflorus***
        6 Staminal column 1.2-5 cm long, < ½× as long as the petals; petals 4-12 cm long; [widespread].
          7 Capsule glabrous and dark brown to black; bracts of involucel eciliate; upper leaf surface glabrous or nearly so ..... ***Hibiscus moscheutos***
          7 Capsule pubescent (the dark surface largely or completely obscured); bracts of the involucel usually ciliate; upper leaf surface usually modertaley densely stellate-pubescent. ..... ***Hibiscus lasiocarpos***

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

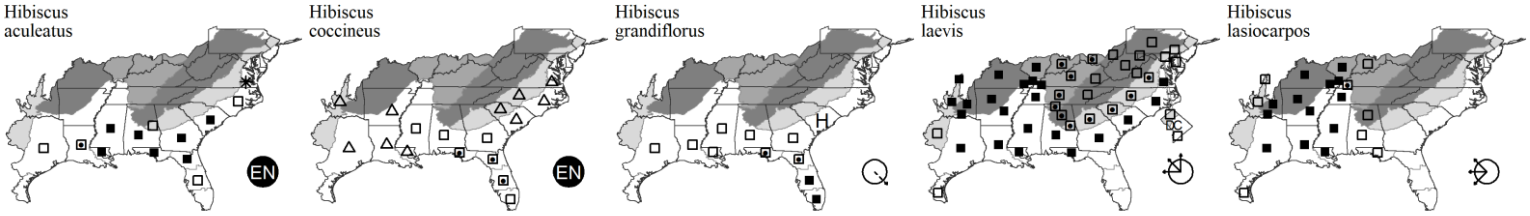
Hibiscus aculeatus Walter. SAVANNA HIBISCUS, COMFORT-ROOT. **Hab:** Pine savannas, swamp forests, dry sandy or loamy soils of maritime forest edges. **Dist:** Se. NC south to sc. peninsular FL, west to LA and extreme e. TX. **Phen:** Jun-Aug; Jul-Sep. **Syn:** = Fl4, FNA6, GW2, K1, K3, K4, RAB, S, WH3. NatureServe G4G5 (Apparently Secure).

Hibiscus coccineus Walter. SCARLET HIBISCUS. **Hab:** Marshes, swamp forests, roadside swales, cultivated as an ornamental in yards, in much of our area presumably introduced from farther south, but sometimes appearing native. **Dist:** S. GA and s. AL south to s. FL, west to s. AL, and s. MS (a wider distribution is the result of naturalization from horticultural use). **Phen:** (Feb-) Apr-Aug. **Syn:** = Ar, Fl4, FNA6, GW2, K1, K3, K4, S, Va, WH3. NatureServe G4? (Apparently Secure).

Hibiscus grandiflorus Michaux. LARGE-FLOWERED HIBISCUS, SWAMP HIBISCUS. **Hab:** Tidal marshes, swamps, lakeshores, wet pine flatwoods and savannas. **Dist:** E. GA (Chatham Co., adjacent to the SC border) (Jones & Coile 1988) and historically apparently in se. SC (Mellichamp 1889) south to s. FL, west to e. LA; w. Cuba. **Phen:** (May-) Jun-Aug (-Sep). **Syn:** = Fl4, FNA6, GW2, K1, K3, K4, S, WH3, WI. NatureServe G4? (Apparently Secure).

Hibiscus laevis Allioni. SMOOTH ROSE-MALLOW, HALBERD-LEAVED MARSH-MALLOW, SHOWY HIBISCUS. **Hab:** Freshwater marshes, exposed riverbanks, sandbars. **Dist:** S. PA south to FL Panhandle, west to TX; north in the interior to around the Great Lakes. **Phen:** Jun-Aug (-Nov); Aug-Oct (-Dec). **Syn:** = Ar, C, Fl4, FNA6, GrPl, Il, K1, K3, K4, Mi, NcTx, NY, Pa, Tn, Va, W, WH3; = *Hibiscus militaris* Cavanilles – F, G, GW2, RAB, S, Tx, WV.

Hibiscus lasiocarpos Cavanilles. WESTERN ROSE-MALLOW. **Hab:** Marshes, swamps. **Dist:** KY, IN, IL, MO, KS, and NM south to Panhandle FL (?), AL, MS, LA, and TX. **Phen:** Jul-Oct. **Syn:** = GrPl, Tx, Shiller (1960); < *Hibiscus lasiocarpos* Cavanilles – Ar, F, GW2, Il, S; < *Hibiscus lasiocarpus* – G, orthographic variant; < *Hibiscus moscheutos* Linnaeus – Fl4, WH3; < *Hibiscus moscheutos* Linnaeus ssp. *lasiocarpos* (Cavanilles) O.J. Blanchard – FNA6, K1, K3, K4, NcTx, Blanchard (2008); < *Hibiscus moscheutos* ssp. *lasiocarpus* – Tn, orthographic variant; < *Hibiscus moscheutos* Linnaeus var. *occidentalis* Torrey – C.

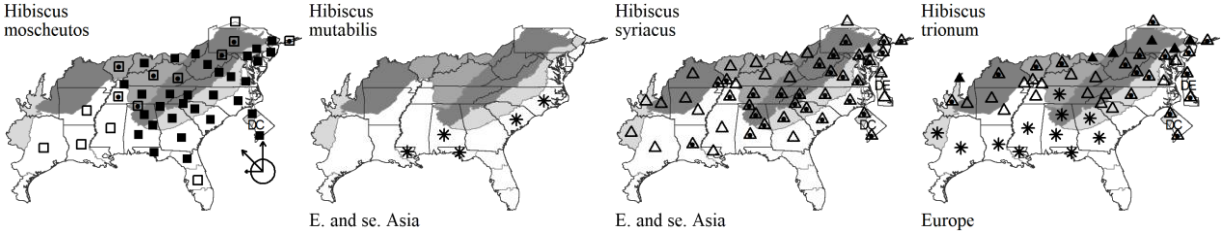


Hibiscus moscheutos Linnaeus. EASTERN ROSE-MALLOW. **Hab:** Marshes, swamps, river sandbars. **Dist:** E. MA west to MI, south to c. peninsular FL and e. TX. **Phen:** Jun-Oct; Jul-Oct. **Syn:** = GrPl, Il, Mi, Pa, Tx, Va; = *Hibiscus moscheutos* Linnaeus ssp. *moscheutos* – FNA6, K1, K3, K4, NcTx, NE, NY, Tn, Blanchard (2008); = *Hibiscus moscheutos* var. *moscheutos* – C; > *Hibiscus incanus* Wendland f. – G, S, Shiller (1960); < *Hibiscus moscheutos* Linnaeus – Fl4, WH3; > *Hibiscus moscheutos* Linnaeus – F, G, S, W; > *Hibiscus moscheutos* Linnaeus ssp. *incanus* (Wendland f.) H.E. Ahles – GW2, RAB; > *Hibiscus moscheutos* Linnaeus ssp. *moscheutos* – GW2, RAB, W; > *Hibiscus moscheutos* Linnaeus ssp. *palustris* (Linnaeus) R.T. Clausen – GW2, RAB, W; > *Hibiscus oculiroseus* Britton – S; > *Hibiscus palustris* Linnaeus – F, G.

* ***Hibiscus mutabilis*** Linnaeus. DIXIE ROSE-MALLOW; CONFEDERATE ROSE-MALLOW. **Hab:** Disturbed areas, persistent (at least) from horticultural use. **Dist:** Native of Asia. **Phen:** Jul-Oct. **Syn:** = FNA6, K3, K4, WI. NatureServe GNR (Not Yet Ranked).

* ***Hibiscus syriacus*** Linnaeus. ROSE-OF-SHARON, ALTHAEA. **Hab:** Escaped or persistent after cultivation, often spreading by rhizomes. **Dist:** Native of e. Asia. **Phen:** Jun-Sep; Aug-Oct. **Syn:** = Ar, C, F, FNA6, G, Il, K1, K3, K4, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WV. NatureServe GNR (Not Yet Ranked).

* ***Hibiscus trionum*** Linnaeus. FLOWER-OF-AN-HOUR, VENICE MALLOW, BLADDER KETMIA. **Hab:** Fields, roadsides, railroad yards, disturbed areas. **Dist:** Native of Europe or Africa. Reported for Ware County, GA (Carter, Baker, & Morris 2009). **Phen:** Jun-Sep. **Tax:** There is substantial question about the taxonomic treatment of the *H. trionum* complex and the identity of the species (singular or plural) naturalized in e. North America (Craven et al. 2011; Murray, Craven, & de Lange 2008). **Syn:** = C, Fl4, FNA6, G, GrPl, Il, K1, K3, K4, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, W, WH3, WI, WV; = *Trionum trionum* (Linnaeus) Wooton & Standley – S. NatureServe GNR (Not Yet Ranked).

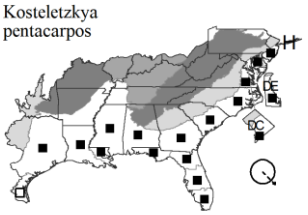


Kosteletzkya C. Presl 1835 (SEASHORE-MALLOW)

A genus of about 15-30 species, herbs, of North America, sub-Saharan Africa, and Madagascar. Perhaps better included in a broadly circumscribed *Hibiscus* (Pfeil & Crisp 2005). References: Alexander (2010); Alexander, Hayek, & Weeks (2012); Bayer & Kubitzki in Kubitzki & Bayer (2003); Blanchard (2008); Blanchard (2015b) in FNA6 (2015); Weeks (2017b) in Weakley et al (2017).

Kosteletzkya pentacarpos (Linnaeus) Ledebour. SEASHORE-MALLOW, SALTMARSH-MALLOW, FEN-ROSE. **Hab:** Brackish to freshwater tidal marshes. **Dist:** NY (Long Island) south to s. FL, west to TX; West Indies (Cuba); also early introduced in Europe, Linnaeus's name based on its occurrence in Venice). **Phen:** Jul-Oct. **Tax:** Several varieties have often been recognized on the basis of length of hairs and of parts of the flower and inflorescence (see synonymy). While geographic trends are readily apparent, the recognition of infraspecific taxa is made problematic by the non-correlation of various characters. In recent studies, neither Blanchard (2008) nor Alexander (2010) recognize varieties in our flora area. *K.*

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



smilacifolia A. Gray, of peninsular FL, appears to warrant specific status, as treated by Small (1933). It also appears that the supposedly "Eurasian" *K. pentacarpos* represents an early introduction of North American *Kosteletzkya* to the Old World (probably via ship's ballast) and is conspecific; *K. pentacarpos* (based on European material) has nomenclatural priority over *K. virginica* (Blanchard 2008). **Syn:** = Va, WI; = *Kosteletskya virginica* (Linnaeus) C. Presl ex A. Gray – RAB, orthographic variant; = *Kosteletzkya pentacarpos* var. *pentacarpos* – K3, K4, NY, Alexander (2010), Weeks (2017b) in Weakley et al (2017); > *Kosteletzkya althaeifolia* (Chapman) Rusby – S; < *Kosteletzkya pentacarpos* (Linnaeus) Ledebour – Fl4, FNA6, WH3, Blanchard (2008); > *Kosteletzkya virginica* (Linnaeus) C. Presl ex A. Gray – GW2, K1, S; > *Kosteletzkya virginica* var. *althaefolia* – Tx, orthographic variant; > *Kosteletzkya virginica* var. *althaeifolia* Chapman – F, G; > *Kosteletzkya virginica* var. *aquilonia* Fernald – C, F, G; > *Kosteletzkya virginica* var. *virginica* – C, F, G.

Malva Linnaeus 1753 (MALLOW)

A genus of about 40 species, herbs, of temperate Eurasia and montane Africa. References: Bayer & Kubitzki in Kubitzki & Bayer (2003); Hill (2015d) in FNA6 (2015).

Unkeyed waifs: *Malva nicaeensis*

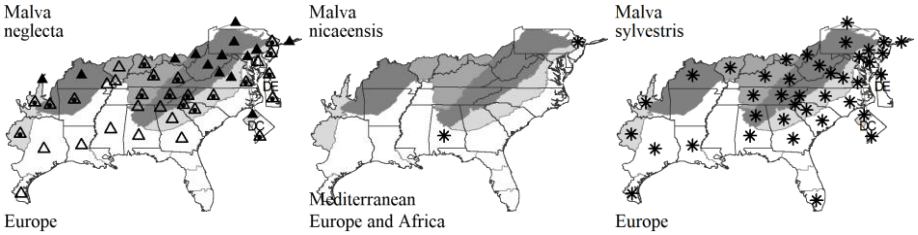
3 Epicalyx of 3 oblong-ovate bractlets; petals reddish purple, (12-) 16-30 (-45) mm long; biennial, erect, usually not branched at the base..... ***Malva sylvestris***

3 Epicalyx of 3 linear or linear to narrowly lanceolate bractlets; petals white or pink, 3-15 mm long; annual, sprawling, usually branched at the base (except *M. verticillata*). ***Malva neglecta***

* ***Malva neglecta*** Wallroth. COMMON MALLOW, CHEESES. **Hab:** Pastures, roadsides, barnyards. **Dist:** Native of Europe. **Phen:** Apr-Nov. **Syn:** = Ar, C, F, FNA6, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, W, WV; = *Malva rotundifolia* Linnaeus – S, rejected because of uncertain application.

* ***Malva nicaeensis*** Allioni. BULL MALLOW. **Hab:** On ballast, disturbed area. **Dist:** Native of Mediterranean Europe. **Phen:** Jan-Dec. **Comm:** {not yet keyed}. **Syn:** = FNA6, K4. NatureServe GNR (Not Yet Ranked).

* ***Malva sylvestris*** Linnaeus. COMMON MALLOW, HIGH MALLOW, CHEESES. **Hab:** Pastures, roadsides, barnyards. **Dist:** Native of Europe. **Phen:** May-Oct. **Syn:** = C, FNA6, GrPl, K1, K3, K4, Mi, NcTx, NY, Pa, RAB, S, Tn, Tx, Va, W; > *Malva sylvestris* var. *mauritiana* (Linnaeus) Boissier – F, G, Il; > *Malva sylvestris* var. *sylvestris* – F, G, Il.



Malvastrum A. Gray 1849 (FALSE-MALLOW)

A genus of 14 species, herbs, of tropical and warm temperate areas. References: Bates (1967); Bayer & Kubitzki in Kubitzki & Bayer (2003); Hill (2015e) in FNA6 (2015).

1 Leaves linear-lanceolate to lanceolate, 3.5-8× as long as wide; plant 1-5 (-8) dm tall; [of inland calcareous habitats]..... ***Malvastrum hispidum***

1 Leaves broadly lanceolate to broadly ovate, 1.5-2.5× as long as wide; plant (5-) 10-20 dm tall; [of near coastal habitats, mainly FL, waifs elsewhere].

3 Mericarps with minute cusps, none longer than 0.1-0.4 mm long..... ***Malvastrum corchorifolium***

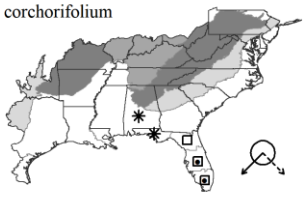
3 Mericarps with well-developed sharp cusps, the larger 1-2 mm long..... ***Malvastrum coromandelianum***

Malvastrum corchorifolium (Desrousseaux) Britton ex Small. **Hab:** Disturbed areas, coastal hammocks. **Dist:** FL and AL south to Central America; West Indies. **Phen:** Jan-Dec. **Syn:** = Bah, Fl4, FNA6, K1, K3, K4, S, WH3, WI. NatureServe G5 (Secure).

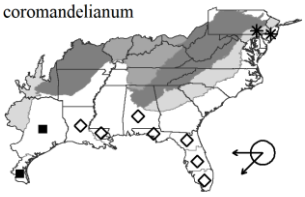
Malvastrum coromandelianum (Linnaeus) Garcke. THREE-LOBE MALLOW. **Hab:** Coastal hammocks, disturbed areas; eastwards a waif on ballast or wool waste. **Dist:** Native of tropical America (TX to Argentina). Northern occurrences, such as in PA (Rhoads & Klein 1993) and NJ (Kartesz 1999), represent old records of ballast or wool waste waifs. **Phen:** Jan-Dec. **Syn:** = Bah, Fl4, FNA6, K1, K3, K4, NcTx, NE, S, Tx, WH3, WI. NatureServe GNR (Not Yet Ranked).

Malvastrum hispidum (Pursh) Hochreutiner. HAIRY FALSE-MALLOW. **Hab:** Limestone barrens. **Dist:** KY, w. VA (Lee County [Fleming & Ludwig 1996]), c. TN, and n. AL; e. IN; IL west to IA, KS, and OK. **Phen:** Jul-Aug; Aug-Oct. **Syn:** = Ar, C, FNA6, GrPl, Il, K1, K4, Tn; = *Malvastrum angustum* A. Gray – G, K3, S, Va; = *Sphaeralcea angusta* (A. Gray) Fernald – F.

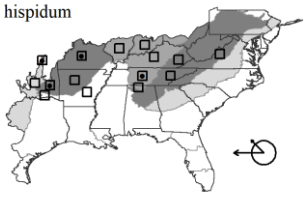
Malvastrum corchorifolium



Malvastrum coromandelianum

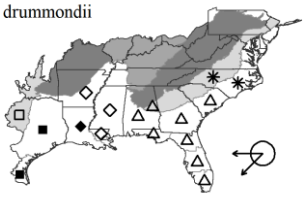


Malvastrum hispidum



Malvaviscus Fabricius 1759 (WAX-MALLOW)

Malvaviscus drummondii



A genus of 3-4 species, herbs, of tropical and subtropical areas. Perhaps better included in a broadly circumscribed *Hibiscus* (Pfeil & Crisp 2005). References: Bayer & Kubitzki in Kubitzki & Bayer (2003); Mendenhall & Fryxell (2015) in FNA6 (2015); Turner & Mendenhall (1993).

Malvaviscus drummondii Torrey & A. Gray. WAX-MALLOW, TURK'S-CAP MALLOW. **Hab:** Open areas, streambanks, disturbed areas. **Dist:** Native west of the Mississippi, in LA, s. AR, e. and c. TX south into n. Mexico. **Phen:** Jun-Oct. **Comm:** First reported for NC and SC by Leonard (1971b). Although Turner & Mendenhall (1993) cite Leonard's specimens as *M. arboreus* var. *arboreus*, they were correctly determined by Leonard as *M. drummondii*. Therefore the attribution of *M. arboreus* var. *arboreus* to NC by Kartesz (1999) is an error. **Syn:** = S; = *Malvaviscus arboreus* Dillenius ex Cavanilles var. *drummondii* (Torrey & A. Gray) Schery – Ar, Fl4, FNA6, K1, K3, K4, NcTx, Tx, WH3, Turner & Mendenhall (1993); < *Malvaviscus arboreus* Cavanilles – WI. NatureServe GNRT4T5Q (Apparently Secure).

Melochia Linnaeus 1753 (CHOCOLATE-WEED)

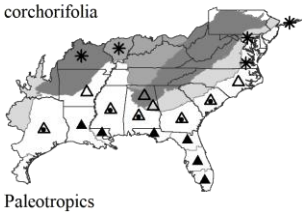
A genus of about 54 species, herbs and shrubs, of tropical regions, especially America. References: Bayer & Kubitzki in Kubitzki & Bayer (2003); Brizicky (1966); Goldberg (2015) in FNA6 (2015).

2 Petioles >1.5 cm long; pubescence of the stem and leaves sparse, of stellate, forked, and/or simple hairs; cymes compact, terminal on primary and secondary branches.....***Melochia corchorifolia***
2 Petioles < 1 cm long; pubescence of the stem and leaves dense (tomentose), of stellate hairs; cymes spikelike, in upper leaf axils ..... ***Melochia villosa***

* ***Melochia corchorifolia*** Linnaeus. CHOCOLATE-WEED. **Hab:** Sandy fields, especially in low, wet places. **Dist:** Native of the Old World tropics. **Phen:** Aug-Oct. **Syn:** = Ar, Fl4, FNA6, GW2, Il, K1, K3, K4, NY, RAB, S, Tx, WH3, Brizicky (1966). NatureServe GNR (Not Yet Ranked).

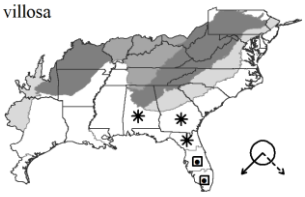
Melochia villosa (P. Miller) Fawcett & Rendle. BRETONICA-PELUDA. **Hab:** Calcareous pine flatwoods, disturbed areas. **Dist:** Native of tropical America, the original distribution uncertain. In GA (Kartesz 1999) and FL (Brizicky 1966). **Syn:** = FNA6, Brizicky (1966); = *Melochia spicata* (Linnaeus) Fryxell – Fl4, K1, K3, K4, WH3, WI; = *Riedlea hirsuta* (Cavanilles) A.L.P.P. de Candolle – S. NatureServe GNR (Not Yet Ranked).

Melochia corchorifolia



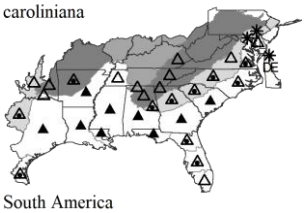
Paleotropics

Melochia villosa



Modiola Moench 1794 (BRISTLY-MALLOW)

Modiola caroliniana

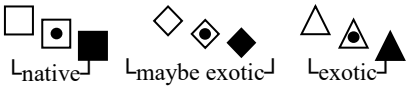


South America

A monotypic genus, an herb, currently of North America, Central America, and South America (but likely not native in North and Central America). References: Bayer & Kubitzki in Kubitzki & Bayer (2003); Hill (2015f) in FNA6 (2015).

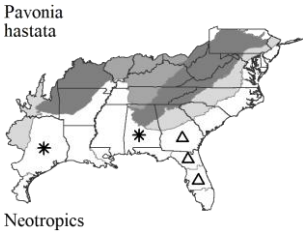
* ***Modiola caroliniana*** (Linnaeus) G. Don. BRISTLY-MALLOW. **Hab:** Lawns, roadsides, disturbed areas, pondshores, edges of brackish marshes; probably adventive in our area from an original native range in South America. **Dist:** The original distribution unclear: sometimes considered as ranging as a native from SC south to FL, west to TX, south into the tropics, and adventive northward, but probably wholly introduced in the southeastern United States from a native distribution in South America. **Phen:** Late Mar-Jun (sometimes later). **Syn:** = Ar, C, F, Fl4, FNA6, G, GW2, K1, K3, K4, NcTx, NE, RAB, S, Tx, Va, WH3, WI. NatureServe G5 (Secure).

Key to Map Symbology:



* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable
X : extirpated



Pavonia Cavanilles 1787

A genus of about 150 species, of tropical and subtropical areas. Perhaps better included in a broadly circumscribed *Hibiscus* (Pfeil & Crisp 2005). References: Bayer & Kubitzki in Kubitzki & Bayer (2003); Fryxell & Hill (2015k) in FNA6 (2015).

* ***Pavonia hastata*** Cavanilles. SWAMPMALLOW. **Hab:** Mesic flatwoods, roadsides, disturbed areas. **Dist:** Native of tropical America. In se. GA (Jones & Coile 1988). **Syn:** = Fl4, FNA6, K1, K3, K4, S, WH3. NatureServe GNR (Not Yet Ranked).

Sida Linnaeus 1753 (SIDA)

A genus of about 100 species, shrubs and herbs, of tropical, subtropical, and warm temperate areas. References: Bayer & Kubitzki in Kubitzki & Bayer (2003); Fryxell & Hill (2015m) in FNA6 (2015); Fryxell (1985); Fuertes Aguilar, Fryxell, & Jansen (2003); Siedo (1999, 2001); Siedo (2014); Verdcourt (2004).

Unkeyed waifs: *Sida linifolia*

2 Mericarps, styles, and stigmas 5; stem with a spine subtending each leaf; leaves usually truncate to subcordate at the base; [section *Spinosae*] ..... ***Sida spinosa***

2 Mericarps, styles, and stigmas (6-) avg. 10 (-14); stem lacking spines subtending the leaves; leaves usually cuneate to rounded (cordate to subcordate in *S. cordifolia*) at the base.

3 Leaves cordate to subcordate at the base; flowers clustered into a terminal panicle; [section *Cordifoliae*] ..... ***Sida cordifolia***

3 Leaves cuneate to rounded at the base; flowers solitary in leaf axils.

4 Leaves elliptic-rhombic, mostly 2-3× as long as wide; [section *Sidae*].

5 Leaves and branches borne distichously; stipules usually falcate, several-veined ..... ***Sida ulmifolia***

5 Leaves and branches borne spirally; stipules linear, 1 (-3)-veined ..... ***Sida rhombifolia var. rhombifolia***

4 Leaves narrowly elliptic to linear, (3-) 4-20× as long as wide; [section *Ellipticifoliae*].

..... ***Sida elliottii var. elliottii***

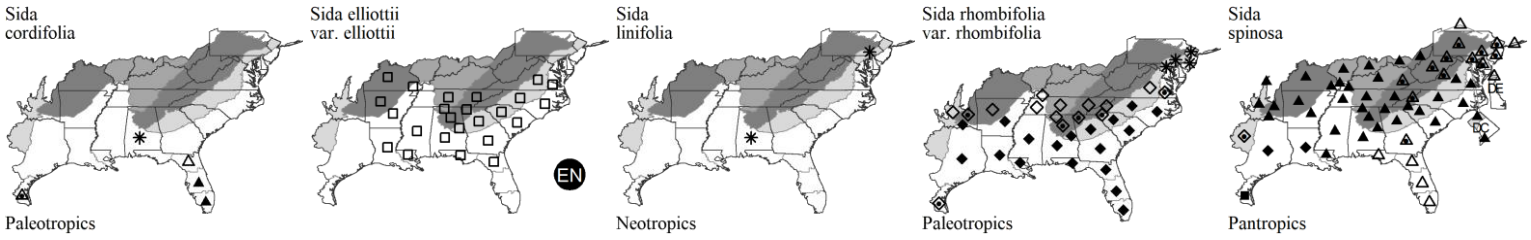
* ***Sida cordifolia*** Linnaeus. MALVA BLANCA, GREATLEAF SIDA, LLIMA. **Hab:** Disturbed sandhills, disturbed hammocks, roadsides, disturbed areas. **Dist:** Native of Old World tropics (perhaps India). **Phen:** Jul-Nov. **Syn:** = Fl4, FNA6, K1, K3, K4, S, Tx, WH3, WI, Fryxell (1985). NatureServe G5 (Secure).

Sida elliottii Torrey & A. Gray *var.* ***elliottii***. COASTAL PLAIN SIDA. **Hab:** Stream banks, sandy openings, pineland pond margins, limestone glades and barrens, mesic hammocks. **Dist:** Var. *elliottii* ranges from se. VA south to n. FL, west to LA and north in the interior to c. TN and se. MO. **Phen:** Jul-Oct. **Tax:** *S. inflexa*, of se. VA and ne. NC, is alleged to differ as follows: *S. inflexa* with calyx 7-10 mm long, leaves elliptic to narrowly elliptic, 4-20 mm wide, (3-) 4-10× as long as wide (vs. *S. elliottii* var. *elliottii* with calyx 5-7 mm long; leaves narrowly lanceolate to linear, 1.5-7 mm wide, 10-20× as long as wide). **Syn:** = FNA6, K3, K4, Va, Siedo (2014); < *Sida elliottii* Torrey & A. Gray – Ar, C, Fl4, G, Il, RAB, S, Tn, WH3; >< *Sida elliottii* Torrey & A. Gray – F, K1, Fryxell (1985); > *Sida inflexa* Fernald – F, K1, Fryxell (1985).

* ***Sida linifolia*** Cavanilles. FLAXLEAF SIDA. **Hab:** On ballast, last collected in 1886 and seemingly a waif. **Dist:** Native of West Indies. **Syn:** = FNA6, K3, K4. NatureServe GNR (Not Yet Ranked).

* ***Sida rhombifolia*** Linnaeus *var.* ***rhombifolia***. ARROWLEAF SIDA, AXOCATZIN. **Hab:** Roadsides, fields, gardens, disturbed areas. **Dist:** Southeastern North America west to TX, south through Mexico, Central America, and n. South America; West Indies; the original distribution of this species is uncertain, but Fryxell & Hill in FNA (2015) suggest it is native to the Old World tropics. **Phen:** Apr-Oct. **Tax:** Verdcourt (2004) discussed variation in this taxon, and suggested that "studies throughout the entire range of the species will necessitate recognition of more than one species". He recognized six varieties in e. Africa, aside from the Linnaean var. *rhombifolia* (with type in Jamaica). **Syn:** = FNA6, Va, Verdcourt (2004); < *Sida rhombifolia* – Bah, C, F, Fl4, G, K1, K3, K4, RAB, S, Tn, Tx, W, WH3, WI, Fryxell (1985). NatureServe G5TNR (Not Yet Ranked).

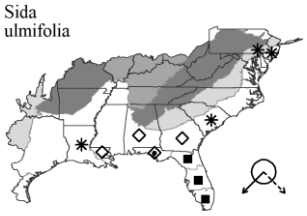
Sida spinosa Linnaeus. PRICKLY SIDA, PRICKLY-MALLOW, FALSE-MALLOW. **Hab:** Disturbed areas, wet fields. **Dist:** Native of the Neotropics and Paleotropics. **Phen:** (May-) Jun-Nov. **Syn:** = Ar, Bah, C, F, Fl4, FNA6, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WI, WV, Fryxell (1985). NatureServe G5? (Secure).



Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

247. MALVACEAE

Sida ulmifolia P. Miller. BROOMWEED, WIREWEED. **Hab:** Disturbed areas. **Dist:** Native of the Tropics, the original northern limit uncertain. Usually considered native in peninsular FL, but the area of nativity uncertain. **Phen:** Jun-Oct. **Syn:** = FNA6; = *Sida carpinifolia* Linnaeus f. – RAB, S; >< *Sida acuta* Burman f. – K1, K3, K4, Fryxell (1985), misapplied; > *Sida acuta* var. *acuta* – Bah; > *Sida acuta* var. *carpinifolia* K. Schumann – Bah; < *Sida ulmifolia* P. Miller – Fl4, WH3, WI. NatureServe G5TNR (Not Yet Ranked).



Tilia Linnaeus 1753 (BASSWOOD, WHITEWOOD, LINDEN, LINN)

A genus of about 25-45 species, trees, of temperate regions of North America, Europe and Asia. Hardin's (1990) treatment of American *Tilia* seems a practical and reasonable approach; it gives taxonomic status to the more distinctive (and geographically based) elements of variation, while recognizing the intergradational nature of the variation; McCarthy (2012) agreed with Hardin's entities and their ranks. Pigott (2012), however, differed in his interpretation (see synonymy). Further investigation of this complex group is, however, warranted. References: Bayer & Kubitzki in Kubitzki & Bayer (2003); NE; Hardin (1990); McCarthy (2012); Pigott (2012); Stace (2010); Strother (2015b) in FNA6 (2015).

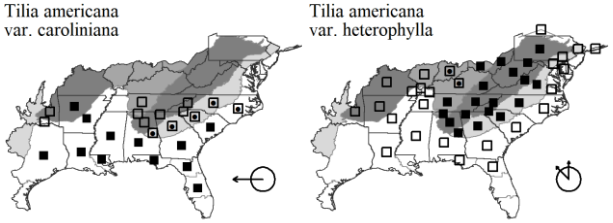
Identification Notes: While the varieties treated below are broadly distinctive and have definite geographic distributions across e. North America, they are imperfectly distinct in geographic areas of overlap. In our area, their identification is particularly problematic in Virginia, where individuals in many parts of the state show intergradation between the northern var. *americana* and the Southern and Central Appalachian var. *heterophylla*. When not in flower or fruit, *Tilia* and *Morus* are often confused. They can be easily told apart by leaf venation. *Morus* has the main leaf veins splitting towards the margin but then rejoining to form a rather prominent, looping (scalloped) marginal vein; the basal veins 3, palmate, sometimes an additional prominent vein on each side joining the lateral vein above its divergence from the petiole end; and the main lateral leaf veins (above the basal veins) mainly alternate. *Tilia* has the main leaf veins splitting several times towards the leaf margin and leading into the teeth without rejoining and forming a marginal vein; the basal veins 5, palmate, all joining together at the summit of the petiole; and the main lateral leaf veins (above the basal veins) usually opposite

3 Lower leaf surfaces grayish or brownish, loosely but densely tomentose with fasciculate and/or stipitate-stellate trichomes, either remaining tomentose or becoming puberulent, or puberulent from emergence and green beneath; lateral buds 3-5 mm long; pericarp 0.5-0.6 mm thick; [generally southern, Coastal Plain and Piedmont of NC, SC, GA and southward and westward]..... ***Tilia americana var. caroliniana***

3 Lower leaf surfaces pale or whitish, densely stellate tomentose with appressed, sessile-stellate trichomes obscuring the surface (rarely becoming puberulent with age but with some stellate trichomes persisting along major veins, the margin, and/or the apex); lateral buds 5-8 mm long; pericarp 0.8-1.0 mm thick; [widespread in our area]..... ***Tilia americana var. heterophylla***

Tilia americana Linnaeus *var*. ***caroliniana*** (P. Miller) Castiglioni. SOUTHERN BASSWOOD, CAROLINA BASSWOOD. **Hab:** Mesic forests, in the outer Coastal Plain usually associated with shell deposits, Indian shell middens, or underlying coquina limestone ("marl"). **Dist:** NC south to c. peninsular FL and west to OK and c. TX. **Phen:** (Apr-) Jun-Jul; Jul-Aug. **Tax:** Pigott (2012) splits this entity into two taxa, each recognized at subspecific rank under *T. caroliniana*. **Syn:** = Ar, Fl4, K1, K3, K4, NcTx, WH3, Hardin (1990), McCarthy (2012); < *Tilia americana* – FNA6; > *Tilia caroliniana* P. Miller – RAB, S, Tx; > *Tilia caroliniana* ssp. *caroliniana* – Pigott (2012); > *Tilia caroliniana* ssp. *floridana* (Small) Murray – Pigott (2012); > *Tilia floridana* Small – F, RAB, S, Tx; > *Tilia georgiana* Sargent – S; > *Tilia littoralis* Sargent – S. NatureServe G5T5 (Secure).

Tilia americana Linnaeus *var*. ***heterophylla*** (Ventenat) Loudon. MOUNTAIN BASSWOOD, WHITE BASSWOOD, LINN. **Hab:** Rich coves and mesic to dry slopes (the drier sites usually on limestone), often one of the most abundant trees in Southern Appalachian cove forests. **Dist:** Centered in the Southern Appalachians: sw. PA and WV south to c. NC, wc. GA, FL Panhandle, and westward as disjunct populations to the Ozarkian Highlands of s. MO and n. AR. **Phen:** May-Jul; Jul-Aug. **Tax:** In VA, var. *heterophylla* dominates in sw. VA and along southern Piedmont river bluffs, with disjunct populations in calcareous ravines in the upper Coastal Plain (Surry County); it also extends less commonly into the northern VA mountains and foothills, where var. *americana* is more prevalent, but seems to be absent (or very uncommon) in the Potomac valley east of the Blue Ridge. Pigott (2012) recognizes this entity at subspecific rank and treats it as one of three subspecies of *T. caroliniana*. **Syn:** = Ar, C, Fl4, K1, K3, K4, NE, NE, NY, Pa, Tn, Va, WH3, Hardin (1990), McCarthy (2012); = *Tilia caroliniana* ssp. *heterophylla* (Ventenat) Pigott – Pigott (2012); = *Tilia heterophylla* Ventenat – F, Il, RAB, W, WV; < *Tilia americana* – FNA6; > *Tilia australis* Small – S; > *Tilia eburnea* W.W. Ashe – S; > *Tilia heterophylla* Ventenat – G, S; > *Tilia lasioclada* Sargent – S; > *Tilia michauxii* Nuttall – S; > *Tilia monticola* Sargent – G. NatureServe G5T5 (Secure).



Triumfetta Linnaeus 1753

A genus of about 70-150 species, trees, shrubs, and herbs, of tropical regions. References: Bayer & Kubitzki in Kubitzki & Bayer (2003); Nesom (2015d) in FNA6 (2015).

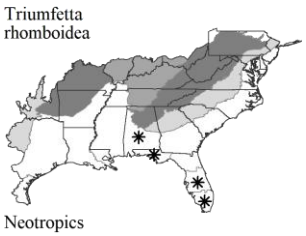
1 Spines of the capsule glabrate; capsule surfaces densely tomentose-pilose ..... ***Triumfetta rhomboidea***

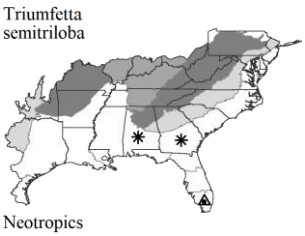
1 Spines of the capsule either retrorsely barbed or densely hirsute on one side; capsule surfaces glabrous, minutely hirtellous, or densely tomentose. ..... ***Triumfetta semitriloba***

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

* ***Triumfetta rhomboidea*** Jacquin. DIAMOND BURBARK. **Hab:** Disturbed areas. **Dist:** Native of tropical America. **Phen:** Oct-Dec. **Syn:** = Fl4, FNA6, K3, K4, WH3, WI. NatureServe GNR (Not Yet Ranked).

* ***Triumfetta semitriloba*** Jacquin. MOSOTE, BURWEED. **Hab:** Disturbed areas. **Dist:** Native of tropical America. In sw. GA (Jones & Coile 1988) and s. peninsular FL. **Phen:** May-Dec. **Syn:** = Bah, Fl4, FNA6, K1, K3, K4, S, WH3, WI. NatureServe G5 (Secure).





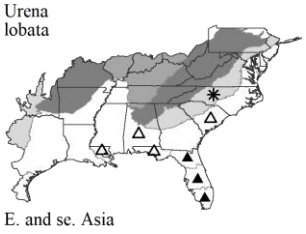
Urena Linnaeus 1753 (CAESARWEED)

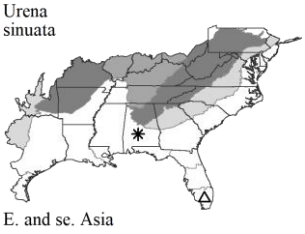
A genus of about 6 species, of tropical and subtropical regions. Perhaps better included in a broadly circumscribed *Hibiscus* (Pfeil & Crisp 2005). References: Bayer & Kubitzki in Kubitzki & Bayer (2003); Hill (2015g) in FNA6 (2015).

1 Leaves unlobed or shallowly palmately lobed, the sinuses extending < 1/4 of the way from the leaf margin to the leaf base ..... ***Urena lobata***
1 Leaves deeply 3-5 palmately lobed, the sinuses extending > 1/2 if the way from the leaf margin to the leaf base ..... ***Urena sinuata***

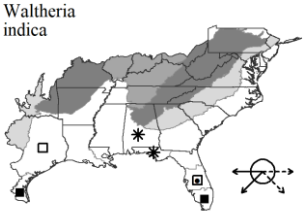
* ***Urena lobata*** Linnaeus. CAESARWEED, BUR MALLOW, CONGO JUTE. **Hab:** Swamps, moist flatwoods, etc., roadsides, vacant lots; an especially bad weed of moist habitats. **Dist:** Native of se. Asia. Introduced to se. SC via landscaping plantings, spreading to vacant lots and roadsides (P. McMillan, pers. comm., 2005). **Syn:** = Bah, Fl4, FNA6, GW2, K1, K3, K4, S, WH3, WI. NatureServe GNR (Not Yet Ranked).

* ***Urena sinuata*** Linnaeus. **Hab:** Disturbed areas, also as a waif on ballast. **Dist:** Native of tropical s. Asia. Reported for Broward County, FL (Lange, Bradley, & Sadle [in prep.]). **Phen:** Jan-Dec. **Tax:** Sometimes regarded as a variety or subspecies of *U. lobata* (see synonymy). **Syn:** = FNA6, K1, K3, K4, WI. NatureServe GNR (Not Yet Ranked).





Waltheria Linnaeus 1753 (RAICHIE)



A genus of about 60 species, herbs and shrubs, pantropical. References: Bayer & Kubitzki in Kubitzki & Bayer (2003); Saunders (2015) in FNA6 (2015).

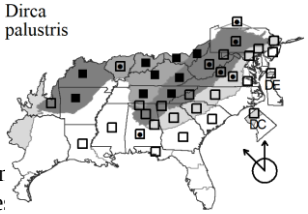
Waltheria indica Linnaeus. SLEEPY MORNING, BASORA PRIETA, UHALOA. **Hab:** Pine rocklands, marl prairies, coastal grasslands, coastal rock barrens, rocky or sandy open areas (TX), disturbed uplands. **Dist:** FL peninsula; West Indies; S. and se. TX and s. AZ south through Mexico and Central America to South America; extensive in the Paleotropics. **Phen:** Jan-Dec. **Syn:** = Bah, FNA6, K1, K3, K4, Tx; > *Waltheria americana* Linnaeus – S; < *Waltheria indica* Linnaeus – Fl4, WH3, WI.

249. THYMELAEACEAE A.L. de Jussieu 1789 (MEZEREUM FAMILY) [in MALVALES]

A family of about 45-53 genera and 500-800 species, mostly trees and shrubs, of cosmopolitan distribution, but especially diverse in Africa (Van der Bank, Fay, & Chase 2002). *Dirca*, *Edgeworthia*, and *Thymelaea* are all in subfamily Thymelaeoideae (Van der Bank, Fay, & Chase 2002). References: Herber in Kubitzki & Bayer (2003); Nevling & Barringer (2015a) in FNA6 (2015); Van der Bank, Fay, & Chase (2002).

1 Annual herb, annual; leaf blades < 2 cm long; fruits capsular, indehiscent ..... ***Thymelaea***
1 Perennial shrub; leaf blades > 2 cm long; fruits drupaceous or berrylike.
..... ***Dirca***

Dirca Linnaeus 1753 (LEATHERWOOD, LEATHERBARK)



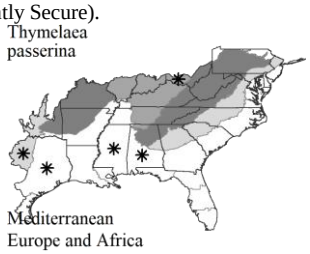
A genus of 4 species, shrubs, of North America (including Mexico). Our species is most closely related to *D. mexicana* Nesom & Mayfield (of the Sierra Madre Oriental, Tamaulipas, Mexico) and *D. decipiens* Floden (of n.

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : plar; ? : que

AR, s. MO, and e. KS); the other species is *D. occidentalis* A. Gray of California (Schrader & Graves 2004; Floden, Mayfield, & Ferguson 2009).
References: Floden & Nevling (2015) in FNA6 (2015); Floden, Mayfield, & Ferguson (2009); Nevling (1962).

Dirca palustris Linnaeus. LEATHERWOOD, LEATHERBARK, WICOPEE, ROPE-BARK. **Hab:** Very rich forests, on slopes or bottomlands, limited to calcareous or mafic rocks such as limestone, calcareous siltstone, calcareous shale, gabbro, or amphibolite, in marl ravine bottoms in the Coastal Plain of VA, in Ashe County NC ascending to 1500 meters elevation. **Dist:** NS and s. QC, south to Panhandle FL, AL, and OK. **Phen:** Mar-May; Jun-Jul. ; Jun-Jul. **Comm:** The common names refer to the extraordinary toughness of the tan-brown bark, which was used by native Americans for cordage. **ID Notes:** The curiously flexible twigs with light brown bark and swollen nodes are distinctive. **Syn:** = Ar, C, F, Fl4, FNA6, G, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Va, W, WH3, WV, Floden, Mayfield, & Ferguson (2009), Nevling (1962). NatureServe G4 (Apparently Secure).

Thymelaea P. Miller 1754 (MEZEREON)



A genus of ca. 30 species, mainly of Mediterranean Europe. References: Nevling & Barringer (2015b) in FNA6 (2015).

* ***Thymelaea passerina*** (Linnaeus) Lange. MEZEREON, SPURGE FLAX. **Hab:** Disturbed barren. **Dist:** Native of Europe. An apparent waif in AL and MS. **Phen:** Late Jun-Aug; Jul-early Sep. **Syn:** = FNA6, GrPl, Il, K1, K3, K4, Mi. NatureServe GNR (Not Yet Ranked).

251. CISTACEAE A.L. de Jussieu 1789 (ROCKROSE FAMILY) [in MALVALES]

A family of about 8 genera and 180 species, shrubs and herbs, of warm temperate and subtropical areas, centered in Mediterranean Europe.
References: Arrington & Kubitzki in Kubitzki & Bayer (2003); Strother (2015c) in FNA6 (2015).

2 Flowers of 2 types, the chasmogamous with 5 showy yellow petals, the cleistogamous lacking petals; pubescence of the stem stellate; leaves 10-50 mm long, alternate; plants with shoots of one type only, not producing short basal shoots; capsules 1.3-12.5 mm long, the larger capsules of chasmogamous flowers at least 2.0 mm long ..... ***Crocanthemum***

2 Flowers of 1 type, with 3 inconspicuous, dark red petals; pubescence of the stem simple; leaves 4-15 mm long (to 30 mm long in *L. pulchella* and *L. mucronata*), linear to linear-elliptic, 0.5-4 mm wide (to 13 mm wide in *L. mucronata*), alternate, opposite, or whorled; plants with shoots of two types, the short, prostrate to ascending basal shoots produced late in the season and overwintering; capsules 0.9-1.7 mm long ..... ***Lechea***

Crocanthemum Spach 1836 (FROSTWEED, ROCKROSE)

A genus of about 24 species, of eastern North America, California, Mexico, and s. South America. The eastern North American species previously attributed to *Helianthemum* are in a clade distinct from the Old World *Helianthemum*, and should be recognized as *Crocanthemum*. References: Arrington & Kubitzki in Kubitzki & Bayer (2003); Daoud & Wilbur (1965); Obae (2013); Sorrie (2015b) in FNA6 (2015); Wilbur & Daoud (1964).

Identification Notes: The identification of most of our species of *Crocanthemum* requires an understanding of the 2 types of flowers produced. Chasmogamous flowers have showy yellow petals and larger sepals, the distinct portion of the 2 linear outer sepals usually linear, (0.7-) 1.3-5.5 mm long, the distinct portion of the 3 broader inner sepals 2.5-12 (-14) mm long. Cleistogamous flowers lack petals and have smaller sepals, the distinct portion of the 2 linear outer sepals 0.2-3 mm long, the distinct portion of the 3 broader inner sepals 1.5-4.8 mm long. In some species (*C. canadense*, *C. bicknellii*, *C. propinquum*) the chasmogamous flowers open earlier (Apr-Jul) than the cleistogamous (Jun-Sep). In others (*C. corymbosum*, *C. georgianum*, *C. nashii*, *C. rosmarinifolium*), the two types of flowers open at the same time (Mar-Jun) or cleistogamous flowers are nearly always absent (*C. carolinianum*). Capsules from chasmogamous flowers are larger and contain more seeds than those from cleistogamous flowers.

1 Leaves 1-4 (-7) mm wide, (5-) 7-15× as long as wide; capsules from chasmogamous flowers 2-3 mm long, with 1-3 (-6) seeds; capsules from cleistogamous flowers 1.3-1.7 mm long, with 1 (-2) seeds ..... ***Crocanthemum rosmarinifolium***

1 Leaves 2-20 mm wide, 2-6 (-8)× as long as wide; capsules from chasmogamous flowers (2.4-) 3-9 (-10.5) mm long, with 6-92 (-135) seeds; capsules from cleistogamous flowers 1.5-4.2 mm long, with 1-20 seeds.

2 Leaves basally disposed, the largest and most prominent leaves in a basal rosette; stem leaves 2-5 below those subtending flowers or fruits; stem with spreading trichomes to 2.5 mm long; lower surface of leaves sparsely pubescent, the surface readily visible; cleistogamous flowers usually never produced; capsules 6-9 (-10.5) mm long, with 80-92 (-135) papillate seeds ..... ***Crocanthemum carolinianum***

2 Leaves predominantly cauline (in some species a rosette of closely spaced smaller and caducous leaves present at the ground's surface); stem leaves 5-20 below those subtending flowers or fruits; stem glabrate to densely puberulent (the pubescence not long and spreading); lower surface of leaves densely pubescent, hiding the surface; cleistogamous flowers regularly produced, either intermixed with the chasmogamous or in separate inflorescences; capsules 1.3-7 (-8.5) mm long, with 1-46 papillate, reticulate, or smooth seeds (pebbled to somewhat papillate in *H. nashii*).

3 Ovary and capsule densely stellate pubescent ..... ***Crocanthemum arenicola***

3 Ovary and capsule glabrous.

5 Chasmogamous flowers usually solitary, terminal or subterminal, later overtopped by lateral branches; seeds papillate, 35-46 per chasmogamous capsule, 5-9 (-12) per cleistogamous capsule; chasmogamous capsules (4-) 6-7 (-8.5) mm long, cleistogamous capsules (2-) 2.3-3.0 (-3.8) mm long; upper surface of cauline leaves with some long simple trichomes mixed with the shorter stellate trichomes ..... ***Crocanthemum canadense***

5 Chasmogamous flowers usually (1-) 2-18, rarely overtopped by lateral branches (often 1-3 in cymes in *H. georgianum*); seeds smooth or reticulate, 12-35 per chasmogamous capsule, 1-20 per cleistogamous capsule; chasmogamous capsules (2.4-) 3.5-5.7 mm long, cleistogamous capsules 1.5-4.2 mm long; upper surface of cauline leaves with the shorter stellate trichomes only.

7 Flowers borne in dense many-flowered flat-topped cymes terminating the stem and sometimes also the main branches; capsules of the cleistogamous flowers 1.6-3.8 mm long, with 4-8 (-10) seeds; pedicels and calyx with 0.5-1.5 mm long simple trichomes mixed with the shorter stellate trichomes; outer sepals of both chasmogamous and cleistogamous flowers with an expanded, obtuse, spatulate tip, 0.3-1.2 mm wide. ***Crocanthemum corymbosum***

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

7 Flowers borne in loose 1-7-flowered cymes or racemes at the ends of the main branches; capsules of the cleistogamous flowers 3.0-4.2 mm long, with 12-20 seeds; pedicels and calyx with short stellate pubescence only; outer sepals of both chasmogamous and cleistogamous flowers linear, 0.2-0.5 mm wide..... ***Crocanthemum georgianum***

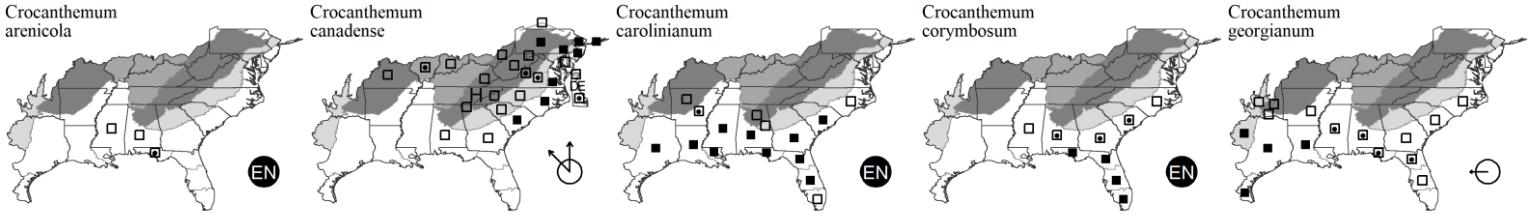
Crocanthemum arenicola (Chapman) Barnhart. GULF COAST SUNROSE. **Hab:** Longleaf pine sandhills, dunes, Florida scrub. **Dist:** Panhandle FL west to s. MS. **Syn:** = Fl4, FNA6, K3, K4, S; = *Helianthemum arenicola* Chapman – K1, WH3, Daoud & Wilbur (1965), Wilbur & Daoud (1964). NatureServe G3 (Vulnerable).

Crocanthemum canadense (Linnaeus) Britton. CANADA FROSTWEED, CANADA SUNROSE, CANADA ROCKROSE. **Hab:** Fields, woodlands, forest edges, roadsides, disturbed areas. **Dist:** NS and ME west to MI and MN, south to e. GA, e. AL, e. TN, KY, and MO. **Phen:** Apr-May (chasm.), May-Aug (cleist.); Jun-Oct. **Syn:** = FNA6, K3, K4, Mi, NE, NY, S, Va; = *Helianthemum canadense* (Linnaeus) Michaux – C, F, G, Il, K1, Pa, RAB, Tn, W, WV, Daoud & Wilbur (1965), Wilbur & Daoud (1964); > *Helianthemum canadense* var. *canadense* – F; > *Helianthemum canadense* var. *sabulonum* Fernald – F. NatureServe G5 (Secure).

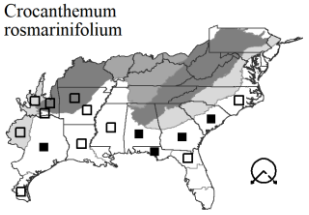
Crocanthemum carolinianum (Walter) Spach. CAROLINA SUNROSE. **Hab:** Fields, pine savannas, dry pine flatwoods, scrubby flatwoods. **Dist:** Ne. NC (Dare County) south to s. FL, west to AR and e. TX. **Phen:** (Jan-) Mar-May; Jul-Aug. **Syn:** = Ar, Fl4, FNA6, K3, K4, S; = *Helianthemum carolinianum* (Walter) Michaux – K1, RAB, Tx, WH3, Daoud & Wilbur (1965), Wilbur & Daoud (1964). NatureServe G4 (Apparently Secure).

Crocanthemum corymbosum (Michaux) Britton. PINEBARREN SUNROSE. **Hab:** Openings in maritime forests, dry hammocks, pine rocklands. **Dist:** E. NC south to s. FL, east to s. MS. **Phen:** (Nov-) Feb-May; (Mar-) Jul-Oct. **Syn:** = Fl4, FNA6, K3, K4, S; = *Helianthemum corymbosum* Michaux – K1, RAB, WH3, Daoud & Wilbur (1965), Wilbur & Daoud (1964). NatureServe G4G5 (Apparently Secure).

Crocanthemum georgianum (Chapman) Barnhart. GEORGIA SUNROSE. **Hab:** Openings in maritime forests, sandy disturbed areas. **Dist:** E. NC south to n. FL, west to c. TX and AR. **Phen:** Apr-May; May-Oct. **Syn:** = Ar, Fl4, FNA6, K3, K4, S; = *Helianthemum georgianum* Chapman – K1, NcTx, RAB, Tx, WH3, Daoud & Wilbur (1965), Wilbur & Daoud (1964). NatureServe G4 (Apparently Secure).



Crocanthemum rosmarinifolium (Pursh) Janchen. ROSEMARY SUNROSE. **Hab:** Longleaf pine sandhills, sandy roadsides, fields. **Dist:** S. NC south to Panhandle FL, west to c. TX; West Indies. **Phen:** May-Jun; Jul-Oct. **Syn:** = Ar, Fl4, FNA6, K3, K4, S; = *Helianthemum rosmarinifolium* Pursh – K1, NcTx, RAB, Tx, WH3, Daoud & Wilbur (1965), Wilbur & Daoud (1964). NatureServe G4 (Apparently Secure).



Lechea Linnaeus 1753 (PINWEED)

Contributed by Bruce A. Sorrie

A genus of about 18 species, herbs, of North America, the West Indies, and Central America. References: Arrington & Kubitzki in Kubitzki & Bayer (2003); Hodgdon (1938); Lemke (2014); Lemke (2015) in FNA6 (2015); Sorrie & Weakley (2007b); Sorrie & Weakley (2007c); Spaulding (2013b); Wilbur & Daoud (1961); Wilbur (1974).

Identification Notes: *Lechea* is recognizable by its production of numerous basal shoots (usually prostrate) in the late summer and fall, often with whorled leaves. These are evergreen and overwinter, and the fertile stems (usually erect or ascending) are produced from renewed growth of the basal shoots in the spring and summer.

2 Pubescence of the stems strongly spreading, not at all appressed; inner sepals carinate (U- or V-shaped in cross-section). ..... ***Lechea mucronata***

2 Pubescence of the stems more or less appressed, usually strongly so; inner sepals shallowly curved in cross section, not carinate.

4 Outer (slender) sepals equaling or exceeding the inner (broad) sepals.

5 Base of the fruiting calyx clearly differentiated into a hardened, shiny, yellowish, obconic base 0.4-0.6 mm long, contrasting in color and texture with the rest of the calyx; pedicels averaging 1.5-3.5 mm long..... ***Lechea racemulosa***

5 Base of the fruiting calyx not conspicuously differentiated in texture and color; pedicels averaging < 1.5 (-2) mm long.

6 Capsule completely enclosed by the sepals, subglobose; leaves averaging > 10× as long as wide; plant short and usually densely bushy, < 3 dm tall ..... ***Lechea tenuifolia***

6 Capsule exserted, usually conspicuously so, the sepals not enclosing the summit of the fruit, ellipsoid to ovate; leaves < 8× (usually < 6×) as long as wide; plant usually taller, 1-7 dm tall.

7 Outer sepals distinctly longer than the inner sepals, usually also longer than the capsule; stem leaves usually whorled, 2 mm wide; plant erect, with short, ascending branches..... ***Lechea minor***

7 Outer sepals shorter than to barely longer than the inner sepals, shorter than the capsule; stem leaves alternate, rarely wider than 1.5 mm wide; plant ascending (sometimes erect or spreading, branches spreading ..... ***Lechea sessiliflora***

4 Outer (slender) sepals shorter than the inner (broad) sepals.

9 Capsules ellipsoid to narrowly pyriform, normally about 2× as long as wide (or even longer in *L. racemulosa*).

10 Stigmas not persistent; pedicels averaging about 2 mm long; base of the fruiting calyx clearly differentiated into a hardened, shiny, yellowish, obconic base 0.4-0.6 mm long, contrasting in color and texture with the rest of the calyx..... ***Lechea racemulosa***

10 Stigmas persistent, reddish-brown, conspicuous on the summit of the capsule; base of the fruiting calyx not conspicuously differentiated in texture and color..... ***Lechea sessiliflora***

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated

9 Capsules of a broader shape, ovoid, broadly ellipsoid, or subglobose, normally < 1.5× as long as wide.
11 Capsules obviously longer than the sepals.
.....***Lechea pulchella var. ramosissima***
11 Capsules almost completely enveloped by the sepals.
.....***Lechea torreyi var. congesta***

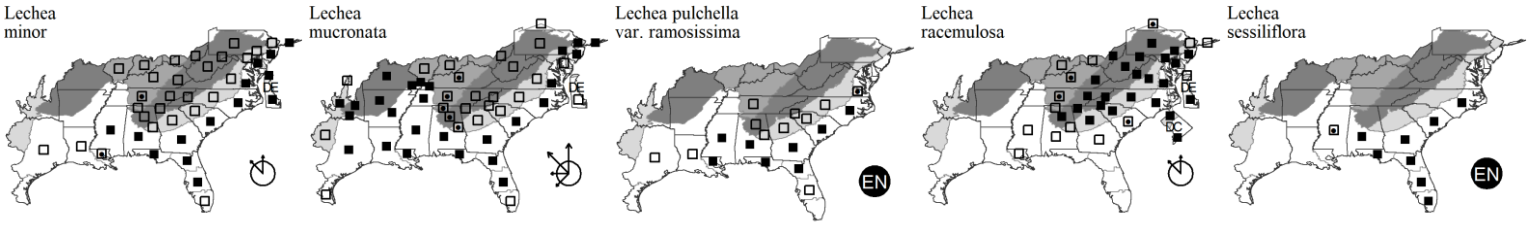
Lechea minor Linnaeus. THYMELEAF PINWEED. **Hab:** Longleaf pine savannas, sandhills, pine-oak woodlands, other dry woodlands or openings, sandy disturbed places. **Dist:** MA and VT west to s. ON and n. IN, south to c. peninsular FL and LA (primarily Coastal Plain and around the Great Lakes). **Phen:** Jul-Aug; Aug-Oct. **Syn:** = C, F, Fl4, FNA6, G, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Va, W, WH3, Hodgdon (1938), Spaulding (2013a), Wilbur & Daoud (1961), Wilbur (1974). NatureServe G5 (Secure).

Lechea mucronata Rafinesque. HAIRY PINWEED. **Hab:** Open dry habitats, longleaf pine sandhills, dunes, dry hammocks, woodlands. **Dist:** NH west to MI and OK, south to c. peninsular FL, TX, and n. Mexico. **Phen:** Jun-Aug; Jul-Oct. **Syn:** = Ar, C, Fl4, FNA6, Il, K1, K3, K4, Mi, NcTx, NE, NY, Tn, Tx, Va, W, WH3, Spaulding (2013a), Wilbur (1974); = *Lechea villosa* Elliott – F, G, Pa, RAB, S, Wilbur & Daoud (1961); > *Lechea villosa* var. *typica* – Hodgdon (1938). NatureServe G5 (Secure).

Lechea pulchella Rafinesque *var.* ***ramosissima*** (Hodgdon) Sorrie & Weakley. SOUTHERN HAIRY PINWEED. **Hab:** Pine-oak woodlands, pine savannas, pine flatwoods, longleaf pine sandhills, openings in maritime forests, sometimes in wet, almost peaty soils. **Dist:** Se. VA south to n. FL and west to e. LA; disjunct in sc. TN (Coffee County). **Phen:** Jun-Aug; Aug-Oct. **Syn:** = Fl4, FNA6, K3, K4, Tn, Va, WH3, Sorrie & Weakley (2007b), Spaulding (2013b); = *Lechea leggettii* Britton & Hollick var. *ramosissima* Hodgdon – F, G, Hodgdon (1938), Wilbur & Daoud (1961); < *Lechea leggettii* Britton & Hollick – C, G, RAB, S; < *Lechea pulchella* Rafinesque var. *pulchella* – K1.

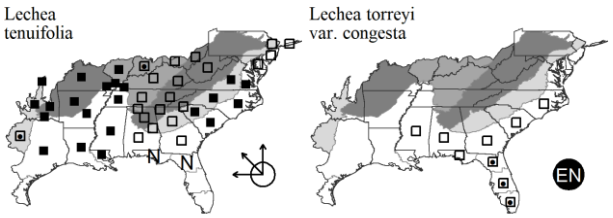
Lechea racemulosa Michaux. APPALACHIAN PINWEED. **Hab:** Dry pine woodlands, other woodlands, forest edges, old fields. **Dist:** Se. NY west to s. OH and s. IL, south to se. VA, NC, c. GA, and AL, with a few disjunct occurrences west to MO; the range is centered on the Appalachian Mountains. **Phen:** Jun-Aug; Jul-Oct. **Syn:** = C, F, FNA6, G, K1, K3, K4, NY, Pa, RAB, S, Tn, Va, W, WV, Hodgdon (1938), Wilbur & Daoud (1961). NatureServe G5 (Secure).

Lechea sessiliflora Rafinesque. PINELAND PINWEED. **Hab:** Longleaf pine sandhills and dry flatwoods. **Dist:** A Southeastern Coastal Plain endemic: s. NC south to s. FL and west to s. MS. **Phen:** Jul-Aug; Aug-Oct. **Syn:** = FNA6, K1, K3, K4, WH3, Wilbur (1974); = *Lechea patula* Leggett – RAB, Hodgdon (1938), Wilbur & Daoud (1961); > *Lechea exserta* Small – S; > *Lechea patula* Leggett – S.



Lechea tenuifolia Michaux. NARROWLEAF PINWEED. **Hab:** Dry oak-pine forests and openings. **Dist:** S. ME south to SC (mostly inner Coastal Plain and Piedmont), and from s. IN n. IL, s. MN, and NE south to e. LA and c. TX. **Phen:** Jun-Aug; Aug-Oct. **Syn:** = Ar, FNA6, GrPl, K1, K3, K4, NcTx, NE, NY, RAB, S, Tn, Tx, Va, W, WV, Spaulding (2013a), Wilbur & Daoud (1961); > *Lechea tenuifolia* var. *occidentalis* Hodgdon – Il, Hodgdon (1938); > *Lechea tenuifolia* var. *tenuifolia* – C, F, G, Il; > *Lechea tenuifolia* var. *typica* – Hodgdon (1938).

Lechea torreyi Leggett ex Britton *var.* ***congesta*** Hodgdon ex Lemke. SANDHILL PINWEED. **Hab:** Longleaf pine sandhills and pine flatwoods. **Dist:** As interpreted by Hodgdon, *L. torreyi* consists of two varieties, the more widespread var. *congesta* ranging from se. NC south to s. FL and west to s. MS (disjunct in Belize), and the more restricted var. *torreyi* restricted to FL. **Phen:** Jun-Jul; Aug-Oct. **Comm:** Wilbur & Daoud (1961) express doubt about the validity of the two varieties, but present little evidence for or against their recognition. Lemke (2014) supports varietal status and validates the name. **Syn:** = FNA6, K3, K4, Hodgdon (1938), Lemke (2014); < *Lechea torreyi* – K1, RAB, S, WH3, Spaulding (2013a), Wilbur & Daoud (1961), Wilbur (1974). NatureServe G4TNR (Not Yet Ranked).

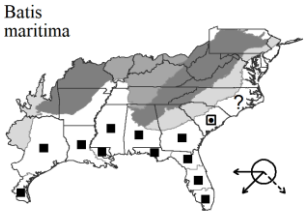


261. BATACEAE Martius ex Perleb 1838 (BATIS FAMILY) [in BRASSICALES]

A monogeneric family, of 2 species, low shrubs, of tropical and subtropical shores of the Americas, New Guinea, the Pacific, and Australia.
References: Bayer & Appel in Kubitzki & Bayer (2003); Rogers (1982b); Thorne (2010) in FNA7 (2010).

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated

Batis P. Browne 1756 (SALTWORT, BEACHWORT, BATIS)



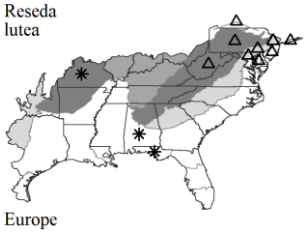
A genus of 2 species, low shrubs, of tropical and subtropical shores of the Americas, New Guinea, the Pacific, and Australia. The only other member of the family and genus is *B. argillicola*, of New Guinea and Australia. References: Bayer & Appel in Kubitzki & Bayer (2003); Goldblatt (1976); Rogers (1982b); Thorne (2010) in FNA7 (2010).

Batis maritima Linnaeus. SALTWORT, BEACHWORT, BATIS, TURTLEWEED, VIDRILLOS. **Hab:** Brackish marshes, "*Batis* flats", other salt flats, mangroves. **Dist:** Se. SC south to s. FL, west to TX, and in Central and South America; West Indies; HI (where apparently introduced). *B. maritima* is alleged (as by FNA and S) to occur as far north as NC, but the documentation is unknown; there is no twentieth century evidence to place *Batis* in NC. **Phen:** Jun-Jul; Oct. **Syn:** = Bah, Fl4, FNA7, GW2, K1, K3, K4, RAB, S, Tx, WH3, Rogers (1982b). NatureServe G5 (Secure).

267. RESEDACEAE Martinov 1820 (MIGNONETTE FAMILY) [in BRASSICALES]

A family of about 6 genera and 75-85 species, herbs and shrubs, of the northern hemisphere. References: Kubitzki & Bayer (2003); Martín-Bravo et al (2007); Martín-Bravo, Tucker, & Daniel (2010) in FNA7 (2010).

Reseda Linnaeus 1754 (MIGNONETTE)



A genus of about 55-60 species, herbs, of Europe, Mediterranean region, and c. Asia. Martín-Bravo et al. (2007) show a complex phylogeny of the family, which may result in either the elevation of some components currently included in *Reseda* to generic rank, or the inclusion in *Reseda* of allied genera (Kadereit et al. 2016). References: Martín-Bravo, Tucker, & Daniel (2010) in FNA7 (2010).

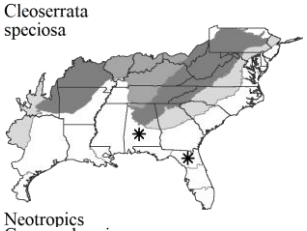
* ***Reseda lutea*** Linnaeus. YELLOW MIGNONETTE, WILD MIGNONETTE, CUTLEAF MIGNONETTE. **Hab:** Disturbed areas. **Dist:** Native of Europe. **Phen:** May-Jul. **Syn:** = C, F, FNA7, G, GrPl, Il, K1, K3, Mi, NE, NY, Pa, WV; > *Reseda lutea* ssp. *lutea*. NatureServe GNR (Not Yet Ranked).

269. CLEOMACEAE Berchtold & J. Presl 1825 (CLEOME FAMILY) [in BRASSICALES]

A family of ca. 18 genera and ca. 175 species, herbs, of mainly tropical and subtropical areas. The Cleomaceae is here circumscribed to include the members of the Capparaceae, subfamily Cleomoideae, following phylogenetic analyses which show this group to be a monophyletic clade more closely related to Brassicaceae than to the rest of Capparidaceae (Hall, Sytsma, & Iltis 2002). The generic classification is still uncertain and in flux (Patchell, Roalson, & Hall 2014; Roalson et al. 2015). References: Christenhusz, Fay, & Byng (2018); Hall, Sytsma, & Iltis (2002); Judd, Sanders, & Donoghue (1994); Kers in Kubitzki & Bayer (2003); Patchell, Roalson, & Hall (2014); Roalson et al (2015); Sanders & Judd (2000); Tucker & Vanderpool (2010) in FNA7 (2010).

1 Stamens (8-) 10-27; petals notched or irregularly lacerate at the apex; gynophore (stipe of the pistil, above the calyx) 2-6 mm long; leaflets (1-) 3 ..... ***Polanisia***
1 Stamens 6 (except 14-25 in *Corynandra*); petals obtuse or acute at the apex; gynophore (stipe of the pistil, above the calyx) 1-80 mm long; leaflets 5-7.
2 Plants with nodal spines (and sometimes with prickles on petioles and leaf veins). ..... ***Tarenaya***
2 Plants lacking nodal spines and lacking prickles on petioles and leaf veins.
4 Filaments fused to lower half of gynophore (evident from scars near the midpoint of the gynophore of fruiting specimens) ..... ***Gynandropsis***
4 Filaments free from gynophore
5 Bracts subtending the pedicels minute ..... ***Cleoserrata***
5 Bracts subtending the pedicels with expanded blades, sometimes even trifoliolate. ..... ***Corynandra***

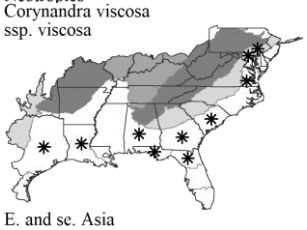
Cleoserrata H.H. Iltis 2007



A genus of 5 species, annual herbs, of tropical America. References: Iltis & Cochrane (2007); Tucker (2010h) in FNA7 (2010).

* ***Cleoserrata speciosa*** (Rafinesque) H.H. Iltis. **Hab:** Vacant lots, disturbed areas. **Dist:** Native of Mexico. **Phen:** Jun-Aug. **Syn:** = FNA7, Il, K3, K4, Iltis & Cochrane (2007); = *Cleome speciosa* Rafinesque – Fl4, K1, WH3. NatureServe GNR (Not Yet Ranked).

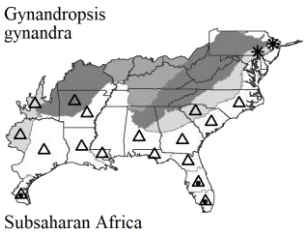
Corynandra Schrader ex Sprengel 1827



A genus of about 10 species, annual herbs, of Asia and Africa. References: Cochrane & Iltis (2014); Iltis (1960); Tucker (2010c) in FNA7 (2010).

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable

* ***Corynandra viscosa*** (Linnaeus) Cochrane & Iltis *ssp.* ***viscosa***. WILD CAIA, YELLOW CLEOME. **Hab:** Disturbed areas. **Dist:** Native of Asia (now pantropical). Reported for sc. GA (Carter, Baker, & Morris 2009; Jones & Coile 1988), se. PA (Rhoads & Klein 1993), and from Beaufort County, SC (J. Nelson, pers.comm. 2006). **Tax:** Our material is the widely weedy *C. viscosa* ssp. *viscosa*. **Comm:** Reported from chrome ore piles in Newport News (Reed 1959); presumably a waif. **Syn:** = Cochrane & Iltis (2014); = *Arivela viscosa* (Linnaeus) Rafinesque – FNA7, K3; = *Cleome viscosa* Linnaeus – Fl4, K1, WH3, Iltis (1960); < *Corynandra viscosa* – K4. NatureServe GNR (Not Yet Ranked).



Gynandropsis A.P. de Candolle 1824

A genus of 2 species, annual or short-lived perennial herbs, pantropical. References: Iltis (1960); Tucker (2010g) in FNA7 (2010).

* ***Gynandropsis gynandra*** (Linnaeus) Briquet. SPIDERWISP, CAT'S-WHISKERS. **Hab:** Fields, disturbed areas. **Dist:** Native of Africa. **Phen:** Jun-Oct. **Syn:** = FNA7, K3, K4, NY; = *Cleome gynandra* Linnaeus – Ar, Bah, Fl4, K1, RAB, S, Tx, WH3, Christenhusz, Fay, & Byng (2018), Iltis (1960). NatureServe GNR (Not Yet Ranked).

Polanisia Rafinesque 1819 (CLAMMYWEED)

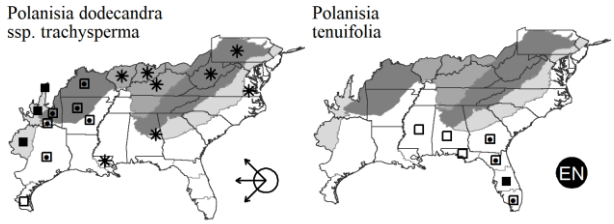
A genus of about 6 species, of North America (including Mexico). References: Tucker (2010f) in FNA7 (2010).

Identification Notes: *Polanisia* has some resemblance to *Warea* (in the Brassicaceae).

1 Petals broadest toward the base, barely or not at all clawed; capsule valvate; [of xeric longleaf pine sandhills] ..... ***Polanisia tenuifolia***
1 Petals broadest toward the tip, narrowed to a long, distinct claw; capsule opening near the tip; [of floodplains and disturbed soils].
..... ***Polanisia dodecandra ssp. trachysperma***

Polanisia dodecandra (Linnaeus) A.P. de Candolle *ssp.* ***trachysperma*** (Torrey & A. Gray) Iltis. **Hab:** Sandy and gravelly soils of prairies; eastwards adventive in disturbed areas. **Dist:** ON west to AB, south to w. LA, TX, NM, AZ, CA, and Mexico. **Phen:** Jun-Sep. **Syn:** = Ar, FNA7, GrPl, K1, K3, K4, NcTx, NE, NY, Pa, Tx; = *Polanisia dodecandra* (Linnaeus) A.P. de Candolle var. *trachysperma* (Torrey & A. Gray) Iltis – C, Mi; = *Polanisia trachysperma* Torrey & A. Gray – F, G, Il, S, WV. NatureServe G5T5? (Secure).

Polanisia tenuifolia Torrey & A. Gray. SLENDERLEAF CLAMMYWEED, PINELAND CATCHFLY. **Hab:** Longleaf pine sandhills, Florida scrub, pine rocklands. **Dist:** E. GA (several counties from the SC border) (Jones & Coile 1988) south to s. FL, west to s. MS. **Phen:** Feb. **Syn:** = Fl4, FNA7, K1, K3, K4, WH3; = *Aldenella tenuifolia* (Torrey & A. Gray) Greene – S. NatureServe G5 (Secure).



Tarenaya Rafinesque 1838 (SPIDERFLOWER)

A genus of about 40 species, annual herbs, of South America, as interpreted to include *Hemiscola* (Patchell, Roalson, & Hall 2014; Soares Neto et al. 2018). References: Iltis & Cochrane (2007); Patchell, Roalson, & Hall (2014); Soares Neto et al (2018); Tucker & Iltis (2010a) in FNA7 (2010); Tucker & Iltis (2010b) in FNA7 (2010).

1 Petals 5-10 mm long; gynophore 1-4 mm long; petioles and leaf blades unarmed.
2 Leaflets ovate to rhomboidal; sepals lanceolate; anthers 0.9-1.0 mm long; silique 20-40 (-60) mm long..... ***Tarenaya aculeata***
2 Leaflets obovate; sepals ovate; anthers 0.3-0.5 mm long; silique 15-20 mm long..... ***Tarenaya diffusa***
1 Petals 10-30 mm; gynophore 45-80 mm; petioles and sometimes leaf blades prickly.
3 Sepals, ovary, and fruit glabrous; fruit about as long as gynophore; petals deep pink or purple (infrequently white) ..... ***Tarenaya species 1***
3 Sepals, ovary, and fruit glandular-pubescent; fruit longer than gynophore; petals white or greenish-white ..... ***Tarenaya spinosa***

Tarenaya aculeata (Linnaeus) Soares Neto & Roalson. PRICKLY SPIDERFLOWER. **Hab:** Disturbed areas. **Dist:** Native of tropical America. Reported for AL. Reported for York County, SC (Bradley et al. [in prep.]). **Syn:** = Soares Neto et al (2018); = *Hemiscola aculeata* (Linnaeus) Rafinesque var. *aculeata* – FNA7; < *Cleome aculeata* Linnaeus – K1, K3, Tx; < *Hemiscola aculeata* – K4. NatureServe G5? (Secure).

* ***Tarenaya diffusa*** (Banks ex A.P. de Candolle) Soares Neto & Roalson. **Hab:** On ballast (Mobile, AL). **Dist:** Native of South America. **Syn:** = Soares Neto et al (2018); = *Cleome diffusa* Banks ex A.P. de Candolle – K1, K3; = *Hemiscola diffusa* (Banks ex A.P. de Candolle) H.H. Iltis – FNA7, K4, Iltis & Cochrane (2007). NatureServe GNR (Not Yet Ranked).

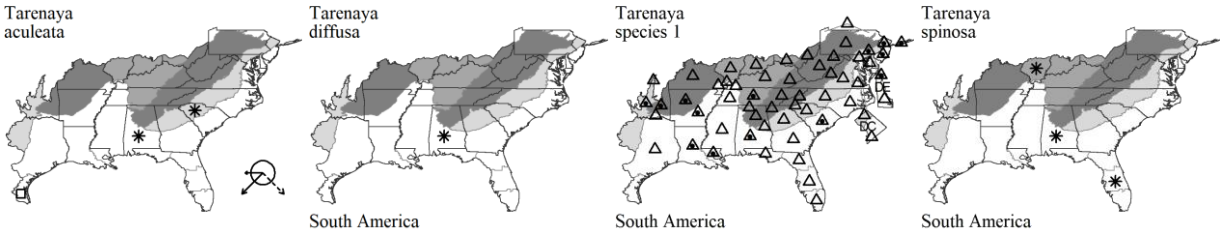
* ***Tarenaya species 1***. CLEOME, SPIDERFLOWER, PINKQUEEN. **Hab:** Gardens, disturbed areas, sandbars, riverbanks, persistent and self-seeding from cultivation as an ornamental. **Dist:** Native of South America. **Phen:** Jun-Nov. **Tax:** The correct name for this species in *Tarenaya* is a new combination (in press). **Comm:** The petals in bud are a pale pink to nearly white, they turn a deep pink upon opening late in the day; by morning the petals have once again faded to a pale pink or white. **Syn:** = *Cleome hasslerana* – Pa, orthographic variant; = *Cleome hassleriana* Chodat – Ar, C, Fl4, K1,

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

269. CLEOMACEAE

NcTx, Tx, WH3, Christenhusz, Fay, & Byng (2018); = *Cleome houtteana* Schlechtendal – RAB, misapplied; = *Tarenaya hassleriana* (Chodat) H.H. Iltis – FNA7, Il, K3, K4, Mi, NE, NY, Tn, Va, Iltis & Cochrane (2007); >< *Cleome spinosa* Jacquin – F, G, misapplied; >< *Neocleome spinosa* (Jacquin) Small – S, misapplied.

* ***Tarenaya spinosa*** (Jacquin) Rafinesque. SPINY SPIDERFLOWER. **Hab:** Disturbed areas. **Dist:** Native of South America. **Phen:** Jun-Sep. **Syn:** = FNA7, Il, K4; = *Cleome spinosa* Jacquin – Fl4, WH3, Christenhusz, Fay, & Byng (2018); < *Neocleome spinosa* (Jacquin) Small – S.



270. BRASSICACEAE Burnett 1835 (MUSTARD FAMILY) [in BRASSICALES]

A family of about 340 genera and 3400 species, annuals, perennials, shrubs, and rarely trees and vines, of cosmopolitan distribution (but most diverse in the temperate Northern Hemisphere). References: Al-Shehbaz (1984); Al-Shehbaz (1985a); Al-Shehbaz (1985b); Al-Shehbaz (1986a); Al-Shehbaz (1986b); Al-Shehbaz (1987); Al-Shehbaz (1988a); Al-Shehbaz (1988b); Al-Shehbaz (2010a) in FNA7 (2010); Appel & Al-Shehbaz in Kubitzki & Bayer (2003); Esmailbegi et al (2018); Rollins (1993).

Tribe a. Alysseae: *Alyssum*, *Berteroa*
Tribe aa. Anastaticeae: *Lobularia*
Tribe b. Anchonieae: *Matthiola*
Tribe d. Arabideae: *Abdra*, *Arabis*, *Draba*, *Tomostima*
Tribe e. Boechereae: *Boechera*
Tribe f. Brassiceae: *Brassica*, *Cakile*, *Coincya*, *Diplotaxis*, *Eruca*, *Erucastrum*, *Orychophragmus*, *Raphanus*, *Rapistrum*, *Sinapis*
Tribe g. Buniadeae: *Bunias*
Tribe h. Calepineae: *Calepina*
Tribe i. Camelineae: *Arabidopsis*, *Camelina*, *Capsella*
Tribe j. Cardamineae: *Armoracia*, *Barbarea*, *Cardamine*, *Iodanthus*, *Leavenworthia*, *Nasturtium*, *Planodes*, *Rorippa*
Tribe k. Chorisporeae: *Chorispora*
Tribe m. Conringeae: *Conringia*
Tribe n. Descurainieae: *Descurainia*
Tribe o. Erysimeae: *Erysimum*
Tribe p. Euclidieae: *Braya*
Tribe s. Hesperideae: *Hesperis*
Tribe t. Iberideae: *Iberis*, *Teesdalia*
Tribe v. Isatideae: *Isatis*, *Myagrum*
Tribe w. Lepidieae: *Lepidium*
Tribe x. ?? Lunarieae: *Lunaria*
Tribe z. Coluteocarpeae: *Noccaea*
Tribe aa. Physarieae: *Paysonia*, *Physaria*
Tribe bb. Sisymbrieae: *Sisymbrium*
Tribe dd. Thelypodieae: *Warea*
Tribe ee. Thlaspideae: *Alliaria*, *Thlaspi*
\

Warning to users: Some genera not yet included in key! *Braya, Bunias, Chorispora, Conringia, Diplotaxis, [Eruca], Erucastrum, [Iberis], Iodanthus, Leavenworthia, Lobularia, Matthiola, Paysonia, Physaria, Rapistrum, Sinapis, Warea*

1 Plants in flower
  2 Trichomes of plant absent or, if present, unbranched. ..... ***Key A***
  2 Trichomes of plant present with some or most or all branched ..... ***Key B***
1 Plants in fruit.
  3 Trichomes of plant absent or, if present, unbranched. ..... ***Key C***
  3 Trichomes of plant present with some or most or all branched ..... ***Key D***

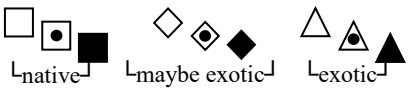
Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated

Key A - plants in flower, trichomes of plant absent or, if present, unbranched

1 Flowers yellow.
  2 Leaves auriculate, sagittate, or amplexicaul at base.
    3 Upper stems glaucous.
      ..... ***Brassica***
    3 Upper stems green; [tribe *Cardamineae*].
      5 Stems angular distally; blooming Apr to early Jun ..... ***Barbarea***
      5 Stems not angular distally; blooming Apr to Oct ..... ***Rorippa***
  2 Leaves not clasping at base.
    6 Petals with contrasting dark veins; [tribe *Brassiceae*] ..... ***Raphanus***
    6 Petals mostly uniform in color.
      7 Ovaries and young fruits 2-segmented; petals 6-30 mm; [tribe *Brassiceae*] ..... ***Brassica***
      7 Ovaries and young fruits unsegmented; petals 1-8 mm.
        8 Stigmas distinctly 2-lobed; [tribe *Sisymbrieae*] ..... ***Sisymbrium***
        8 Stigmas entire, rarely indistinctly 2-lobed; [tribe *Cardamineae*] ..... ***Rorippa***
1 Flowers white, pinkish, purple, lavender, or blue.
  9 Leaves strictly basal or basal and cauline and auriculate.
    10 Plants with only basal leaves or cauline leaves much reduced.
      ..... ***Cardamine***
    10 Plants with some well-developed cauline leaves.
      12 Ovaries and young fruits ovate, orbicular or cordate.
        14 Ovules 2 (rarely 4) per ovary; [tribe *Lepidieae*] ..... ***Lepidium***
        14 Ovules 6-16 per ovary.
          ..... ***Thlaspi***
      12 Ovaries and young fruits linear.
        16 Plants aquatic or semi-aquatic; rooting at nodes; [tribe *Cardamineae*] ..... ***Nasturtium***
        16 Plants terrestrial, though sometimes growing partially submerged; not rooting at nodes.
          18 Cauline leaves sessile; [tribe *Boechereae*] ..... ***Borodinia***
          18 Cauline leaves usually petiolate; [tribe *Cardamineae*] ..... ***Cardamine***
  9 Leaves basal and cauline but not auriculate.
    19 Plants aquatic, rooting at nodes; [tribe *Cardamineae*].
      20 Submersed leaves dissected into filiform segments ..... ***Rorippa***
      20 Leaves not dissected into filiform segments ..... ***Nasturtium***
    19 Plants terrestrial, though sometimes growing partially submersed; not rooting at nodes.
      21 Stamens 2 or 4.
        22 Ovaries and young fruits linear; [tribe *Cardamineae*] ..... ***Cardamine***
        22 Ovaries and young fruits ovate, orbicular or cordate.
          ..... ***Lepidium***
      21 Stamens 6.
        24 Petals 15-30 mm long; [tribe *Lunarieae*] ..... ***Lunaria***
        24 Petals rarely to 20 mm long.
          25 Ovaries and young fruits 2-segmented; [tribe *Brassiceae*] ..... ***Cakile***
          25 Ovaries and young fruits unsegmented.
            26 Ovaries and young fruits ovate, orbicular or cordate; [tribe *Lepidieae*] ..... ***Lepidium***
            26 Ovaries and young fruits linear.
              27 Petals with contrasting dark veins; [tribe *Brassiceae*] ..... ***Raphanus***
              27 Petals mostly uniform in color.
                28 Leaves smelling of garlic when crushed, reniform or cordate, dentate; [tribe *Thlaspideae*] ..... ***Alliaria***
                28 Leaves not smelling of garlic, rarely reniform or cordate, with margins various.
                  29 Cauline leaves sessile; [tribe *Boechereae*] ..... ***Borodinia***
                  29 Cauline leaves usually petiolate; [tribe *Cardamineae*].
                    30 Base of plant usually glabrous; seeds not winged ..... ***Cardamine***
                    30 Base of plant pubescent; seeds winged ..... ***Planodes***

Key B - plants in flower, trichomes of plant present with some or most or all branched

1
1
  2 Flowers yellow.
    3 Trichomes sessile, medifixed; [tribe *Erysimeae*] ..... ***Erysimum***
    3 Trichomes not sessile and medifixed.
      4 Leaves 2-3× pinnately dissected; [tribe *Descurainieae*] ..... ***Descurainia***
      4 Leaves not pinnately dissected.
        ..... ***Alyssum***
  2 Flowers white, pinkish, lavender, or blue.
    7 Leaves only basal; [tribe *Arabideae*] ..... ***Draba***
    7 Leaves cauline (and often basal as well).
      8 Ovaries and young fruits not linear.
        9 Cauline leaves sessile and auriculate; [tribe *Camelineae*].
          ..... ***Capsella***

Key to Map Symbology: 

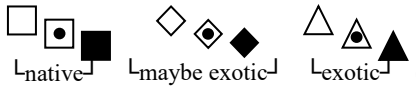
9 Cauline leaves petiolate or sessile and not auriculate.
12 Leaves 2-3× pinnately dissected; [tribe *Descurainieae*] ..... ***Descurainia***
12 Leaves not pinnately dissected.
13 Ovules 1-2 per ovary; [tribe *Alysseae*] ..... ***Alyssum***
13 Ovules 4 or more per ovary; [tribe *Arabideae*] ..... ***Draba***
8 Ovaries and young fruits linear.
14 Cauline leaves sessile and auriculate.
15 Young fruits ascending to descending; [tribe *Boechereae*] ..... ***Borodinia***
15 Young fruits ascending to erect or appressed to rachis.
..... ***Arabis***
14 Cauline leaves usually petiolate and if sessile, not auriculate.
17 Stigmas 2-lobed, petals > 15 mm long; [tribe *Hesperideae*] ..... ***Hesperis***
17 Stigmas entire, petals < 6 mm long.
18 Leaves pinnately divided or lobed.
19 Leaves lyrate pinnatifid; [tribe *Camelineae*] ..... ***Arabidopsis***
19 Leaves 2-3× pinnately dissected; [tribe *Descurainieae*] ..... ***Descurainia***
18 Leaves entire or toothed.
20 Sepals 1-2.5 mm; of disturbed habitats; seeds uniseriate; [tribe *Camelineae*] ..... ***Arabidopsis***
20 Sepals 0.7-1.2 mm or >2.5 mm; of disturbed and natural habitats; seeds biseriate; [tribe *Arabideae*] ..... ***Draba***

Key C - plants in fruit, trichomes of plant absent or, if present, unbranched

1 Fruits silicles (< 3× as long as wide).
2 Fruits 2-segmented ..... ***Cakile***
2 Fruits unsegmented.
3 Fruits 2 cm or more wide ..... ***Lunaria***
3 Fruits < 2 cm wide.
4 Fruits with 20 or more seeds ..... ***Rorippa***
4 Fruits with 16 or fewer seeds.
7 Fruits with 2 seeds ..... ***Lepidium***
7 Fruits with more than 2 seeds.
..... ***Thlaspi***
1 Fruits siliques (> 3× as long as wide).
10 Fruits indehiscent or breaking into 1-seeded segments.
12 Styles obsolete; plants glabrous; of beaches ..... ***Cakile***
12 Styles 1-5 mm; plants pubescent; inland ..... ***Raphanus***
10 Fruits dehiscent, more than 1-seeded.
13 Fruits segmented ..... ***Brassica***
13 Fruits unsegmented.
14 Fruits latiseptate (flattened parallel to the septum).
15 Replums strongly flattened; fruit valves dehiscing elastically, coiled ..... ***Cardamine***
15 Replums terete; fruit valves not dehiscing elastically or coiled.
16 Seeds not winged ..... ***Barbarea***
16 Seeds winged at least distally.
17 Cauline leaves pinnatifid or pinnatisect ..... ***Planodes***
17 Cauline leaves entire or dentate ..... ***Borodinia***
14 Fruits terete or 4-angled.
18 Plants aquatic or semi-aquatic; rooting at nodes ..... ***Nasturtium***
18 Plants terrestrial, though rarely growing partially submersed; not rooting at nodes.
19 Leaves smelling of garlic when crushed, reniform or cordate, dentate ..... ***Alliaria***
19 Leaves not smelling of garlic when crush, rarely reniform or cordate, dentate or not.
20 Seeds biseriate ..... ***Rorippa***
20 Seeds uniseriate.
22 Lower cauline leaves entire or dentate ..... ***Borodinia***
22 Lower cauline leaves pinnatifid or pinnatisect.
23 Terminal leaflet lobes nearly entire to crenate or undulate ..... ***Barbarea***
23 Terminal leaflet lobes sharply toothed or cut ..... ***Sisymbrium***

Key D - plants in fruit, trichomes of plant present with some or most or all branched

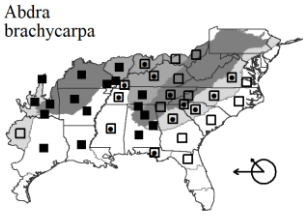
1 Fruits silicles (<3× as long as wide).
2 Leaves basal only ..... ***Draba***
2 Plant with some cauline leaves.
3 Cauline leaves sessile; blade bases auriculate, sagittate, or amplexicaule.
..... ***Capsella***
3 Cauline leaves petiolate or sessile and not auriculate.
5 Leaves 2-3× pinnately dissected ..... ***Descurainia***
5 Leaves not pinnately dissected.
6 Fruits with 1-2 seeds ..... ***Alyssum***
6 Fruits with 4 or more seeds.
..... ***Draba***

Key to Map Symbology: 

270. BRASSICACEAE

1 Fruits siliques (> 3× as long as wide).
- 8 Leaves basal only ..... ***Draba***
- 8 Plant with some cauline leaves.
  - 9 Cauline leaves sessile; blade bases auriculate, sagittate, or amplexicaule.
    - 11 Siliques straight, slightly ascending to strictly erect or appressed; seeds 0.6-1.7 mm long; basal leaves < 8 cm long ..... ***Arabis***
    - 11 Siliques curved or straight, ascending to descending, seeds either <1mm long or < 2.5 mm long, basal leaves 2.5-20 cm long ..... ***Borodinia***
  - 9 Cauline leaves petiolate or sessile and not auriculate.
    - 12 Trichomes sessile, medafixed ..... ***Erysimum***
    - 12 Trichomes not sessile and medafixed.
      - 13 Leaves 2-3× pinnately dissected ..... ***Descurainia***
      - 13 Leaves not 2-3× pinnately dissected..
        - 14 Stigmas 2-lobed with lobes connivent and decurrent to erect ..... ***Hesperis***
        - 14 Stigmas entire and capitate, rarely slightly 2-lobed.
          - 15 Seeds biseriate. ..... ***Draba***
          - 15 Seeds unseriate ..... ***Arabidopsis***

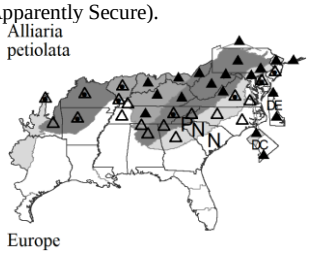
Abdra E.L. Greene 1900 (DRABA)



A genus of about 2 species, annual herbs, of se. North America. This genus has been segregated from *Draba* on molecular and morphological grounds (Jordon-Thaden et al. 2010; Al-Shehbaz 2012). References: Al-Shehbaz (1987); Al-Shehbaz (2012a); Al-Shehbaz, Windham, & Elven (2010) in FNA7 (2010); Koch & Al-Shehbaz (2002); Rollins (1993).

Abdra brachycarpa (Nuttall ex Torrey & A. Gray) E.L. Greene. SHORTPOD DRABA. **Hab:** Granitic flatrocks, open places (fields, roadsides, woodland margins, disturbed areas). **Dist:** VA west to IN and KS, south to FL and TX. **Phen:** Feb-Apr; Mar-May. **Syn:** = K4, Al-Shehbaz (2012a); = *Draba brachycarpa* Nuttall ex Torrey & A. Gray – Ar, C, F, Fl4, FNA7, G, GrPl, Il, K1, K3, NcTx, RAB, S, Tn, Tx, Va, W, WH3, Al-Shehbaz (1987), Rollins (1993). NatureServe G4G5 (Apparently Secure).

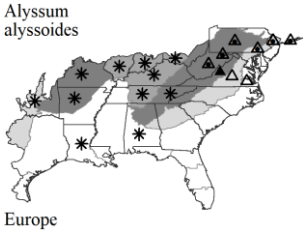
Alliaria Heister ex Fabricius 1759 (GARLIC MUSTARD)



A genus of 2 species, annual or biennial herbs, of Eurasia and n. Africa. References: Al-Shehbaz (1988b); Al-Shehbaz (2010a) in FNA7 (2010); Esmailbegi et al (2018); Rollins (1993).

* ***Alliaria petiolata*** (M. Bieberstein) Cavara & Grande. GARLIC MUSTARD, HEDGE GARLIC. **Hab:** Moist forests in bottomlands and on slopes. **Dist:** Native of Europe. **Phen:** Apr-Jun; May-Jun. **Comm:** This species has become a noxious weed in ne. United States, invading undisturbed moist forests. Dhillion & Anderson (1999) report on physiological characteristics that make *Alliaria* a successful invader in shaded situations. **Syn:** = Ar, C, FNA7, GrPl, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, Tn, Va, W, Al-Shehbaz (1988b), Rollins (1993); = *Alliaria officinalis* Andrzejowski ex Bieberstein – F, G. NatureServe GNR (Not Yet Ranked).

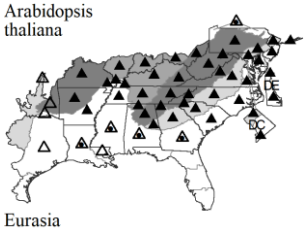
Alyssum Linnaeus 1753 (ALYSSUM, MADWORT)



A genus of ca. 114 species, herbs, of Eurasia. References: Al-Shehbaz (1987); Al-Shehbaz (2010a) in FNA7 (2010); Rollins (1993); Španiel (2015).

* ***Alyssum alyssoides*** (Linnaeus) Linnaeus. YELLOW ALYSSUM. **Hab:** Roadsides, disturbed areas, especially in dry, barren soil. **Dist:** Native of Europe. **Phen:** May-Sep. **Syn:** = Ar, C, F, FNA7, G, GrPl, Il, K1, K3, K4, Mi, NE, NY, Pa, Va, W, Rollins (1993), Španiel (2015); > *Alyssum alyssoides* var. *alyssoides* – Al-Shehbaz (1987). NatureServe GNR (Not Yet Ranked).

Arabidopsis Heynhold 1842 (MOUSE-EAR CRESS)



A genus of about 9 species, annual and perennial herbs, circumboreal and most diverse in Eurasia. References: Al-Shehbaz (1988a); Al-Shehbaz (2010a) in FNA7 (2010); Koch & Al-Shehbaz (2002); Koch, Bishop, & Mitchell-Olds (1999); O'Kane & Al-Shehbaz (1997); O'Kane & Al-Shehbaz (2003); Rollins (1993).

* ***Arabidopsis thaliana*** (Linnaeus) Heynhold. MOUSE-EAR CRESS. **Hab:** Disturbed areas, fields, roadsides, lawns. **Dist:** Native of Eurasia. **Phen:** Mar-May. **Comm:** *Arabidopsis thaliana* has sometimes been referred to as the white mouse of the vascular plant world, having been very extensively used as an experimental plant. **Syn:** = Ar, C, F, FNA7, G, GrPl, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Va, W, Al-Shehbaz (1988a), O'Kane & Al-Shehbaz (1997), Rollins (1993). NatureServe GNR (Not Yet Ranked).

Arabis Linnaeus 1753 (ROCKCRESS)

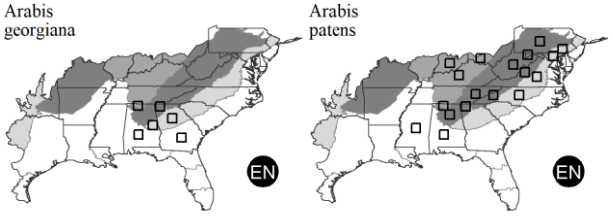
The circumscription of *Arabis* is in flux; there is increasing evidence that the broad circumscription traditionally employed in most North American floras includes discordant elements. Based on molecular phylogenetic studies and morphology, the members of *Arabis* (as circumscribed most broadly) in our area should be divided into at least 4 genera, as follows: *Arabidopsis*, *Arabis* sensu stricto, *Boechera*, and *Turritis*. References: Al-

Shehbaz (1988a); Al-Shehbaz (2003); Al-Shehbaz (2010a) in FNA7 (2010); Al-Shehbaz (2017); Hopkins (1937); Koch & Al-Shehbaz (2002); Koch, Bishop, & Mitchell-Olds (1999); Rollins (1993).

3 Siliques (4.5-) 5-7 cm long; [endemic to w. GA and c. AL] ..... ***Arabis georgiana***
3 Siliques 2.5-4 cm long; [of se. PA, c. PA, and IN south to NC, e. TN, and AL] ..... ***Arabis patens***

Arabis georgiana R.M. Harper. GEORGIA ROCKCRESS. **Hab:** Nutrient-rich streambanks and rock outcrops. **Dist:** Endemic to n. and sw. GA and c. AL. **Phen:** Apr-May; May-early Jul. **Tax:** See Patrick, Allison, & Krakow (1995). **ID Notes:** It differs from our other species by the following combination of characters: fruits 5-7 cm long, borne appressed to ascending, leaves with bifurcate, trifurcate, or stellate hairs. **Syn:** = FNA7, K1, K3, K4, Hopkins (1937), Rollins (1993). NatureServe G1 (Critically Imperiled); USESA T.

Arabis patens Sullivant. SPREADING ROCKCRESS. **Hab:** Thin soils around calcareous or dolomitic outcrops, very rarely in nutrient-rich seepage from mafic rocks. **Dist:** Irregularly distributed, primarily in the sedimentary rock Appalachians, from se. PA, c. PA, and IN south to NC, e. TN, and AL. **Phen:** May-Jun; Jun-Aug. **Comm:** In NC, this species occurs over marble at Blowing Spring, Nantahala River Gorge, Swain County, at various sites over calcareous sedimentary rocks in the Hot Springs Window, near Hot Springs, Madison County, and in nutrient-rich seepage from amphibolite at Chimney Rock, Rutherford County. **Syn:** = C, F, FNA7, G, K1, K3, K4, Pa, RAB, S, Va, W, Al-Shehbaz (1988a), Hopkins (1937), Rollins (1993); = *Boechera patens* (Sullivant) Al-Shehbaz – K2, Tn, Al-Shehbaz (2003). NatureServe G3 (Vulnerable).



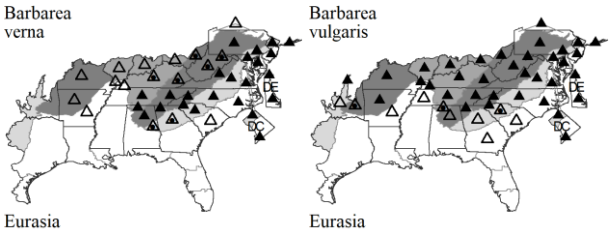
Barbarea R. Brown 1812 (WINTER-CRESS, CREASY GREENS)

A genus of about 20 species, biennial and perennial herbs, semicosmopolitan. References: Al-Shehbaz (1988a); Al-Shehbaz (2010a) in FNA7 (2010); Lange et al (2022); Rollins (1993).

1 Basal leaves with 4-10 pairs of lateral lobes; siliques 4.5-7 cm long; pedicels 1.2-1.8 mm thick ..... ***Barbarea verna***
1 Basal leaves with 1-4 pairs of lateral lobes; siliques 1.5-3 cm long; pedicels 0.5-1.0 mm thick ..... ***Barbarea vulgaris***

* ***Barbarea verna*** (P. Miller) Ascherson. EARLY WINTER-CRESS. **Hab:** Fields, disturbed areas. **Dist:** Native of Eurasia. Formerly a commonly used winter and spring green in rural parts of our area, still available canned as "Dry Land Cress". **Phen:** Mar-Jun. **Syn:** = Ar, C, F, FNA7, G, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, Tn, Va, W, Al-Shehbaz (1988a), Rollins (1993); = *Campe verna* (P. Miller) Heller – S. NatureServe GNR (Not Yet Ranked).

* ***Barbarea vulgaris*** W. Aiton. COMMON WINTER-CRESS, YELLOW ROCKET. **Hab:** Fields, disturbed areas. **Dist:** Native of Eurasia. **Phen:** Apr-Jun. **Tax:** Lange et al. (2022) provided compelling evidence for the recognition of multiple taxa in what has generally been regarded in recent decades as a single, variable species, the variation not warranting taxonomic recognition. **Syn:** = Ar, C, FNA7, GrPl, K1, K3, K4, Mi, NE, NY, Pa, Tn, Va, W, Al-Shehbaz (1988a), Rollins (1993); > *Barbarea vulgaris* var. *arcuata* (Opiz ex J. & C. Presl) Fries – F, G, Il, RAB; > *Barbarea vulgaris* var. *sylvestris* Fries – F; > *Barbarea vulgaris* var. *vulgaris* – F, G, Il, RAB; > *Campe barbarea* (Linnaeus) W. Wight ex Piper – S; > *Campe stricta* (Andrzejowski) W. Wight ex Piper – S, misapplied.



Borodinia N. Busch 1921 (ROCK-CRESS)

A genus of about 7 species, herbs, of eastern North America. References: Alexander et al (2013); Al-Shehbaz & Windham (2010) in FNA7 (2010); Al-Shehbaz (1988a); Al-Shehbaz (2003); Hopkins (1937); Koch & Al-Shehbaz (2002); Koch, Bishop, & Mitchell-Olds (1999); Rollins (1993); Wieboldt (1987); Windham & Al-Shehbaz (2007).

1 Pedicels of fruits definitely deflexed; pedicels of flowers spreading (spreading or very slightly ascending in first few mm, then down-curved). ..... ***Borodinia canadensis***
1 Pedicels of fruits erect or ascending; pedicels of flowers erect, ascending, spreading, or arching.
  2 Mature fruits < 4 cm long; stems branched or simple at the base.
    4 Lower cauline leaves glabrous or sparsely pubescent on the upper surface; fruits erect and appressed, 3-5 cm long ..... ***Arabis***
    4 Lower cauline leaves hirsute or strigose on the upper surface; fruits widely ascending or spreading. 1.5-4 cm long.

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

.....***Arabis patens***

2 Mature fruits > 4 cm long; stems generally simple at the base.

7 Fruits erect, appressed against the stem, the fruiting inflorescence < 2 cm in diameter.

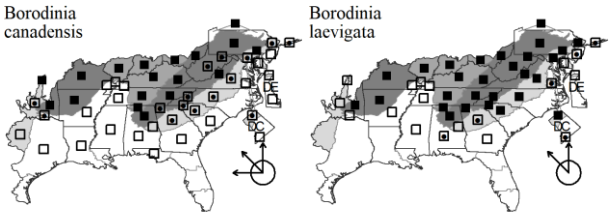
.....***Arabis***

7 Fruits ascending to spreading (not erect and appressed to the stem), the fruiting inflorescence > 4 cm in diameter.

.....***Borodinia laevigata***

Borodinia canadensis (Linnaeus) P.J. Alexander & Windham. SICKLEPOD, CANADA ROCKCRESS. **Hab:** Thin soils around rock outcrops, especially mafic or calcareous, and in dry to mesic, nutrient-rich, often rocky woodlands over mafic or calcareous rocks. **Dist:** QC and ND south to Panhandle FL and TX. **Phen:** (Apr-) May-Jul; Jun-Aug. **Syn:** = K3, K4, NY, Alexander et al (2013); = *Arabis canadensis* Linnaeus – C, F, G, GrPl, K1, NcTx, Pa, RAB, S, W, Al-Shehbaz (1988a), Hopkins (1937), Rollins (1993); = *Boechera canadensis* (Linnaeus) Al-Shehbaz – Ar, Fl4, FNA7, Il, K2, Mi, NE, Tn, Va, WH3, Al-Shehbaz (2003). NatureServe G5 (Secure).

Borodinia laevigata (Muhlenberg ex Willdenow) P.J. Alexander & Windham. COMMON SMOOTH ROCKCRESS. **Hab:** Rocky woodlands and forests, rock outcrops, especially mafic or calcareous, but also on more acidic substrates, rarely also in bottomlands. **Dist:** ME west to MN and SD, south to GA, AL, MS, AR, OK, and CO. **Phen:** Apr-May; May-Jun. **Comm:** Of our *Borodinia*, *B. laevigata* is the most common, being the least limited to calcareous substrates. **Syn:** = K3, K4, NY, Alexander et al (2013); = *Arabis laevigata* (Muhlenberg ex Willdenow) Poiret var. *laevigata* – C, F, G, K1, Pa, W, Al-Shehbaz (1988a), Hopkins (1937), Rollins (1993), Wieboldt (1987); = *Boechera laevigata* (Muhlenberg ex Willdenow) Al-Shehbaz – Ar, FNA7, Il, Mi, NE, Tn, Va; >< *Arabis burkii* (Porter) Small – S, misapplied in part; < *Arabis laevigata* – GrPl; > *Arabis laevigata* – S; > *Arabis laevigata* (Muhlenberg ex Willdenow) Poiret var. *burkii* Porter – RAB, misapplied; > *Arabis laevigata* (Muhlenberg ex Willdenow) Poiret var. *laevigata* – RAB; < *Boechera laevigata* (Muhlenberg ex Willdenow) Al-Shehbaz – Al-Shehbaz (2003).



Brassica Linnaeus 1753 (MUSTARD, TURNIP, RAPE, CABBAGE, COLLARD GREENS, KALE, BROCCOLI,)

Cauliflower, Kohlrabi, Rutabaga, Bok-Choy, Chinese Cabbage, Brussels Sprouts). References: Al-Shehbaz (1985b); Al-Shehbaz (2021); Rollins (1993); Warwick (2010a) in FNA7 (2010).

A genus of about 40 species, herbs, of the Old World.

1 Upper cauline leaves petiolate, or sessile and cuneate.

2 Pedicels and siliques widely spreading to divaricately ascending; siliques 2-4 cm long, terete or nearly so; [section *Rapa*] .....***Brassica juncea***

2 Pedicels and siliques erect and appressed to the rachis; siliques 1-2 cm long, more-or-less 4-angled; [section *Melanosinapis*] .....***Rhamphospermum nigrum***

1 Upper cauline leaves auriculate, slightly to strongly clasping the stem; [section *Rapa*].

4 Petals 10-18 mm long, pale yellow; beak of the silique usually (5-) 7-10 (-16) mm long; plant usually glaucous; siliques 5-10 cm long .....***Brassica napus***

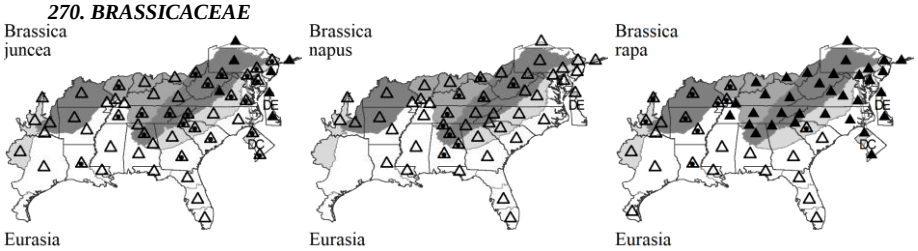
4 Petals 6-10 (-11) mm long, deep yellow; beaks of the silique usually (8-) 10-15 (-22) mm long; plant usually green; siliques 3-7 cm long .....

.....***Brassica rapa***

* ***Brassica juncea*** (Linnaeus) Czernajew. LEAF MUSTARD, BROWN MUSTARD, INDIAN MUSTARD, MUSTARD GREENS, CHINESE MUSTARD. **Hab:** Fields, disturbed areas. **Dist:** Native of Eurasia. **Phen:** Apr-Jun. **Tax:** This species is apparently a recently derived polyploid (n=18) of *B. nigra* (n=8) and *B. rapa* (n=10). **Comm:** The seeds of this species are one source of table mustard; other components include *Brassica nigra* and *Sinapis alba*. **Syn:** = Ar, C, Fl4, FNA7, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, W, WH3, Al-Shehbaz (1985b), Rollins (1993); > *Brassica japonica* (Thunberg) Siebold ex Miquel – S; > *Brassica juncea* (Linnaeus) Czernajew – S. NatureServe GNR (Not Yet Ranked).

* ***Brassica napus*** Linnaeus. RUTABAGA, RAPE, CANOLA, COLZA, SWEDE. **Hab:** Fields, disturbed areas. **Dist:** Native of Eurasia. **Phen:** May-Jul. **Tax:** This species is apparently a recently derived polyploid (n=19) of *B. oleracea* (n=9) and *B. rapa* (n=10). **Comm:** The seeds of this species are the source of 'canola' oil, the name coined by marketers from 'Canadian' + 'oil'+ 'low' + 'acid' to avoid the negative connotation of the ancient name 'rape'. **Syn:** = Ar, Fl4, FNA7, GrPl, Il, K1, K3, Mi, NE, NY, Tn, W, WH3, Al-Shehbaz (1985b), Rollins (1993); < *Brassica napus* Linnaeus – RAB.

* ***Brassica rapa*** Linnaeus. TURNIP, BIRD'S-RAPE, FIELD RAPE, FIELD MUSTARD, BOK-CHOY, CHINESE CABBAGE. **Hab:** Fields, disturbed areas. **Dist:** Native of Europe. **Phen:** Mar-Jun. **Tax:** *B. rapa* is cultivated in a variety of forms, these sometimes given varietal rank, such as *B. rapa* var. *chinensis* (Linnaeus) Kitamura (Bok-choy or Pak-choi) and *B. rapa* var. *amplexicaulis* Tanaka & Ono (Chinese Cabbage). They are probably best regarded as cultivars. **Syn:** = Ar, C, FNA7, Il, Mi, NcTx, NE, NY, Pa, Tn, Al-Shehbaz (1985b), Rollins (1993); > *Brassica campestris* Linnaeus – G, GrPl, S, Tx; > *Brassica napus* Linnaeus – RAB; > *Brassica rapa* Linnaeus – G, GrPl, Tx; > *Brassica rapa* var. *chinensis* (Linnaeus) Kitamura – K4; > *Brassica rapa* Linnaeus var. *rapa* – K1, K3, K4, Va, WH3.



Cakile P. Miller 1754 (SEA ROCKET)

A genus of about 7-8 species, annual herbs, primarily of coastal North America, Europe, and North Africa. References: Al-Shehbaz (1985b); Rodman (1974); Rodman (2010) in FNA7 (2010); Rollins (1993).

Identification Notes: The siliques of *Cakile* are divided near their middle by an abscission zone into two halves, each with a single seed: the upper abscises and disperses by water or wind, the lower remains attached to the parent plant. The size of the two segments and the contour of the abscised surface remaining on the lower segment are important taxonomic characters.

1 Lower silique segment with 2 opposite lateral horns or wings on the sides prolonged upward into sharp triangular wedges, concave in between; petals lavender (rarely white), 8-14 mm long, 3-6 mm wide; most of the leaves deeply pinnatifid into 6-9 lobes ..... ***Cakile maritima ssp. maritima***

1 Lower silique segment without lateral horns, triangular wedges absent to 1.5 mm high; petals white (rarely lavender), 4-10 mm long, 1.2-4.5 mm wide; most of the leaves with a few to many irregular teeth (or pinnatifid in *C. lanceolata*).

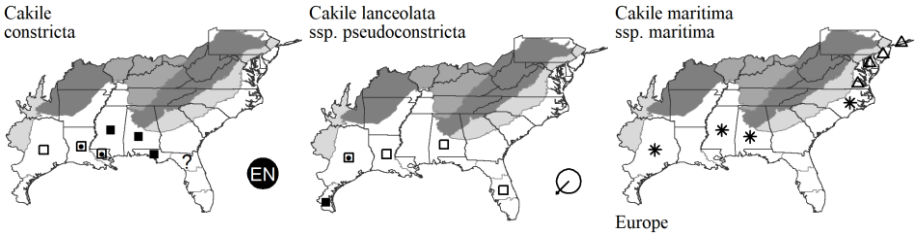
2 Well-developed, normal infructescences > 20 cm long; petals 3.0-4.5 mm wide; [Gulf Coast or FL peninsula]. ..... ***Cakile lanceolata ssp. pseudoconstricta***

2 Infructescences 10-20 cm long; [collectively widespread]. ..... ***Cakile constricta***

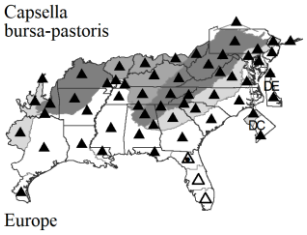
Cakile constricta Rodman. GULF COAST SEA-ROCKET. **Hab:** Beaches, coastal sands. **Dist:** Panhandle FL west to TX. **Phen:** Feb-Oct. **Syn:** = FNA7, GW2, K1, K3, K4, Al-Shehbaz (1985b), Rodman (1974), Rollins (1993); < *Cakile lanceolata* (Willdenow) O.E. Schulz – S, WH3.

Cakile lanceolata (Willdenow) O.E. Schulz *ssp.* ***pseudoconstricta*** Rodman. **Hab:** Beaches, coastal sands. **Dist:** FL, AL, LA, TX, TAM. **Phen:** Jan-Dec. **Syn:** = FNA7, K1, K3, K4, Al-Shehbaz (1985b), Rodman (1974), Rollins (1993); < *Cakile fusiformis* Greene – Tx; < *Cakile lanceolata* (Willdenow) O.E. Schulz – Fl4, GW2, S, WH3. NatureServe G5T2T4 (Vulnerable).

* ***Cakile maritima*** Scopoli *ssp.* ***maritima***. EUROPEAN SEA-ROCKET. **Hab:** Beaches, at or near the wrack line. **Dist:** Native of Europe. The other subspecies are also European but are apparently not introduced in our area. **Comm:** The NC location was on ballast at Wilmington, and is apparently not persistent. VA locations are, however, well-established. **Syn:** = FNA7, NY, Va, Al-Shehbaz (1985b), Rodman (1974); = *Cakile cakile* (Linnaeus) Karstens – S; < *Cakile maritima* – C, F, G, K1, K3, K4, Rollins (1993). NatureServe GNR (Not Yet Ranked).



Capsella Medikus 1792 (SHEPHERD'S PURSE)



A genus of 1-4 species, annual or biennial herbs, of Europe. References: Al-Shehbaz (1986a); Al-Shehbaz (2010a) in FNA7 (2010); Rollins (1993); GBI2; Stace (2010).

* ***Capsella bursa-pastoris*** (Linnaeus) Medikus. COMMON SHEPHERD'S PURSE. **Hab:** Fields, roadsides, gardens, disturbed areas. **Dist:** Native of Europe. **Phen:** Feb-Jun. **Tax:** *C. rubella* Reuter, Pink Shepherd's Purse, is sometimes distinguished (as by F, G, Stace 2010), and occurs in our area. It is alleged to be diploid (vs. tetraploid), to have pink petals 1-2 mm long (vs. white, 2-3 mm long), and lateral margins of the fruit concave (vs. straight to convex). Al-Shehbaz (1986) considered the character correlations to be poor, not warranting taxonomic recognition. **Syn:** = C, Fl4, FNA7, GBI2, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, W, WH3, Al-Shehbaz (1986a), Rollins (1993); = *Bursa bursa-pastoris* (Linnaeus) Britton – S; > *Capsella bursa-pastoris* (Linnaeus) Medikus – F, G, Stace (2010); > *Capsella gracilis* Gren. – F; > *Capsella rubella* Reuter – F, G, Stace (2010).

Cardamine Linnaeus 1753 (BITTERCRESS, TOOTHWORT)

A genus of about 200 species, herbs, cosmopolitan. *Dentaria* should apparently be included (Sweeney & Price 2000). References: Al-Shehbaz (1988a); Al-Shehbaz, Marhold, & Lihová (2010) in FNA7 (2010); Franzke et al (1998); Marhold et al (2016); Rollins (1993); Šlenker et al (2018); Sweeney & Price (2000); Sweeney & Price (2001); Wieboldt (1992).

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

270. BRASSICACEAE

1 Leaves palmately divided (if 1-ternate, then palmately so, the terminal leaflets on a petiolule the same length as the those of the lateral leaflets); ["*Dentaria*"].
  2 Plants entirely glabrous (including on the leaf margins); leaflets highly dissected with linear to filiform segments
    3 Leaf segments > 10 per leaf, each usually sublobed or toothed ..... ***Cardamine dissecta***
    3 Leaf segments < 7 per leaf, each linear, or some of them bifurcate into 2 equal or unequal lobes ..... ***Cardamine furcata***
  2 Plants with marginal leaf trichomes, and often also pubescent on the stem, inflorescence, and petioles; leaflets entire, toothed, or deeply lobed.
    4 Trichomes of leaf margins appressed and ca. 0.1 mm long; stem leaves 2 (-3), opposite; lateral leaflets of stem leaves very rarely incised, the leaf being (and appearing merely 3-foliolate, though teeth may be prominent and lacerate); basal leaves usually present at flowering.
      5 Rhizome with 2-3 cm long segments, each separated by a narrow and fragile connecting portion (which typically is broken on herbarium specimens), and lacking "teeth" (actually prominent reduced leaves); leaflets of the stem leaves (2.5×-) avg. 5× (-7×) as long as wide (thus proportionately much narrower than the leaflets of the basal leaves); central leaflet of stem leaves (2.5-) avg. 3.25 (-4) cm long × (0.5-) avg. 0.75 (-1.0) cm wide; taste of fresh plant relatively mildly mustardy ..... ***Cardamine angustata***
      5 Rhizome elongate and of uniform diameter, lacking definite segments, but with periodic "teeth" (prominent reduced leaves) along it; leaflets of the stem leaves (2×-) avg. 3× (-4×) as long as wide (thus proportionately similar to the leaflets of the basal leaves); central leaflet of stem leaves (4-) avg. 6 (-8) cm long × (1.5-) avg. 2 (-2.5) cm wide; taste of fresh plant strong, like horseradish or wasabi ..... ***Cardamine diphylla***
    4 Trichomes of leaf margins erect and 0.2-0.3 mm long; stem leaves 3, whorled; lateral leaflets of stem leaves usually incised into 2 main lobes, giving the leaf a superficially somewhat 5-parted appearance; basal leaves usually absent (or often present in *C. maxima*) at flowering. ..... ***Cardamine concatenata***

1 Leaves simple, pinnately lobed, or pinnately divided (if 1-ternate, then pinnately so, the terminal leaflet on a longer petiolule than those of the lateral leaflets); [*Cardamine* in the narrow sense].
  7 Cauline leaves simple, sometimes the lower to middle cauline leaves with 1-2 pairs of very small lateral lobes.
    9 Stem glabrous, or with hairs < 0.1 mm long; corolla white, rarely pink; stem leaves 4-12; silique 1.5-3 cm long, plus a 3-7 mm beak ..... ***Cardamine bulbosa***
    9 Stem cinereous-pubescent with hairs (0.2-) 0.3-0.6 (-0.8) mm long; corolla pink to lavender, rarely white; stem leaves 2-5; silique 1-2 cm long, plus a 2-4 mm beak ..... ***Cardamine douglassii***
  7 Cauline leaves 1-ternate or pinnatifid (if 1-ternate, the lateral leaflets about as large as the terminal leaflet).
    17 Stamens 4 (rarely 5 or 6); plant with many, persistent basal leaves forming a compact rosette; stem bases and petioles hirsute ..... ***Cardamine hirsuta***
    17 Stamens 6; plant with few or no basal leaves, not forming a rosette or forming a loose rosette; stem bases and petioles glabrous (or sparsely hirsute).
      18 Cauline leaves 2-4 cm long; terminal leaflet similar to the lateral leaflets in size and shape; leaflets neither decurrent along the rachis nor petiolulate; stem glabrous throughout ..... ***Cardamine parviflora var. arenicola***
      18 Cauline leaves 4-10 cm long; terminal leaflet broader than the lateral leaflets; leaflets either decurrent along the rachis or petiolulate; stem pubescent at base.
        19 Leaflets decurrent on the rachis; stems typically erect; [native] ..... ***Cardamine pensylvanica***
        19 Leaflets petiolulate; stems flexuous; [alien weed]. ..... ***Cardamine occulta***

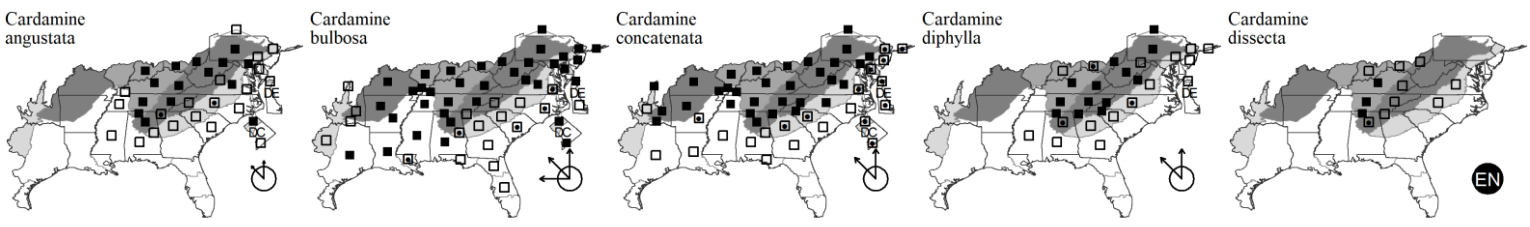
Cardamine angustata O.E. Schulz. EASTERN SLENDER TOOTHWORT. **Hab:** Rich, mesic forests. **Dist:** NJ and IN south to n. GA, c. TN, and ne. MS. **Phen:** Mar-May; Apr-Jun. **Tax:** Material sometimes considered merely disjunct in the Ouachita Mountains of AR, or named as a variety, var. *ouachitana* E.B. Smith, is apparently specifically distinct and not closely related (C.T. Witsell, pers. comm., 2013). **Syn:** = C, Pa, Va, Al-Shehbaz (1988a), Sweeney & Price (2001); = *Cardamine angustata* var. *angustata* – RAB; = *Dentaria heterophylla* Nuttall – F, G, S, Tn, W; < *Cardamine angustata* O.E. Schulz – FNA7, K3, K4, Rollins (1993).

Cardamine bulbosa (Schreber ex Muhlenberg) Britton, Sterns, & Poggenburg. BULBOUS BITTERCRESS. **Hab:** Swampy forests and bogs, primarily (but not strictly) in circumneutral soils over limestone or mafic rocks. **Dist:** ME west to MB, south to FL, LA, and TX. **Phen:** Feb-May; Apr-Jun. **Syn:** = Ar, F, Fl4, FNA7, G, GrPl, GW2, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, Rollins (1993); = *Cardamine rhomboidea* (Persoon) A.P. de Candolle – C, Al-Shehbaz (1988a). NatureServe G5 (Secure).

Cardamine concatenata (Michaux) O. Schwarz. CUTLEAF TOOTHWORT. **Hab:** Rich, mesic forests. **Dist:** ME, QC and MN south to FL Panhandle, LA, OK, and TX. **Phen:** (Jan-) Mar-May; Apr-May. **Syn:** = Ar, C, Fl4, FNA7, GrPl, K1, K3, K4, Mi, NE, NY, Pa, RAB, Va, WH3, Al-Shehbaz (1988a), Rollins (1993), Sweeney & Price (2001); = *Dentaria laciniata* Muhlenberg ex Willdenow – G, GW2, Il, S, Tn, W; > *Dentaria laciniata* var. *coalescens* Fernald – F; > *Dentaria laciniata* var. *laciniata* – F. NatureServe G5 (Secure).

Cardamine diphylla (Michaux) Alph. Wood. CRINKLEROOT, TOOTHWORT, TURKEY MUSTARD. **Hab:** Rich, mesic forests. **Dist:** NB west to MN, south to n. GA, SC, and AL. **Phen:** Apr-May; May-Jun. **Syn:** = C, K1, K3, K4, Mi, NE, NY, Pa, RAB, Va, Al-Shehbaz (1988a), Rollins (1993), Sweeney & Price (2001); = *Dentaria diphylla* Michaux – F, G, Il, Tn, W; > *Dentaria diphylla* Michaux – S; > *Dentaria incisa* Small – S. NatureServe G5 (Secure).

Cardamine dissecta (Leavenworth) Al-Shehbaz. DISSECTED TOOTHWORT. **Hab:** Rich, mesic forests. **Dist:** C. OH and s. IN south through c. KY and c. and e. TN to nw. GA, c. AL, and extreme nw. MS; disjunct east of the Blue Ridge in sc. VA and c. NC. **Phen:** Mar-Apr; Apr-May. **Tax:** See Al-Shehbaz (1988c) for additional discussion of the systematics, nomenclature, ecology, and distribution of this species (or species complex). Arkansas material previously considered part of *C. dissecta* (Gentry et al. 2013) is in the process of being named at species rank (Witsell, Dec. 2015, pers. comm.). Alabama plants. **Comm:** Al-Shehbaz (1988c) states that *C. dissecta* is easily distinguished from its relatives "by its glabrous leaves that are divided into filiform to narrowly linear segments". First reported for VA by Wieboldt et al. (1998). **Syn:** = Va; = *Cardamine angustata* var. *multifida* (Muhlenberg ex Elliott) H.E. Ahles – RAB; = *Dentaria multifida* Muhlenberg ex Elliott – F, G, Tn, W; < *Cardamine dissecta* (Leavenworth) Al-Shehbaz – C, FNA7, K1, K3, K4, Al-Shehbaz (1988a), Rollins (1993), Sweeney & Price (2001); < *Dentaria multifida* Muhlenberg ex Elliott – S.



Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

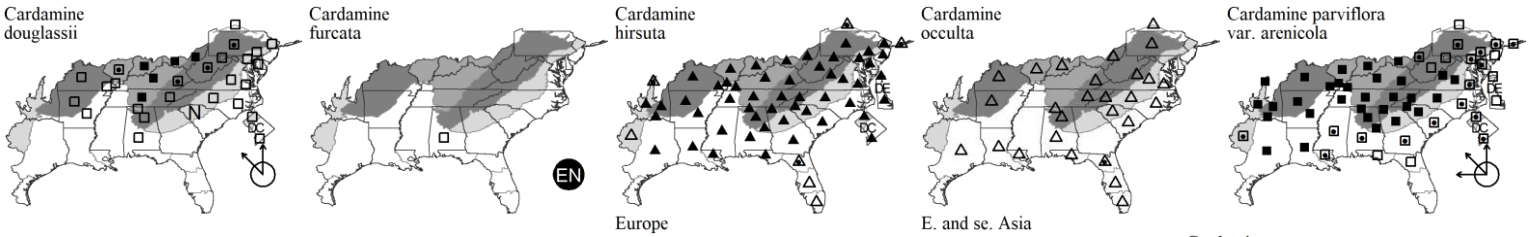
Cardamine douglassii Britton. PURPLE CRESS, LIMESTONE BITTERCRESS, DOUGLASS'S BITTERCRESS, PINK SPRING-CRESS. **Hab:** Nutrient-rich, mesic forests, especially alluvial bottomlands, and in nutrient-rich seepages. **Dist:** NY, ON, and MN south to c. NC (in the drainages of the Neuse, Meherrin, and rarely Cape Fear rivers), sc. TN, AL, and MO. Material reported for SC is *C. bulbosa*. **Phen:** Late Feb-early Apr; Apr-May. **Syn:** = Ar, C, F, FNA7, G, GW2, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, Tn, Va, Al-Shehbaz (1988a), Rollins (1993). NatureServe G5 (Secure).

Cardamine furcata Small. ALABAMA FORKED TOOTHWORT. **Hab:** Moist forests. **Dist:** Endemic to sc. AL (near Tuscaloosa). **Comm:** Under investigation by Brian Keener. **Syn:** = S; < *Cardamine dissecta* (Leavenworth) Al-Shehbaz – FNA7, K1, K3, K4, Al-Shehbaz (1988a), Rollins (1993), Sweeney & Price (2001).

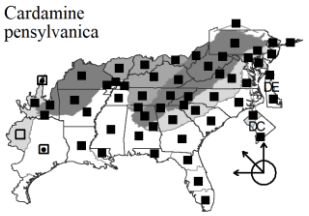
* ***Cardamine hirsuta*** Linnaeus. HAIRY BITTERCRESS. **Hab:** Disturbed areas, including fields and gardens. **Dist:** Native of Europe. **Phen:** Jan-May (or irregularly earlier in response to mild winter weather). **Syn:** = C, F, Fl4, FNA7, G, GW2, Il, K1, K3, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, Al-Shehbaz (1988a), Marhold et al (2016), Rollins (1993), Šlenker et al (2018); > *Cardamine debilis* – Ar; > *Cardamine hirsuta* Linnaeus – Ar.

* ***Cardamine occulta*** Hornemann. HIDDEN BITTERCRESS. **Hab:** Disturbed areas. **Dist:** Native of e. Asia. **Syn:** = K4, Marhold et al (2016), Šlenker et al (2018); < *Cardamine flexuosa* Withering – FNA7, K3, NE, Pa.

Cardamine parviflora Linnaeus *var.* ***arenicola*** (Britton) O.E. Schulz. SAND BITTERCRESS. **Hab:** Various habitats, primarily seasonally wet areas with shallow soil or sand, also on mafic outcrop glades, as on greenstone, diabase, and nutrient-rich granites. **Dist:** The typic variety is Eurasian; our variety is widespread in e. North America, also occurring in the Pacific Northwest. **Phen:** Mar-May. **Tax:** Our plant may warrant specific status. **Syn:** = Ar, C, F, GrPl, Il, K1, NcTx, NE, RAB, Tn, Tx, Va, Al-Shehbaz (1988a), Rollins (1993); > *Cardamine arenicola* Britton – S; < *Cardamine parviflora* – Fl4, FNA7, G, GW2, K3, K4, Mi, NY, Pa, W, WH3; > *Cardamine parviflora* – S. NatureServe G5T5 (Secure).



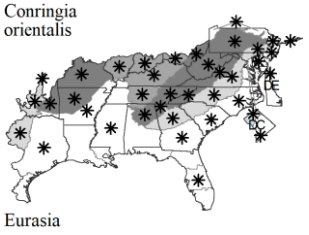
Cardamine pensylvanica Muhlenberg ex Willdenow. QUAKER BITTERCRESS. **Hab:** Various wet habitats, especially swampy depressions, streambanks, small woodland seeps. **Dist:** NL (Newfoundland), NL (Labrador), NT, and AK south to FL, TX, and CA. **Phen:** Mar-May. **Syn:** = Ar, C, Fl4, FNA7, G, GrPl, GW2, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, Va, W, WH3, Al-Shehbaz (1988a), Rollins (1993); > *Cardamine pensylvanica* var. *brittoniana* Farwell – F; > *Cardamine pensylvanica* var. *pensylvanica* – F. NatureServe G5 (Secure).



Conringia Adanson 1763 (HARE'S-EAR MUSTARD)

A genus of 6 species, herbs, of Europe and the Middle East. References: Al-Shehbaz (1985b); Rollins (1993); Warwick (2010h) in FNA7 (2010).

* ***Conringia orientalis*** (Linnaeus) Andrzejowski. HARE'S-EAR MUSTARD, TREACLE MUSTARD. **Hab:** Disturbed areas. **Dist:** Native of Eurasia. **Phen:** Apr-Jun. **Syn:** = Ar, Bah, C, F, Fl4, FNA7, G, GBI2, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Tx, WH3, WV, Al-Shehbaz (1985b), Rollins (1993). NatureServe GNR (Not Yet Ranked).



Descurainia Webb & Berthelot 1836 (TANSY-MUSTARD, FLIXWEED)

A genus of ca. 40 species, primarily of North and South America. References: Al-Shehbaz (1988b); Detling (1939); Goodson & Al-Shehbaz (2010) in FNA7 (2010); Rollins (1993).

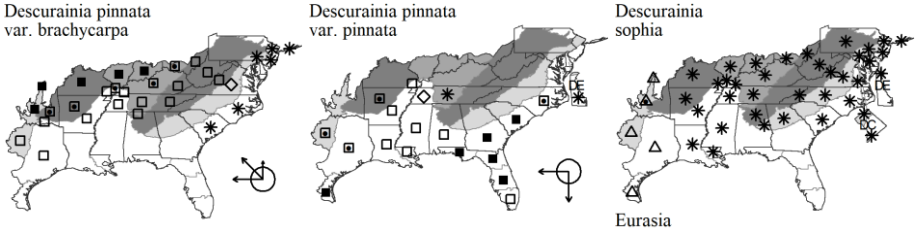
1 Silique 10-25 (-30) mm long, acute to acuminate, the seeds mostly in 1 row ..... ***Descurainia sophia***
1 Silique 5-10 (-13) mm long, obtuse or clavate, the seeds mostly in 2 rows.
  2 Leaves densely gray-canescent; angle between fruiting pedicels and rachis ca. 75 degrees; pedicels glandular-puberulent, 6-12 mm long; plants 2-5 dm tall; [primarily of the Coastal Plain] ..... ***Descurainia pinnata var. pinnata***
  2 Leaves glabrous or glabrescent; angle between fruiting pedicels and rachis ca. 45 degrees; pedicels glabrous, 6-16 mm long; plants 3-7 dm tall; [primarily of the Mountains and Piedmont, rarely weedy in the Coastal Plain]. ..... ***Descurainia pinnata var. brachycarpa***

Descurainia pinnata (Walter) Britton *var.* ***brachycarpa*** (Richardson) Fernald. NORTHEASTERN TANSY-MUSTARD. **Hab:** Dry rocky openings and woodlands. **Dist:** QC west to NT, south to VA, TN, and TX; introduced in the Coastal Plain of NC. **Phen:** Apr-Aug. **Syn:** = Ar, C, F, G, Mi, Pa, Va; = *Descurainia brachycarpa* (Richardson) O.E. Schulz – RAB; = *Descurainia pinnata* ssp. *brachycarpa* (Richardson) Detling – Ar, FNA7, GrPl, Il, K1, NcTx, NE, NY, Al-Shehbaz (1988b), Detling (1939), Rollins (1993); = *Sophia millefolia* Rydberg – S; > *Descurainia pinnata* var. *osmiarum* – Tx; < *Descurainia pinnata* – W; < *Descurainia pinnata* ssp. *brachycarpa* (Richardson) Detling – K3, K4, Tn; > *Descurainia pinnata* (Walter) Britton var. *brachycarpa* (Richardson) Fernald – Tx, WV; > *Descurainia pinnata* (Walter) Britton var. *pinnata* – WV.

Descurainia pinnata (Walter) Britton *var.* ***pinnata***. SOUTHEASTERN TANSY-MUSTARD. **Hab:** Open sandy areas, especially roadsides. **Dist:** E. NC south to FL, west to TX and OK. Reported for DE, where considered non-native, by Longbottom, Naczi, & Knapp (2016). **Phen:** Feb-May. **Syn:** = C, F, G, Tx; = *Descurainia pinnata* – Fl4, RAB, WH3; = *Descurainia pinnata* ssp. *pinnata* – Ar, FNA7, K1, K3, K4, NcTx, Tn, Al-Shehbaz (1988b), Detling (1939), Rollins (1993); = *Sophia pinnata* (Walter) T.J. Howell – S.

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

* ***Descurainia sophia*** (Linnaeus) Webb ex Prantl. HERB SOPHIA, FLIXWEED. **Hab:** Disturbed areas. **Dist:** Native of Eurasia. **Phen:** Apr-Aug. **Syn:** = C, F, FNA7, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, WV, Al-Shehbaz (1988b), Detling (1939), Rollins (1993); = *Sophia sophia* (Linnaeus) Britton – S. NatureServe GNR (Not Yet Ranked).



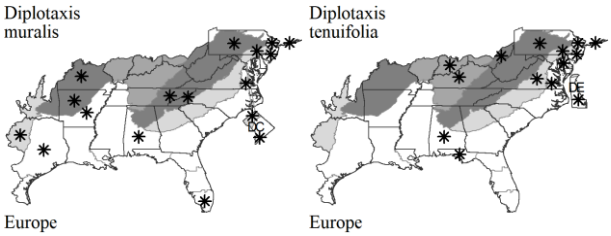
Diplotaxis A.P. de Candolle 1821 (WALL-ROCKET)

A genus of ca. 30 species, herbs, of Eurasia and Africa. References: Al-Shehbaz (1985b); Martínez-Laborde (2010) in FNA7 (2010); Rollins (1993).

1 Leaves mostly basal or very low-cauline; plant annual or biennial; siliques lacking a gynophore (stipe) between the sepal scars and the base of the valves; [section *Anocarpum*] ..... ***Diplotaxis muralis***
1 Leaves mostly cauline; plant perennial, becoming somewhat woody at the base; siliques with a 0.5-2 mm gynophore (stipe) between the sepal scars and the base of the valves; [section *Diplotaxis*] ..... ***Diplotaxis tenuifolia***

* ***Diplotaxis muralis*** (Linnaeus) A.P. de Candolle. ANNUAL WALL-ROCKET, SAND-ROCKET, STINKING WALL-ROCKET. **Hab:** Disturbed areas. **Dist:** Native of Europe. The report of this species for NC by Ahles & Radford (1959) was based on a misidentification of *Coincya muralis* (Naczi & Thieret 1996). **Phen:** May-Sep. **Syn:** = Ar, Bah, C, F, Fl4, FNA7, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, S, Tx, WH3, Al-Shehbaz (1985b), Rollins (1993). NatureServe GNR (Not Yet Ranked).

* ***Diplotaxis tenuifolia*** (Linnaeus) A.P. de Candolle. PERENNIAL WALL-ROCKET, FLIXWEED. **Hab:** Disturbed areas, ballast. **Dist:** Native of Europe. **Phen:** May-Oct. **Syn:** = C, F, Fl4, FNA7, G, GBI2, Il, K1, K3, K4, Mi, NE, NY, Pa, S, WH3, Al-Shehbaz (1985b), Rollins (1993). NatureServe GNR (Not Yet Ranked).



Draba Linnaeus 1753 (DRABA, WHITLOW-GRASS)

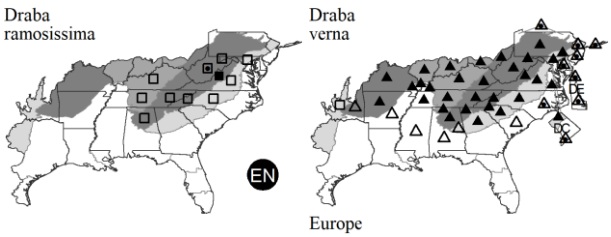
A genus of about 330 species, perennial and annual herbs, of Northern Hemisphere and Andean South America, particularly in arctic and alpine habitats. Molecular phylogenetic studies show that *Erophila* should be included in *Draba*, but that other elements are discordant and should be segregated as *Abdra* and *Tomostima* (Koch & Al-Shehbaz 2002; Al-Shehbaz 2012; Jordon-Thaden et al. 2010). References: Al-Shehbaz (1987); Al-Shehbaz (2012a); Al-Shehbaz, Windham, & Elven (2010) in FNA7 (2010); Jordon-Thaden et al (2010); Koch & Al-Shehbaz (2002); Rollins (1993).

1 Leaves all basal; petals deeply bifid (about 1/2 way to base) ..... ***Draba verna***
1 Leaves basal and cauline (the basal sometimes withering by fruiting); petals merely emarginate.
  2 Silique twisted; petals 5-6 mm long; styles conspicuous, 1.5-3 mm long; perennial from a caudex; flowers all chasmogamous, with anthers 0.5-0.6 mm long, and with petals; [on calcareous rock outcrops] ..... ***Draba ramosissima***
  2 Silique not twisted; petals 0-5 mm long; styles absent to inconspicuous, 0-0.25 mm long; winter-annuals; flowers of two types, the early ones chasmogamous, with anthers 0.2-0.4 mm long, and with petals, the later ones cleistogamous, with anthers ca. 0.05 mm long, and lacking petals; [mostly in open situations in sandy or clayey soils, sometimes on rocks, including limestone].
    3 Silique 1-6 mm long; leaves extending upward into the lower branches of the inflorescence; trichomes exclusively cruciform ..... ***Abdra***
    3 Silique 8-14 mm long; leaves low-cauline, not extending upward into the lower branches of the inflorescence; trichomes of 2 types, simple and 2-7-rayed ..... ***Tomostima***

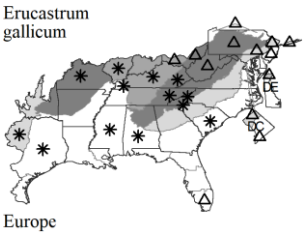
Draba ramosissima Desvaux. ROCKTWIST, APPALACHIAN DRABA. **Hab:** In crevices of rock outcrops, or in dry talus slopes, over a variety of rock types (including limestone, dolostone, schist, gneiss, shale). **Dist:** W. MD and e. WV south through w. VA and nc. KY south to w. NC, e. and c. TN, and n. AL. The AL occurrence (Marshall County) is reported by Dattilo & Keener (2017). **Phen:** Apr-May; May-Jul. **Syn:** = FNA7, K1, K3, K4, RAB, S, Tn, Va, W, WV, Al-Shehbaz (1987), Al-Shehbaz (2012a), Rollins (1993). NatureServe G4 (Apparently Secure).

Draba verna Linnaeus. WHITLOW-GRASS. **Hab:** Disturbed areas, especially in dry, barren soils, including granitic flatrocks. **Dist:** Native of Europe. **Phen:** Feb-Apr; Mar-May. **Syn:** = Ar, C, FNA7, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Va, W, WV, Al-Shehbaz (1987), Al-Shehbaz (2012a), Rollins (1993); > *Draba verna* ssp. *praecox* Stevens – Il; > *Draba verna* ssp. *verna* – Il; > *Draba verna* var. *boerhaavii* van Hall – F, G; > *Draba verna* var. *verna* – F, G. NatureServe GNR (Not Yet Ranked).

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

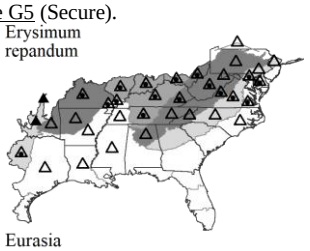


Erucastrum C. Presl 1826 (DOG-MUSTARD)



A genus of ca. 22 species, herbs, of Africa, Europe, and Arabia. References: Al-Shehbaz (1985b); Luken, Thieret, & Kartesz (1993); Rollins (1993); Warwick (2010d) in FNA7 (2010).

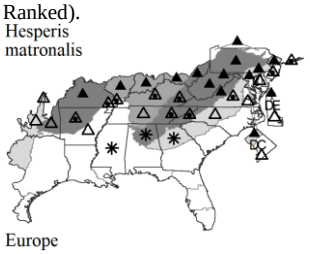
* ***Erucastrum gallicum*** (Willdenow) O.E. Schulz. DOG-MUSTARD, ROCKET-WEED, FRENCH ROCKET. **Hab:** Disturbed areas. **Dist:** Native of Europe. Luken, Thieret, and Kartesz (1993) discuss the introduction and spread of *E. gallicum* in North America. **Phen:** Apr-Sep. **Comm:** While only weakly naturalized in our area, *E. gallicum* seems likely to increase in abundance. The report of *Brassica erucastrum* for NC in RAB is apparently based on material of *Coincya muralis* (Naczi & Thieret (1996). **Syn:** = Bah, C, F, Fl4, FNA7, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, Tx, WH3, Al-Shehbaz (1985b), Rollins (1993). NatureServe G5 (Secure).



Erysimum Linnaeus 1753 (WALLFLOWER, TREACLE MUSTARD)

A genus of ca. 150-180 species, of the Northern Hemisphere. References: Al-Shehbaz (1988d); Al-Shehbaz (2010a) in FNA7 (2010); Rollins (1993).

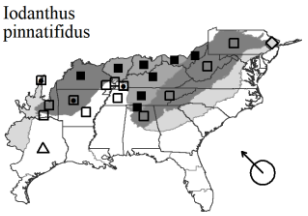
* ***Erysimum repandum*** Linnaeus. TREACLE MUSTARD, BUSHY WALLFLOWER. **Hab:** Disturbed areas. **Dist:** Native of Eurasia. **Phen:** Apr-May; May-Jul. **Syn:** = Ar, C, F, FNA7, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, WV, Al-Shehbaz (1988d), Rollins (1993); = *Cheirinia repanda* (Linnaeus) Link – S. NatureServe GNR (Not Yet Ranked).



Hesperis Linnaeus 1753 (DAME'S ROCKET)

A genus of ca. 25 species, herbs, of Eurasia and n. Africa. References: Al-Shehbaz (1988d); Al-Shehbaz (2010a) in FNA7 (2010); Rollins (1993).

* ***Hesperis matronalis*** Linnaeus. DAME'S ROCKET. **Hab:** Bottomlands, roadsides, moist forests. **Dist:** Native of Europe. **Phen:** Apr-Aug. **Comm:** The flowers are white or pink. **Syn:** = Ar, C, F, FNA7, G, GrPl, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Va, W, WV, Al-Shehbaz (1988d), Rollins (1993). NatureServe G4G5 (Apparently Secure).



Iodanthus Torrey & A. Gray 1840 (PURPLE ROCKET)

A monotypic genus, a perennial herb, of e. North America. References: Al-Shehbaz (1988a); Al-Shehbaz (2010a) in FNA7 (2010); Rollins (1993).

Identification Notes: *Iodanthus pinnatifidus* somewhat resembles *Hesperis matronalis* in overall appearance, but differs in the following ways: petals 10-13 mm long (vs. 20-25 mm long), siliques 2-4 cm long (vs. 5-10 cm long), pubescence of the lower stem of simple trichomes (vs. branched trichomes).

Iodanthus pinnatifidus (Michaux) Steudel. PURPLE ROCKET. **Hab:** Rich forests of bottomlands and lower slopes, bottomland fields. **Dist:** W. PA west to MN and IA, south through WV and e. and c. TN to AL and e. and se. TX. **Phen:** May-Jun. **Syn:** = Ar, C, F, FNA7, G, GrPl, Il, K1, K3, K4, NcTx, Pa, S, Tn, Tx, WV, Al-Shehbaz (1988a), Rollins (1993). NatureServe G5 (Secure).

Leavenworthia Torrey 1837 (GLADE CRESS)

A genus of 8 species, annual herbs, endemic to e. North America. References: Al-Shehbaz & Beck (2010) in FNA7 (2010); Al-Shehbaz (1988a); Rollins (1993).

1 Petals entire, white, < 7 mm long; leaf lobes deeply dentate, the terminal lobe only slightly larger than the larger lateral lobes..... ***Leavenworthia uniflora***
1 Petals deeply to shallowly emarginate (notched at the tip), yellow, white, or lavender, 7-15 mm long; leaf lobes entire to shallowly dentate, the terminal lobe markedly larger than the largest lateral lobes.
  2 Siliques conspicuously torulose (constricted between the seeds), even when young..... ***Leavenworthia torulosa***
  2 Siliques not torulose (constricted between the seeds) (or slightly so in *L. stylosa*).

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

3 Petals 7-10 mm long, shallowly emarginate; style 1-3 mm long; siliques flat; [of AL, GA, KY, and TN].
.....***Leavenworthia exigua var. lutea***
3 Petals 10-16 mm long, deeply emarginate; styles 2.5-7 mm long; siliques thick or flat; [of AL and TN].
6 Siliques thin, flat; styles 1.5-5.5 mm long; petals white to lavender; [of n. AL].
7 Styles 2-5.5 mm long; mature siliques cuneate at the base and acute at the tip; [of Colbert, Franklin, and Lawrence counties, AL] .....
.....***Leavenworthia alabamica var. alabamica***
7 Styles 1.5-2 (-3) mm long; mature siliques rounded at the base and at the tip; [of Morgan County, AL] .....
..... ***Leavenworthia alabamica var. brachystyla***
6 Siliques thick, fleshy; styles 2.5-7 mm long; petals yellow, white, or lavender; [of n. AL and c. TN].
9 Siliques 6-10 mm long; styles 3-6 mm long; petals white to yellow, 10-13 mm long; [of Lawrence and Morgan counties, AL].....
.....***Leavenworthia crassa var. crassa***
9 Siliques 8-12 mm long; styles 1.5-3.5 mm long; petals yellow, 9-11 mm long; [of Morgan County, AL] ..... ***Leavenworthia crassa var. elongata***

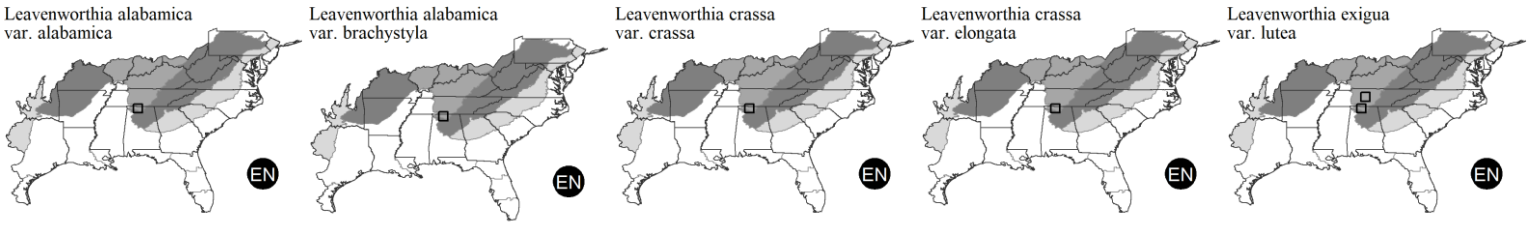
Leavenworthia alabamica Rollins *var*. ***alabamica***. **Hab:** Limestone glades. **Dist:** Endemic to n. AL (Colbert, Franklin, and Lawrence counties). **Phen:** Mar-Apr. **Syn:** = K1, Al-Shehbaz (1988a), Rollins (1993); < *Leavenworthia alabamica* – FNA7, K3, K4. NatureServe G2T2Q (Imperiled).

Leavenworthia alabamica Rollins *var*. ***brachystyla*** Rollins. **Hab:** Limestone glades, other calcareous sites. **Dist:** Endemic to n. AL (Morgan County). **Phen:** Mar-May. **Syn:** = K1, Al-Shehbaz (1988a), Rollins (1993); < *Leavenworthia alabamica* – FNA7, K3, K4. NatureServe G2T1T2Q (Critically Imperiled).

Leavenworthia crassa Rollins *var*. ***crassa***. **Hab:** Limestone glades, disturbed calcareous soils nearby. **Dist:** Endemic to n. AL (Lawrence and Morgan counties). **Phen:** Mar-May. **Syn:** = K1, Al-Shehbaz (1988a), Rollins (1993); < *Leavenworthia crassa* – FNA7, K3, K4. NatureServe G2T1Q (Critically Imperiled).

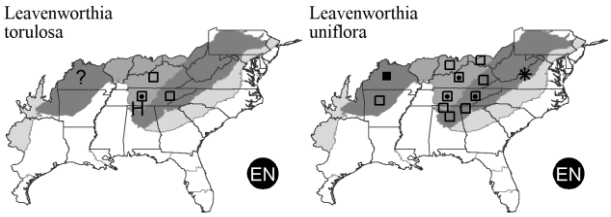
Leavenworthia crassa Rollins *var*. ***elongata*** Rollins. **Hab:** Limestone glades, disturbed calcareous soils nearby. **Dist:** Endemic to n. AL (Morgan County). **Phen:** Mar-Apr. **Syn:** = K1, Al-Shehbaz (1988a), Rollins (1993); < *Leavenworthia crassa* – FNA7, K3, K4. NatureServe G2T1Q (Critically Imperiled).

Leavenworthia exigua Rollins *var*. ***lutea*** Rollins. **Hab:** Limestone glades, disturbed calcareous sites nearby. **Dist:** Endemic to the Central Basin of n. AL (Jefferson County) and c. TN (Bedford and Maury counties) (Chester, Wofford, & Kral 1997). **Phen:** Mar-Apr. **Syn:** = K1, Tn, Al-Shehbaz (1988a), Rollins (1993); < *Leavenworthia exigua* – FNA7, K3, K4. NatureServe G4T1 (Critically Imperiled).



Leavenworthia torulosa A. Gray. NECKLACE GLADECRESS. **Hab:** Limestone glades, disturbed calcareous sites nearby (fields). **Dist:** Endemic to the Central Basin of c. TN (10 counties), the Ridge and Valley of e. TN (Bradley and Meigs counties), the Western Highland Rim of KY (Logan, Simpson, Todd, and Warren counties), n. AL (Madison County), and reported form MO (possibly based on an herbarium mounting/labeling error). **Phen:** Mar-Apr. **Syn:** = C, F, FNA7, G, K1, K3, K4, Mo2, S, Tn, Al-Shehbaz (1988a), Rollins (1993). NatureServe G4 (Apparently Secure).

Leavenworthia uniflora (Michaux) Britton. **Hab:** Limestone glades, disturbed calcareous sites nearby (fields). **Dist:** Endemic to the Central Basin of c. TN (8 counties), the Ridge and Valley of e. TN (Hamilton, Meigs, Bledsoe, and Knox counties), nw. GA (Walker and Murray counties), c. KY (15 counties), and the Interior Highlands of MO and n. AR. Reported from a church parking lot in Shenandoah County, VA (Domague & McMullen 2013). **Syn:** = Ar, C, F, FNA7, G, K1, K3, K4, Mo2, S, Tn, Al-Shehbaz (1988a), Rollins (1993). NatureServe G4 (Apparently Secure).



Lepidium Linnaeus 1753 (PEPPERWORT, PEPPERGRASS, PEPPERWEED)

A genus of ca. 220 species, herbs, cosmopolitan. Al-Shehbaz, Mummenhof, & Appel (2002) discuss the inclusion of *Cardaria* and *Coronopus* in *Lepidium*.References: Al-Shehbaz & Gaskin (2010) in FNA7 (2010); Al-Shehbaz (1986a); Al-Shehbaz (1986b); Al-Shehbaz, Mummenhoff, & Appel (2002); Rollins (1993); GBI2.

section *Lepidium*: perfoliatum, graminifolium
section *Cardamon*: sativum
section *Lepia*: campestre
section *Dileptium*: austrinum, densiflorum, oblongum, virginicum ssp. virginicum
??: didymum, draba, ruderale, africanum, bonariense, lasiocarpum, schinzii, coronopus

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

1 Upper cauline leaves sessile, and also perfoliate, sagittate, or auriculate at the base.
3 Stamens 2; petals absent (or minute); basal leaves 1-2-pinnatifid; [wool-alien waif, probably not established in our area] ..... ***Lepidium oblongum***
3 Stamens 6; petals present; basal leaves entire, dentate, sinuate (rarely 1-pinnatifid); [collectively common and widespread in our area]. ..... ***Lepidium campestre***
1 Upper cauline leaves petiolate, not perfoliate, sagittate, or auriculate at the base.
5 Valves of the silicles rugose-verrucose; some inflorescences (at least) borne opposite a leaf.
6 Silicles reniform to ovate-cordate, 2.3-3.4 mm long, strongly ridged, not notched at the apex, indehiscent ..... ***Lepidium coronopus***
6 Silicles bilobed, 1.3-1.7 mm long, reticulate, strongly notched at the apex; splitting into two halves ..... ***Lepidium didymum***
5 Valves of the silicles smooth; inflorescences not leaf-opposed.
11 Petals 1-2× as long as the sepals ..... ***Lepidium virginicum var. virginicum***
11 Petals 0-0.8× as long as the sepals.
12 Upper cauline leaves laciniate to pinnatifid; inflorescence rachis with hairs to 0.8 mm long. ..... ***Lepidium oblongum***
12 Upper cauline leaves entire, serrate, or dentate; inflorescence axis glabrous, papillose, or with hairs < 0.1 mm long.
14 Basal leaves 2-3-pinnatifid; seeds marginless; fresh plants fetid ..... ***Lepidium ruderale***
14 Basal leaves undivided or to 1-pinnatifid; seeds narrowly winged (marginless in L. africanum); fresh plants not fetid.
16 Inflorescence rachis with straight, usually subclavate papillae; silicles widest above the middle ..... ***Lepidium densiflorum***
16 Inflorescence rachis with minute trichomes, these usually subappressed; silicles widest at or below the middle ..... ***Lepidium virginicum var. virginicum***

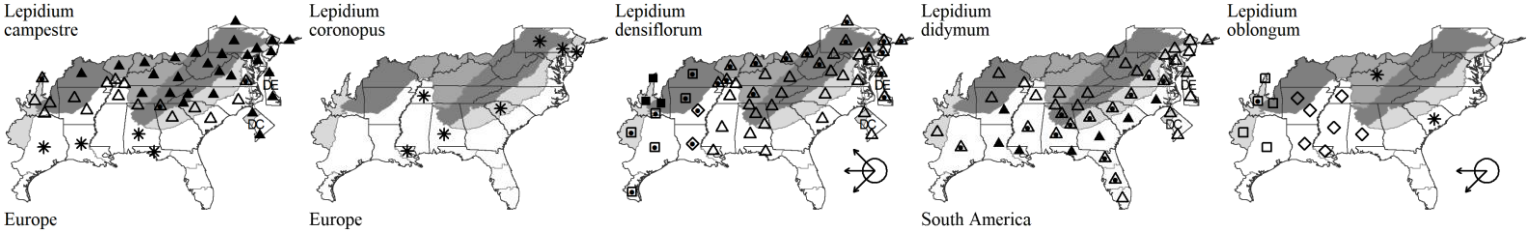
* ***Lepidium campestre*** (Linnaeus) R. Brown. FIELD PEPPERWORT, COW CRESS, FIELD CRESS. **Hab:** Disturbed areas. **Dist:** Native of Europe. **Phen:** Mar-Jun. **Syn:** = C, F, Fl4, FNA7, G, GBI2, GrPl, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Va, W, WH3, WV, Rollins (1993). NatureServe GNR (Not Yet Ranked).

* ***Lepidium coronopus*** (Linnaeus) Al-Shehbaz. **Hab:** Disturbed areas. **Dist:** Native of Europe. **Syn:** = FNA7, K4, NY; = *Carara coronopus* (Linnaeus) Medikus – S; = *Coronopus squamatus* (Forsskål) Ascherson var. *squamatus* – GBI2; > *Coronopus procumbens* Gilibert – F, G; > *Coronopus squamatus* (Forsskål) Ascherson – C, K1, K2, Pa; > *Lepidium squamatum* Forsskål – NE, Al-Shehbaz, Mummenhoff, & Appel (2002). NatureServe GNR (Not Yet Ranked).

Lepidium densiflorum Schrader. PRAIRIE PEPPERWEED, GREEN-FLOWERED PEPPERGRASS. **Hab:** Prairies, glades, disturbed areas. **Dist:** The original distribution difficult to reconstruct, perhaps AB west to AK, south to TX, CA, and Mexico; now much more widespread. **Phen:** (Feb-) May-Jun. **Syn:** = C, F, Fl4, FNA7, G, GBI2, GrPl, Il, K3, K4, Mi, NcTx, Pa, S, Tn, Tx, Va, WH3, WV; > *Lepidium densiflorum* var. *densiflorum* – K1, NE, NY, Al-Shehbaz (1986a), Rollins (1993). NatureServe G5T5 (Secure).

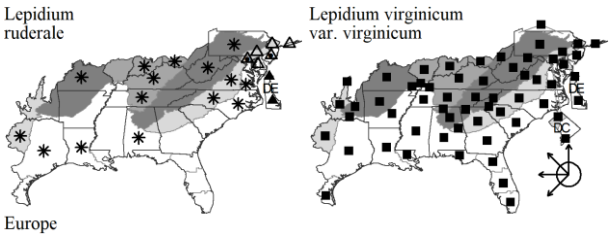
* ***Lepidium didymum*** Linnaeus. WART-CRESS, LESSER SWINE-CRESS. **Hab:** Fields, roadsides, disturbed areas. **Dist:** Native of South America. **Syn:** = Ar, Fl4, FNA7, Il, K3, K4, NE, NY, Tn, Va, WH3, Al-Shehbaz, Mummenhoff, & Appel (2002); = *Carara didyma* (Linnaeus) Britton – S; = *Coronopus didymus* (Linnaeus) Smith – Bah, C, F, G, GBI2, K1, NcTx, Pa, RAB, Tx, Rollins (1993). NatureServe GNR (Not Yet Ranked).

Lepidium oblongum Small. VEINY PEPPERGRASS. **Hab:** Fields and roadsides, also as a waif around wool-combing mills in Coastal Plain of SC. **Dist:** Native of sc. and sw. North America south through Mexico to Central America (perhaps native in the western portions of our area). AL, AR, KS, NM, AZ, and OR south to TX, Mexico, and Central America. Reported for MD (Longbottom, Naczi, & Knapp 2016). **Comm:** For further information, see Rollins (1993) and Al-Shehbaz (1986). **Syn:** = FNA7, GrPl, K3, K4, NcTx, Tx, Al-Shehbaz (1986a), Al-Shehbaz (1986b); > *Lepidium oblongum* var. *oblongum* – Ar, K1, Rollins (1993). NatureServe G5TNR (Not Yet Ranked).



* ***Lepidium ruderale*** Linnaeus. NARROWLEAF PEPPERWORT, STINKING PEPPERWEED. **Hab:** Disturbed areas. **Dist:** Native of Europe. **Phen:** Apr-Jun. **Syn:** = C, F, FNA7, G, GBI2, Il, K1, K3, K4, Mi, NcTx, NE, NY, RAB, S, Tx, Al-Shehbaz (1986a), Al-Shehbaz (1986b), Rollins (1993). NatureServe GNR (Not Yet Ranked).

Lepidium virginicum Linnaeus *var*. ***virginicum***. POOR MAN'S PEPPER. **Hab:** Disturbed areas. **Dist:** *L. virginicum* var. *virginicum* is widespread in e. and c. North America; also introduced in various places elsewhere in the world. **Phen:** Feb-Jun (-Dec). **Tax:** Rollins (1993) interprets *L. virginicum* as having seven additional varieties, all in western North America and Central America. For North America, FNA recognizes two subspecies. **Syn:** = C, G, K1, NE, Tx, Al-Shehbaz (1986a), Al-Shehbaz (1986b), Rollins (1993); = *Lepidium virginicum* Linnaeus ssp. *virginicum* – FNA7, K3, K4, NY; < *Lepidium virginicum* – Ar, Bah, F, GBI2, GrPl, Il, Mi, NcTx, Pa, RAB, S, Tn, Va, W, WH3, WV. NatureServe G5T5 (Secure).

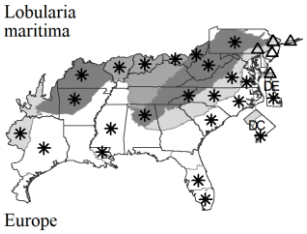


Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more)

* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable

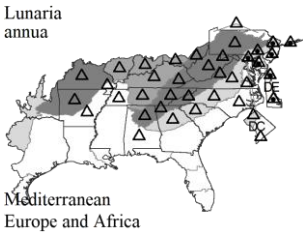
X : extirpated



Lobularia Desvaux 1815 (SWEET ALYSSUM)

A genus of 4 species, herbs, of Eurasia and Macaronesia. References: Al-Shehbaz (1987); Borgen (2010) in FNA7 (2010); Rollins (1993).

* ***Lobularia maritima*** (Linnaeus) Desvaux. SWEET ALYSSUM. **Hab:** Disturbed areas, lawns. **Dist:** Native of Europe. The NC occurrences are doubtfully established, from gardens and a "lawn". **Phen:** Jun-Nov. **Syn:** = Ar, C, F, Fl4, FNA7, G, Il, K1, K3, K4, Mi, NE, NY, Pa, Tx, WH3, Al-Shehbaz (1987), Rollins (1993). NatureServe GNR (Not Yet Ranked).



Lunaria Linnaeus 1753 (HONESTY)

A genus of 3 species, biennial herbs, of Europe. References: Al-Shehbaz (1987); Al-Shehbaz (2010a) in FNA7 (2010); Rollins (1993).

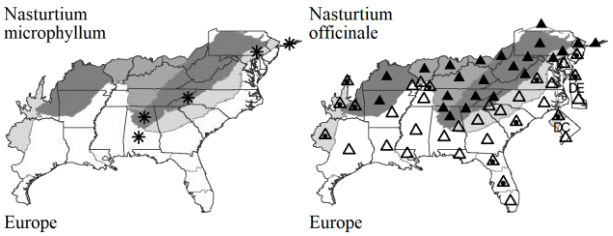
* ***Lunaria annua*** Linnaeus. ANNUAL HONESTY, SILVER-DOLLAR. **Hab:** Escaped from cultivation around gardens, naturalizing in floodplains in suburban areas. **Dist:** Native of se. Europe. **Phen:** Apr-Jun. **Syn:** = Ar, C, F, FNA7, G, Il, K1, Mi, NE, NY, Pa, Tn, Va, Rollins (1993); > *Lunaria annua* ssp. *annua* – K3, K4. NatureServe GNR (Not Yet Ranked).

Nasturtium R. Brown 1812 (WATERCRESS)

A genus of 5 species, perennial herbs, of Eurasia, n. Africa, and North America. Al-Shehbaz & Price (1998) summarize the reasons for separating *Nasturtium* from *Rorippa*; Franzke et al. (1998) provide corroboration based on molecular analysis. References: Al-Shehbaz & Price (1998); Al-Shehbaz (1988a); Al-Shehbaz (2010a) in FNA7 (2010); Franzke et al (1998); Green (1962); Rollins (1993); Stuckey (1972).

2 Mature siliques 1-1.5 mm wide, terete or subterete; seeds in 1 row in each locule of the silique; seeds with (75-) 100-150 (-175) polygonal depressions on each side .. ***Nasturtium microphyllum***
2 Mature siliques (1.8-) 2-3 mm wide, flattened; seeds in 2 rows in each locule of the silique; seeds with 25-50 (-60) polygonal depressions on each side ..... ***Nasturtium officinale***

* ***Nasturtium microphyllum*** Boenninghausen ex Reichenbach. NARROW-FRUITED WATERCRESS. **Hab:** Streams, springs. **Dist:** Native of Europe. **Phen:** Jun-Aug. **Tax:** See Green (1962) for additional information. **Syn:** = FNA7, GrPl, K3, K4, Mi, NE, NY, Pa, Al-Shehbaz & Price (1998); = *Nasturtium officinale* W.T. Aiton var. *microphyllum* (Boenninghausen ex Reichenbach) Thellung – F; = *Rorippa microphylla* (Boenninghausen ex Reichenbach) Hylander ex Löve & Löve – C, K1, Al-Shehbaz (1988a), Green (1962), Rollins (1993); < *Nasturtium officinale* W.T. Aiton – G, RAB, W. NatureServe GNR (Not Yet Ranked).
* ***Nasturtium officinale*** W.T. Aiton. WATERCRESS. **Hab:** Streams, springs, seepages. **Dist:** Native of Eurasia. **Phen:** Apr-Jul. **Syn:** = Fl4, FNA7, GrPl, GW2, Il, K3, K4, Mi, NE, NY, Pa, Tn, Va, WH3, WV, Al-Shehbaz & Price (1998); = *Rorippa nasturtium-aquaticum* (Linnaeus) Hayek – C, K1, NcTx, Tx, Al-Shehbaz (1988a), Green (1962), Rollins (1993); = *Sisymbrium nasturtium-aquaticum* Linnaeus – S; < *Nasturtium officinale* W.T. Aiton – G, RAB, W; > *Nasturtium officinale* var. *officinale* – F; > *Nasturtium officinale* var. *siifolium* (Reichenbach) W.D.J. Koch – F. NatureServe GNR (Not Yet Ranked).



Paysonia O'Kane & Al-Shehbaz 2002 (BLADDERPOD)

A genus of 8-9 species, herbs, endemic to southeastern United States. O'Kane & Al-Shehbaz (2002) clearly show that *Paysonia* is not a part of *Lesquerella*, which itself is included within *Physaria*. References: Al-Shehbaz (1987); O'Kane (2010a) in FNA7 (2010); O'Kane & Al-Shehbaz (2002); Rollins & Shaw (1973); Rollins (1993).

2 Siliques strongly compressed parallel to the plane of the septum, orbicular; valves pubescent with a mixture of large, simple, bulbous-based trichomes and smaller branched trichomes; flowers yellow ..... ***Paysonia lescurii***
2 Siliques not compressed, nearly globose, subglobose, pyriform, or slightly bilobed; valves glabrous or pubescent with only a single type of trichome; flowers white or yellow.
5 Siliques densely pubescent; styles pubescent (at least near base) ..... ***Paysonia densipila***
5 Siliques glabrous; styles glabrous ..... ***Paysonia lyrata***

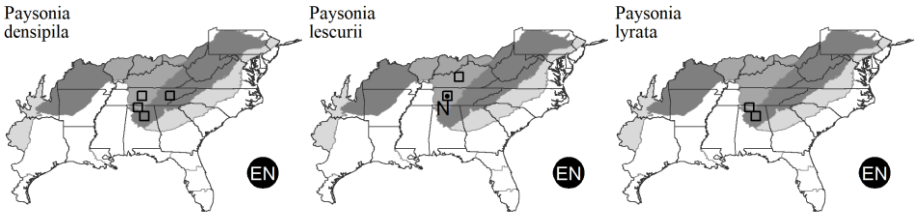
Paysonia densipila (Rollins) O'Kane & Al-Shehbaz. DUCK RIVER BLADDERPOD. **Hab:** Calcareous glades, sometimes in fields and bottomlands. **Dist:** Endemic to an area from c. TN south to n. AL. **Syn:** = FNA7, K3, K4, Tn, O'Kane & Al-Shehbaz (2002); = *Lesquerella densipila* Rollins – K1, Al-Shehbaz (1987), Rollins & Shaw (1973), Rollins (1993). NatureServe G3 (Vulnerable).

Key to Map Symbology: ←rare ←uncommon ←common (see introduction for more)

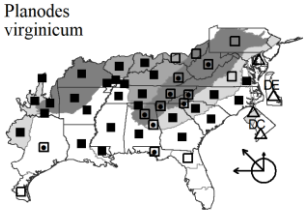
* : waif
EN : endemic
H : historic
N : no
P : planted
? : questionable
X : extirpated

Paysonia lescurii (A. Gray) O'Kane & Al-Shehbaz. LESQUEREUX'S BLADDERPOD. **Hab:** Calcareous glades, fields, bottomlands. **Dist:** Endemic to an area from sc. KY south through c. TN. Report of the species from AL appear to be in error (see Chester 2017). **Phen:** Mar-May. **Syn:** = FNA7, K3, K4, Tn, O'Kane & Al-Shehbaz (2002); = *Lesquerella lescurii* (A. Gray) S. Watson – K1, S, Al-Shehbaz (1987), Rollins & Shaw (1973), Rollins (1993). NatureServe G4 (Apparently Secure).

Paysonia lyrata (Rollins) O'Kane & Al-Shehbaz. LYRELEAF BLADDERPOD. **Hab:** Calcareous glades. **Dist:** Endemic to Colbert, Franklin, and Lawrence counties, AL. **Syn:** = FNA7, K3, K4, Tn, O'Kane & Al-Shehbaz (2002); = *Lesquerella lyrata* Rollins – K1, Al-Shehbaz (1987), Rollins & Shaw (1973), Rollins (1993). NatureServe G1 (Critically Imperiled); USESA T.



Planodes E.L. Greene 1912 (VIRGINIA-CRESS)



A genus of 2 species, of North America and Mexico. References: Al-Shehbaz (1988a); Al-Shehbaz (2010a) in FNA7 (2010); Rollins (1993).

Planodes virginicum (Linnaeus) E.L. Greene. VIRGINIA-CRESS, SIBARA. **Hab:** Disturbed areas, fields, roadsides. **Dist:** VA west to IL, IA, and KS, south to FL and TX. **Phen:** Feb-Jun. **Comm:** A native weed, presumably much more common now than formerly. **Syn:** = Ar, Fl4, FNA7, K3, Va, Rollins (1993); = *Arabis virginica* (Linnaeus) Poiret – GrPl, S; = *Planodes virginica* – Il, K4, Mo2, Tn, orthographic variant; = *Sibara virginica* (Linnaeus) Rollins – C, F, G, K1, NcTx, RAB, Tx, W, WH3, WV, Al-Shehbaz (1988a). NatureServe G5 (Secure).

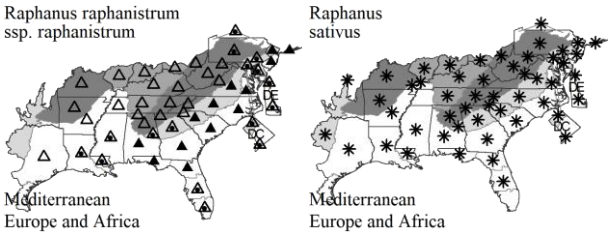
Raphanus Linnaeus 1753 (RADISH)

A genus of 3 species, herbs, of the Old World. References: Al-Shehbaz (1985b); Rollins (1993); Stace (2010); Warwick (2010e) in FNA7 (2010).

1 Siliques moniliform (constricted between the seeds), the silique body about the same diameter for most of its length, longitudinally grooved; petals usually yellow, fading white (rarely purple); seeds 4-12 per silique ..... ***Raphanus raphanistrum ssp. raphanistrum***
1 Siliques not moniliform, the silique body tapered from its widest point below the middle to the apex, smooth or slightly longitudinally grooved; petals usually purple (rarely white); seeds 1-3 (-5) per silique ..... ***Raphanus sativus***

* ***Raphanus raphanistrum*** Linnaeus *ssp. **raphanistrum***. WILD RADISH, JOINTED CHARLOCK, WHITE CHARLOCK. **Hab:** Fields, roadsides, disturbed areas. **Dist:** Native of Mediterranean Europe. **Phen:** Mar-Jun (and sporadically later). **Tax:** European authors (such as Stace 2010) recognize several infraspecific taxa in *R. raphanistrum*; North American material represents ssp. *raphanistrum*. **Syn:** = FNA7, NE, NY, Stace (2010); < *Raphanus raphanistrum* Linnaeus – Ar, C, F, Fl4, G, Il, K1, K3, K4, Mi, Mo2, Pa, RAB, Tn, Va, W, WH3, WV, Al-Shehbaz (1985b), Rollins (1993). NatureServe GNRTNR (Not Yet Ranked).

* ***Raphanus sativus*** Linnaeus. RADISH, GARDEN RADISH. **Hab:** Persistent after cultivation or as a "throw-out". **Dist:** Native of Mediterranean Europe. Cultivated for at least 5000 years. **Phen:** Apr-Jun (-Sep). **Syn:** = Ar, C, F, Fl4, FNA7, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Tx, W, WH3, WV, Al-Shehbaz (1985b), Rollins (1993), Stace (2010). NatureServe GNR (Not Yet Ranked).



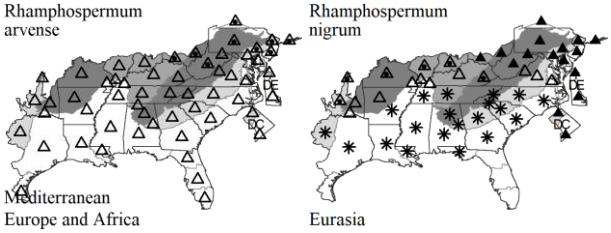
Rhamphospermum Andrzejowski ex Besser 1822

A genus of 4 species, annual herbs, of the Eurasia and n. Africa. See Al-Shehbaz (2021). References: Al-Shehbaz (1985b); Al-Shehbaz (2021); Rollins (1993); Warwick (2010g) in FNA7 (2010).

* ***Rhamphospermum arvense*** (Linnaeus) Al-Shehbaz. CHARLOCK, CRUNCHWEED, WILD MUSTARD, CORN CHARLOCK. **Hab:** Disturbed areas. **Dist:** Native of Mediterranean Europe. **Phen:** Apr-Jul. **Syn:** = Al-Shehbaz (2021); = *Sinapis arvensis* Linnaeus – Ar, C, Fl4, FNA7, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, S, Tn, WH3, Al-Shehbaz (1985b), Rollins (1993); ? *Brassica kaber* (A.P. de Candolle) L.C. Wheeler – G, GrPl, RAB, Tx; > *Brassica kaber* var. *pinnatifida* (Stokes) L.C. Wheeler – F, WV. NatureServe GNR (Not Yet Ranked).

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

* ***Rhamphospermum nigrum*** (Linnaeus) Al-Shehbaz. BLACK MUSTARD, CHARLOCK. **Hab:** Fields, disturbed areas. **Dist:** Native of Eurasia. **Phen:** May-Aug. **Comm:** The seeds of this species are one source of table mustard; other species used include *B. juncea* and *Sinapis alba*. **Syn:** = Al-Shehbaz (2021); = *Brassica nigra* (Linnaeus) W.D.J. Koch – Ar, C, F, Fl4, FNA7, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, S, Tn, Tx, Va, WH3, Al-Shehbaz (1985b), Rollins (1993). NatureServe GNR (Not Yet Ranked).



Rorippa Scopoli 1760 (YELLOW CRESS, MARSHCRESS)

A genus of about 75 species, herbs, cosmopolitan. The separation of *Nasturtium* from *Rorippa* is warranted (Al-Shehbaz & Price 1998); Franzke et al. (1998) provide corroboration based on molecular analysis. The species treated here as *R. aquatica* has been placed in several genera in recent years. References: Al-Shehbaz & Bates (1987); Al-Shehbaz (1988a); Al-Shehbaz (1988a); Al-Shehbaz (2010a) in FNA7 (2010); Les, Anderson, & Cleland (1995); Rollins (1993); Stuckey (1972).

1 Plant a submerged aquatic, rooting from lower nodes; leaves of two forms, the submerged pectinately divided, the emergent simple, sometimes lobed; fruit < 2.5× as long as wide; petals white ..... ***Rorippa aquatica***
1 Plant terrestrial or of wet places, not rooting from lower nodes; leaves of one form, pinnately lobed or simple; fruit > 2.5× as long as wide; petals yellow or pale yellow (or absent).
  2 Plant a rhizomatous, colony-forming perennial; petals (2.0-) 2.8-6.0 mm long; siliques 3-15× as long as wide. ..... ***Rorippa sylvestris***
  2 Plant a taprooted annual or biennial; petals 0-3.5 mm long; siliques either 2-9 (-10)× or 15-50× as long as wide.
    4 Flowers nearly sessile; petals absent; lower fruiting pedicels 0.5-1.5 mm long; siliques (3-) 5.4-8.5 (-10.2) mm long, (1.4-) 1.8-2.6 (-3.3) mm wide, mostly 3-5× as long as wide ..... ***Rorippa sessiliflora***
    4 Flowers clearly pedicellate; petals present (or absent in *R. dubia*); lower fruiting pedicels > 4 mm long; siliques 4-20 mm long, either 2-9 (-10)× or 15-50× as long as wide.
      5 Siliques (7-) 10-40 mm long, 15-50× as long as wide. ..... ***Rorippa indica***
      5 Siliques 2.5-12.5 (-20.4) mm long, 2-9 (-10)× as long as wide.
        7 Siliques (5.2-) 8.5-12.5 (-20.4) mm long, (4-) 6-9 (-10)× as long as wide; leaves deeply pinnatifid, the pinnae themselves toothed, lobed or dissected; seeds 0.4-0.5 mm long, 100-150 per silique ..... ***Rorippa teres***
        7 Siliques 2.5-9 mm long, 2-5× as long as wide; leaves serrate, lobed, or pinnately dissected, the pinnae (when present) merely toothed; seeds 0.5-0.9 mm long, 20-80 per silique. ..... ***Rorippa palustris ssp. palustris***

Rorippa aquatica (Eaton) E.J. Palmer & Steyermark. LAKE CRESS. **Hab:** Shallow water of swamps and lake and reservoir margins. **Dist:** VT west to MN, south to s. GA, FL, and e. TX, widely scattered and probably dispersed by waterfowl. **Phen:** May-Aug. **Comm:** See Al-Shehbaz & Bates (1987) and Les, Anderson, & Cleland (1995) for additional information on this interesting plant. Apparently most closely related to *Rorippa*, and here included in that genus. **Syn:** = Fl4, FNA7, K3, K4, Mi, NE, NY, Tn, Va; = *Armoracia aquatica* (Eaton) Wiegand – F, G, GW2; = *Armoracia lacustris* (A. Gray) Al-Shehbaz & V. Bates – C, Al-Shehbaz & Bates (1987), Rollins (1993); = *Neobeckia aquatica* (Eaton) Greene – Ar, Il, K1, S, WH3, Les, Anderson, & Cleland (1995). NatureServe G4? (Apparently Secure).

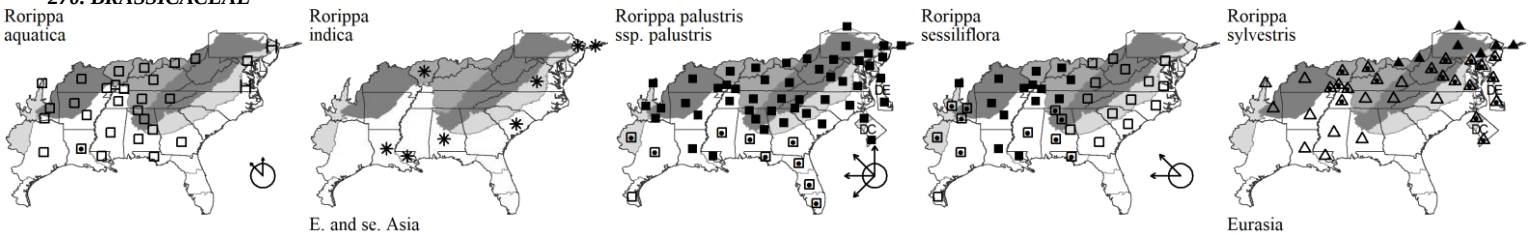
* ***Rorippa indica*** (Linnaeus) Hiern. INDIAN YELLOW-CRESS. **Hab:** River banks and bars. **Dist:** Native of se. Asia. Reported for VA (VBA, G. Fleming, pers. comm. 2009). **Comm:** {add X to synonymy}. **Syn:** = C, K3, K4, NY, Va, Stuckey (1972); = *Rorippa indica* var. *indica* – K1, Rollins (1993). NatureServe GNRTNR (Not Yet Ranked).

Rorippa palustris (Linnaeus) Besser *ssp. **palustris***. MARSHCRESS. **Hab:** Marshes, bogs, seeps. **Dist:** ME and NB west to SK, south to FL, TX, ID, and n. South America. **Phen:** May-Oct. **Syn:** = K3, K4, Mi, NY, Va, Al-Shehbaz (1988a); = *Radicula palustris* (Linnaeus) Moench – S; = *Rorippa islandica* (Oeder ex Murray) Borbás – RAB, misapplied; = *Rorippa palustris* var. *palustris* – NE; > *Rorippa islandica* var. *fernaldiana* Butters & Abbe – F, G, WV, misapplied; > *Rorippa islandica* (Oeder ex Murray) Borbás var. *islandica* – F, G, Tx, misapplied; < *Rorippa palustris* – Fl4, GW2, Pa, W, WH3; > *Rorippa palustris* ssp. *fernaldiana* (Butters & Abbe) Jonsell – K1, NcTx, Tn, Al-Shehbaz (1988a); > *Rorippa palustris* ssp. *glabra* (O.E. Schulz) R. Stuckey var. *fernaldiana* (Butters & Abbe) R. Stuckey – GrPl, Stuckey (1972); > *Rorippa palustris* ssp. *palustris* var. *palustris* – Stuckey (1972); > *Rorippa palustris* var. *fernaldiana* (Butters & Abbe) R. Stuckey – Ar, C, Il, Rollins (1993); > *Rorippa palustris* var. *palustris* – C, Il, Rollins (1993).

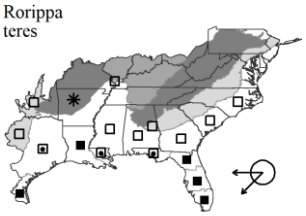
Rorippa sessiliflora (Nuttall ex Torrey & A. Gray) A.S. Hitchcock. STALKLESS MARSHCRESS. **Hab:** Wet places, marshes, swamps. **Dist:** MD, WV (Cusick 1994), OH, IN, IL, MN, and NE south to Panhandle FL, s. AL, LA, and c. TX. **Phen:** Apr-Jul. **Syn:** = Ar, C, F, Fl4, FNA7, G, GrPl, GW2, Il, K1, K3, K4, NcTx, NE, RAB, Tn, Tx, Va, W, WH3, Al-Shehbaz (1988a), Rollins (1993), Stuckey (1972); = *Radicula sessiliflora* (Nuttall ex Torrey & A. Gray) E.L. Greene – S. NatureServe G5 (Secure).

* ***Rorippa sylvestris*** (Linnaeus) Besser. CREEPING YELLOW CRESS. **Hab:** Lawns, disturbed moist to wet soils. **Dist:** Native of Eurasia. **Phen:** May-Aug. **Syn:** = Ar, C, F, FNA7, G, GrPl, GW2, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, Tn, Va, W, WV, Al-Shehbaz (1988a), Rollins (1993), Stuckey (1972); = *Radicula sylvestris* (Linnaeus) Druce – S. NatureServe G5 (Secure).

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



Rorippa teres (Michaux) R. Stuckey. SOUTHERN MARSH YELLOWCRESS. **Hab:** Cypress-gum ponds, marshes, swamps, ditches, disturbed wet areas. **Dist:** Se. NC south to s. FL, west to se. OK, sw. TX, and s. and w. Mexico (SIN). **Phen:** Mar-May. **Syn:** = C, Fl4, FNA7, Il, K1, K3, K4, NcTx, Tx, WH3; = *Radicula walteri* (Elliott) E.L. Greene – S; = *Rorippa walteri* – RAB; > *Rorippa teres* var. *teres* – Ar, GW2, Al-Shehbaz (1988a), Rollins (1993), Stuckey (1972). NatureServe G5 (Secure).

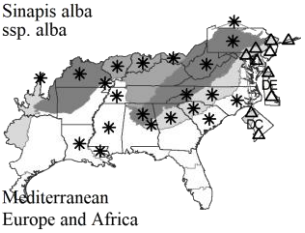


Sinapis Linnaeus 1753 (MUSTARD)

A genus of ca. 6 species, herbs, of s. Europe. References: Al-Shehbaz (1985b); Al-Shehbaz (2021); Rollins (1993); Warwick (2010g) in FNA7 (2010).

1 Beak of silique strongly compressed; silique densely covered with long, stiff trichomes, ca. 4 mm in diameter; pedicels slender, mostly at right angles to the rachis; seeds 4-8 per silique; [section *Sinapis*] ..... ***Sinapis alba ssp. alba***
1 Beak of silique conical; silique glabrous or nearly so, ca. 2 mm in diameter; pedicels thick, erect to spreading; seeds 7-13 per silique; [section *Ceratosinapis*] ..... ***Rhamphospermum arvense***

* ***Sinapis alba*** Linnaeus *ssp. alba*. WHITE MUSTARD, YELLOW MUSTARD, WHITE CHARLOCK. **Hab:** Disturbed areas. **Dist:** Native of Mediterranean Europe. **Phen:** Apr-Jun. **Comm:** The seeds of this species are one source of table mustard; other species used include *Brassica juncea* and *B. nigra*. **Syn:** = FNA7; = *Sinapis alba* Linnaeus – Al-Shehbaz (1985b), Rollins (1993); ? *Brassica hirta* – F, G, GrPl, RAB, Tx, WV; < *Sinapis alba* Linnaeus – C, Il, K1, K3, K4, Mi, NcTx, NE, Pa, S. NatureServe GNRTNR (Not Yet Ranked).



Sisymbrium Linnaeus 1753 (JIM HILL MUSTARD)

A genus of about 41 species, herbs, mainly northern hemisphere. References: Al-Shehbaz (1986b); Al-Shehbaz (1988a); Al-Shehbaz (2010a) in FNA7 (2010); Rollins (1993).

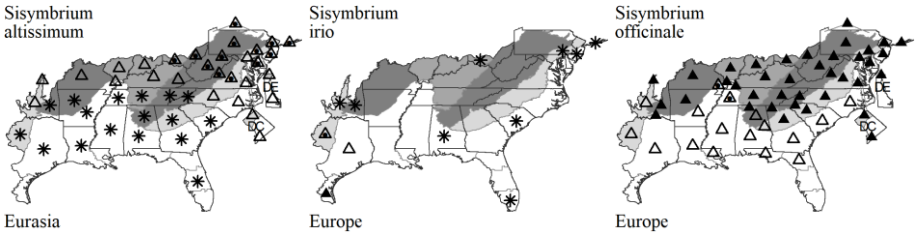
Unkeyed taxa: *Sisymbrium irio*

1 Silique linear, 5-10 cm long; spreading from the rachis; pedicels 5-20 mm long; petals 6-8 mm long ..... ***Sisymbrium altissimum***
1 Silique subulate, 0.8-1.5 cm long, appressed to the rachis; pedicels 1-3 mm long; petals 3-4 mm long ..... ***Sisymbrium officinale***

* ***Sisymbrium altissimum*** Linnaeus. TUMBLE MUSTARD, JIM HILL MUSTARD, TALL HEDGE-MUSTARD. **Hab:** Fields, disturbed areas. **Dist:** Native of Eurasia. **Phen:** May-Jun (-Aug). **Syn:** = Ar, C, F, Fl4, FNA7, G, GrPl, Il, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, W, WH3, WV, Al-Shehbaz (1986b), Rollins (1993); = *Norta altissima* (Linnaeus) Britton – S. NatureServe GNR (Not Yet Ranked).

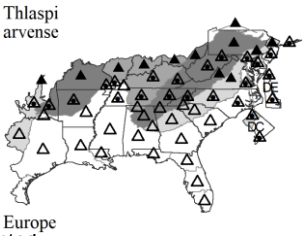
* ***Sisymbrium irio*** Linnaeus. LONDON-ROCKET. **Hab:** Fields, roadsides, other disturbed areas; eastwards in our region only as a waif, as around wool-combing mills in Coastal Plain of SC, on ballast, and in other disturbed areas. **Dist:** Native of Europe. **Phen:** Dec-Jun. **Tax:** For further information and keys, see Rollins (1993) and Al-Shehbaz (1986b). **Syn:** = C, F, Fl4, FNA7, G, GrPl, K1, K3, K4, Mi, NcTx, NE, NY, Tx, WH3, Al-Shehbaz (1986b), Rollins (1993). NatureServe GNR (Not Yet Ranked).

* ***Sisymbrium officinale*** (Linnaeus) Scopoli. HEDGE MUSTARD. **Hab:** Fields, pastures, barnyards, disturbed areas. **Dist:** Native of Europe. **Phen:** May-Nov. **Syn:** = Ar, C, Fl4, FNA7, K1, K3, K4, Mi, NcTx, NE, NY, Pa, Tn, Tx, Va, WH3, Al-Shehbaz (1986b), Rollins (1993); = *Erysimum officinale* Linnaeus – S; > *Sisymbrium officinale* var. *leiocarpum* A.P. de Candolle – F, G, GrPl, Il, RAB, W, WV; > *Sisymbrium officinale* var. *officinale* – F, G, GrPl, Il, RAB, W, WV.



Thlaspi Linnaeus 1753 (PENNYCRESS)

A genus of about 6 species, as much more narrowly circumscribed, annual herbs, native to Eurasia and n. Africa. Mummenhoff & Koch (1994), Meyer (1973, 1979), Koch & Al-Shehbaz (2004), and Al-Shehbaz (2014) discuss



Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable

the reasons for separating *Noccaea* from *Thlaspi*; they are now additionally treated in separate tribes. References: Al-Shehbaz (1986a); Al-Shehbaz (2010a) in FNA7 (2010); Esmailbegi et al (2018); Rollins (1993).

* ***Thlaspi arvense*** Linnaeus. FIELD PENNYCRESS, FRENCHWEED. **Hab:** Fields, disturbed areas. **Dist:** Native of Europe. **Phen:** Mar-Jun (-Sep); Apr-Jul (-Oct). **Syn:** = C, F, Fl4, FNA7, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Tx, Va, W, WH3, WV, Al-Shehbaz (1986a), Rollins (1993). NatureServe GNR (Not Yet Ranked).

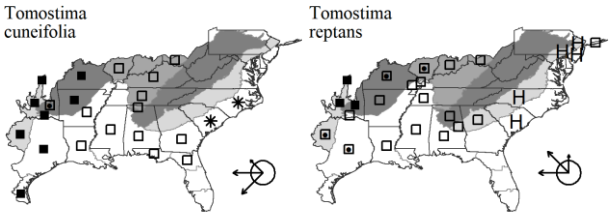
Tomostima Rafinesque 1825 (DRABA)

A genus of 6 species, annual herbs, of North America south into Mexico and disjunct in South America. This genus has been segregated from *Draba* on molecular and morphological grounds (Jordon-Thaden et al. 2010; Al-Shehbaz 2012). References: Al-Shehbaz (1987); Al-Shehbaz (2012a); Al-Shehbaz, Windham, & Elven (2010) in FNA7 (2010); Jordon-Thaden et al (2010); Koch & Al-Shehbaz (2002); Rollins (1993).

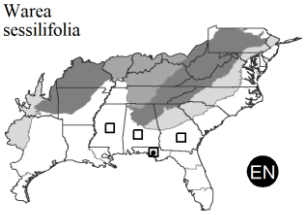
1 Inflorescence congested, the fruiting portion ca. 1.5 cm long; trichomes of the upper leaf surface simple or once-forked; pedicels glabrous (rarely with a few scattered trichomes)..... ***Tomostima reptans***
1 Inflorescence not congested, the fruiting portion mostly > 2.5 cm long; trichomes of the upper leaf surface dendritic; pedicels densely pubescent. ..... ***Tomostima cuneifolia***

Tomostima cuneifolia (Nuttall ex Torrey & A. Gray) Al-Shehbaz, M. Koch, & Jordon-Thaden. WEDGELEAF DRABA. **Hab:** Calcareous barrens and glades, open blackland prairies, preferring rocky, bare soil, limestone outcrops, also waste areas around wool-combing mills, possibly other habitats. **Dist:** IL south to LA, west to UT, NV, CA, and Mexico (BCN, BCS, CHH, COA, NLE, SON); scattered eastwards as apparently native disjuncts in OH, KY, TN, GA, AL, MS, and FL, and also as an occasional weed in NC and SC and perhaps other states. **Phen:** Feb-Apr; Mar-May. **Comm:** The species extends as a native at least as far east as c. GA (Houston County) (Echols 2007) and AL, where it occurs in prairies and on limestone outcrops (Diamond & Woods 2009). Taxa previously treated as additional varieties are now considered to be separate species. **Syn:** = K4, Al-Shehbaz (2012a); = *Draba cuneifolia* Nuttall ex Torrey & A. Gray var. *cuneifolia* – Ar, FNA7, Il, K1, K3, Tx, Al-Shehbaz (1987), Rollins (1993); < *Draba cuneifolia* – C, F, Fl4, G, GrPl, NcTx, RAB, S, Tn, WH3. NatureServe G5T5 (Secure).

Tomostima reptans (Lamarck) Al-Shehbaz, M. Koch, & Jordon-Thaden. CAROLINA DRABA. **Hab:** Dry soil. **Dist:** MA and ON west to WA, south to NC, GA, TX and CA. **Phen:** Feb-Mar; Mar-Apr. **Comm:** The few occurrences in the eastern part of our area seem to make little ecological or phytogeographic sense; they may represent introductions. The first collection in our area was, however, by Walter. **Syn:** = K4, NY, Al-Shehbaz (2012a); = *Draba reptans* (Lamarck) Fernald – Ar, FNA7, K1, K3, Mi, NcTx, NE, Pa, RAB, Al-Shehbaz (1987), Rollins (1993); > *Draba caroliniana* Walter – S; > *Draba reptans* var. *micrantha* (Nuttall) Fernald – Tx; > *Draba reptans* var. *reptans* – C, F, G, GrPl, Il, Tx. NatureServe G5 (Secure).



Warea Nuttall 1834 (WAREA, PINELAND-CRESS)



A genus of 4 species, annual herbs, of se. North America. The genus is endemic to se. United States Coastal Plain. This is the only genus of tribe *Thelypodieae* in our area. References: Al-Shehbaz (1985a); Al-Shehbaz (2010a) in FNA7 (2010); Channell & James (964); Rollins (1993).

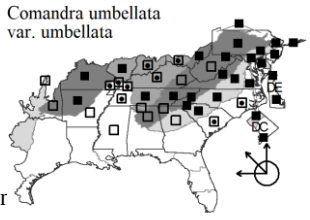
Identification Notes: *Warea* (Brassicaceae) and *Polanisia* (Cleomaceae) are superficially similar. The genus is quite showy and conspicuous, reminiscent of a small *Cleome* because of its white to pink, clawed petals and silique borne on a long gynophore.

Warea sessilifolia Nash. SESSILE-LEAF WAREA, SESSILE-LEAF PINELAND-CRESS. **Hab:** Longleaf pine sandhills. **Dist:** Panhandle FL and adjacent AL (Pike County) and wc. GA (Stewart County) (Sorrie 1998b). **Phen:** Aug-Sep. **Syn:** = Fl4, FNA7, K3, K4, S, WH3, Al-Shehbaz (1985a), Rollins (1993). NatureServe G2G4 (Vulnerable).

276a. COMANDRACEAE Nickrent & Der 2010 (COMANDRA FAMILY) [in SANTALALES]

A family of 2 genera and 2-4 species, herbs or weak shrubs, of North America and Eurasia. References: Nickrent (2016g) in FNA12 (2016); Nickrent et al (2010).

Comandra Nuttall 1818 (COMANDRA, BASTARD-TOADFLAX)



A genus of 2 species, hemiparasitic perennial herbs, of North America and Europe. *Comandra* is placed in the segregate family Comandraceae by Nickrent et al. (2010). References: Nickrent (2016g) in FNA12 (2016); Piehl (1965).

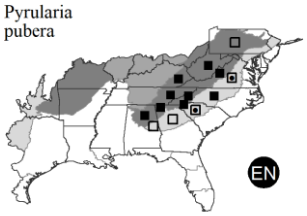
Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : plar ? : que

Comandra umbellata (Linnaeus) Nuttall *var*. ***umbellata***. EASTERN COMANDRA, EASTERN BASTARD-TOADFLAX, STAR-TOADFLAX. **Hab:** Dry forests and woodlands, woodland borders, glades, usually in acidic soils and most common in oak/heath forests. **Dist:** Var. *umbellata* ranges from ME to e. ND, south to SC, n. GA, n. AL, n. MS, s. AR, e. OK, and c. KS. **Phen:** Apr-Jul; Jul-Aug. **Tax:** Other varieties are western or (allegedly) of the Balkan region of Europe. These taxa are sometimes treated at specific or subspecific rank (see synonymy). **Syn:** = C, Va; = *Comandra umbellata* ssp. *umbellata* – Ar, FNA12, GrPl, K1, K3, NE, NY, Piehl (1965); > *Comandra richardsiana* – F, G; < *Comandra umbellata* – Il, Mi, Pa, RAB, S, Tn, W, WV; > *Comandra umbellata* – F, G. NatureServe G5T5 (Secure).

276c. CERVANTESIACEAE Nickrent & Der 2010 (BUFFALO NUT FAMILY) [in SANTALALES]

A family of 8 genera and about 20 species, shrubs (rarely trees), of e. United States, South America, Asia, and Africa. References: Nickrent (2016a) in FNA12 (2016); Zhou et al (2019).

Pyrularia Michaux 1803 (BUFFALO-NUT)



A genus of 5 species, hemiparasitic shrubs, of e. North America and e. Asia (the other 4 species are of e. Asia). *Pyrularia* is placed in the segregate family Cervantesiaceae by Nickrent et al. (2010), but is sometimes treated in a more broadly-conceived Santalaceae. References: Nickrent (2016a) in FNA12 (2016); Zhou et al (2019).

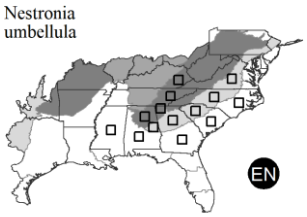
Pyrularia pubera Michaux. BUFFALO-NUT, OIL-NUT. **Hab:** Mesic to dry forests, over a wide range of substrates. **Dist:** A Southern and Central Appalachian endemic, *P. pubera* ranges from sw. PA (Rhoads & Block 2007), e. WV, and w. VA south and west to e. KY, w. NC, e. TN, and n. and wc. GA. **Phen:** Apr-May; Jul-Oct. **Comm:** The oil in the fruits is very poisonous. *Pyrularia pubera* forms parasitic root connections with numerous trees, shrubs, and herbs with which it grows. **Syn:** = C, F, FNA12, G, K1, K3, NY, Pa, RAB, S, Tn, Va, W, WV, Zhou et al (2019). NatureServe G5 (Secure).

276d. SANTALACEAE R. Brown 1810 (SANDALWOOD FAMILY) [in SANTALALES]

A family of about 11 genera and 67 species, trees and shrubs, primarily of tropical and warm temperate regions of the Old World and New World. All members of the family are hemiparasitic, attaching to the stems or roots of other plants. References: Nickrent & Malécot (2001); Nickrent (2016c) in FNA12 (2016); Nickrent et al (2010).

1 Leaves alternate; monoecious herb or shrub.
  2 Herb, < 2 (-3) dm tall; leaves 1-4 cm long, glabrous; inflorescence a terminal panicle of cymes; [tribe *Comandreae* or family *COMANDRACEAE]* ..... ***Comandra***
  2 Shrub, > 4 dm tall; leaves 5-15 cm long, pubescent; inflorescence a terminal raceme; [tribe *Pyrularieae* or family *CERVANTESIACEAE*] ..... ***Pyrularia pubera***
1 Leaves opposite; dioecious shrubs.
  3 Aerial (epiphytic) shrubs, parasitic on tree trunks and branches; leaves either coriaceous and brittle when live, or minute and scale-like; [tribe *Visceae* or family *VISCACEAE*]
  ..... ***Phoradendron***
  3 Terrestrial shrubs, parasitic via root connections; leaves herbaceous, flexible when live.
  ..... ***Nestronia umbellula***

Nestronia Rafinesque 1836 [1838] (NESTRONIA)



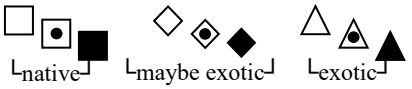
A monotypic genus, a hemiparasitic shrub, endemic to se. United States. *Nestronia* is placed in a much more narrowly circumscribed Santalaceae by Nickrent et al. (2010) and Nickrent in FNA (2016). References: Libby & Bloom (1998); Nickrent (2016c) in FNA12 (2016); Sowers (1979).

Identification Notes: In its clonal, usually knee-high growth, *Nestronia* has something of the aspect of an opposite-leaved lowbush blueberry.

Nestronia umbellula Rafinesque. NESTRONIA, CONJURER'S-NUT, LEECHBRUSH, INDIAN-OLIVE. **Hab:** Relatively mesic sites in sandhills in the upper Coastal Plain, mesic to dry Piedmont and montane oak forests. **Dist:** Sc. VA south and west to sc. GA, se. AL, nc. AL, and sc. TN; disjunct in sc. KY. **Phen:** Apr-Jun; Jul-early Sep. **Comm:** See Sowers (1979) and Libby & Bloom (1998) for interesting discussions of the biology of the species and county distribution maps. It sometimes forms colonies (presumably clones) several hectares in size. **Syn:** = C, F, FNA12, G, K1, K3, K4, RAB, S, Tn, Va, W, Libby & Bloom (1998), Sowers (1979). NatureServe G4 (Apparently Secure).

281. TAMARICACEAE Link 1821 (TAMARISK FAMILY) [in CARYOPHYLLALES]

A family of about 4 genera and 80 species, shrubs and trees, of Eurasia and Africa (especially from the Mediterranean to c. Asia). References: Crins (1989b); Gaskin in Kubitzki & Bayer (2003); Gaskin (2015) in FNA6 (2015); Gaskin et al (2004).

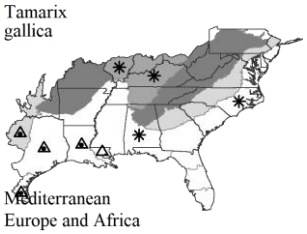
Key to Map Symbology: 

* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable

X : extirpated

Tamarix Linnaeus 1753 (TAMARISK, SALT-CEDAR)



A genus of about 55 species, trees and shrubs, native of Eurasia and Africa. References: Baum (1978); Crins (1989b); Gaskin (2015) in FNA6 (2015).

Identification Notes: An important character is the staminal disk; three terms are used. In hololophic disks, the lobe between each stamen is obvious and separate from the stamens on either side, and each is usually 2-lobed. In paralophic disks, each lobe is deeply bipartite, and each half-lobe is fused to the base of the adjacent stamen, but is still somewhat distinct from it. In synlophic disks, the lobes are also deeply bipartite, but each half-lobe is fused confluently with the stamen base, giving the appearance that the filament has swollen base.

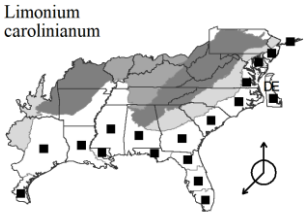
* ***Tamarix gallica*** Linnaeus. FRENCH TAMARISK. **Hab:** Brackish marshes. **Dist:** Native of the w. Mediterranean region of Europe. Most reports of this taxon from the Southeast represent misidentifications or a very broad interpretation of the species. **Phen:** Apr-Jul. **Syn:** = F, FNA6, G, K1, K4, NcTx, Baum (1978), Crins (1989b); < *Tamarix gallica* Linnaeus – K4, RAB, S.

282. PLUMBAGINACEAE A.L. de Jussieu 1789 (LEADWORT FAMILY) [in CARYOPHYLLALES]

A family of about 24-27 genera and 650-775 species, shrubs, vines, and herbs, of cosmopolitan distribution. Lledó et al. (1998) and other authors suggest that the portion of the Plumbaginaceae often recognized as tribe Staticeae or subfamily Staticoideae (which includes *Limonium*) would be better treated as a distinct family. References: Kubitzki, Rohwer, & Bittrich (1993); Lledó et al (1998); Morin (2005) in FNA5 (2005).

Limonium P. Miller 1754 (SEA-LAVENDER)

A genus of about 350 species, dwarf shrubs, perennial and annual herbs, of cosmopolitan distribution. References: Kubitzki, Rohwer, & Bittrich (1993); Luteyn (1976); Smith (2005a) in FNA5 (2005).



Limonium carolinianum (Walter) Britton. CAROLINA SEA-LAVENDER, SEASIDE THRIFT, INKROOT, MARSH ROSEMARY. **Hab:** Tidal marshes, especially in hypersaline flats. **Dist:** Along the coast from NL (Labrador) south to s. FL, west to TX and ne. Mexico. **Phen:** Aug-Oct. **Tax:** Various treatments recognize from 1 to 4 taxa in our area. The most recent monographer of the genus in our region, Luteyn (1976), recognized only a polymorphic *L. carolinianum* – a treatment followed by most flora authors since. Although Godfrey & Wooten (1981) followed Luteyn's treatment, they stated "we are not at all confident that Luteyn's treatment is a reasonable one." Modern study is needed. **Comm:** The flowering stems of this species are sometimes gathered in large quantities for dried floral arrangements. Herbalists gather the roots in winter to brew a tea as a remedy for colds, fever, and diarrhea. **Syn:** = C, Fl4, FNA5, GW2, K1, K3, K4, NE, NY, Va, WH3, Luteyn (1976); > *Limonium angustatum* (A. Gray) Small – S; > *Limonium carolinianum* (Walter) Britton – F, S; > *Limonium carolinianum* var. *angustatum* (A. Gray) Blake – G; > *Limonium carolinianum* var. *carolinianum* – G, RAB; > *Limonium carolinianum* var. *obtusilobum* (Blake) H.E. Ahles – RAB; > *Limonium nashii* Small – F, S; > *Limonium nashii* Small var. *angustatum* (A. Gray) H.E. Ahles – RAB, Tx; > *Limonium nashii* Small var. *nashii* – G, RAB, Tx; > *Limonium obtusilobum* Blake – S.

283. POLYGONACEAE A.L. de Jussieu 1789 (SMARTWEED FAMILY) [in CARYOPHYLLALES]

A family of about 43-48 genera and 1100-1200 species, trees, shrubs, vines, and herbs, cosmopolitan, but especially north temperate. Recent changes in the circumscription of various genera (including *Polygonum*, *Persicaria*, *Fallopia*, etc.) have received strong support from molecular phylogenetic studies (Kim & Donoghue 2008; Lamb Frye & Kron 2003; Schuster, Reveal, & Kron 2011). References: Brandbyge in Kubitzki, Rohwer, & Bittrich (1993); Freeman & Reveal in FNA5 (2005); Horton (1972); Kim & Donoghue (2008); Lamb Frye & Kron (2003); Mitchell & Dean (1978); Ronse De Craene & Akeroyd (1988); Schuster et al (2015); Schuster, Reveal, & Kron (2011); Schuster, Wilson, & Kron (2011); Yurtseva et al (2016).

1 Woody vine, climbing by tendrils; [subfamily Polygonoideae, tribe Coccolobeae].
  2 Leaf base deeply cordate ..... ***Antigonon***
  2 Leaf base truncate to broadly cuneate ..... ***Brunnichia***
1 Herb (sometimes very robust and rather woody), herbaceous vine, tree or shrub (*Coccoloba*), or (*Fallopia baldschuanica*) a somewhat woody vine lacking tendrils.
  5 Stem leaves (in our species) whorled; flowers in involucrate heads; ocreae absent; stamens 9; leaves densely white-tomentose on the lower surface; [of xeric situations of shale barrens and sandhills]; [subfamily Eriogonoideae, tribe Eriogoneae] ..... ***Eriogonum***
  5 Stem leaves alternate; flowers in various inflorescences (not involucrate); ocreae present; stamens (3-) 5-8 (-9); leaves glabrous or variously pubescent, but not densely white-tomentose; [of various habitats, including xeric ones]; [subfamily Polygonoideae].
    6 Tepals 6, in 2 series of 3 each; plants with leaves basally disposed, the largest basal (these withering in some species later in the season); [tribe Rumiceae]. ..... ***Rumex***
    6 Tepals mostly 5 in a single whorl; plants with leaves along the stem, lacking well-developed basal leaves.
      9 Flowers in small clusters or very reduced racemes of 1-5 flowers, borne in the axils of normally sized or reduced leaves; plants erect or sprawling herbs with stems < 1 m long, from taproots; leaves jointed at base; [tribe Polygoneae].
        10 Stems with 4 obscure ribs or angles (or lacking apparent ribs); leaf venation parallel, with inconspicuous secondary veins, longitudinally plicate; anthers pink-purple ..... ***Duravia***
        10 Stems with 8-16 distinct ribs; leaf venation pinnate, the secondary veins apparent; anthers whitish yellow ..... ***Polygonum***
      9 Flowers in diffuse axillary panicles, or in terminal or long-peduncled axillary racemes, corymbs, or heads; plants various, either erect or sprawling herbs, or erect, robust, and suffrutescent herbs, or climbing herbaceous or suffrutescent vines, or suffrutescent bushy herbs; leaves not jointed at base (except *Polygonella*).

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

11 Leaves cuneate at the base, either linear, spatular, or oblanceolate, mostly < 4 cm long and < 5 mm wide; leaves jointed at the base; pedicels jointed at the base; [tribe Polygoneae]..... ***Polygonella***

11 Leaves cuneate, cordate, or hastate at the base, either lanceolate or ovate, mostly > 5 cm long and > 8 mm wide; leaves not jointed at the base; pedicels not jointed at the base.

12 Inflorescence corymbiform, terminal; achenes strongly exserted at maturity; tepals almost free, horizontally spreading, white, 3-4 mm long; [erect annual, uncommonly cultivated and rarely persistent or escaped]; [tribe *Persicarieae*]..... ***Fagopyrum***

12 Inflorescence paniculate, racemiform, or headlike, terminal and axillary; achenes enclosed in the perianth at maturity; tepals fused for much of their length, ascending, pink, green, or white.

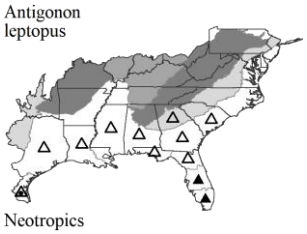
13 Outer tepals neither keeled nor winged at maturity; inflorescence of spikelike racemes, heads, or sparse, interrupted racemes; [tribe *Persicarieae*] ..... ***Persicaria***

13 Outer tepals keeled or winged at maturity; inflorescence a compound panicle of racemes; [tribe *Polygoneae*].

14 Plants climbing or sprawling, herbaceous to somewhat woody, the stems slender; perianth usually not enlarging in fruit; stigma capitate or peltate..... ***Fallopia***

14 Plants erect, robust (1-4 m tall), woody, the stems generally over 1 cm in diameter, hollow; perianth enlarging in fruit; stigma fimbriate ..... ***Reynoutria***

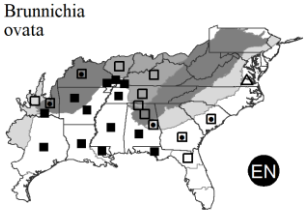
Antigonon Endlicher 1837 (LOVE-CHAIN, CORALVINE, CORALLITA)



A genus of about 6 species, vines, of tropical America. References: Freeman (2005a) in FNA5 (2005).

* ***Antigonon leptopus*** Hooker & Arnott. LOVE-CHAIN, QUEEN'S-JEWELS, CONFEDERATE-VINE, CORALLITA, CORALLINA, CORALVINE, TALLAHASSEE-VINE, ROSA DE MONTANA, COAMECATL. **Hab:** Cultivated and persisting; commonly cultivated, rarely persisting or escaping. **Dist:** Native of tropical America. **Phen:** Jun-Oct. **Syn:** = Bah, Fl4, FNA5, K1, K3, K4, NcTx, Tx, WH3, WI; = *Corculum leptopus* (Hooker & Arnott) Stuntz – S. NatureServe GNR (Not Yet Ranked).

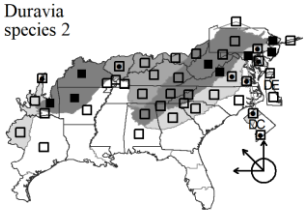
Brunnichia Banks ex Gaertner 1788 (BUCKWHEAT-VINE)



A genus of 3-4 species, vines, of. e. North America and w. Africa. References: Brandbyge in Kubitzki, Rohwer, & Bittrich (1993); Holmes (2005) in FNA5 (2005).

Brunnichia ovata (Walter) Shinners. BUCKWHEAT-VINE, EARDROP-VINE, LADIES'-EARDROPS, REDVINE. **Hab:** Floodplain forests, swamp forests. **Dist:** Ne. SC south to n. FL, west to e. TX, and north in the interior to w. TN, w. KY, s. IL, and se. MO. **Phen:** May-Jul; Aug-Sep. **Comm:** Introduced in se. VA. **Syn:** = Ar, Fl4, FNA5, GW2, Il, K1, K3, K4, NcTx, Tn, Tx, WH3, WI; = *Brunnichia cirrhosa* Gaertner – C, F, F, RAB, S. NatureServe G4G5 (Apparently Secure).

Duravia (S. Watson) Greene 1904 (KNOTWEED)



A genus of about 20 species, shrubs, subshrubs, and annual herbs, of western North America (with one species in e. North America). References: Brandbyge in Kubitzki, Rohwer, & Bittrich (1993).; Costea & Tardif (2003a); Costea, Tardif, & Hinds (2005f) in FNA5 (2005); Ronse De Craene, Hong, & Smets (2004).

Duravia species 2. GLADE KNOTWEED, SLENDER KNOTWEED. **Hab:** Glades, barrens, and thin, rocky soils, over various rock types (including granite, diabase, amphibolite, greenstone, metagabbro, and shale), also in dry sands. **Dist:** ME, ON, MN, SD, WY, south to GA, AL, MS, LA, TX. **Phen:** Jul-Oct; Aug-Nov. **Syn:** = *Polygonum tenue* Michaux – Ar, C, FNA5, GrPl, Il, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WV, Horton (1972), Mitchell & Dean (1978); > *Polygonum tenue* var. *protrusum* Fernald – F, G, K1; > *Polygonum tenue* var. *tenue* – F, G, K1.

Eriogonum Michaux 1803 (WILD-BUCKWHEAT)

A genus of about 250 species, herbs and shrubs, of w. North America (a few in se. North America). Like *Astragalus*, it is represented in e. North America by a few species restricted to unusually dry habitats. References: Brandbyge in Kubitzki, Rohwer, & Bittrich (1993); Goodman (1947); Nesom (2002a); Reveal (1989); Reveal (2004); Reveal (2005) in FNA5 (2005).

1 Cauline leaves whorled; basal leaves persistent at flowering. ..... ***Eriogonum tomentosum***

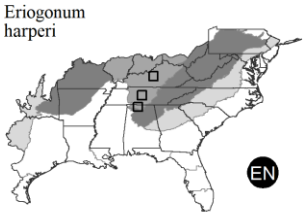
1 Cauline leaves alternate; basal leaves either persistent, or absent or withering at flowering;[subgenus *Eriogonum*]. ..... ***Eriogonum harperi***

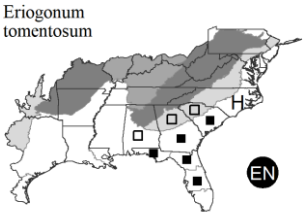
Eriogonum harperi Goodman. HARPER'S WILD-BUCKWHEAT. **Hab:** Limestone glades and barrens. **Dist:** Endemic of sc. KY, nc. TN, and n. AL. **Comm:** See Goodman (1947) for additional information. **Syn:** = Tn, Goodman (1947); = *Eriogonum longifolium* Nuttall var. *harperi* (Goodman) Reveal – C, FNA5, K3, K4, Horton (1972), Reveal (1989), Reveal (2004). NatureServe G4T2 (Imperiled).

Eriogonum tomentosum Michaux. SANDHILL WILD-BUCKWHEAT, SOUTHERN WILD-BUCKWHEAT, DOG-TONGUE. **Hab:** Longleaf pine sandhills, usually in white sand, primarily in the fall-line Sandhills and on riverine dunes in the middle and upper Coastal Plain. **Dist:** S. NC (at least formerly) south to c. peninsular FL, west to s. AL. There seems no reason to doubt the label data of an 1890's Biltmore Herbarium collection from Bladen

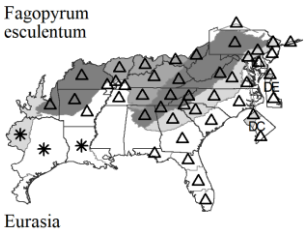
Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

County, NC (Pittillo, Horton, & Herman 1972), as *E. tomentosum* is fairly common not far away in SC; the species has apparently not been seen in NC since. **Phen:** Late Jul-Sep; Sep-Nov. **Syn:** = Fl4, FNA5, K3, K4, RAB, S, WH3, Horton (1972), Reveal (1989), Reveal (2004). NatureServe G4G5 (Apparently Secure).





Fagopyrum P. Miller 1754 (BUCKWHEAT)



A genus of about 8-16 species, perennial and annual herbs, of e. Asia and Africa. The Latin and common name both refer to the similarity of the seeds to beechnuts. References: Brandbyge in Kubitzki, Rohwer, & Bittrich (1993); Hinds & Freeman (2005a) in FNA5 (2005).

* ***Fagopyrum esculentum*** Moench. BUCKWHEAT. **Hab:** Fields, disturbed areas, railroad rights-of-way, escaped from cultivation. **Dist:** Native of Eurasia. **Phen:** Jun-Nov. **Syn:** = Bah, C, FNA5, G, GrPl, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, Tn, Va, W, WH3, WI, WV; = *Fagopyrum sagittatum* Gilibert – F. NatureServe GNR (Not Yet Ranked).

Fallopia Adanson 1763 (CLIMBING BUCKWHEAT)

A genus of about 9-10 species, woody and herbaceous vines, of temperate regions of the Northern Hemisphere. If accepted (as here) as a genus distinct from *Polygonum*, this group takes the name *Fallopia* Adanson (1763), which has priority over *Tiniaria* (1832) and *Bilderdykia* (1827). *Reynoutria* is sometimes included. References: Brandbyge in Kubitzki, Rohwer, & Bittrich (1993); Freeman & Hinds (2005) in FNA5 (2005); Ronse De Craene & Akeroyd (1988).

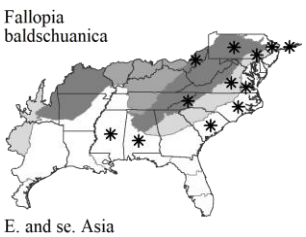
1 Plant woody; inflorescences freely branched, strongly paniculate; [sometimes cultivated, apparently naturalizing]..... ***Fallopia baldschuanica***
1 Plant herbaceous; inflorescences less-branched, usually a reduced panicle with only a few racemose branches; [collectively common and in various natural and disturbed habitats].
  3 Achene dull black; outer sepals keeled, not expanding into obvious wings in fruit, the fruit therefore 3.5-4.5 mm long (measured from the pedicel joint to the tip); [weedy annual]..... ***Fallopia convolvulus***
  3 Achene glossy black; outer sepals expanding into obvious wings in fruit, the fruit therefore 7-15 mm long (measured from the pedicel joint to the tip); [native perennial or weedy annual].
    5 Perianth 7-10 mm long at maturity (measured from the pedicel joint to the tip); achenes 2-3.5 mm long..... ***Fallopia cristata***
    5 Perianth 10-15 mm long at maturity (measured from the pedicel joint to the tip); achenes 3.5-6 mm long..... ***Fallopia scandens***

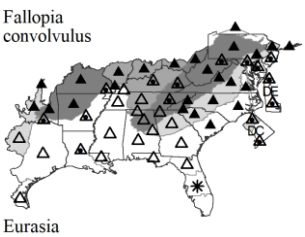
* ***Fallopia baldschuanica*** (Regel) Holub. SILVER-LACE-VINE, CHINA FLEECE-VINE. **Hab:** Disturbed areas, roadsides. **Dist:** Native of Asia. **Syn:** = FNA5, K3, K4, NE, NY, Pa; > *Fallopia aubertii* (Henry) Holub – Ronse De Craene & Akeroyd (1988); > *Polygonum aubertii* Henry – C, F, K1.

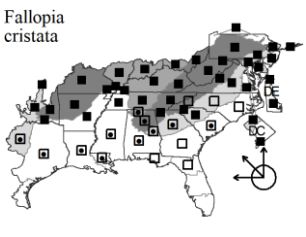
* ***Fallopia convolvulus*** (Linnaeus) Á. Löve. BINDWEED, CLIMBING BUCKWHEAT, BLACK BINDWEED, NIMBLE-WILL. **Hab:** Disturbed areas. **Dist:** Native of Eurasia. **Phen:** May-Nov. **Syn:** = Ar, Fl4, FNA5, GrPl, Il, K3, K4, Mi, NE, NY, Pa, Tn, Tx, Va, Ronse De Craene & Akeroyd (1988); = *Bilderdykia convolvulus* (Linnaeus) Dumortier – S; = *Polygonum convolvulus* – GW2, NcTx, RAB, W, WH3, WV, Horton (1972), Mitchell & Dean (1978); > *Polygonum convolvulus* Linnaeus var. *convolvulus* – C, F, K1; > *Polygonum convolvulus* var. *subulatum* Lejeune & Courtois – K1. NatureServe GNR (Not Yet Ranked).

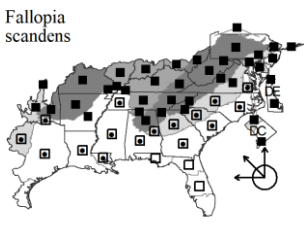
Fallopia cristata (Engelmann & A. Gray) Holub. CRESTED CLIMBING BUCKWHEAT. **Hab:** Moist to wet open habitats. **Dist:** MA, NY, IN, IL, MN, south to c. peninsular FL and TX. **Phen:** Jul-Oct. **Syn:** = Il, NE, NY, Va; = *Bilderdykia cristata* (Engelmann & A. Gray) Greene – S; = *Polygonum cristatum* Engelmann & A. Gray – F, Tx, WV; = *Polygonum scandens* Linnaeus var. *cristatum* (Engelmann & A. Gray) Gleason – C, GW2, K1, NcTx, Mitchell & Dean (1978); < *Fallopia scandens* (Linnaeus) Holub – K3, K4, Tn, Ronse De Craene & Akeroyd (1988); < *Polygonum scandens* – WH3, Horton (1972); < *Polygonum scandens* Linnaeus var. *cristatum* (Engelmann & A. Gray) Gleason – RAB.

Fallopia scandens (Linnaeus) Holub. COMMON CLIMBING BUCKWHEAT. **Hab:** Moist to wet open habitats. **Dist:** NS, ON and MB, south to Panhandle FL and TX. **Phen:** Jul-Oct. **Syn:** = Ar, FNA5, Il, Mi, NE, NY, Pa, Va; = *Bilderdykia scandens* (Linnaeus) Greene – S; = *Polygonum scandens* Linnaeus var. *scandens* – C, GrPl, GW2, K1, RAB, Mitchell & Dean (1978); < *Fallopia scandens* (Linnaeus) Holub – K3, Tn, Ronse De Craene & Akeroyd (1988); < *Polygonum scandens* – F, Tx, W, WH3, WV, Horton (1972).









Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Persicaria P. Miller 1754 (SMARTWEED, TEARTHUMB, JUMPSEED)

A genus of about 150 species, herbs, nearly cosmopolitan (primarily temperate Northern Hemisphere). The sections are well-marked morphologically and in molecular phylogenies; some advocate their recognition at generic rank. References: Atha & Rall (2020); Atha, Nee, & Naczi (2010); Brandbyge in Kubitzki, Rohwer, & Bittrich (1993); Hinds & Freeman (2005b) in FNA5 (2005); Kim & Donoghue (2008); Kim, Donoghue, & Sultan (2017); Mun & Park (1995); Park (1988); Schuster et al (2015); Shaw (2008); Suh, Kim, & Park (1997).

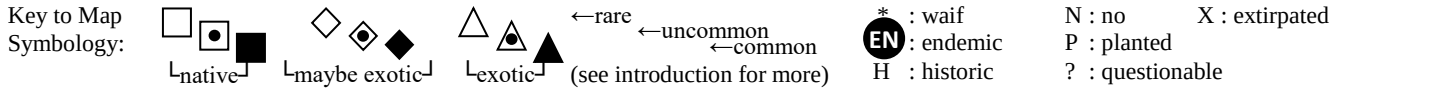
1 Stem, petioles, and lower surface of major leaf veins with abundant recurved prickles; [section *Echinocaulon*].
..... ***Persicaria sagittata***
1 Stem, petioles, and lower surface of major leaf veins unarmed.
5 Styles exserted, persistent on achenes; inflorescences spikelike, interrupted; [section *Tovara*].
..... ***Persicaria virginiana***
5 Styles included, rarely exserted, deciduous; inflorescences capitate, paniclelike, or spikelike, uninterrupted or interrupted.
7 Inflorescences capitate; leaf blades < 6 cm long (except *P. chinensis*); leaf blades usually <2× as long as wide; [section *Cephalophilon*].
..... ***Persicaria capitata***
7 Inflorescences panicle-like or spikelike; leaf blades usually > 6 cm long; leaf blades<2× as long as wide (except *P. orientalis*).
11 Ocreae with a green, herbaceous flange; leaves 3-17 cm wide ..... ***Persicaria orientalis***
11 Ocreae hyaline, tan, brown, or reddish throughout; leaves < 6 (-8) cm wide.
12 Ocreae lacking cilia or with cilia 0-1 mm long.
13 Plants perennial, with rhizomes or stolons; leaves lacking a triangular reddish blotch in the middle of the upper surface.
14 Achenes biconvex; styles 2; leaf base cuneate; ocreae 12-23 mm long..... ***Persicaria densiflora***
14 Achenes triangular in ×-section; styles 3; leaf base rounded to cordate; ocreae 6-12 mm long..... ***Persicaria hirsuta***
13 Plants annual, lacking rhizomes or stolons; leaves often with a triangular reddish blotch in the middle of the upper surface (except for in *P. minor*).
16 Outer tepals with 3 strong veins, each forked in an anchor shape; tepals 4 (-5); inflorescences usually arching-drooping .....
..... ***Persicaria lapathifolia***
16 Outer tepals with inconspicuous and irregularly-forking veins; tepals 5; inflorescences erect.
..... ***Persicaria pensylvanica***
12 Ocreae with cilia 1-12 mm long.
18 Perianth with glandular punctae.
19 Achenes minutely textured, dull; axillary inflorescences sometimes included within ocreae..... ***Persicaria hydropiper***
19 Achenes smooth, shiny; axillary inflorescences never included within ocreae.
20 Glandular punctae not uniformly distributed on the tepals, mainly on the lower portions of the outer tepals and on the inner tepals.....
..... ***Persicaria hydropiperoides***
20 Glandular punctae uniformly distributed on the tepals, not noticeably absent on the upper portions of the outer tepals.
..... ***Persicaria punctata***
18 Perianth lacking glandular punctae.
22 Plants perennial, with rhizomes or stolons; leaves lacking a triangular reddish blotch in the middle of the upper surface.
23 Achenes biconvex; styles 2
..... ***Persicaria amphibia ssp. laevimarginata***
23 Achenes triangular in ×-section; styles 3.
25 Ocreae glabrous, or strigose toward the base (the hairs stiff and appressed) ..... ***Persicaria hydropiperoides***
25 Ocreae strigose and hirsute, at least some of the hairs loosely ascending to spreading.
26 Leaf blades rounded to cordate at the base; stem internodes brownish-hirsute ..... ***Persicaria hirsuta***
26 Leaf blades cuneate to truncate at the base; stem internodes glabrous or loosely spreading-hirsute near the nodes only .....
..... ***Persicaria setacea***
22 Plants annual, lacking rhizomes or stolons.
28 Bristles of ocreae (0.5-) 1-4 (-6) mm long; achenes triangular in ×-section; styles 3.
..... ***Persicaria longiseta***
28 Bristles of ocreae 0.2-1.3 (-2) mm long; achenes biconvex or triangular in ×-section; styles 2-3.
..... ***Persicaria maculosa***

Persicaria amphibia (Linnaeus) S.F. Gray *ssp.* ***laevimarginata*** (Hultén) Soják. WATER SMARTWEED. **Hab:** Marshes, wet disturbed areas. **Dist:** NL (Newfoundland), NU, and AK south to SC, TN, TX, and CA, and southward into the New World tropics. **Phen:** Jun-Oct. **Tax:** See Haines (2011) for rather compelling comments for the recognition of several taxa in the *P. amphibia* complex. **Syn:** = NE, NY; = *Polygonum amphibium* Linnaeus var. *stipulaceum* Coleman – C, F, K1, Mitchell & Dean (1978); < *Persicaria amphibia* (Linnaeus) S.F. Gray – Ar, Fl4, FNA5, Il, K3, K4, Pa, Tn, Va; > *Persicaria amphibia* (Linnaeus) S.F. Gray var. *stipulacea* (Coleman) Hara – Mi; ? *Persicaria muhlenbergii* (S. Watson) Small – S; < *Polygonum amphibium* Linnaeus – W; < *Polygonum coccineum* Muhlenberg ex Willdenow – G, RAB, Horton (1972). NatureServe G5T5 (Secure).

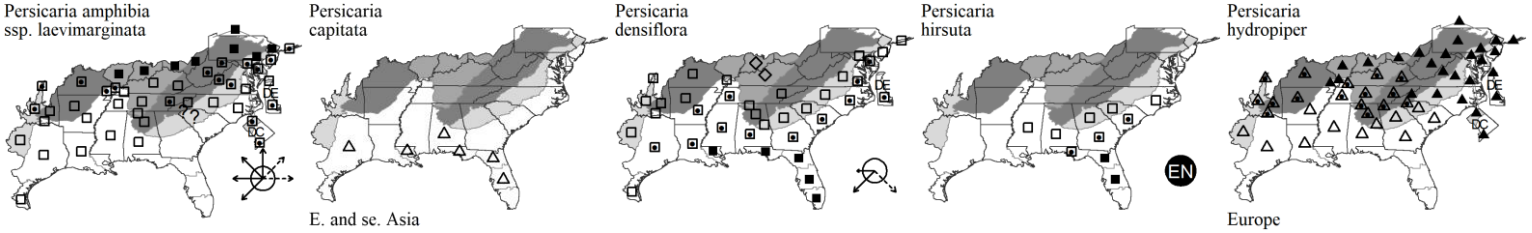
* ***Persicaria capitata*** (Buchanan-Hamilton ex D. Don) H. Gross. PINK-HEAD KNOTWEED. **Hab:** Disturbed blackland prairies, other disturbed areas. **Dist:** Native of s. Asia. See Singhurst, Mink, & Holmes (2013) for additional information about the naturalization of this species in TX. Reported for Orleans Parish, LA. Reported for Montgomery County, AL (Diamond & Keener 2021). **Syn:** = Fl4, FNA5, K3, K4, NY. NatureServe GNR (Not Yet Ranked).

Persicaria densiflora (Meisner) Moldenke. DENSE-FLOWER SMARTWEED. **Hab:** Swamp forests. **Dist:** The *Persicaria glabra* complex is widespread in the Neotropics, in North America north to s. NJ, VA, KY, MO, and TX. The distribution of *Persicaria densiflora* is unclear. **Phen:** Jun-Oct. **Tax:** *Persicaria densiflora*, the American component of the pantropical *Persicaria glabra* complex, seems to warrant recognition. **Syn:** = Tx; = *Persicaria portoricensis* (Bertero ex Small) Small – S, illegitimate name; = *Polygonum densiflorum* Meisner – Bah, C, F, G, GW2, K1, NcTx, RAB, WH3, Horton (1972); < *Persicaria glabra* (Willdenow) M. Gómez – Ar, FNA5, Il, K3, K4, Pa, Tn, Va. NatureServe G5 (Secure).

Persicaria hirsuta (Walter) Small. HAIRY SMARTWEED. **Hab:** Pondcypress savannas, depression ponds in pinelands. **Dist:** Se. NC south to c. peninsular FL, west to s. MS. **Phen:** Jun-Dec. **Syn:** = FNA5, K3, K4, S; = *Polygonum hirsutum* Walter – GW2, K1, RAB, WH3, Horton (1972). NatureServe G3G4 (Vulnerable).



* ***Persicaria hydropiper*** (Linnaeus) Opiz. COMMON SMARTWEED, WATERPEPPER, MARSHPEPPER SMARTWEED. **Hab:** Wet pastures, barnyards, ditches. **Dist:** Native of Europe. **Phen:** May-Dec. **Syn:** = Ar, FNA5, Il, K3, K4, Mi, NE, NY, Pa, S, Tn, Tx, Va; = *Polygonum hydropiper* Linnaeus – C, F, GW2, K1, RAB, W, Horton (1972); > *Polygonum hydropiper* var. *hydropiper* – WV; > *Polygonum hydropiper* var. *projecta* Stanford – WV. NatureServe GNR (Not Yet Ranked).



Persicaria hydropiperoides (Michaux) Small. WATERPEPPER. **Hab:** Swamp forests, streams, ditches. **Dist:** NS, ON, and AK, south to FL, TX, and CA, and into the New World tropics. **Phen:** May-Nov. **Syn:** = Ar, FNA5, K3, K4, Mi, NE, NY, Pa, Tn, Va; = *Polygonum hydropiperoides* Michaux – Bah, K1, NcTx, W, WH3, WV, Horton (1972); > *Persicaria hydropiperoides* (Michaux) Small – S; > *Persicaria hydropiperoides* var. *bushiana* (Stanford) Mohlenbrock – Il; > *Persicaria hydropiperoides* (Michaux) Small – Il, Tx; > *Persicaria hydropiperoides* (Michaux) Small var. *opelousana* (Riddell ex Small) J.S. Wilson – Tx; > *Persicaria opelousana* (Riddell ex Small) Small – Il, S; > *Polygonum hydropiperoides* Michaux – GW2, Mitchell & Dean (1978); > *Polygonum hydropiperoides* var. *breviciliatum* Fernald – F; > *Polygonum hydropiperoides* var. *euronotorum* Fernald – F; > *Polygonum hydropiperoides* var. *hydropiperoides* – C, F, RAB; > *Polygonum hydropiperoides* var. *opelousanum* (Riddell ex Small) Riddell ex W. Stone – C, RAB; > *Polygonum opelousanum* Riddell – GW2, Mitchell & Dean (1978); > *Polygonum opelousanum* Riddell var. *opelousanum* – F. NatureServe G5 (Secure).

Persicaria lapathifolia (Linnaeus) S.F. Gray. WILLOW-WEED, DOCKLEAF SMARTWEED, PALE SMARTWEED. **Hab:** Bottomlands, bottomland fields, disturbed areas. **Dist:** Nearly cosmopolitan in current distribution, the original distributions hard to interpret, sometimes regarded as having both native and introduced elements in North America. **Phen:** Jun-Dec. **Syn:** = Ar, Fl4, FNA5, Il, K3, K4, Mi, NE, NY, Pa, S, Tn, Tx, Va, Atha, Nee, & Naczi (2010); = *Polygonum lapathifolium* Linnaeus – C, GW2, K1, NcTx, RAB, W, WH3, WV, Horton (1972), Mitchell & Dean (1978); > *Polygonum lapathifolium* var. *lapathifolium* – G; > *Polygonum lapathifolium* var. *nodosum* (Rafinesque) Weinmann – G.

* ***Persicaria longiseta*** (de Bruijn) Kitagawa. LONGBRISTLE SMARTWEED, BRISTLY LADY'S-THUMB, CREEPING SMARTWEED. **Hab:** Disturbed areas, lawns, ditches. **Dist:** Native of Asia. **Phen:** May-Oct. **Syn:** = Ar, FNA5, Il, K3, K4, Mi, NE, NY, Pa, Tn, Va; = *Persicaria cespitosa* (Blume) Nakai var. *longiseta* (de Bruijn) C.F. Reed – Fl4; = *Polygonum cespitosum* Blume var. *longisetum* (de Bruijn) A.N. Steward – C, F, G, GW2, K1, RAB, W, WH3, WV, Horton (1972), Mitchell & Dean (1978).

* ***Persicaria maculosa*** S.F. Gray. LADY'S-THUMB, HEART'S-EASE. **Hab:** Disturbed areas. **Dist:** Native of Eurasia. **Phen:** May-Dec. **Syn:** = Ar, Fl4, FNA5, Il, K3, K4, Mi, NE, NY, Pa, Tn, Va, Atha, Nee, & Naczi (2010); = *Persicaria persicaria* (Linnaeus) Small – S; = *Persicaria vulgaris* Webb & Moquin-Tandon – Tx; = *Polygonum persicaria* Linnaeus – C, G, GW2, K1, NcTx, RAB, W, WH3, WV, Horton (1972), Mitchell & Dean (1978); > *Polygonum dubium* Stein – F; > *Polygonum persicaria* var. *angustifolium* Beckhaus – F; > *Polygonum persicaria* var. *persicaria* – F; > *Polygonum persicaria* var. *ruderale* (Salisbury) Meisner – F.

* ***Persicaria orientalis*** (Linnaeus) Spach. KISS-ME-OVER-THE-GARDEN-GATE, PRINCE'S-FEATHER, PRINCE'S-PLUME, PRINCESS-FEATHER. **Hab:** Barnyards, disturbed areas, garden edges. **Dist:** Native of Eurasia. **Phen:** Jun-Nov. **Syn:** = Ar, Fl4, FNA5, Il, K3, K4, Mi, NE, NY, Pa, S, Tn, Tx, Va; = *Polygonum orientale* Linnaeus – C, F, K1, RAB, W, WH3, WV, Horton (1972), Mitchell & Dean (1978). NatureServe GNR (Not Yet Ranked).

Persicaria pensylvanica (Linnaeus) M. Gómez. PINKWEED, COMMON SMARTWEED, PENNSYLVANIA SMARTWEED. **Hab:** Disturbed areas, bottomlands. **Dist:** NL (Newfoundland), ON, MT, and CA, south to FL, TX, AZ; disjunct (perhaps only introduced?) in AK, Ecuador, Europe. **Phen:** May-Dec. **Syn:** = Ar, FNA5, K3, K4, Mi, NE, NY, Pa, S, Tn, Tx, Va; = *Polygonum pensylvanicum* Linnaeus – C, GW2, K1, NcTx, RAB, W, WH3, WV, Horton (1972); < *Persicaria pensylvanica* (Linnaeus) M. Gómez – Fl4; > *Persicaria pensylvanica* var. *dura* (Stanford) C.F. Reed – Il; > *Persicaria pensylvanica* var. *laevigata* (Fernald) Mohlenbrock – Il; > *Persicaria pensylvanica* var. *pensylvanica* – Il; > *Polygonum pensylvanicum* var. *durum* Stanford – F; > *Polygonum pensylvanicum* var. *eglandulosum* J.C. Myers – F; > *Polygonum pensylvanicum* var. *laevigatum* Fernald – F; > *Polygonum pensylvanicum* var. *pensylvanicum* – F; > *Polygonum pensylvanicum* var. *rosaeflorum* J.B.S. Norton – F.

Persicaria punctata (Elliott) Small. DOTTED SMARTWEED. **Hab:** Swamp forests, bottomlands, marshes. **Dist:** NS, ON, and BC south to FL, TX, and CA, south into the New World tropics. **Phen:** Jul-Nov. **Syn:** = Ar, Fl4, FNA5, Il, K3, K4, Mi, NE, NY, Pa, Tn, Tx, Va; = *Polygonum punctatum* – Bah, GW2, NcTx, RAB, W, WH3, WV; > *Persicaria punctata* (Elliott) Small var. *leptostachya* (Meisner) Small – S; > *Persicaria punctata* (Elliott) Small var. *punctata* – S; < *Polygonum punctatum* – Horton (1972); > *Polygonum punctatum* Elliott var. *confertiflorum* (Meisner) Fassett – C, G, K1, Mitchell & Dean (1978); > *Polygonum punctatum* Elliott var. *leptostachyum* (Meisner) Small – F; > *Polygonum punctatum* var. *parvum* Marie-Victorin & Rousseau – F; > *Polygonum punctatum* Elliott var. *punctatum* – C, F, G, K1, Mitchell & Dean (1978).

Persicaria sagittata (Linnaeus) H. Gross ex Nakai. ARROWLEAF TEARTHUMB, ARROWVINE, SCRATCH-GRASS. **Hab:** Marshes, bogs, beaver impoundments, wet thickets. **Dist:** NL (Newfoundland) west to MB, south to Panhandle FL and e. TX; China, Manchuria, India, Siberia, Korea, and Japan. **Phen:** May-Dec. **Syn:** = Ar, Fl4, FNA5, K3, K4, Mi, NE, NY, Pa, Tn, Va; = *Polygonum sagittatum* Linnaeus – C, G, GW2, K1, RAB, Tx, W, WH3, WV, Horton (1972), Mitchell & Dean (1978); = *Tracaulon sagittatum* (Linnaeus) Small – Il, S; > *Polygonum sagittatum* var. *gracilentum* Fernald – F; > *Polygonum sagittatum* var. *sagittatum* – F.

Persicaria setacea (Baldwin) Small. SWAMP SMARTWEED. **Hab:** Swamp forests, bottomland forests. **Dist:** MA, MI, MO, and OK south to s. FL and TX. **Phen:** Jul-Nov. **Syn:** = Ar, Fl4, FNA5, Il, K3, K4, NE, NY, Pa, S, Tn, Tx, Va; = *Polygonum hydropiperoides* Michaux var. *setaceum* (Baldwin) Gleason –

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

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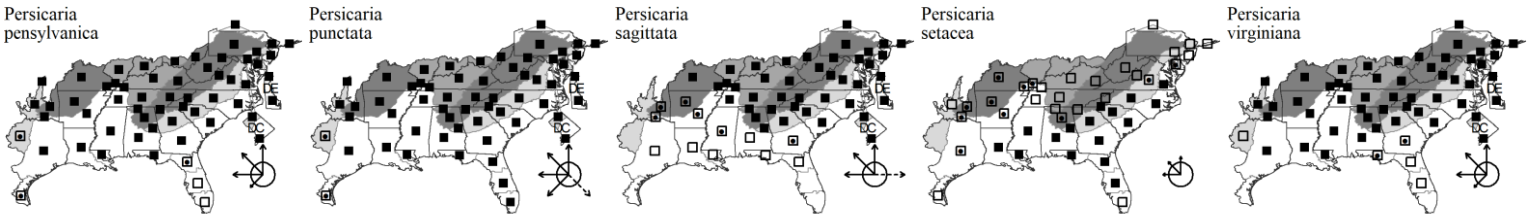
C, G; = *Polygonum setaceum* Baldwin – GW2, NcTx, RAB, W, WH3, Horton (1972), Mitchell & Dean (1978); > *Polygonum setaceum* var. *interjectum* Fernald – F, K1; > *Polygonum setaceum* var. *setaceum* – F, K1; > *Polygonum setaceum* var. *tonsum* Fernald – F, K1.

Persicaria virginiana (Linnaeus) Gaertner. JUMPSEED, VIRGINIA KNOTWEED. **Hab:** Floodplains, moist forests. **Dist:** NH, QC, MN, and NE, south to n. peninsular FL and TX; disjunct in c. Mexico. **Phen:** Jun-Oct. **Tax:** Section *Tovara* consists of 3-5 species of e. North America and e. Asia (Mun & Park 1995); if the section is recognized as a genus (as it often has been), the correct name for this species is *Antenoron virginianum*. Variation in North America, previously sometimes recognized as varieties, as by F and G, is under study by M. Pyne. **Syn:** = Ar, Fl4, FNA5, Mi, NE, NY, Pa, Tn, Va; = *Antenoron virginianum* (Linnaeus) Roberty & Vautier – Il, Horton (1972); = *Polygonum virginianum* Linnaeus – C, GrPl, GW2, K1, NcTx, Tx, W, WH3, Mitchell & Dean (1978); = *Tovara virginiana* (Linnaeus) Rafinesque – RAB, S, WV; < *Persicaria virginiana* (Linnaeus) Gaertner – K3, K4; > *Polygonum virginianum* var. *glaberrimum* (Fernald) Steyermark – G; > *Polygonum virginianum* var. *virginianum* – G; > *Tovara virginiana* var. *glaberrima* Fernald – F; > *Tovara virginiana* var. *virginiana* – F. NatureServe G5 (Secure).



Polygonella Michaux 1803 (JOINTWEED)

A genus of about 12-15 species, herbs and shrubs, of se. and sc. North America. Based on morphology, Ronse Decraene, Hong, & Smets (2004) suggested that *Polygonella* should be merged into *Polygonum*, as part of section *Duravia*; Schuster, Reveal, & Kron (2011) developed molecular evidence of the close relationship of *Polygonella* to the *Duravia* group of *Polygonum* and transferred the species into *Polygonum*. It now seems best to me to pursue an alternative course, of recognizing the very distinctive clades as separate genera – in our area, *Polygonum* s.s., *Polygonella*, and *Duravia*. References: Freeman (2005e) in FNA5 (2005); Horton (1961); Nesom & Bates (1984); Ronse Decraene et al. (1993); Schuster et al (2015); Schuster, Reveal, & Kron (2011); Wunderlin (1981).

1 Inner perianth segments fimbriate; stamen filaments monomorphic; ocreae ciliate.
..... ***Polygonella fimbriata***
1 Inner perianth segments not fimbriate; stamen filaments dimorphic (the inner 3 stamen filaments dilated more abruptly than the outer 5, with toothed or horned shoulders); ocreae ciliate or not.
6 Leaves (3-) 9-30 mm wide; [of sand pine scrub and coastal dunes in Panhandle FL and s. AL] ..... ***Polygonella macrophylla***
6 Leaves 0.3-6 mm wide; [collectively more widespread].
7 Style and stigma (0.4-) 0.5-0.8 (-1.0) mm long at anthesis; inner sepals (1.7-) 1.9-2.5 (-2.9) mm long in flower, (3.1-) 3.3-4.7 (-6.0) mm long in fruit; perennial; leaves very numerous, (4.0-) 5.2-12.0 (-19.0) mm long, 0.5-0.9 (-1.2) mm wide, nearly as thick as wide.
..... ***Polygonella americana***
7 Style and stigma 0-0.1 (-0.2) mm long at anthesis; inner sepals (0.6-) 0.7-1.8 (-2.3) mm long at anthesis, (1.6-) 1.7-2.8 (-3.6) mm in fruit; annual or perennial; leaves (2.5-) 4.4-39.0 (-65.0) mm long, (0.3-) 0.6-5.0 (-8.0) mm wide, wider than thick.
9 Annual, simple to much-branched from above the base; leaves lacking hyaline margins, mostly deciduous before fruiting (or even flowering); ocreae obtuse; achenes 1.0-1.4 mm wide.
..... ***Polygonella gracilis***
9 Perennial, much-branched from near the distinctly woody base; leaves with hyaline margins toward the tip, persistent through fruiting; ocreae obtuse, acute, acuminate, or aristate-attenuate; achenes (0.7-) 0.8-1.0 (-1.2) mm wide.
..... ***Polygonella polygama***

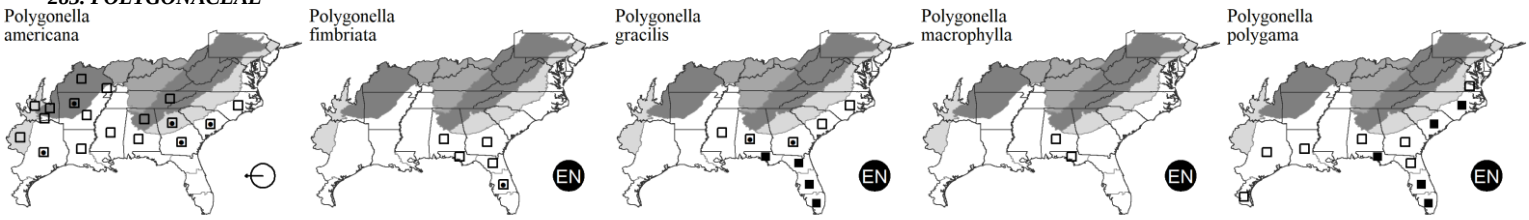
Polygonella americana (Fischer & C.A. Meyer) Small. SOUTHERN JOINTWEED. **Hab:** Longleaf pine sandhills, other dry woodlands, glades, and barrens with sandy or rocky soil. **Dist:** Sc. NC south to c. TX, north in the interior to ec. TN, se. MO, and AR; disjunct in Panhandle TX and NM. **Phen:** Jun-Oct; Aug-Nov. **Syn:** = Ar, F, FNA5, G, GrPl, K1, NcTx, RAB, S, Tn, Tx, Horton (1961); = *Polygonum americanum* (Fischer & C.A. Meyer) T.M. Schuster & Reveal – K3, K4, Schuster, Reveal, & Kron (2011). NatureServe G5 (Secure).

Polygonella fimbriata (Elliott) Horton. SANDHILL JOINTWEED. **Hab:** Longleaf pine sandhills. **Dist:** E. GA (not far from SC) and se. AL south to Panhandle FL. **Syn:** = Fl4, FNA5, K1, WH3, Nesom & Bates (1984); = *Polygonella fimbriata* var. *fimbriata* – Horton (1961); = *Polygonum fimbriatum* Elliott, Sandhill Jointweed – K3, K4, Schuster, Reveal, & Kron (2011); = *Thysanella fimbriata* (Elliott) A. Gray – S. NatureServe G5 (Secure).

Polygonella gracilis (Nuttall) Meisner. WIREWEED. **Hab:** Longleaf pine sandhills. **Dist:** Sc. NC south to s. FL, west to s. MS, perhaps adventive toward the northern part of the range. **Phen:** Late Aug-Oct; Oct-Jan. **Syn:** = Fl4, FNA5, K1, RAB, WH3, Horton (1961); = *Delopyrum gracile* (Meisner) Small – S, nom. illeg.; = *Polygonum pinicola* T.M. Schuster & Reveal – K3, K4, Schuster, Reveal, & Kron (2011). NatureServe G4G5 (Apparently Secure).

Polygonella macrophylla Small. LARGELEAF WIREWEED. **Hab:** Sand pine scrub, coastal dunes. **Dist:** S. AL and Panhandle FL. **Syn:** = Fl4, FNA5, K1, S, WH3, Horton (1961); = *Polygonum smallianum* T.M. Schuster & Reveal – K3, K4, Schuster, Reveal, & Kron (2011). NatureServe G3 (Vulnerable).

Polygonella polygama (Ventenat) Engelmann & A. Gray. COMMON OCTOBER-FLOWER. **Hab:** Longleaf pine sandhills, other dry sandy habitats. **Dist:** Se. VA south to s. FL, west to se. TX (perhaps absent in GA). *P. polygamum* occurs in the outer Coastal Plain of VA and NC, extending into the middle Coastal Plain and fall-line Sandhills in SC (Richland, Lexington, and Aiken counties, SC). **Phen:** Jun-Oct; Sep-Nov. **Syn:** = S; = *Polygonella polygama* var. *polygama* – Fl4, FNA5, Va, WH3, Nesom & Bates (1984), Wunderlin (1981); = *Polygonum polygamum* Ventenat var. *polygamum* – K3, Schuster, Reveal, & Kron (2011); < *Polygonella polygama* (Ventenat) Engelmann & A. Gray – C, F, G, K1, RAB, Tx, Horton (1961). NatureServe G4TNR (Not Yet Ranked).



Polygonum Linnaeus 1753 (KNOTWEED)

A genus of about 45 species, herbs, of temperate regions of the Northern Hemisphere. Based on morphology, Ronse Decraene, Hong, & Smets (2004) suggested that *Polygonella* should be merged into *Polygonum*, as part of section *Duravia*; the close relationship of *Polygonella* and *Duravia* was confirmed using molecular evidence by Schuster, Reveal, & Kron (2011). References: Brandbyge in Kubitzki, Rohwer, & Bittrich (1993); Brandbyge in Kubitzki, Rohwer, & Bittrich (1993); Costea & Tardif (2003a); Costea, Tardif, & Hinds (2005f) in FNA5 (2005); Horton (1961); Ronse De Craene, Hong, & Smets (2004); Schuster, Reveal, & Kron (2011).

Unkeyed waifs: *Polygonum patulum*

1 Flowers in terminal or long-peduncled axillary racemes; branches adnate to stems, therefore appearing to arise internodally; plants suffrutescent bushy herbs ..... ***Polygonella***

1 Flowers in small clusters or very reduced racemes of 1-5 flowers, borne in the axils of normally sized or reduced leaves; branches not adnate to the stem, and thus arising at nodes; plants erect or sprawling herbs.

2 Stems with 4 obscure ribs or angles (or lacking apparent ribs); leaf venation parallel, with inconspicuous secondary veins, longitudinally plicate; anthers pink-purple ..... ***Duravia***

2 Stems with 8-16 distinct ribs; leaf venation pinnate, the secondary veins apparent; anthers whitish yellow; [section *Polygonum*].

3 Perianth bottle-shaped, constricted above the achene. ..... ***Polygonum erectum***

3 Perianth more open, not constricted above the achene.

6 Ocreae pruinose; mature tepals notably white or pink, loosely spreading; achenes smooth, glossy; [of maritime situations] ..... ***Polygonum glaucum***

6 Ocreae not pruinose; mature tepals yellow-green, white, pink, or reddish, appressed to the achene; achenes either smooth and glossy or textured and dull; [mainly of inland and disturbed situations]; [*P. aviculare* complex].

7 Outer 3 tepals cucullate, in fruiting condition distinctly surpassing the inner 2 sepals and concealing them. ..... ***Polygonum prolificum***

7 Outer 3 tepals flat, equaling or shorter than the inner 2 sepals.

10 Perianth tube 40-57% of the perianth length.

11 Tepals green, margins pink or red (rarely white), with branched veins; plants prostrate to ascending, with 3-15 stems; leaf blades 2.8-5.7 (-6.5)× as long as wide ..... ***Polygonum aviculare ssp. depressum***

11 Tepals green or reddish brown, margins white, with unbranched veins; plants usually ascending, with 1-7 stems; leaf blades (3.40) 4.2-9.2× as long as wide ..... ***Polygonum aviculare ssp. neglectum***

10 Perianth tube 15-40% of the perianth length.

12 Leaf blades 2-4.5× as long as wide; perianth (2.3-) 2.8-4.7 (-5) mm long; achenes (of the early season) (2.1-) 2.7-3.7 mm long ..... ***Polygonum aviculare ssp. aviculare***

12 Leaf blades (3.4-) 4.2-9.2× as long as wide; perianth 1.9-3.4 mm long; achenes (of the early season) 1.2-1.8 mm long ..... ***Polygonum aviculare ssp. neglectum***

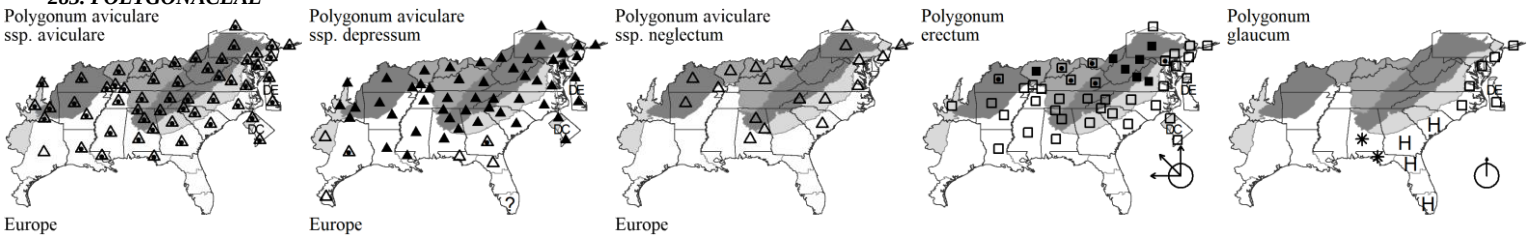
* ***Polygonum aviculare*** Linnaeus *ssp.* ***aviculare***. KNOTWEED. **Hab:** Disturbed areas. **Dist:** Native of Eurasia. **Phen:** Mar-Nov. **Syn:** = Ar, FNA5, K3, K4, NE, NY, Costea & Tardif (2003a); = *Polygonum aviculare* – C, GrPl, Il, K1, Mi, RAB, S, Tx, W, Mitchell & Dean (1978); < *Polygonum aviculare* – Fl4, G, NcTx, Pa, Tn, Va, WH3, Horton (1972); > *Polygonum aviculare* var. *aviculare* – F, WV; > *Polygonum aviculare* var. *vegetum* Ledebour – F, WV.

* ***Polygonum aviculare*** Linnaeus *ssp.* ***depressum*** (Meisner) Arcangeli. DOORYARD KNOTWEED. **Hab:** Bottomlands, marshes, disturbed areas. **Dist:** Native of Europe. **Phen:** Jun-Oct. **Syn:** = Ar, FNA5, K4, NE, NY, Costea & Tardif (2003a); = *Polygonum arenastrum* Boreau – C, GrPl, Il, K1, Mi, Tx; < *Polygonum aviculare* – Fl4, G, NcTx, Pa, Tn, Va, WH3.

* ***Polygonum aviculare*** Linnaeus *ssp.* ***neglectum*** (Besser) Arcangeli. NEEDLE-LEAF KNOTWEED. **Hab:** Fields, disturbed areas. **Dist:** Native of Europe. Documented from scattered locations in s. PA (Rhoads & Klein 1993); DE, NJ, and MD (Kartesz 1999); and WV (as *P. aviculare* ssp. *rurivagum*) (Costea & Tardif 2003). **Syn:** = FNA5, K3, K4, NE, NY; = *Polygonum neglectum* Besser – GrPl, Il; < *Polygonum aviculare* – G, NcTx, Pa, Tn, WH3; < *Polygonum aviculare* var. *aviculare* – F; ? *Polygonum bellardii* Allioni – K1.

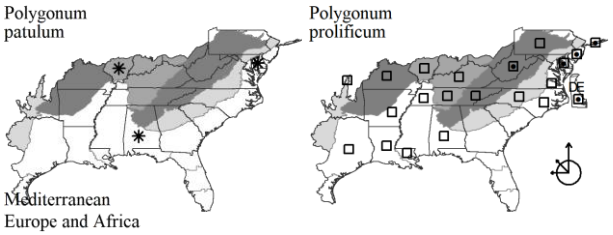
Polygonum erectum Linnaeus. ERECT KNOTWEED. **Hab:** Bottomland forests, streambanks, disturbed areas, open places. **Dist:** ME, ON, and AB south to GA, LA, and NM. **Phen:** Jun-Oct; Jul-Oct. **Syn:** = Ar, C, F, FNA5, GrPl, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Va, W, WV, Horton (1972), Mitchell & Dean (1978). NatureServe G5 (Secure).

Polygonum glaucum Nuttall. SEABEACH KNOTWEED. **Hab:** Ocean beaches, sound-side sandy shores, dune bases. **Dist:** Along the coast, MA south to ne. FL; also in Panhandle FL and s. AL (perhaps not native on the Gulf Coast). **Phen:** May-Oct; Jun-Nov. **Syn:** = C, F, Fl4, FNA5, K1, K3, K4, NE, NY, RAB, S, Va, WH3, Horton (1972), Mitchell & Dean (1978). NatureServe G3 (Vulnerable).

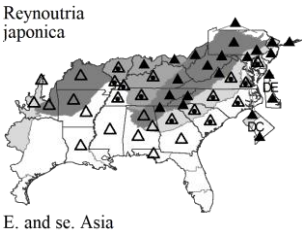


* ***Polygonum patulum*** M. Bieberstein. RED KNOTGRASS. **Hab:** On ballast, presumably just a waif. **Dist:** Native of Mediterranean Europe and n. Africa. **Syn:** = FNA5, Il, K3, K4. NatureServe GNR (Not Yet Ranked).

Polygonum prolificum (Small) B.L. Robinson. LONGFRUIT KNOTWEED, BUSHY KNOTWEED, PROLIFIC KNOTWEED. **Hab:** Brackish marshes, disturbed areas. **Dist:** PE, QC, MB, and BC, south to GA, AL, LA, TX. **Comm:** Also reported for NC (Kartesz 1999). **Syn:** = C, G; = *Polygonum ramosissimum* ssp. *prolificum* (Small) Costea & Tardif – Ar, FNA5, K3, K4, NE, NY, Pa, Tn, Costea & Tardif (2003a); = *Polygonum ramosissimum* Michaux var. *prolificum* Small – K1, Mitchell & Dean (1978); > *Polygonum exsertum* Small – F, Il; > *Polygonum prolificum* (Small) B.L. Robinson – F, Il; < *Polygonum ramosissimum* Michaux – GrPl, Horton (1972).



Reynoutria Houttuyn 1777



A genus of about 15 species, perennial herbs, of temperate e. Asia. Ronse Decraene & Akeroyd (1988) and most other recent workers in Polygonaceae treat this group as *Fallopia* section *Reynoutria* (Houttuyn) Ronse Decraene, but molecular evidence supports its recognition at genus rank, as a monophyletic genus basal to *Fallopia* and *Muehlenbeckia* (Schuster, Reveal, & Kron 2011). References: Brandbyge in Kubitzki, Rohwer, & Bittrich (1993); Freeman & Hinds (2005) in FNA5 (2005); Ronse De Craene & Akeroyd (1988); Schuster, Reveal, & Kron (2011); Schuster, Wilson, & Kron (2011); Zika & Jacobson (2003).

* ***Reynoutria japonica*** Houttuyn. JAPANESE KNOTWEED, JAPANESE BAMBOO, JAPANESE BUCKWHEAT. **Hab:** Roadsides, disturbed areas, river banks and sandbars, often forming dense thickets. **Dist:** Native of e. Asia. **Phen:** May-Oct; Aug-Oct. **Syn:** = Fl4, Il, K3, K4, NY, Va; = *Fallopia japonica* (Houttuyn) Ronse Decraene – Mi, Tn, Ronse De Craene & Akeroyd (1988); = *Fallopia japonica* (Houttuyn) Ronse Decraene var. *japonica* – Ar, FNA5, NE, Pa; = *Pleuropterus zuccarinii* Small – S; = *Polygonum cuspidatum* Siebold & Zuccarini – C, F, GrPl, K1, RAB, W, WV, Horton (1972), Mitchell & Dean (1978). NatureServe GNR (Not Yet Ranked).

Rumex Linnaeus 1753 (DOCK)

A genus of about 200 species, perennial and annual herbs (and a few shrubs), of cosmopolitan distribution. Perhaps to be (re)split with *Acetosa* accorded genus rank. References: Brandbyge in Kubitzki, Rohwer, & Bittrich (1993); Löve (1983); Mosyakin (2005) in FNA5 (2005); Stace (2010).

Identification Notes: pedicel measurements include the true pedicel (below the joint) and the pseudopedicel (the stipe-like hypanthium above the joint or articulation).

1 Leaf blades of well-developed leaves (at least) hastate or sagittate; plants dioecious (rarely polygamo-monoecious), the flowers mostly unisexual; fresh foliage pleasantly acid to taste.
  3 Inner tepals (at fruiting) 2.5-3.2 mm long, much longer and wider than the achene, with an expanded, accrescent wing that develops prominent reticulate veins; pedicel jointed near its middle or base, well below the tepals; plants annual or short-lived perennial; from a taproot; [subgenus *Acetosa*; section *Americanae*] ..... ***Rumex hastatulus***
  3 Inner tepals (at fruiting) 1.2-1.7 (-2.0) mm long, about as long and wide as the achene, with a minute or absent free wing; pedicel jointed just below the tepals; plant perennial, from a thin, creeping rhizome; [subgenus *Acetosella*] ..... ***Rumex acetosella ssp. pyrenaicus***

1 Leaf blades not hastate or sagittate; plants synoecious (rarely with some dioecious or polygamo-monoecious individuals), the flowers normally bisexual (sometimes bisexual and unisexual flowers in the same inflorescence); fresh foliage "green" or bitter to taste; [subgenus *Rumex*].
  5 Leaves primarily cauline; inner tepal margins entire; [subgenus *Rumex*; section *Axillares*].
    6 Pedicels 2.5-5× as long as the inner tepals; pedicel joint below the midpoint of the pedicel.
      8 Leaf blades 3-5 (-6)× as long as wide; coriaceous and usually somewhat fleshy; inflorescences dense (interrupted only at base); pedicels 2.5-3× as long as the inner tepals; inner tepals as wide as or wider than long..... ***Rumex floridanus***
      8 Leaf blades 5-7 (-10)× as long as wide; thin; inflorescences interrupted in at least the lower half; pedicels 3-5× as long as the inner tepals; inner tepals longer than wide (rarely as long as wide)..... ***Rumex verticillatus***
    6 Pedicels usually < 2.5× as long as the inner tepals; pedicel joint either the midpoint of the pedicel, or below it.
      9 Leaf blades widest toward the apex; leaf apex rounded or obtuse..... ***Rumex cuneifolius***
      9 Leaf blades widest at the middle or toward the base; leaf apex acute (rarely nearly obtuse).

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

10 Leaf blades widest toward the base; inner sepals 4.5-6 mm long, 3-4.5 (-6) mm wide..... ***Rumex altissimus***
10 Leaf blades widest near the middle; inner sepals (2-) 2.5-4.5 (-5) mm long, (2-) 2.5-4 (-4.5) mm wide.
..... ***Rumex chrysocarpos***
5 Leaves basally disposed, the largest and best developed in a basal rosette (these sometimes withering at maturity, especially in annual species); inner tepal margins entire or variously dentate; [subgenus *Rumex*; section *Rumex*].
12 Inner tepal margins entire, indistinctly erose, or (rarely) minutely denticulate (the teeth then < 0.2 mm long).
13 Inner tepals ca. 2× as long as wide, margins entire, largest tubercle almost as wide as the inner tepal.
14 Tubercles 3, equal or nearly so in size; inflorescence leafy through at least 2/3 of its length; pedicels 1.4 (-5) mm long.....
..... ***Rumex conglomeratus***
14 Tubercles 1 (or if 3, then one much larger than the other 2); inflorescence leafy only in basal 1/3 or less of its length; pedicels (2-) 4-6 (-8) mm long.....
..... ***Rumex sanguineus***
13 Inner tepals ca. 1-1.5× as long as wide, margins entire or denticulate, largest tubercle much narrower than the inner tepal.
..... ***Rumex crispus ssp. crispus***
12 Inner tepal margins prominently dentate, at least some of the teeth > 0.3 mm long.
18 Inner tepals with 3-5 strongly hooked teeth on each side..... ***Rumex brownii***
18 Inner tepals with straight teeth.
20 Plants perennial; base of leaf blade usually distinctly cordate.
21 Stems 6-12 (-15) dm tall; leaf blades 20-40 cm long; inflorescence branches normally ascending, making an angle of 30-45° with inflorescence axis; tubercles of the inner sepals smooth ..... ***Rumex obtusifolius***
21 Stems 2-6 (-7) dm tall; leaf blades 4-10 (-15) cm long; inflorescence branches spreading, making an angle of 60-90° with inflorescence axis; tubercles of the inner sepals usually verrucose..... ***Rumex pulcher***
20 Plants annual or biennial; base of leaf blade cuneate (rarely rounded).
22 Inner tepals 4-5 (-5.5) mm long; tubercles of the inner sepals verrucose..... ***Rumex obovatus***
22 Inner tepals 3-4 mm long; tubercles of the inner sepals smooth or minutely punctate..... ***Rumex paraguayensis***

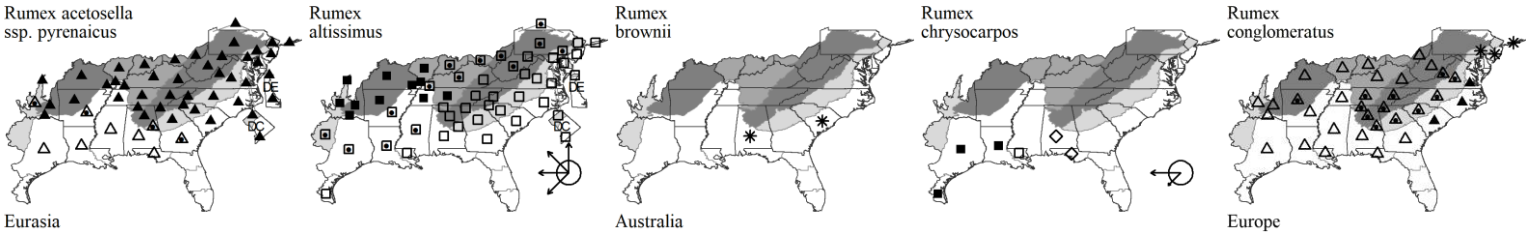
* ***Rumex acetosella*** Linnaeus *ssp.* ***pyrenaicus*** (Pourret ex Lapeyrouse) Akeroyd. RED DOCK, SHEEP SORREL, SOURGRASS. **Hab:** Pastures, fields, roadsides, rock outcrops, grassy balds, gardens. **Dist:** Native of Eurasia. Variation in *R. acetosella* has been studied in considerable detail in Eurasia, and a number of infrataxa named; the application of these to North American material is unclear at this time. **Phen:** Mar-Sep; May-Nov. **Tax:** *R. acetosella* ssp. *pyrenaicus* (Pourret ex Lapeyrouse) Akeroyd, a hexaploid subspecies from western Europe, is apparently the predominant naturalized subspecies in North America. See Mosyakin in FNA (2005) and the references cited therein for further information. **Syn:** = NE, NY, Stace (2010); = *Acetosella vulgaris* (Koch) Fourreau ssp. *pyrenaica* (Pourret ex Lapeyrouse) Á. Löve – Löve (1983); = *Rumex acetosella* var. *pyrenaeus* (Pouret) Timbal-Lagrave – F; < *Acetosella acetosella* (Linnaeus) Small – S; < *Rumex acetosella* Linnaeus – Ar, C, Fl4, FNA5, G, GrPl, GW2, Il, K1, K3, K4, Mi, NcTx, Pa, RAB, Tn, Tx, Va, W, WH3, WV.

Rumex altissimus Alph. Wood. PALE DOCK, TALL DOCK, PEACHLEAF DOCK. **Hab:** Bottomlands, swamps, marshes, roadsides, disturbed areas. **Dist:** ME and MN south to GA, AL, TX, AZ, and n. Mexico. **Phen:** Mar-Jun (sometimes later); May-Jul (sometimes later). **Syn:** = Ar, C, F, FNA5, G, GrPl, GW2, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WV. NatureServe G5 (Secure).

* ***Rumex brownii*** Campderá. BROWN'S DOCK. **Hab:** Lawns, disturbed areas, floodplains, wool-combing waif. **Dist:** Native of Australia. Reported for Baldwin County, AL (H. Horne, pers. comm., Nov 2015). **Syn:** = FNA5, K3, K4; = *Rumex brownei* – K1, orthographic variant. NatureServe GNR (Not Yet Ranked).

Rumex chrysocarpos Moris. AMAMASTLA DOCK. **Hab:** Swamps, disturbed wet areas. **Dist:** Panhandle FL (where possibly not native?) and se. LA west to TX and Tamaulipas. Recently discovered in s. AL (Mobile County) (H. Horne, pers. comm., 2018). **Phen:** Jul-Sep. **Syn:** = K4; = *Rumex chrysocarpus* Moris – Fl4, FNA5, K3, Tx, WH3, orthographic variant.

* ***Rumex conglomeratus*** Murray. CLUSTERED GREEN DOCK. **Hab:** Marshes, disturbed areas, bottomland forests, pastures. **Dist:** Native of Europe. **Phen:** Apr-Jun; May-Jul. **Syn:** = Ar, C, F, FNA5, G, GW2, Il, K1, K3, NY, RAB, S, Tn, Tx, Va, WV. NatureServe GNR (Not Yet Ranked).

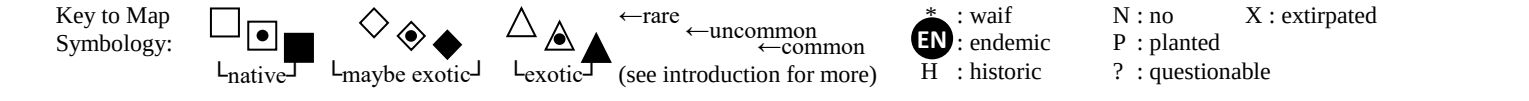


* ***Rumex crispus*** Linnaeus *ssp.* ***crispus***. CURLY DOCK. **Hab:** Disturbed areas, pastures, fields. **Dist:** Native of Europe. **Phen:** Mar-Jun; May-Jul. **Syn:** = FNA5, K1, K3, K4, NE, NY, Va; < *Rumex crispus* – Ar, Bah, C, F, Fl4, G, GrPl, GW2, Il, Mi, NcTx, Pa, RAB, S, Tn, Tx, W, WH3, WV. NatureServe GNRTNR (Not Yet Ranked).

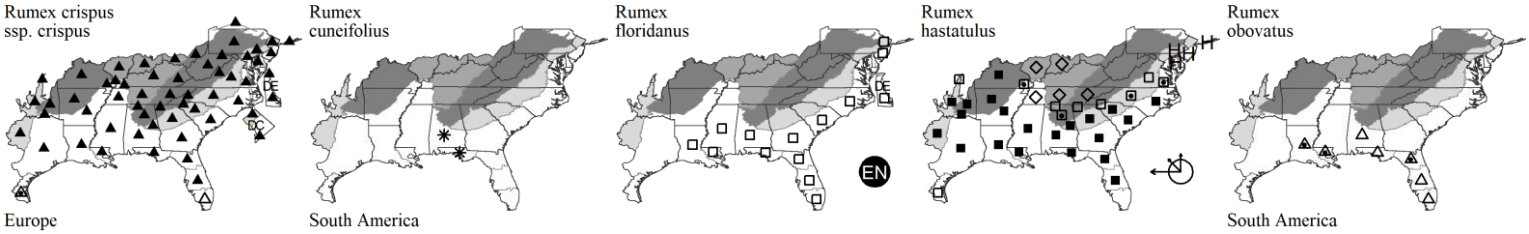
* ***Rumex cuneifolius*** Campderá. **Hab:** Disturbed areas, not recently collected and perhaps only a waif. **Dist:** Native of South America. A rare introduction from South America in AL, FL. **Syn:** = Fl4, FNA5, K3, K4, S, WH3; ? *Rumex frutescens* Thouars – K1, misapplied. NatureServe GNR (Not Yet Ranked).

Rumex floridanus Meisner. FLORIDA DOCK. **Hab:** Swamps and marshes. **Dist:** NJ south to FL, west to LA. Reported for Orangeburg County, SC (S.W. Leonard, pers. comm.). **Syn:** = FNA5, G, K3, K4, S; > *Rumex chrysocarpus* Moris – GW2, K1, misapplied; < *Rumex verticillatus* Linnaeus – C, F, GW2, RAB, WH3.

Rumex hastatulus Baldwin. WILD DOCK, HEARTWING DOCK. **Hab:** Glades, barrens, xeric sands; eastwards in fields (especially sandy fields in the Coastal Plain), roadsides, disturbed areas. **Dist:** E. MA, NY, IN, IL, MO, and KS, south to c. peninsular FL, TX, and NM. The eastern part of the distribution seems to be strictly or mostly in altered habitats, suggesting the possibility that the eastern extent (east of the Mississippi River) of the distribution is adventive. **Phen:** Mar-Jun; Apr-Jun. **Syn:** = Ar, C, F, Fl4, FNA5, G, GrPl, GW2, Il, K1, K3, K4, NcTx, NE, NY, Pa, RAB, S, Tx, Va, W, WH3. NatureServe G5 (Secure).



* ***Rumex obovatus*** Danser. TROPICAL DOCK. **Hab:** Maritime shores, riverbanks, pond margins. **Dist:** Native of South America. **Syn:** = Fl4, FNA5, K1, K3, K4, WH3. NatureServe G5 (Secure).



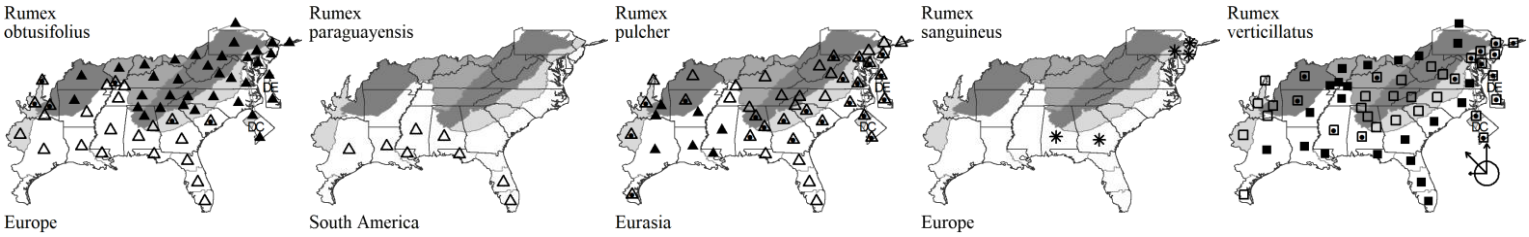
* ***Rumex obtusifolius*** Linnaeus. BITTER DOCK. **Hab:** Pastures, barnyards, disturbed areas. **Dist:** Native of Europe. **Phen:** Apr-Jun; Jun-Aug. **Syn:** = Ar, C, F, FNA5, G, GrPl, GW2, Il, K1, K3, K4, Mi, Pa, RAB, S, Tn, Va, W, WH3, WV; > *Rumex obtusifolius* ssp. *obtusifolius* – NE, NY. NatureServe GNR (Not Yet Ranked).

* ***Rumex paraguayensis*** D. Parodi. PARAGUAYAN DOCK. **Hab:** Moist maritime shores. **Dist:** Native of South America. **Comm:** See Brown & Marcus (1998) and Berger et al. (2012). **Syn:** = Fl4, FNA5, GW2, K1, K3, K4, WH3. NatureServe GNR (Not Yet Ranked).

* ***Rumex pulcher*** Linnaeus. FIDDLE DOCK. **Hab:** Disturbed areas, bottomland fields, bottomland forests. **Dist:** Native of Eurasia. **Phen:** Apr-Jul; Jun-Aug. **Syn:** = Ar, C, F, Fl4, FNA5, G, GW2, K1, K3, NcTx, NE, NY, Pa, S, Tx, Va, W, WH3. NatureServe GNR (Not Yet Ranked).

* ***Rumex sanguineus*** Linnaeus. BLOODY DOCK, RED-VEINED DOCK, BLOODY SORREL, WOOD DOCK. **Hab:** Disturbed areas. **Dist:** Native of Europe. Introduced at least as far south as se. PA (Rhoads & Klein 1993), MD, NJ, and AL (Kartesz 1999), perhaps only as a waif. Reported for AL, MS, LA, and VA by Small (1933). **Syn:** = C, FNA5, G, K1, K3, K4, S. NatureServe GNR (Not Yet Ranked).

Rumex verticillatus Linnaeus. SWAMP DOCK. **Hab:** Tidal freshwater marshes and swamps, but also inland in disturbed areas. **Dist:** QC, ON, MN, and SD, south to s. FL and se. and c. TX. **Phen:** Apr-Jun; May-Jul. **Syn:** = Ar, Fl4, FNA5, GrPl, Il, Mi, NE, NY, S, Tn, Tx, Va; < *Rumex verticillatus* Linnaeus – C, F, G, GW2, K1, K3, K4, Pa, RAB, W, WH3.



284. DROSERACEAE Salisbury 1808 (SUNDEW FAMILY) [in CARYOPHYLLALES]

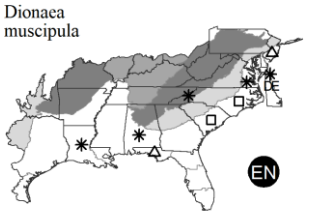
A family of 3 genera (*Drosera*, *Dionaea*, *Aldrovanda*) and about 100 species, nearly cosmopolitan. References: Kubitzki & Bayer (2003); Mellichamp (2015) in FNA6 (2015); Schnell (2002b).

2 Leaves catching insects via "snap-trap" leaves, with stiff marginal hairs; stamens 10-20; inflorescence cymose; [endemic to the Coastal Plain of se. NC and ne. SC] .. ***Dionaea***

2 Leaves catching insects via "flypaper" leaves, with gland-tipped hairs; stamens 5; inflorescence racemose; [collectively widespread in our area] ***Drosera***

Dionaea J. Ellis 1768 (VENUS FLYTRAP, MEADOW CLAM)

This monotypic genus, a perennial herb, is endemic to the Coastal Plain of NC and SC. References: Mellichamp (2015) in FNA6 (2015); Roberts & Oosting (1958); Schnell (2002b); Wood (1960).



Dionaea muscipula J. Ellis. VENUS FLYTRAP, MEADOW CLAM, TIPPITIWITCHET. **Hab:** Wet pine savannas, sandhill seepages. **Dist:** E. NC and ne. SC; also introduced outside that native range (including Panhandle FL, Yancey County in the mountains of NC, and s. NJ, where it persists and spreads to varying degrees). **Phen:** May-Jun; Jun-Jul. **Comm:** The shiny black seeds are exposed at the maturity and dehiscence of the capsule. Perhaps the most remarkable species in our flora, *Dionaea* has become increasingly rare and now receives some protection as a NC Special Concern species and a Convention on International Trade in Endangered Species "Appendix 2" species. Although collection and trade as a novelty item have contributed to the decline of *Dionaea*, its more fundamental problem is that faced by the great majority of Coastal Plain species in our area – destruction of habitat and fire suppression. In the fall-line Sandhills, *Dionaea* is now restricted to a very few sites on Fort Bragg; in the central Coastal Plain, it is also nearly extirpated. Substantial populations remain only in the Outer Coastal Plain, primarily in Brunswick, Pender, and Onslow counties. Ellis's Latin phrase describing the plant to Linnaeus (quoted in Croom 1837) is worth repeating for its succinctness: "Miraculum naturae! – folia biloba, radicalia, ciliata, sensibilia, conduplicanda, insecta incarcerantia". The colonial governor of North Carolina, Arthur Dobbs, wrote in 1759, "we have a kind of Catch Fly Sensitive which closes upon anything that touches it". Gibson (1991) shows that trap size and prey size are correlated; trap leaves of *Dionaea* primarily capture insects about 5 mm smaller than the length of the trap. Deliberately introduced and at least somewhat naturalized at other places in the Coastal Plain, notably Apalachicola National Forest, FL. **Syn:** = Fl4, FNA6, GW2, K1, K3, K4, RAB, S, WH3, Schnell (2002b). NatureServe G2 (Imperiled).

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Drosera Linnaeus 1753 (SUNDEW)

A genus of about 170 species, herbs, nearly cosmopolitan. References: Howard (2019); Mellichamp (2015) in FNA6 (2015); Rice, Robinson, & Fleischmann (2017); Schnell (1976); Schnell (1995); Schnell (2002b); Shinners (1962); Sorrie (1998a); Wood (1960); Wynne (1944).

1 Leaves filiform, the expanded leaf bases forming a corm-like base. ..... ***Drosera tracyi***
1 Leaves spatulate or suborbicular, the leaf bases not expanded.
  4 Inflorescence stipitate-glandular; basal rosettes 0.8-3.5 cm in diameter; leaf bases cuneate to narrowly cuneate, usually not parallel-sided for any part of their length; stipules absent or obsolete (consisting of a few hair-like segments); seeds black, crateriform ..... ***Drosera brevifolia***
  4 Inflorescence glabrous; basal rosettes (2-) 3-12 cm in diameter; leaf bases obviously petiolate, with parallel margins; stipules present, fimbriate; seeds light brown and longitudinally striate, or reddish brown to black and densely papillose, or brown and coarsely corrugated into 14-16 longitudinal ridges.
    5 Leaf blades wider than long, suborbicular or reniform; seeds about 6× as long as wide ..... ***Drosera rotundifolia***
    5 Leaf blades about as wide as long, spatulate to obovate; seeds 1-2× as long as broad.
      6 Petioles with few to many long trichomes; petals pink (sometimes fading to white); plants scapose; inflorescence straight at base; seeds coarsely corrugated into 14-16 longitudinal ridges ..... ***Drosera capillaris***
      6 Petioles glabrous; petals white; plants usually with a leafy stem 1-10 cm long; inflorescence arching at base; seeds reddish brown to black and densely papillose ..... ***Drosera intermedia***

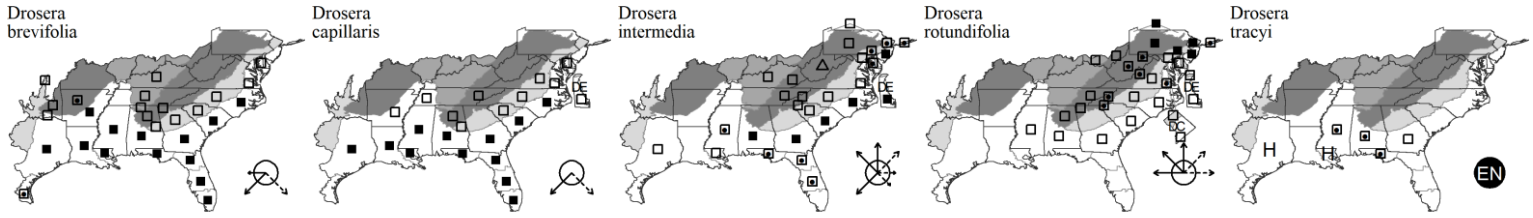
Drosera brevifolia Pursh. DWARF SUNDEW. **Hab:** Pine savannas, other wet sandy sites, rarely in seepage over rock outcrops. **Dist:** The species ranges from e. MD (Howard 2019) and se. VA south to s. FL and west to AR, OK, and TX; disjunct in sc. TN; disjunct in w. SC in the uppermost Piedmont (Blue Ridge Escarpment region); Cuba; Mexico; Central America; South America. **Phen:** Feb-May (-Jun). **Comm:** *D. leucantha* may be the correct name for this taxon; see Shinners (1962) and Wood (1966) for a contentious discussion of nomenclatural issues. **Syn:** = Ar, C, F, Fl4, FNA6, G, GrPl, GW2, K1, K3, K4, NcTx, S, Tn, Va, WH3, Schnell (2002b), Wood (1960), Wynne (1944); = *Drosera leucantha* Shinners – RAB, Shinners (1962); > *Drosera annua* E.L. Reed – Tx. NatureServe G5 (Secure).

Drosera capillaris Poiret. PINK SUNDEW. **Hab:** Pine savannas, other wet sandy or peaty sites. **Dist:** Se. VA south to s. FL and west to TX, rarely inland, as in TN; also extending into tropical America, in the West Indies, Mexico, and n. South America. **Phen:** May-Aug. **Syn:** = Ar, C, F, Fl4, FNA6, G, GW2, K1, K3, K4, RAB, S, Tn, Tx, Va, W, WH3, Schnell (2002b), Shinners (1962), Wood (1960), Wynne (1944). NatureServe G5 (Secure).

Drosera intermedia Hayne. WATER SUNDEW, SPOONLEAF SUNDEW. **Hab:** Pine savannas, ditches, pocosins, margins of pools or streams, often in standing water. **Dist:** *D. intermedia* is interruptedly circumboreal (Europe and the Caucasus in the Old World), in North America ranging from NL (Newfoundland) and MN south to c. peninsular FL and TX, and into tropical America (Cuba, n. South America). Reported as adventive in a single county in WV (Harmon, Ford-Werntz, & Grafton 2006). **Phen:** Jun-Sep. **Syn:** = C, F, Fl4, FNA6, G, GW2, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, Schnell (2002b), Shinners (1962), Wood (1960), Wynne (1944). NatureServe G5 (Secure).

Drosera rotundifolia Linnaeus. ROUNDLEAF SUNDEW. **Hab:** Mountain bogs and fens, seepages slopes, vertical seepages on rock (in the mountains) or clay (as along the Little River in the Sandhills of NC), northward also in Coastal Plain wetlands. **Dist:** A circumboreal species ranging south in North America to SC, ne. GA, e. and nc. TN, IL, and CA. **Phen:** Jul-Sep. **Tax:** Var. *comosa* Fernald (of ne. US and e. Canada) does not appear to warrant taxonomic recognition (Haines 2011). **Syn:** = C, FNA6, G, GrPl, GW2, Il, Mi, NE, NY, Pa, RAB, S, Tn, W, WV, Schnell (2002b), Shinners (1962), Wood (1960), Wynne (1944); > *Drosera rotundifolia* var. *comosa* – F, K1, K3, K4; > *Drosera rotundifolia* var. *rotundifolia* – F, K1, K3, K4, Va.

Drosera tracyi (Diels) MacFarlane. TRACY'S SUNDEW. **Hab:** Pine savannas, hillside seepage bogs; savanna/depression wetland ecotones. **Dist:** Sc. GA and Panhandle FL, west to e. LA. **Phen:** Apr-Jun. **Tax:** The notion that this species is not distinguishable from *D. filiformis* (or is only varietally distinct) is erroneous (Sorrie 1998a); see Schnell (1995) for a contrary view. **Comm:** *D. tracyi* has been reported for SC by various authors, including Wynne (1944), but the basis for these reports is unknown. **Syn:** = Fl4, FNA6, GW2, K1, K3, K4, WH3, Shinners (1962), Sorrie (1998a); = *Drosera filiformis* Rafinesque var. *tracyi* Diels – Schnell (2002b).



295. CARYOPHYLLACEAE A.L. de Jussieu 1789 (PINK FAMILY) [in CARYOPHYLLALES]

A family of about 86 genera and 2200-3000 species, herbs, shrubs, and trees, nearly cosmopolitan, but mostly Northern Hemisphere. References: Bittrich (1993) in Kubitzki, Rohwer, & Bittrich (1993); Madhani et al (2018); Rabeler & Hartman (2005a) in FNA5 (2005).

1 Stipules absent.
  2 Sepals fused into a toothed or lobed tube ..... ***Key A***
  2 Sepals distinct, or slightly fused at their bases ..... ***Key B***
1 Stipules present and readily apparent, scarious or hyaline.
  3 Fruit a utricle; seed 1 per fruit; petals absent. ..... ***Paronychia***
  3 Fruit a capsule; seeds 3-many per fruit; petals present.

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated

6 Stem leaves subulate, 1-2 mm long, pectinate-fringed at the base; basal rosette leaves spatulate (usually withering quickly after overwintering; stems wiry, stiff, subdichotomously branched; [of xeric sands on the Coastal Plain from se. VA southward] ..... ***Stipulicida***

6 Stem leaves larger, mostly both longer and broader, not pectinate-fringed at the base; basal rosette present or absent; stems either thicker, more flexuous, or not subdichotomously branched; [collectively more widespread].

7 Leaves appearing verticillate, 10-16 per node, filiform to linear; [tribe *Spergulaeae*] ..... ***Spergula***

7 Leaves opposite or in whorls of 4, linear to ovate or spatulate.

8 Leaves mostly in whorls of 4, obovate-spatulate, 2-8 mm long; [tribe *Polycarpaeae*] ..... ***Polycarpon***

8 Leaves opposite, linear or orbicular, 5-40 mm long.

9 Leaves orbicular-ovate; styles partly united; [tribe *Polycarpaeae*] ..... ***Drymaria***

9 Leaves linear; styles separate; [tribe *Spergulaeae*] ..... ***Spergularia***

Key A

1 Calyx immediately subtended by 1-3 pairs of bracts; [tribe *Caryophylleae*].

2 Calyx 20-40-nerved ..... ***Dianthus***

2 Calyx 15-nerved ..... ***Petrorhagia***

1 Calyx lacking subtending bracts.

3 Sepals 25-62 mm long; calyx lobes longer than the calyx tube, the lobes as long as or longer than the corolla lobes; [tribe *Sileneae*] ..... ***Agrostemma***

3 Sepals (1-) 10-28 (-40) mm long; calyx lobes shorter than the calyx tube, the lobes much shorter than the corolla lobes (except *Gypsophila*).

4 Styles 2; fruit valves 4; petals appendaged or not; [tribe *Caryophylleae*].

5 Sepals 1-5 mm long, the commissures between the sepals scarious. ..... ***Gypsophila***

5 Sepals 7-25 mm long, lacking commissures.

7 Calyx tubular, 20-nerved; petals appendaged; perennial ..... ***Saponaria***

7 Calyx ovoid, 5-nerved; petals not appendaged; annual ..... ***Gypsophila vaccaria***

4 Styles 3-5 (or 0 in staminate plants); fruit valves 3, 4, 5, 6, 8, or 10; petals generally appendaged; [tribe *Sileneae*]

8 Plant glabrous; calyx glabrous, narrowly funnelform, dilated above the midpoint; petals pink; stem with glutinous zones on upper internodes ..... ***Atocion***

8 Plant glabrous or pubescent; calyx glabrous or pubescent, either tubular (nearly the same diameter through its length) or broadened below the middle (flask-shaped); petals white or pink (rarely absent); stem lacking glutinous zones (except *S. antirrhina*).

9 Styles mostly 3; capsule with 3 or 6 teeth; calyx tubular or campanulate at anthesis, not greatly inflated (except in *S. vulgaris*) ..... ***Silene***

9 Styles mostly 5; capsule with 5 or 10 teeth; calyx tubular at anthesis, becoming strongly inflated later in *S. dioica* and *S. latifolia*.

11 Leaf blades with dense silky white hairiness; flowers bisexual; [or former *Lychnis* section *Agrostemma*] ..... ***Silene coronaria***

11 Leaf blades variously pubescent, but not with silky-appressed pubescence; [*Silene* section *Melandrium*] ..... ***Silene***

Key B

1 Petals absent; fruit a 1-seeded, indehiscent utricle; styles 2; [tribe *Scleranthea*] ..... ***Scleranthus***

1 Petals present (rarely obsolete or essentially absent); fruit a few-many seeded capsule; styles 3-5.

3 Styles 4-5.

4 Leaves linear-subulate, < 2 mm wide; styles 4-5. ..... ***Sagina***

4 Leaves ovate, obovate, > 4 mm wide; styles 5; [tribe *Alsineae*]. ..... ***Cerastium***

3 Styles 3.

7 Inflorescence umbelliform; petals irregularly denticulate at apex; [tribe *Alsineae*] ..... ***Holosteum***

7 Inflorescence cymose or racemiform; petals entire, notched, or deeply cleft.

8 Petals shallowly to deeply 2-cleft, notched at least 1/4 of the length, often divided nearly to the base and then appearing almost as 10 petals; [tribe *Alsineae*].

9 Capsule cylindric, twice as long as the sepals; petals 2-cleft 1/5 - 1/2 length; styles (3-) 5 (-6), 0.5-2 mm long ..... ***Cerastium***

9 Capsule spherical, ellipsoid, or globose, as long as or slightly longer than the sepals; petals 2-cleft 2/3-3/4 length (1/2 length in *Rabelera*); styles (2-) 3 (-5), 0.2-7 mm long ..... ***Stellaria***

8 Petals entire, or emarginate.

11 Valves or teeth of the capsule as many as the styles.

12 Leaves strongly basally disposed, most in the lowermost 1/3 of the stem, and overlapping (the internodes < the leaf length; leaves firm, with axillary fascicles of leaves; [tribe *Sagineae*] ..... ***Sabulina***

12 Leaves evenly distributed along the stem and widely spaced (the internodes > the leaf length); leaves herbaceous to slightly fleshy, generally without axillary fascicles of leaves.

13 Sepals 4; petals 0; [tribe *Sagineae*] ..... ***Sabulina***

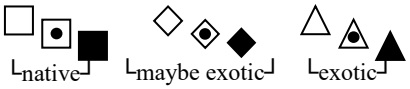
13 Sepals 5; petals 5; [tribe *Scleranthea*] ..... ***Geocarpon***

11 Valves or teeth of the capsule twice as many as the styles.

15 Capsule straight; petals entire or barely emarginated; [tribe *Arenarieae*] ..... ***Arenaria***

15 Capsule cylindrical, and often somewhat curved; petals emarginate to bifid; [tribe *Alsineae*] ..... ***Cerastium***

Key to Map Symbology:

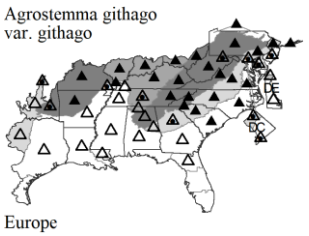


←rare ←uncommon ←common (see introduction for more)

* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable

X : extirpated



Agrostemma Linnaeus 1753 (CORNCOCKLE)

A genus of 2 species, herbs, of temperate Eurasia. References: Bittrich (1993) in Kubitzki, Rohwer, & Bittrich (1993); Thieret (2005) in FNA5 (2005).

* ***Agrostemma githago*** Linnaeus *var*. ***githago***. CORNCOCKLE, PURPLE COCKLE, CORN-CAMPION. **Hab:** Fields, disturbed areas. **Dist:** Native of Europe. **Phen:** Mar-Jul. **Syn:** = Ar, FNA5, NE, NY, Va; < *Agrostemma githago* – C, F, Fl4, G, GrPl, Il, K1, K3, K4, Mi, NcTx, Pa, RAB, S, Tn, Tx, W, WH3. NatureServe GNRTNR (Not Yet Ranked).

Arenaria Linnaeus 1753 (SANDWORT)

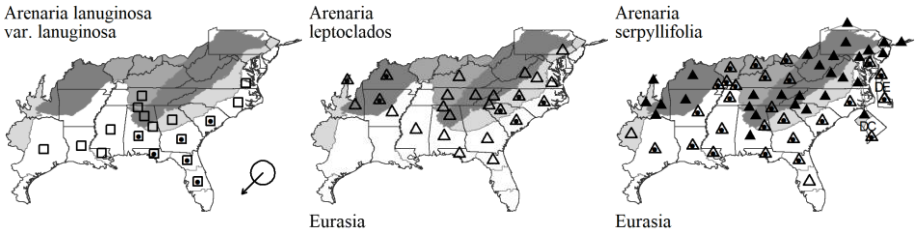
A genus of about 150-210 species, herbs, of temperate and subarctic regions of the Northern Hemisphere, extending southward to the montane tropics of South America and Africa. References: Abuhadra (2000); Bittrich (1993) in Kubitzki, Rohwer, & Bittrich (1993); Hartman, Rabeler, & Utech (2005) in FNA5 (2005).

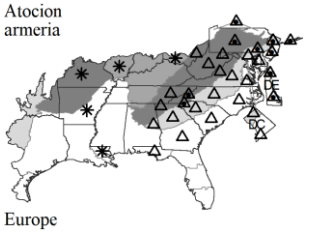
1 Leaves lanceolate to oblanceolate, (7-) 15-32 mm long, 2-8 (-14) mm wide; perennial, stems to 8 dm long..... ***Arenaria lanuginosa var. lanuginosa***
1 Leaves ovate, 3-8 mm long, 1-4 mm wide; annual, stems to 3 dm long.
  2 Fruiting calyx lobes papillate (at 40× magnification); capsule nearly straight-sided, nearly as wide near the top as at the base ..... ***Arenaria leptoclados***
  2 Fruiting calyx lobes not papillate (at 40× magnification); capsule ovoid, distinctly broader at the base ..... ***Arenaria serpyllifolia***

Arenaria lanuginosa (Michaux) Rohrbach *var*. ***lanuginosa***. SPREADING SANDWORT. **Hab:** Dunes, maritime forests, coquina limestone outcrops, other rocky bluffs. **Dist:** Se. VA south to c. peninsular FL, west to e. TX, AR, and Mexico, and north in the interior to sc. TN (Chester, Wofford, & Kral 1997). **Phen:** May-Jul. **Comm:** Var. *saxosa* is native to sw. United States and south into Mexico. **Syn:** = C, FNA5, Tx, Va; = *Arenaria lanuginosa* ssp. *lanuginosa* – G; < *Arenaria lanuginosa* – F, Fl4, RAB, S, Tn, WH3; > *Arenaria lanuginosa* ssp. *lanuginosa* var. *lanuginosa* – K1, K3, K4; > *Arenaria lanuginosa* ssp. *lanuginosa* var. *longepedunculata* Duncan – K1, K3, K4.

* ***Arenaria leptoclados*** (Reichenbach) Gussone. SMALL THYME-LEAVED SANDWORT, SLENDER SANDWORT. **Hab:** Disturbed areas. **Dist:** Native of Eurasia. The relative ranges, habitats, and abundance of the *A. leptoclados* and *A. serpyllifolia* are poorly known; additional herbarium work is needed. **Phen:** Mar-Jun. **Comm:** This and *A. serpyllifolia* s.s. have been treated variously by workers in their native range and where introduced (as here). *A. leptoclados* is diploid (2n=20), whereas *A. serpyllifolia* is tetraploid (2n=40). **Syn:** = K4, S, Va, Abuhadra (2000); = *Arenaria serpyllifolia* Linnaeus ssp. *leptoclados* (Reichenbach) Nyman – Fl4, NE, WH3; = *Arenaria serpyllifolia* Linnaeus var. *tenuior* Mertens & W.D.J. Koch – Ar, C, F, FNA5, G, K3, Pa, Tn; < *Arenaria serpyllifolia* Linnaeus – GrPl, K1, RAB, W. NatureServe GNRTNR (Not Yet Ranked).

* ***Arenaria serpyllifolia*** Linnaeus. LARGE THYME-LEAVED SANDWORT. **Hab:** Disturbed areas. **Dist:** Native of Eurasia. The relative ranges, habitats, and abundance of this and *A. leptoclados* in our area are poorly known. **Phen:** Mar-Jul. **Syn:** = K4, NcTx, NY, S, Tx, Va, Abuhadra (2000); = *Arenaria serpyllifolia* ssp. *serpyllifolia* – Fl4, NE, WH3; = *Arenaria serpyllifolia* var. *serpyllifolia* – Ar, C, F, FNA5, G, K3, Pa, Tn; < *Arenaria serpyllifolia* Linnaeus – GrPl, Il, K1, Mi, RAB, W. NatureServe GNRTNR (Not Yet Ranked).





Atocion Adanson 1763 (SWEET WILLIAM CATCHFLY)

A genus of 5 species, of Europe. Frajman, Heidari, & Oxelman (2009) and earlier studies clearly show that *Atocion* cannot be reasonably included in *Silene*. References: Frajman, Heidari, & Oxelman (2009).

* ***Atocion armeria*** (Linnaeus) Rafinesque. SWEET WILLIAM CATCHFLY, NONE-SO-PRETTY, GARDEN CATCHFLY. **Hab:** Disturbed areas. **Dist:** Native of Europe. **Phen:** Jun-Oct. **Syn:** = K3, K4, Mi, NE, NY, Frajman, Heidari, & Oxelman (2009); = *Silene armeria* Linnaeus – Ar, C, F, Fl4, FNA5, G, Il, K1, Pa, RAB, Va, W, WH3, WV. NatureServe GU (Unrankable).

Cerastium Linnaeus 1753 (MOUSE-EAR CHICKWEED, MOUSE-EAR)

A genus of about 100 species, herbs, especially north temperate but nearly cosmopolitan. References: Bittrich (1993) in Kubitzki, Rohwer, & Bittrich (1993); Gustafson et al (2003); Morton (2005a) in FNA5 (2005); Pennell (1930); Rabeler & Thieret (1988); Scheen et al (2004); Sharples & Tripp (2019).

6 Perennial, matted at the base and rooting at the nodes.
  7 Sepals 5-7 mm long; petals 5-7 mm long; capsules cylindric, 9-13 mm long mm long..... ***Cerastium fontanum ssp. vulgare***
  7 Sepals 2.5-3 mm long; petals 2.5-3.5 mm long; capsules broadly ovoid, 4-5 mm long..... ***Cerastium parvum***
6 Annual, taprooted.
  8 Sepals with long, appressed, eglandular hairs extending beyond the tip of the sepal.

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

9 Inflorescence an open cyme, most of the pedicels longer than the sepals ..... ***Cerastium brachypetalum***
9 Inflorescence a compact, cymose cluster, most of the pedicels shorter than the sepals ..... ***Cerastium glomeratum***
8 Sepals lacking long, appressed, eglandular hairs.
12 Bracts of the inflorescence with distinctly scarious margins; leaves mostly 0.5-1.0- (-1.5) cm long.
13 Petals equaling or surpassing the sepals; cleft in petal apex 1.0-1.5 mm deep ..... ***Cerastium pumilum***
13 Petals shorter than the sepals; cleft in petal apex 0.2-0.5 (-0.9) mm deep ..... ***Cerastium semidecandrum***
12 Bracts of the inflorescence with green margins; leaves mostly (1.0-) 1.5-8 cm long.
14 Pedicels 3-10 (-15) mm long; leaves to 3.5 cm long ..... ***Cerastium brachypodum***
14 Pedicels (10-) 15-40 (-55) mm long; leaves to 8 cm long ..... ***Cerastium nutans***

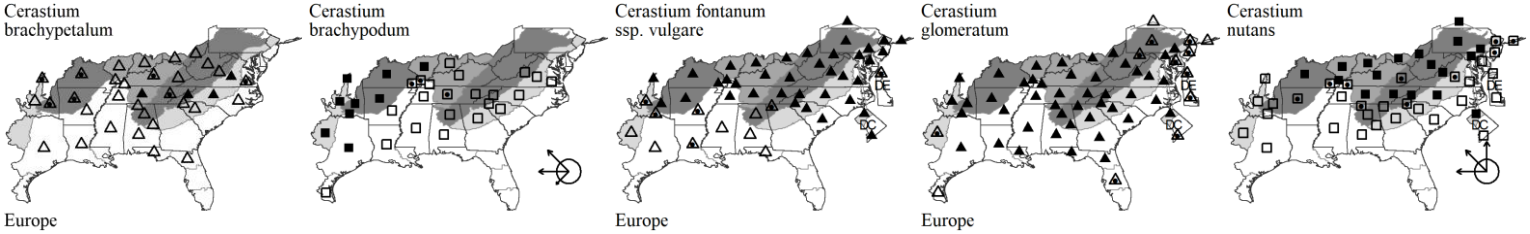
* ***Cerastium brachypetalum*** Desportes. GRAY MOUSE-EAR. **Hab:** Lawns, roadsides, disturbed areas. **Dist:** Native of Europe. The reports of *C. tetrandrum* for e. VA in F and G are actually this species. **Phen:** Apr-Jun. **Syn:** = C, F, Fl4, FNA5, G, GrPl, Il, K4, Mo2, NcTx, RAB, Tn, Va, W, WH3; > *Cerastium brachypetalum* ssp. *brachypetalum* – K1; >< *Cerastium tetrandrum* W. Curtis – F, G. NatureServe GNR (Not Yet Ranked).

Cerastium brachypodum (Engelmann ex A. Gray) B.L. Robinson. **Hab:** Disturbed areas, roadsides, fields, lawns. **Dist:** IL west to AB and OR, south to NC, nc. GA (Jones & Coile 1988), and AZ. This taxon is perhaps only introduced in the eastern parts of our region from farther west. **Phen:** Apr-May. **Syn:** = Ar, F, FNA5, GrPl, Il, K1, K3, K4, Mi, Mo2, NcTx, S, Tn, Tx; = *Cerastium nutans* Rafinesque var. *brachypodum* Engelmann ex A. Gray – G, RAB, W; < *Cerastium nutans* Rafinesque – C.

* ***Cerastium fontanum*** Baumgartner *ssp.* ***vulgare*** (Hartman) Greuter & Burdet. COMMON MOUSE-EAR. **Hab:** Fields, disturbed areas. **Dist:** Native of Europe. **Phen:** Mar-Jun. **Syn:** = Ar, Fl4, FNA5, K1, K3, K4, Mo2, NcTx, NE, NY, Pa, Tn, Va, WH3; = *Cerastium holosteoides* Fries var. *vulgare* (Hartman) Hylander – RAB; = *Cerastium vulgatum* Linnaeus – C, GrPl, S; < *Cerastium fontanum* – Il, Mi; ? *Cerastium fontanum* ssp. *triviale* (Link) Jalas – W; > *Cerastium vulgatum* var. *hirsutum* Fries – G; > *Cerastium vulgatum* var. *holosteoides* (Fries) Wahlenberg – F, G, Tx; > *Cerastium vulgatum* var. *vulgatum* – F, G, Tx.

* ***Cerastium glomeratum*** Thuillier. STICKY MOUSE-EAR. **Hab:** Fields, disturbed areas, lawns. **Dist:** Native of Europe. **Phen:** Feb-May. **Syn:** = Ar, Fl4, FNA5, GrPl, Il, K1, K3, K4, Mi, Mo2, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, W, WH3; = *Cerastium viscosum* Linnaeus – C, F, G, S. NatureServe GNR (Not Yet Ranked).

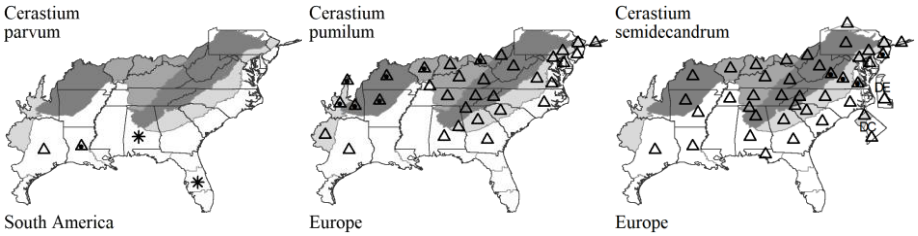
Cerastium nutans Rafinesque. **Hab:** Alluvial forests, bottomlands, moist forests. **Dist:** NS west to NT, south to SC, GA, AZ, Mexico, and OR. **Phen:** Apr-May. **Syn:** = F, GrPl, Il, Mi, NcTx, Tn, Tx, Va, WV; = *Cerastium nutans* ssp. *nutans* – Mo2, NE; = *Cerastium nutans* var. *nutans* – G, K1, K3, K4, RAB, W; > *Cerastium longepedunculatum* Willdenow ex Britton – S; < *Cerastium nutans* Rafinesque – C, Pa; > *Cerastium nutans* var. *nutans* – Ar, FNA5, NY. NatureServe G5T5 (Secure).



* ***Cerastium parvum*** (Pedersen) M.T. Sharples & E. Tripp. PYGMY STARWORT. **Hab:** Ditches and other moist, disturbed areas. **Dist:** Native of South America. **Phen:** Apr-Oct. **Syn:** = Sharples & Tripp (2019); = *Stellaria parva* Pedersen – Fl4, FNA5, K3, K4, WH3. NatureServe GNR (Not Yet Ranked).

* ***Cerastium pumilum*** W. Curtis. DWARF MOUSE-EAR. **Hab:** Disturbed areas. **Dist:** Native of Europe. **Phen:** Apr-May. **Comm:** See Rabeler & Thieret (1988) for discussions and reports. **Syn:** = Ar, C, F, FNA5, G, Il, K1, K3, K4, Mi, Mo2, NcTx, NY, Pa, Tn; ? *Cerastium pumilum* ssp. *pumilum* – NE.

* ***Cerastium semidecandrum*** Linnaeus. LITTLE MOUSE-EAR. **Hab:** Disturbed areas. **Dist:** Native of Europe. Reported for SC by Nelson & Kelly (1997). **Phen:** Apr-Jun. **Comm:** Inconspicuous and easily overlooked. **Syn:** = Ar, C, F, Fl4, FNA5, G, Il, K1, K3, K4, Mi, Mo2, NE, NY, Pa, RAB, S, Tn, Va, W, WH3. NatureServe GNR (Not Yet Ranked).



Dianthus Linnaeus 1753 (PINK, CARNATION)

A genus of about 300-320 species, herbs, of Eurasia and Africa. Species other than those treated here are grown in gardens and may escape or persist. References: Bittrich (1993) in Kubitzki, Rohwer, & Bittrich (1993); Rabeler & Hartman (2005f) in FNA5 (2005).

1 Flowers clustered in crowded cymes, short-pedicelled; [subgenus *Carthusianastrum*].
2 Leaves 2-5 (-8) mm wide; annual or biennial; inflorescence pubescent ..... ***Dianthus armeria ssp. armeria***
2 Leaves mostly (8-) 10-20 mm wide; perennial; inflorescence glabrous ..... ***Dianthus barbatus ssp. barbatus***
1 Flowers solitary, or few, long-pedicelled; [subgenus *Dianthus*].
..... ***Dianthus plumarius ssp. plumarius***

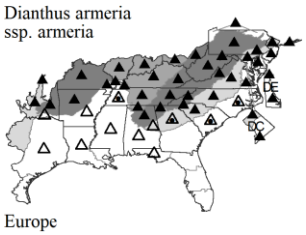
Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

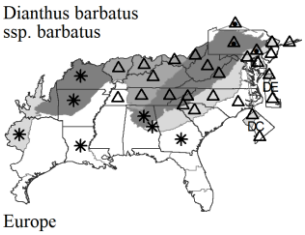
295. CARYOPHYLLACEAE

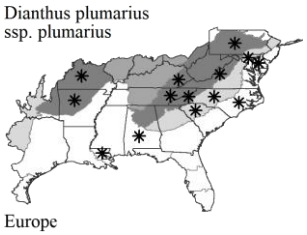
* ***Dianthus armeria*** Linnaeus *ssp.* ***armeria***. DEPTFORD PINK. **Hab:** Fields, roadsides, pastures. **Dist:** Native of Europe. **Phen:** May-Sep. **Tax:** Another subspecies occurs in Eurasia. **Syn:** = Ar, FNA5, Mo2, NY, Va; < *Dianthus armeria* – C, F, Fl4, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, Pa, RAB, S, Tn, W, WH3, WV. NatureServe GNRTNR (Not Yet Ranked).

* ***Dianthus barbatus*** Linnaeus *ssp.* ***barbatus***. SWEET WILLIAM. **Hab:** Cultivated as an ornamental, rarely escaped to disturbed areas. **Dist:** Native of Europe. **Phen:** Jun-Aug. **Tax:** Another subspecies occurs in Eurasia. **Syn:** = Ar, FNA5, Mo2, NY; < *Dianthus barbatus* – C, F, G, Il, K1, K3, K4, Mi, NcTx, NE, Pa, RAB, Tn, WV. NatureServe GNRTNR (Not Yet Ranked).

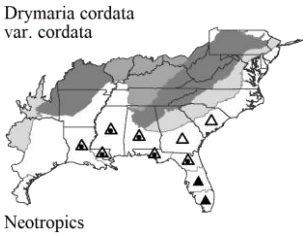
* ***Dianthus plumarius*** Linnaeus *ssp.* ***plumarius***. GARDEN PINK, GRASS PINK, COTTAGE PINK. **Hab:** Cultivated as an ornamental, rarely escaped to disturbed areas. **Dist:** Native of e. Europe. **Phen:** Jun-Aug. **Tax:** Additional subspecies occur in e. Europe. **Syn:** = FNA5, Mo2, NY; < *Dianthus plumarius* – C, F, G, Il, K1, K3, K4, Mi, NE, RAB. NatureServe GNRTNR (Not Yet Ranked).







Drymaria Willdenow ex J.A. Schultes 1819 (DRYMARY)



A genus of about 48 species, herbs, mostly New World (tropical to temperate), but 1 species pantropical.
References: Bittrich (1993) in Kubitzki, Rohwer, & Bittrich (1993); Duke (1961); Hartman (2005a) in FNA5 (2005).

* ***Drymaria cordata*** (Linnaeus) Willdenow ex Roemer & J.A. Schultes *var.* ***cordata***. DRYMARY, WEST INDIAN CHICKWEED. **Hab:** Moist hammocks, moist disturbed areas. **Dist:** Sc. GA south to s. FL south into the New World tropics, the North American distribution probably all adventive (not reported for the Southeastern US by Chapman 1883, Mohr 1901, or Small 1903); also Old World tropics. **Tax:** Var. *diandra* Blume is restricted to the Old World. **Syn:** = FNA5; = *Drymaria cordata* ssp. *cordata* – K1, K3, K4, Duke (1961); < *Drymaria cordata* – Bah, Fl4, S, WH3. NatureServe GNRTNR (Not Yet Ranked).

Geocarpon Mackenzie 1914

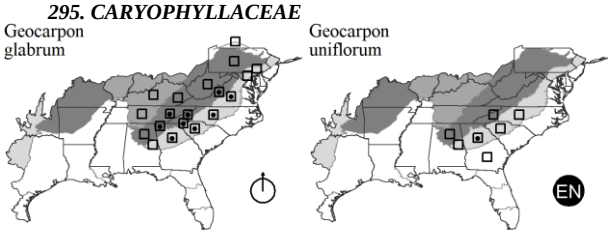
A genus of 7 species, annual and perennial herbs, centered in eastern North America. See Schilling et al. (2022) for detailed information.

2 Flowers solitary in leaf axils; petals absent; [calcareous seepage, KY, TN, n. AL] ..... ***Sabulina fontinalis***
2 Flowers (1-) 5-50+ in terminal corymbose cymes; petals present.
  3 Sepals acute to acuminate at the tip; sepal venation prominently 3- or 5-veined, or (in *Geocarpon nuttallii*) obscure.
    4 Plants perennial from woody crowns; leaves rigid, with axillary fascicles; pedicels glabrous ..... ***Sabulina michauxii***
    4 Plants either annual or perennial from slender wintering stems; leaves flexuous, lacking axillary fascicles; pedicels sparsely to densely stipitate-glandular.
      5 Stems prostrate or decumbent, leafy throughout; [of moist habitats] ..... ***Sabulina paludicola***
      5 Stems erect, leafy mostly near the base, the stem leaves few in number and reduced in size upward; [of moist to dry upland habitats].
        6 Sepals 3-nerved; leaves narrowly lanceolate to narrowly oblanceolate, (0.6-) 1.5-3.2 mm wide; seeds 0.7-0.9 mm long, the surface appearing pebbled or with short papillae, black ..... ***Sabulina muscorum***
        6 Sepals 5-nerved or 5-ribbed; leaves narrowly olinear to linear, 0.5-1.5 (-1.8) mm wide; seeds 0.5-0.7 mm long, the surface tuberculate, reddish brown to black ..... ***Sabulina patula***
  3 Sepals obtuse or rounded at the tip; sepal venation obscure.
    10 Seeds 0.4-0.6 mm long, suborbicular, lacking an adaxial groove; petals oblanceolate, not clawed ..... ***Geocarpon uniflorum***
    10 Seeds 0.5-0.8 mm long, obliquely triangular, with an adaxial groove; petals clawed, broadly obovate. ..... ***Geocarpon glabrum***

Geocarpon glabrum (Michaux) E.E. Schilling. APPALACHIAN SANDWORT. **Hab:** Granitic flatrocks, other outcrops of granite, granitic gneiss, or other felsic gneisses and schists, in the mountains restricted to low or medium elevations. **Dist:** ME and NH south to w. GA (Jones & Coile 1988) and AL, primarily on the Piedmont and also in the Cumberlands (Chester, Wofford, & Kral 1997). **Phen:** Apr-May. **Syn:** = Schilling et al (2022), in press; = *Arenaria glabra* Michaux – GW2, W; = *Arenaria groenlandica* (Retzius) Sprengel var. *glabra* (Michaux) Fernald – C, F, G, RAB; = *Minuartia glabra* (Michaux) Mattfeld – FNA5, Il, K1, K3, NE, Pa, Va; = *Mononeuria glabra* (Michaux) Dillenberger & Kadereit – K4, NY, Tn, Dillenberger & Kadereit (2014); = *Sabulina glabra* (Michaux) Small – S. NatureServe G4 (Apparently Secure).

Geocarpon uniflorum (Walter) E.E. Schilling. **Hab:** Granitic flatrocks, outcrops of Altamaha grit. **Dist:** S. NC south to c. GA, west to ec. AL, on the Piedmont and extending into the Coastal Plain of Georgia on Altamaha grit. **Phen:** Apr-May. **Tax:** *Minuartia alabamensis*, named on the basis of its tiny flowers, has been shown to be a self-pollinating form of *Mononeuria uniflora* which has arisen repeatedly and independently at various sites in the range of *Mononeuria uniflora*. **Syn:** = Schilling et al (2022), in press; = *Arenaria uniflora* (Walter) Muhlenberg – RAB; = *Minuartia uniflora* (Walter) Mattfeld – FNA5, K1, K3; = *Mononeuria uniflora* (Walter) Dillenberger & Kadereit – K4, Dillenberger & Kadereit (2014); = *Sabulina brevifolia* (Nuttall ex Torrey & A. Gray) Small – S; > *Arenaria alabamensis* J.F. McCormick, Bozeman, & Spongberg – GW2, W; > *Arenaria uniflora* (Walter) Muhlenberg – GW2, W.

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



Gypsophila Linnaeus 1754 (BABY'S-BREATH)

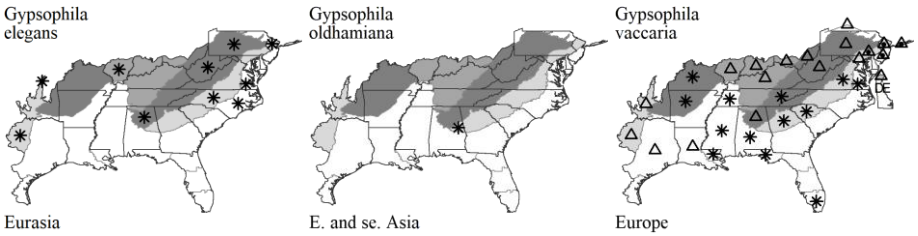
A genus of about 150 species, annual and perennial herbs, of temperate Eurasia, Africa, and Australia. References: Pringle (2005) in FNA5 (2005).

1 Calyx 9-17 mm long, urnlike in shape (constricted upwards), with 5 prominent winged ridges with a cordlike marginal vein ..... ***Gypsophila vaccaria***
1 Calyx 1-5 mm long, cuplike in shape (widening upwards), not winged.
  2 Inflorescence dense, subcapitate ..... ***Gypsophila oldhamiana***
  2 Inflorescence diffuse.
  ..... ***Gypsophila elegans***

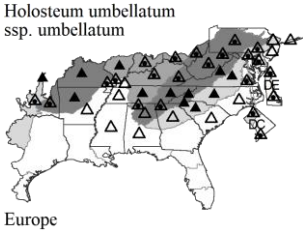
* ***Gypsophila elegans*** M. Bieberstein. ANNUAL BABY'S-BREATH. **Hab:** Disturbed areas, persistent from cultivation, doubtfully established. **Dist:** Native of Eurasia. **Phen:** May-Jun. **Comm:** See Rabeler & Thieret (1988) for additional information. **Syn:** = C, FNA5, GrPl, Il, K1, K3, K4, Mi, NE, NY. NatureServe GNR (Not Yet Ranked).

* ***Gypsophila oldhamiana*** F.A.W. Miquel. MANCHURIAN BABY'S-BREATH. **Hab:** Waif in field. **Dist:** Native of e. Asia. **Syn:** = FNA5, K3, K4. NatureServe GNR (Not Yet Ranked).

* ***Gypsophila vaccaria*** (Linnaeus) Smith. COW-COCKLE, COW-HERB, COW-SOAPWORT. **Hab:** Fields, disturbed areas. **Dist:** Native of Europe. The record from VA (Arlington County) probably represents a waif. **Phen:** May-Jul. **Syn:** = K4, Madhani et al (2018); = *Saponaria vaccaria* Linnaeus – F, WV; = *Vaccaria hispanica* (P. Miller) Rauschert – Ar, C, Fl4, FNA5, Il, K1, K3, Mi, NcTx, NE, NY, Pa, WH3; = *Vaccaria pyramidata* Medikus – GrPl, RAB, Tx; = *Vaccaria vaccaria* (Linnaeus) Britton – S; ? *Vaccaria segetalis* Garcke ex Ascherson – G. NatureServe GNR (Not Yet Ranked).



Holosteum Linnaeus 1753 (JAGGED CHICKWEED)



A genus of 3-4 species, herbs, of temperate Eurasia. References: Bittrich (1993) in Kubitzki, Rohwer, & Bittrich (1993); Rabeler & Hartman (2005d) in FNA5 (2005); Shinners (1965).

* ***Holosteum umbellatum*** Linnaeus *ssp.* ***umbellatum***. JAGGED CHICKWEED. **Hab:** Fields, roadsides, lawns, disturbed shale barrens, other disturbed areas. **Dist:** Native of Europe. **Phen:** Mar-Jun. **Tax:** Four additional subspecies are not known to be present in North America. **Syn:** = Ar, FNA5, Mo2, NE, NY, Va; < *Holosteum umbellatum* – C, F, G, GrPl, Il, K1, K3, K4, Mi, Oh3, Pa, RAB, S, Tn, W, WV. NatureServe GNRTNR (Not Yet Ranked).

Paronychia P. Miller 1754 (WHITLOW-WORT, NAILWORT)

A genus of about 110 species, herbs and shrubs, nearly cosmopolitan in distribution. This genus consists mostly of plants of dry rocky or sandy habitats. References: Bittrich (1993) in Kubitzki, Rohwer, & Bittrich (1993); Chaudhri (1968); Hartman, Thieret, & Rabeler (2005) in FNA5 (2005); Rohrer (1997); Schenk & Appleton (2021); Schenk et al (2018); Shinners (1962h); Turner (1983); Ward (1977a); Ward (1977b).

Identification Notes: Magnification of at least 10× is necessary for the identification of many of the taxa.

1 Sepal lobes with a long (0.5-2.1+ mm long) awn attached at or below their apices.
  2 Sepal awns white.
  ..... ***Paronychia argyrocoma***
  2 Sepal awns green to brown or yellow.
    5 Leaves elliptic to ovate or spatulate, 1-6 mm wide, 2-4× as long as wide; [Coastal Plain of NC, SC, GA, AL, and FL] ..... ***Paronychia herniarioides***
    5 Leaves linear or subulate, 0.3-1 mm wide, 10-20+× as long as wide; [west of the Mississippi River, or disjunct eastwards in the inland provinces of AL, GA, VA, WV, MD, and DC].
    ..... ***Paronychia virginica***

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

295. CARYOPHYLLACEAE

1 Sepal lobes rounded or with a short (< 0.3 mm long) mucro or cusp.
 11 Sepals petaloid, the tip, margins, or entire sepal whitish; perigynous zone very well developed (mostly equaling or somewhat longer than the sepals); [of the Coastal Plain, from SC southward and westward]; [subgenus *Siphonychia*].
  12 Sepals glabrous to the base; plant a cespitose perennial with ascending annual stems.
   13 Stems minutely gray-puberulent ..... ***Paronychia erecta var. corymbosa***
   13 Stems glabrous and often also glaucous ..... ***Paronychia erecta var. erecta***
  12 Sepals densely pubescent on the basal portion (glabrous above); plant a sprawling, ascending or erect annual.
   14 Pubescent portion of the sepal nearly ½ its length; sepals broadly rounded and hooded; stem glabrous or one side with curly hairs ..... ***Paronychia americana***
   14 Pubescent portion of the sepal <1/3 its length; sepals narrowed toward the apex, with a short tooth or awn; stem uniformly pubescent with retrorse hairs.
    15 Stem spreading or ascending, the branching unevenly dichotomously, the flowers therefore in diffuse cymes; glabrous portion of the sepal 0.8 mm long ..... ***Paronychia patula***
    15 Stem erect, the branching symmetrical and dichotomous, the flowers therefore in weirdly geometric, tight square cymes; glabrous portion of the sepal > 1.1 mm long ..... ***Paronychia rugelii***
 11 Sepals not petaloid, green, sometimes scarious-margined; perigynous zone somewhat shorter than the sepals; [of various provinces, collectively widespread in our area]; [subgenus *Paronychia*].
  16 Leaves with a distinctly ciliate margin; plants prostrate, the branching below the inflorescence not pseudo-dichotomous.
   17 Plant an annual (-biennial); stems 1-4 dm long, uniformly and minutely recurved-puberulent; flowers 1.25-1.4 mm long, shortly ciliate to nearly glabrous; sepals ca. 1 mm long, oval-oblong, the margin ciliolate; style 0.4-0.5 mm long, bifid; fruit rounded at the top ..... ***Paronychia baldwinii ssp. baldwinii***
   17 Plant a perennial; stems 2-12 dm long, glabrous or minutely puberulent in longitudinal bands; flowers 1.45-1.55 mm long, more or less glabrous; sepals 1-1.2 mm long, oblong, with a brownish margin; style 0.35-0.4 mm long, the 2 lobes divergent-recurved at maturity; fruit narrowed to the top ..... ***Paronychia baldwinii ssp. riparia***
  16 Leaves entirely glabrous or with a slightly ciliate-serrulate margin; plants erect, suberect, or somewhat prostrate, pseudo-dichotomously branched.
   19 Stems glabrous; leaves oval-elliptic, 5-25 mm long, 2-8 (-10) mm wide, obtuse (rarely sub-obtuse or acute), very thin in texture, deep-green; calyx 0.9-1.3 mm long; sepals 0.5-1 mm long, herbaceous ..... ***Paronychia canadensis***
   19 Stems retrorsely puberulent (sometimes sparsely so); leaves oblanceolate, 5-15 mm long, 2-5 mm wide, acute (rarely sub-obtuse to obtuse), firm in texture, dull brownish-green; calyx 1.1-1.6 mm long; sepals 1-1.2 mm long, leathery. ..... ***Paronychia fastigiata var. fastigiata***

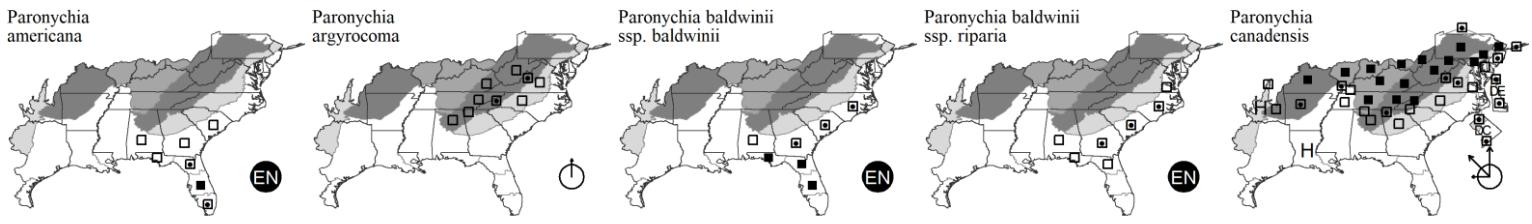
Paronychia americana (Nuttall) Fenzl ex Walpers. AMERICAN WHITLOW-WORT. **Hab:** Longleaf pine sandhills, Florida scrub. **Dist:** S. SC south to GA and s. FL. **Phen:** Jun-Sep. **Tax:** Two taxa have been questionably distinguished. Ssp. *americana*, with the cymes many-flowered and forming spheroidal glomerules, has the range of the species; ssp. *pauciflora* (Small) Chaudhri, differing in its laxer, more open cymes, is restricted to s. GA and n. FL. **Syn:** = Fl4, FNA5, K3, K4, WH3, Shinners (1962h), Ward (1977a), Ward (1977b); > *Paronychia americana* (Nuttall) Fenzl ex Walpers – RAB; > *Paronychia americana* (Nuttall) Fenzl ex Walpers ssp. *americana* – K1, Chaudhri (1968); > *Paronychia americana* (Nuttall) Fenzl ex Walpers ssp. *pauciflora* (Small) Chaudhri – K1, Chaudhri (1968); > *Siphonychia americana* (Nuttall) Torrey & Gray – S; > *Siphonychia pauciflora* Small – S.

Paronychia argyrocoma (Michaux) Nuttall. SILVERLING, SILVER WHITLOW-WORT. **Hab:** Thin soils of rock outcrops, especially on mountain summits at medium to high elevations, disjunct to a few Piedmont monadnocks. **Dist:** A characteristic component of the summit flora of Southern Appalachian peaks, *P. argyrocoma* occurs in the mountains of New England (ME, NH, VT, and MA), and in the Southern Appalachians of WV, VA, NC, TN, n. GA (Jones & Coile 1988), and n. AL. **Phen:** Jul-Sep. **Syn:** = C, FNA5, K1, K3, K4, NE, RAB, S, Tn, Va, W, WV; > *Paronychia argyrocoma* var. *albimontana* Fernald – F, G, Chaudhri (1968); > *Paronychia argyrocoma* var. *argyrocoma* – F, G.

Paronychia baldwinii (Torrey & A. Gray) Fenzl ex Walpers *ssp.* ***baldwinii***. ANNUAL DUNE WHITLOW-WORT. **Hab:** Dry sandy sites, woodlands or dunes. **Dist:** E. NC south to c. peninsular FL and west to AL (and LA?), on the Coastal Plain. **Phen:** Jun-Oct. **Syn:** = K1, Chaudhri (1968), Ward (1977a), Ward (1977b); = *Anychiastrum baldwinii* (Torrey & Gray) Small – S; < *Paronychia baldwinii* – Fl4, FNA5, K3, K4, WH3; < *Paronychia riparia* Chapman – RAB. NatureServe G4TNR (Not Yet Ranked).

Paronychia baldwinii (Torrey & A. Gray) Fenzl ex Walpers *ssp.* ***riparia*** (Chapman) Chaudhri. PERENNIAL DUNE WHITLOW-WORT. **Hab:** Dry sandy sites, woodlands or dunes. **Dist:** Se. VA south to n. FL (and AL?), on the Coastal Plain. **Phen:** Jun-Oct. **Comm:** Though Chaudhri (1968) and Ward (1977a and 1977b) independently reached the conclusion to reduce *P. riparia* to a subspecies of *P. baldwinii*, neither stated any reasons for their choice of subspecific status. I here follow the independent conclusions of Chaudhri and Ward, but the appropriate taxonomic rank remains unclear. **Syn:** = K1, Va, Ward (1977a), Ward (1977b); = *Anychiastrum riparium* (Chapman) Small – S; = *Paronychia riparia* Chapman – C, F; < *Paronychia baldwinii* – Fl4, FNA5, K3, K4, WH3; > *Paronychia baldwinii* ssp. *riparia* var. *ciliata* Chaudhri – Chaudhri (1968); > *Paronychia baldwinii* ssp. *riparia* var. *riparia* – Chaudhri (1968); < *Paronychia riparia* Chapman – NY, RAB. NatureServe G4T4? (Apparently Secure).

Paronychia canadensis (Linnaeus) Alph. Wood. CANADA WHITLOW-WORT, FORKED CHICKWEED. **Hab:** Dry rocky woods, shale barrens. **Dist:** NH and s. ON west to MN, south to n. GA (Jones & Coile 1988), AL, n. AR, c. LA, and KS. **Phen:** Jun-Oct. **Comm:** This species is somewhat taller on average than *P. fastigiata* or *P. montana*. **Syn:** = Ar, C, F, FNA5, G, GrPl, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, Tn, Va, W, WV, Chaudhri (1968); = *Anychia canadensis* (Linnaeus) Elliott – S. NatureServe G5 (Secure).



Paronychia erecta (Chapman) Shinners *var.* ***corymbosa*** (Small) Chaudhri. HAIRY SQUAREFLOWER. **Hab:** Coastal dunes. **Dist:** Panhandle FL west to se. LA. **Phen:** Mar-Nov. **Tax:** Needing additional study. **Syn:** = K1, Chaudhri (1968), Ward (1977a), Ward (1977b); = *Odontonychia corymbosa* Small – S; < *Paronychia erecta* – Fl4, FNA5, K3, K4, WH3, Shinners (1962h). NatureServe G3G4T2T4 (Vulnerable).

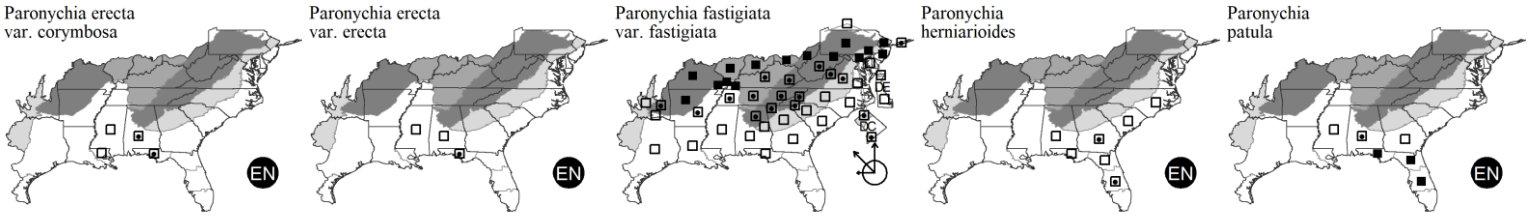
Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Paronychia erecta (Chapman) Shinners *var*. ***erecta***. SMOOTH SQUAREFLOWER. **Hab:** Coastal dunes. **Dist:** Panhandle FL west to s. MS. **Phen:** Mar-Nov. **Syn:** = K1, Chaudhri (1968), Ward (1977a), Ward (1977b); = *Odontonychia erecta* (Chapman) Small – S; < *Paronychia erecta* – Fl4, FNA5, K3, K4, WH3, Shinners (1962h). NatureServe G3G4TNR (Not Yet Ranked).

Paronychia fastigiata (Rafinesque) Fernald *var*. ***fastigiata***. COMMON FORKED WHITLOW-WORT. **Hab:** Dry, usually rocky, woodlands, often on thin soil around outcrop edges. **Dist:** MA and VT west to se. MN, south to Panhandle FL and e. TX. **Phen:** Jun-Oct. **Tax:** The three varieties of *P. fastigiata* (though accepted by Chaudhri and many recent floras) need additional investigation to confirm their taxonomic status, habitats, and geographic ranges. **Syn:** = Ar, C, F, G, K1, NE, NY, Pa, Tx, WV, Chaudhri (1968); < *Anychia polygonoides* Rafinesque – S; < *Paronychia fastigiata* – GrPl, Il, Mi, NcTx, RAB, Tn, Va, W, Turner (1983); < *Paronychia fastigiata* (Rafinesque) Fernald var. *fastigiata* – FNA5, K3, K4. NatureServe G5T5 (Secure).

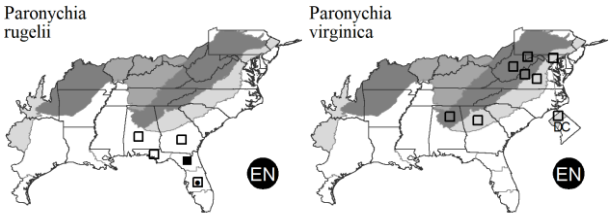
Paronychia herniarioides (Michaux) Nuttall. MICHAUX'S WHITLOW-WORT. **Hab:** Longleaf pine sandhills, Florida scrub. **Dist:** Sc. NC south to c. peninsular FL and e. Panhandle FL. **Phen:** Apr-Jul. **Comm:** The occurrence of this species in NC (cited by Small, Chaudhri, and FNA) is based on the type specimen of André Michaux ("in arenosis aridis Carolinae septentrionalis"); the species has been relocated in NC (Scotland County) by Harry E. LeGrand, Jr, over two centuries later, apparently very close to where Michaux must have encountered it. **Syn:** = Fl4, FNA5, K1, K3, K4, RAB, WH3, Chaudhri (1968), Ward (1977a), Ward (1977b); = *Gastronychia herniarioides* (Michaux) Small – S. NatureServe G2G4 (Vulnerable).

Paronychia patula Shinners. PINELAND NAILWORT. **Hab:** Longleaf pine sandhills, sandy disturbed areas. **Dist:** Sw. GA west to s. AL, south to c. peninsular FL. **Phen:** May-Nov. **Syn:** = Fl4, FNA5, K1, K3, K4, WH3, Chaudhri (1968), Shinners (1962h), Ward (1977a), Ward (1977b); = *Siphonychia diffusa* Chapman – S. NatureServe G3G4 (Vulnerable).

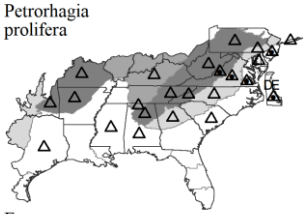


Paronychia rugelii (Chapman) Shuttleworth ex Chapman. SAND-SQUARES, RUGEL'S NAILWORT. **Hab:** Longleaf pine sandhills, pine flatwoods. **Dist:** S. GA and se. AL south to c. peninsular FL. **Phen:** Jul-Oct. **Syn:** = Fl4, FNA5, K3, K4, WH3, Shinners (1962h), Ward (1977a), Ward (1977b); > *Gibbesia rugelii* (Chapman) Small – S; > *Odontonychia interior* Small – S; > *Paronychia rugelii* (Chapman) Shuttleworth ex Chapman var. *interior* (Small) Chaudhri – K1, Chaudhri (1968); > *Paronychia rugelii* (Chapman) Shuttleworth ex Chapman var. *rugelii* – K1, Chaudhri (1968).

Paronychia virginica Sprengel. VIRGINIA WHITLOW-WORT. **Hab:** Shale barrens, rocky riversides, calcareous rock outcrops and talus, serpentine outcrops. **Dist:** W. & c. MD, DC, w. VA, e. WV, ec. GA, and c. AL. **Phen:** Jun-Aug. **Syn:** = *Paronychia dichotoma* (Linnaeus) Nuttall – S; = *Paronychia virginica* ssp. *virginica* – G; = *Paronychia virginica* Sprengel var. *virginica* – C, Va, Chaudhri (1968); < *Paronychia virginica* Sprengel – Ar, F, FNA5, K1, K3, K4, W, WV.



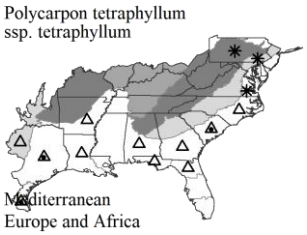
Petrorhagia (Seringe) Link 1831 (PINK)



A genus of about 28-33 species, herbs, of Eurasia. References: Bittrich (1993) in Kubitzki, Rohwer, & Bittrich (1993); Madhani et al (2018); Rabeler & Hartman (2005e) in FNA5 (2005); Rabeler (1985).

* ***Petrorhagia prolifera*** (Linnaeus) P.W. Ball & Heywood. CHILDING PINK, PROLIFEROUS PINK. **Hab:** Roadsides, disturbed areas. **Dist:** Native of Europe. **Phen:** May-Sep. **Syn:** = Ar, C, FNA5, K1, K3, K4, Mi, NE, NY, Pa, Va, Madhani et al (2018), Rabeler (1985); = *Dianthus prolifer* Linnaeus – F, WV; = *Petrorhagia prolifer* (Linnaeus) Ball & Heywood – Tx, W, orthographic variant; = *Tunica prolifera* (Linnaeus) Scopoli – G. NatureServe GNR (Not Yet Ranked).

Polycarpon Linnaeus 1759 (ALLSEED)



A genus of about 18 species, herbs, primarily of Europe, with several species in South America, and 1 cosmopolitan. References: Allen et al (2010); Bittrich (1993) in Kubitzki, Rohwer, & Bittrich (1993); MacRoberts & MacRoberts (2020); Thieret & Rabeler (2005b) in FNA5 (2005).

* ***Polycarpon tetraphyllum*** (Linnaeus) Linnaeus *ssp.* ***tetraphyllum***. FOUR-LEAVED ALLSEED. **Hab:** Beaches, disturbed areas, paths, lawns, parking lots, ballast. **Dist:** Native of Mediterranean Europe. Reported for AL (Diamond & Woods 2009; H. Horne, pers. comm., 2013), VA (Wright, pers. comm. 2010), wc. LA (Allen et al. 2010), nw. LA (MacRoberts & MacRoberts 2020), and s. AR (J.M. Kelley, pers.comm. 2021). **Phen:** Apr-Oct. **Syn:** = FNA5, K1, NE; < *Polycarpon tetraphyllum* – Fl4, K3, NcTx, RAB, S, Tx, WH3, Allen et al (2010). NatureServe GNR (Not Yet Ranked).

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more)

* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable
X : extirpated

Sabulina Reichenbach 1832

A genus of ca. 65 or more species, annual and perennial herbs, widely distributed in the Northern Hemisphere, with 2 species in South America, as well. See Schilling et al. (2022) for discussion of generic boundaries in *Sabulina* and related genera. References: Bittrich (1993) in Kubitzki, Rohwer, & Bittrich (1993); Dillenberger & Kadereit (2014); Dillenberger & Rabeler (2018); Rabeler, Hartman, & Utech (2005) in FNA5 (2005); Schilling et al (2022).

1 Flowers solitary in leaf axils; petals absent; [calcareous seepage, KY, TN, n. AL] ..... ***Sabulina fontinalis***
1 Flowers (1-) 5-50+ in terminal corymbose cymes; petals present.
  2 Plants perennial from woody crowns; leaves rigid, with axillary fascicles; pedicels glabrous ..... ***Sabulina michauxii***
  2 Plants either annual or perennial from slender wintering stems; leaves flexuous, lacking axillary fascicles; pedicels sparsely to densely stipitate-glandular.
    3 Stems prostrate or decumbent, leafy throughout; [of moist habitats] ..... ***Sabulina paludicola***
    3 Stems erect, leafy mostly near the base, the stem leaves few in number and reduced in size upward; [of moist to dry upland habitats].
      4 Sepals 3-nerved; leaves narrowly lanceolate to narrowly oblanceolate, (0.6-) 1.5-3.2 mm wide; seeds 0.7-0.9 mm long, the surface appearing pebbled or with short papillae, black ..... ***Sabulina muscorum***
      4 Sepals 5-nerved or 5-ribbed; leaves narrowly olinear to linear, 0.5-1.5 (-1.8) mm wide; seeds 0.5-0.7 mm long, the surface tuberculate, reddish brown to black ..... ***Sabulina patula***

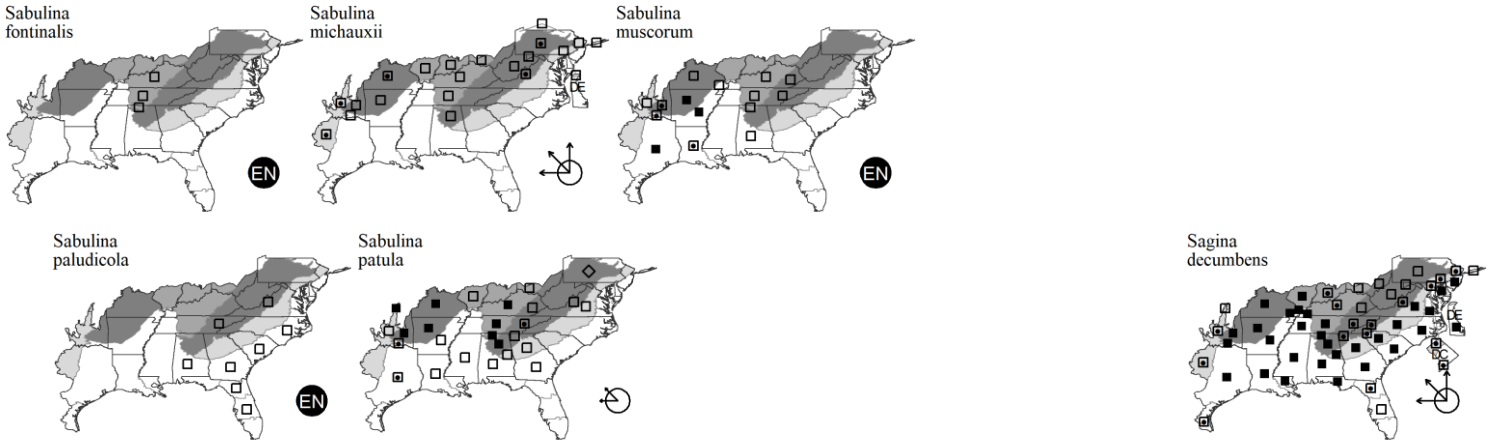
Sabulina fontinalis (Short & R. Peter) Dillenberger & Kadereit. SEEPAGE STARWORT, WATER STARWORT. **Hab:** Seepages and wet cliffs, disturbed areas. **Dist:** C. TN (Chester, Wofford, & Kral 1997) and c. KY. **Phen:** Mar-May. **Tax:** Its generic placement has traditionally been very controversial and uncertain (six genera!; see synonymy), but is resolved by recent data (Dillenberger & Kadereit 2014; Schilling et al. 2022). See Rabeler & Reznicek (2016) for an account of the species' history and its typification. **Syn:** = K4, Dillenberger & Kadereit (2014), Schilling et al (2022), in press; = *Alsine fontinalis* (Short & R. Peter) Britton – S; = *Sagina fontinalis* Short & R. Peter – C; = *Stellaria fontinalis* (Short & R. Peter) B.L. Robinson – F, FNA5, G, K1, K3, Tn. NatureServe G3 (Vulnerable).

Sabulina michauxii (Fenzl) Dillenberger & Kadereit. ROCK SANDWORT. **Hab:** Limestone, dolostone, calcareous sandstone, serpentine, and calcareous shale outcrops and barrens. **Dist:** ME west to SD, south to VA, AL, nw. AR, TX, and NM. **Phen:** May-Jul. **Tax:** Two varieties are sometimes recognized: a more eastern "*michauxii*" entity ranging from ME west to MI, south to sw. VA, AL, and AR, and a more western "*texana* " entity occurring from MO and w. SD south to TX and NM. Additional study is needed. **Comm:** The distribution is curious and fragmented. **Syn:** = K4, NY, Dillenberger & Kadereit (2014), Schilling et al (2022); = *Arenaria stricta* Michaux – W, WV; = *Minuartia michauxii* (Fenzl) Farwell – Ar, FNA5, Il, K3, Mi, Pa; = *Sabulina stricta* – S; > *Arenaria stricta* Michaux ssp. *stricta* – G; > *Arenaria stricta* ssp. *texana* – GrPl; > *Arenaria stricta* Michaux var. *stricta* – C, F, Tx; > *Arenaria stricta* var. *texana* B.L. Robinson ex Britton – Tx; > *Minuartia michauxii* var. *michauxii* – K1, Va; > *Minuartia michauxii* var. *texana* – NcTx.

Sabulina muscorum (Fassett) E.E. Schilling. LIME-BARREN SANDWORT. **Hab:** Rocky barrens of calcareous or mafic rocks, sandy barrens. **Dist:** KY, TN, and AL west to MO, e. KS, e. OK, and e. TX. **Phen:** Apr-Jun. **Syn:** = Schilling et al (2022); = *Arenaria patula* Michaux var. *robusta* (Steyermark) Maguire – C, G, GrPl, Tx; = *Minuartia muscorum* (Fassett) Rabeler – Ar, FNA5, K1, K3, Mo2, NcTx; = *Mononeuria muscorum* (Fassett) Dillenberger & Kadereit – K4, Tn, Dillenberger & Kadereit (2014); < *Arenaria patula* Michaux – F; < *Sabulina patula* (Michaux) Small – S.

Sabulina paludicola (Fernald & B.G. Schubert) E.E. Schilling. GODFREY'S SANDWORT. **Hab:** Tidal freshwater marshes, other wetlands. **Dist:** Peculiarly and irregularly distributed, with isolated and scattered locations in the Coastal Plain and Mountains: wc. VA, ne. TN, e. NC, ne. SC, e. Panhandle FL, n. peninsular FL, and wc. AL. **Phen:** Apr-Jun. **Syn:** = Schilling et al (2022), in press; = *Arenaria godfreyi* Shinners – GW2, RAB, W; = *Minuartia godfreyi* (Shinners) McNeill – FNA5, K1, K3, Tn, WH3; = *Mononeuria paludicola* (Fernald & B.G. Schubert) Dillenberger & Kadereit – Fl4, K4, Dillenberger & Kadereit (2014); = *Sabulina uniflora* – S, misapplied. NatureServe G1 (Critically Imperiled).

Sabulina patula (Michaux) Small. LIME-BARREN SANDWORT. **Hab:** Rocky barrens of calcareous or mafic rocks. **Dist:** Ec. PA and w. VA west to IN and MN, south to AL and TX. **Phen:** Apr-Jun. **Syn:** = Schilling et al (2022), in press; = *Arenaria patula* Michaux var. *patula* – C, G, GrPl, Tx; = *Minuartia patula* (Michaux) Mattfeld – Ar, FNA5, Il, K1, K3, Mo2, NcTx, Pa, Tn, Va; = *Mononeuria patula* (Michaux) Dillenberger & Kadereit – K4, Dillenberger & Kadereit (2014); < *Arenaria patula* Michaux – F; < *Sabulina patula* (Michaux) Small – S. NatureServe G4 (Apparently Secure).



Sagina Linnaeus 1753 (PEARLWORT)

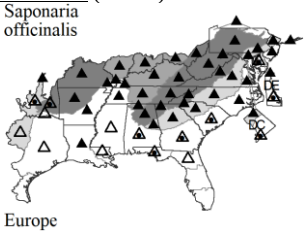
A genus of about 25 species, herbs, mainly north temperate. References: Atha, Alvarez, & Chaya (2018); Bittrich (1993) in Kubitzki, Rohwer, & Bittrich (1993); Crow (1978); Crow (2005) in FNA5 (2005).

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Key based on Atha, Alvarez, & Chaya (2018).

Sagina decumbens (Elliott) Torrey & A. Gray. EASTERN PEARLWORT, ANNUAL PEARLWORT. **Hab:** Disturbed ground, fields, cracks in pavement or sidewalks. **Dist:** NB west to IL and MO, south to c. peninsular FL and TX, with adventive occurrences farther west. **Phen:** Feb-Jul. **Tax:** Crow (1978) and Crow in FNA (2005) treat *S. decumbens* and *S. occidentalis* S. Watson of the Pacific Coast of North America as subspecies. They differ primarily in seed architecture. Though clearly closely related, they seem equally well (and more simply) regarded as sibling species. A report of *S. subulata* (Swartz) C. Presl for Bedford County, VA, is apparently actually *S. decumbens*. **Syn:** = C, F, Fl4, G, Il, NcTx, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, Atha, Alvarez, & Chaya (2018); = *Sagina decumbens* ssp. *decumbens* – Ar, FNA5, GrPl, K1, K4, NE, Crow (1978). NatureServe G5T5 (Secure).

Saponaria officinalis



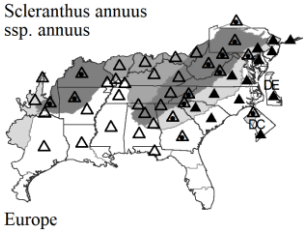
Europe

Saponaria Linnaeus 1753 (SOAPWORT)

A genus of about 40 species, herbs, of temperate regions of Eurasia. References: Bittrich (1993) in Kubitzki, Rohwer, & Bittrich (1993); Thieret & Rabeler (2005e) in FNA5 (2005).

* ***Saponaria officinalis*** Linnaeus. SOAPWORT, BOUNCING BET. **Hab:** Disturbed areas, fields, roadsides. **Dist:** Native of Europe. **Phen:** May-Oct. **Syn:** = C, F, Fl4, FNA5, G, GrPl, Il, K1, K3, K4, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV. NatureServe GNR (Not Yet Ranked).

Scleranthus annuus ssp. annuus



Europe

Scleranthus Linnaeus 1753 (KNAWEL)

A genus of 10 species, herbs, mainly of temperate regions of the Northern Hemisphere. References: Bittrich (1993) in Kubitzki, Rohwer, & Bittrich (1993).

* ***Scleranthus annuus*** Linnaeus *ssp. **annuus***. KNAWEL, ANNUAL KNAWEL, KNOTGRASS. **Hab:** Fields, ditches, roadsides, other disturbed areas. **Dist:** Native of Mediterranean Europe, n. Africa, and w. Asia. **Phen:** Mar-Oct. **Tax:** There are seven other subspecies (Thieret & Rabeler in FNA 2005). **Syn:** = Ar, FNA5, NY; < *Scleranthus annuus* Linnaeus – C, F, Fl4, G, GrPl, Il, K1, K3, K4, Mi, NE, Pa, RAB, Tn, Va, W, WH3, WV. NatureServe GNRTNR (Not Yet Ranked).

Silene Linnaeus 1753 (CATCHFLY, CAMPION, FIRE-PINK, WILD-PINK)

A genus of about 700 species, of Eurasia and North America. References: Bittrich (1993) in Kubitzki, Rohwer, & Bittrich (1993); Clausen (1939); Morton (2005c) in FNA5 (2005); Weakley & Poindexter (2020b) in Weakley et al (2020); Wilbur (1970b).

1 Styles mostly 5; capsule with 5 or 10 teeth; calyx tubular at anthesis, becoming strongly inflated later in *S. dioica* and *S. latifolia*. ..... ***Silene coronaria***

1 Styles mostly 3; capsule with 3 or 6 teeth; calyx tubular or campanulate at anthesis, not greatly inflated (except in *S. vulgaris*).

5 Middle cauline leaves in whorls of 4; petals fimbriate ..... ***Silene stellata***

5 Middle cauline leaves opposite; petals entire, slightly erose, bilobed, 2-cleft, or 8+-cleft.

6 Flowers bright red.

7 Petals entire or slightly erose at the tip; cauline leaves 5-20 pairs. ..... ***Silene regia***

7 Petals 2-cleft at the tip; cauline leaves 2-8 pairs.

9 Cauline leaves 2.0-7.0 cm wide, elliptic, obovate, or orbicular, usually 1-2× as long as wide; entire plant sticky glandular-pubescent; [of sandstone cliffs and crevices, in our area only in sw. VA] ..... ***Silene rotundifolia***

9 Cauline leaves 0.8-4.0 cm wide, mostly oblanceolate, usually at least 2.5× as long as wide; plant not covered with sticky glandular hairs; [of various, mostly rocky, habitats, widespread in our area]. ..... ***Silene virginica var. virginica***

6 Flowers white or pink.

11 Petals 8-cleft or more divided; plants perennial; [native].

12 Plants 2-6 dm tall; petals pink, the >8 ultimate segments of each dichotomously forked at nearly right angles; calyx ca. 2.5 cm long; stem with long, villous pubescence ..... ***Silene catesbyi***

12 Plants (5-) 7-15 dm tall; petals white, the 8 segments of each essentially parallel to one another; calyx ca. 1 cm long; stem with short rigid pubescence .. ***Silene ovata***

11 Petals entire, bilobed, or 2-cleft; plants 0.5-8 dm tall, perennial or annual; [either alien weeds occurring mostly in disturbed sites, or native in forests, woodlands, or rock outcrops].

13 Plant < 2.5 dm tall; plant perennial, with a stout, carrot-like taproot; [native, of woodlands, rock outcrops, barrens, glades, and dry roadbanks]. ..... ***Silene caroliniana var. wherryi***

13 Plant usually 2-8 dm tall (depauperate individuals rarely smaller); plant annual or biennial (perennial from a creeping rhizome in *S. nivea* and *S. vulgaris*), lacking a carrot-like taproot; [alien, mostly of disturbed habitats (except *S. nivea* and *S. antirrhina*).

22 Stems glabrous or sparsely pubescent (if pubescent, puberulent).

23 Calyx 4-10 mm long; carpophore ca. 1 mm long ..... ***Silene antirrhina***

23 Calyx 13-17 mm long; carpophore 7-8 mm long ..... ***Atocion armeria***

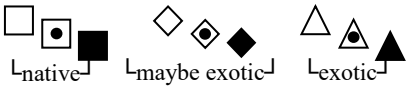
22 Stems densely pubescent (hirsute or glandular-hirsute).

24 Petals entire or emarginate; fruiting calyx 6-10 mm long ..... ***Silene gallica***

24 Petals deeply 2-lobed; calyx; fruiting calyx 10-30 mm long.

25 Fruiting calyx 10-15 mm long; petal appendages ca. 0.2 mm long ..... ***Silene dichotoma ssp. dichotoma***

25 Fruiting calyx (15-) 25-30 mm long; petal appendages 0.5-1.5 mm long ..... ***Silene noctiflora***

Key to Map Symbology:  (see introduction for more)

* : waif EN : endemic H : historic

N : no P : planted ? : questionable X : extirpated

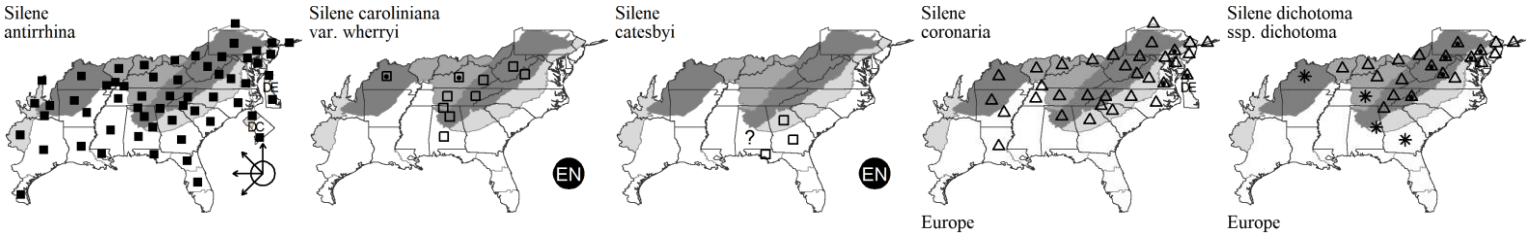
Silene antirrhina Linnaeus. SLEEPY CATCHFLY, GARTER-PINK. **Hab:** Fields, disturbed areas. **Dist:** Nearly throughout North America, south to c. peninsular FL, and in Mexico and South America; introduced in Europe. **Phen:** Apr-Jul. **Syn:** = Ar, C, F, Fl4, FNA5, G, GrPl, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV; > *Silene antirrhina* var. *antirrhina* – Il; > *Silene antirrhina* var. *divaricata* Robins – Il. NatureServe G5 (Secure).

Silene caroliniana Walter *var*. ***wherryi*** (Small) Fernald. **Hab:** Dry, rocky places. **Dist:** OH and WV (and VA according to FNA) south and west to AL, KY, MO, and KS. **Phen:** Apr-Jul. **Syn:** = F; = *Silene caroliniana* ssp. *wherryi* (Small) Clausen – FNA5, G, K1, K3, K4, Clausen (1939), Wilbur (1970b); > *Silene caroliniana* Walter var. *pensylvanica* (Michaux) Fernald – C. NatureServe G5T2T4Q (Vulnerable).

Silene catesbyi Walter. EASTERN FRINGED CATCHFLY, FRINGED CAMPION. **Hab:** Mesic deciduous forests along streams or on lower- to mid-slopes. **Dist:** C. GA south to Panhandle FL, and possibly in AL based on a C.T. Mohr specimen (see FNA). **Phen:** Mid-Mar-early May. **Tax:** Ward (2006) discusses the nomenclatural change from 'polypetala' to 'catesbaei'. Additionally, the epithet has traditionally been spelled *catesbaei*; this is necessarily corrected to *catesbyi* under provisions of the Code (Weakley & Poindexter 2020). **Syn:** = Weakley & Poindexter (2020b) in Weakley et al (2020); = *Silene baldwinii* Nuttall – S; = *Silene catesbaei* Walter – K3, K4, WH3; = *Silene polypetala* (Walter) Fernald & Schubert – Fl4, FNA5, K1. NatureServe G2 (Imperiled); USESA E.

* ***Silene coronaria*** (Linnaeus) Clairville. MULLEIN-PINK, ROSE CAMPION. **Hab:** Disturbed areas. **Dist:** Native of Europe. **Phen:** May-Jul. **Syn:** = Ar, FNA5, Il, K3, K4, Mi, Pa, Va; = *Lychnis coronaria* (Linnaeus) Desrousseaux – C, F, G, K1, NY, RAB, WV. NatureServe GNR (Not Yet Ranked).

* ***Silene dichotoma*** Ehrhart *ssp*. ***dichotoma***. FORKED CATCHFLY. **Hab:** Fields, disturbed areas. **Dist:** Native of Europe. **Phen:** May-Aug. **Syn:** = FNA5, NY, Va; < *Silene dichotoma* – C, F, G, GrPl, Il, K1, K3, K4, NE, Pa, RAB, S, W, WV. NatureServe GNRTNR (Not Yet Ranked).



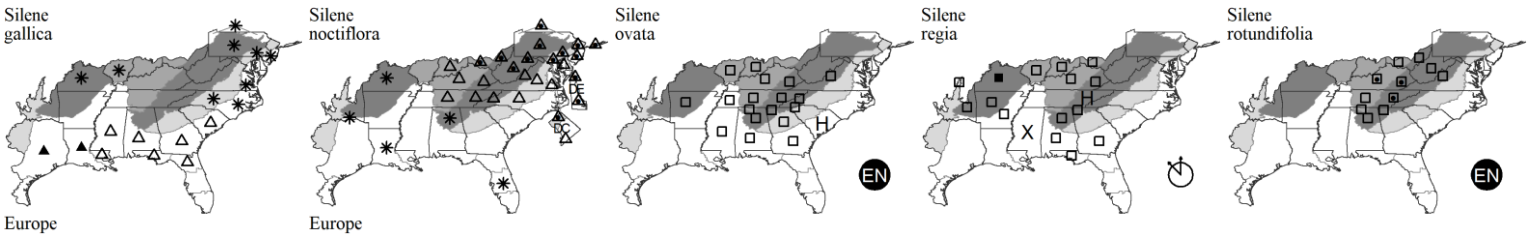
* ***Silene gallica*** Linnaeus. SMALL-FLOWERED CATCHFLY, COMMON CATCHFLY. **Hab:** Sandy disturbed areas. **Dist:** Native of Europe. **Phen:** May-Jul. **Syn:** = C, F, Fl4, FNA5, G, Il, K1, K3, K4, NE, Pa, RAB, Tx, WH3; > *Silene anglica* Linnaeus – S, misapplied. NatureServe GNR (Not Yet Ranked).

* ***Silene noctiflora*** Linnaeus. STICKY COCKLE, NIGHT-FLOWERING CATCHFLY, STICKY CAMPION. **Hab:** Fields, disturbed areas. **Dist:** Native of Europe. **Phen:** Jun-Aug. **Syn:** = C, F, Fl4, FNA5, G, GrPl, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Va, W, WH3, WV. NatureServe GNR (Not Yet Ranked).

Silene ovata Pursh. MOUNTAIN CATCHFLY. **Hab:** Circumneutral soils of woodlands and forests, especially over mafic or calcareous rocks, mostly at medium elevations in the mountains. **Dist:** Sw. VA, KY, s. IN, s. IL, and n. AR, south to e. SC, sw. GA, s. AL, s. MS, and c. AR. **Phen:** Aug-Sep. **Syn:** = Ar, C, F, FNA5, G, Il, K1, K3, K4, RAB, S, Tn, Va, W. NatureServe G3 (Vulnerable).

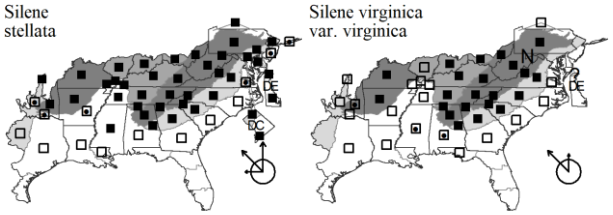
Silene regia Sims. ROYAL CATCHFLY. **Hab:** Prairies and calcareous woodlands and forests. **Dist:** OH, n. IN, n. IL, and e. KS south e. TN (Chester, Wofford, & Kral 1997; Tennessee Flora Committee 2015), nw. and sw. GA (Jones & Coile 1988), FL Panhandle (Jackson County), s. AL, s. AR, and sw. OK. **Phen:** Jul-Aug. **Syn:** = Ar, C, F, Fl4, FNA5, G, GrPl, Il, K1, K3, K4, S, Tn, WH3. NatureServe G3 (Vulnerable).

Silene rotundifolia Nuttall. ROUNDLEAF FIRE-PINK, SANDSTONE FIRE-PINK. **Hab:** Sandstones cliffs, ledges, and talus, and at bases of sandstone cliffs. **Dist:** S. OH and WV south to nw. GA (Jones & Coile 1988) and n. AL, nearly restricted to the Cumberland Plateau. **Phen:** May-Jun. **Syn:** = C, F, FNA5, G, K1, K3, K4, S, Tn, Va, WV. NatureServe G4 (Apparently Secure).

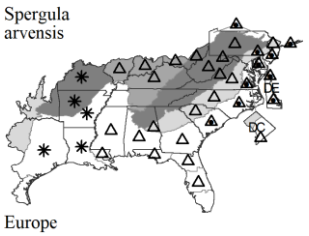


Silene stellata (Linnaeus) W.T. Aiton. STARRY CAMPION, WIDOW'S-FRILL. **Hab:** Dry to mesic forests, rock outcrops. **Dist:** CT and VT west to SD, south to c. GA and TX. **Phen:** Jun-Aug. Jun-Sep. **Syn:** = Ar, F, FNA5, GrPl, K1, K3, K4, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WV; > *Silene stellata* var. *scabrella* E.J. Palmer & Steyermark – C, G, Il, Mi; > *Silene stellata* var. *stellata* – C, G, Il, Mi.

Silene virginica Linnaeus *var*. ***virginica***. FIRE-PINK. **Hab:** Woodlands, rock outcrops, crevices in cliffs, roadbanks. **Dist:** PA west to s. ON and se. MI, south to Panhandle FL (Bay County), GA and OK. **Phen:** Apr-Jul. **Syn:** = K1, Tn, WV; < *Silene virginica* – Ar, C, F, Fl4, FNA5, G, Il, K3, K4, Mi, NY, Pa, RAB, S, Va, W, WH3. NatureServe G5T5 (Secure).



Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



Spergula Linnaeus 1753 (SPURREY)

A genus of 6 species, herbs, of temperate Eurasia and n. Patagonia. References: Bittrich (1993) in Kubitzki, Rohwer, & Bittrich (1993); Hartman & Rabeler (2005a) in FNA5 (2005).

* ***Spergula arvensis*** Linnaeus. CORN SPURREY. **Hab:** Fields, roadsides, disturbed areas. **Dist:** Native of Europe. **Phen:** Apr-Jun. **Tax:** Two varieties are sometimes recognized; var. *arvensis*, with seeds ornamented with white, clavate papillae, the plants sparsely glandular, and var. *sativa*, with seeds reticulate and lacking papillae, the plants sparsely to densely glandular. Additional information is needed on the distinctiveness, range in our area, etc. of the two putative varieties. **Syn:** = Ar, C, Fl4, FNA5, GrPl, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tx, Va, WH3, WV; > *Spergula arvensis* Linnaeus var. *arvensis* – F, G; > *Spergula arvensis* Linnaeus var. *sativa* (Boenninghausen) Mertens & W.D.J. Koch – F, G.

Spergularia (Persoon) J. Presl & C. Presl 1819 (SAND-SPURREY)

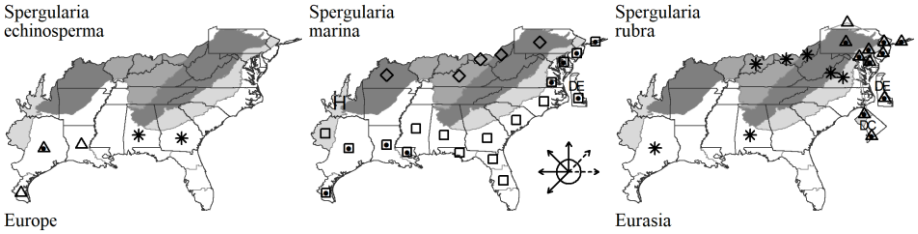
A genus of about 25 species, herbs, cosmopolitan. The genus is perhaps not distinct from *Spergula*. References: Bittrich (1993) in Kubitzki, Rohwer, & Bittrich (1993); Hartman & Rabeler (2005b) in FNA5 (2005).

1 Stamens 6-10; seeds either 0.4-0.6 or 0.8-1.1 mm long; axillary leaf clusters of 2-4 leaves (or sometimes absent in *S. media*). ..... ***Spergularia rubra***
1 Stamens 1-5; seeds 0.5-0.7 (-0.8) mm long; axillary leaf clusters usually absent.
  3 Seeds shiny and silvery; stipules wider than long; styles 0.3-0.4 mm long ..... ***Spergularia echinosperma***
  3 Seeds dull, not silvery; stipules longer than wide; styles 0.4-0.7 mm long ..... ***Spergularia marina***

* ***Spergularia echinosperma*** Čelakovský. **Hab:** Disturbed soils. **Dist:** Native of Europe. Naturalized in GA and AL (FNA). **Syn:** = FNA5, K1, K3, K4. NatureServe GNR (Not Yet Ranked).

Spergularia marina (Linnaeus) Besser. SALTMARSH SAND-SPURREY. **Hab:** Brackish and salt marsh flats, inland in salt springs (as in n. LA) and introduced in salt waste (as pickle brine in Mount Olive, NC) and along salted highways. **Dist:** Widespread on coasts of North America (from QC south to c. peninsular FL, from BC south to Baja California), inland along salted highways, in South America, and Eurasia. Considered by some (C, G) to be introduced only in North America, by others native (F, FNA, S). **Phen:** Jun-Oct. **Tax:** Kirschner, Kirschnerová, & Štěpánek (2007) discussed the complicated nomenclature and concluded that *S. marina* (Linnaeus) Besser is correct. **Syn:** = C, F, Fl4, G, GrPl, GW2, K3, K4, Mi, NE, NY, RAB, Tx, WH3; = *Spergularia salina* J. & C. Presl – FNA5, Il, K1, NcTx, Pa, Va; = *Tissa marina* (Linnaeus) Britton – S, misapplied. NatureServe G5 (Secure).

* ***Spergularia rubra*** (Linnaeus) J. Presl & C. Presl. PURPLE SAND-SPURREY, ROADSIDE SAND-SPURREY. **Hab:** Disturbed areas. **Dist:** Native of Eurasia. **Phen:** May-Sep. **Syn:** = C, F, FNA5, G, K1, K3, K4, Mi, NE, NY, Pa; = *Tissa rubra* (Linnaeus) Britton – S. NatureServe G5 (Secure).



Stellaria Linnaeus 1753 (CHICKWEED, STITCHWORT, STARWORT)

A genus of about 112 species, cosmopolitan (centered in Asia). Generic circumscription follows Sharples & Tripp (2019). References: Bittrich (1993) in Kubitzki, Rohwer, & Bittrich (1993); Morton (2005b) in FNA5 (2005); Sharples & Tripp (2019); Sharples (2019).

2 Leaves narrow, usually linear, lanceolate, oblanceolate, or narrowly elliptic, the blade 3-10× as long as wide, 0.8-10 mm wide; stems prominently 4-angled. ..... ***Sabulina fontinalis***
2 Leaves broad, usually ovate, obovate, or broadly elliptic, the blade 1-2.5× (or to 4×) as long as wide, 4-30 mm wide (if > 2.5× as long as wide, then definitely > 10 mm wide); stems terete or 4-angled.
  9 Leaves (1.0-) 2.5-10 cm long (with strong dimorphism between sterile and fertile shoots, the leaves of sterile shoots much larger); seeds 1.7-2 mm long; sepals 4-11 mm long; stem pubescence in vertical lines or uniformly distributed; perennial, the stems strong and ascending to erect; [native]; [*Insignes* clade].
    10 Sepals 7-11 (-12) mm long, acuminate, ciliate, but more-or-less glabrous on the back; [of the mountains] ..... ***Stellaria corei***
    10 Sepals 3.5-7 mm long, acute, ciliate and more-or-less pubescent on the back; [widespread in our area] ..... ***Stellaria pubera***
  9 Leaves 0.3-4.0 cm long; seeds 0.6-1.7 mm long; sepals 2.5-6.5 mm long; stem pubescence always in vertical lines; annual, the stems weak and in part prostrate, the tips or vigorous growth ascending; [alien]; [*Petiolares* clade].
    12 Stamens 3-5 (-8); sepals 4.5-5.2 (-6.0) mm long, lacking red band at base; seeds 0.9-1.4 mm long; petals usually present ..... ***Stellaria media***
    12 Stamens 0-3 (-5); sepals 3.0-4.0 mm long, frequently with a red band at the base; seeds 0.4-0.9 mm long; petals usually absent ..... ***Stellaria pallida***

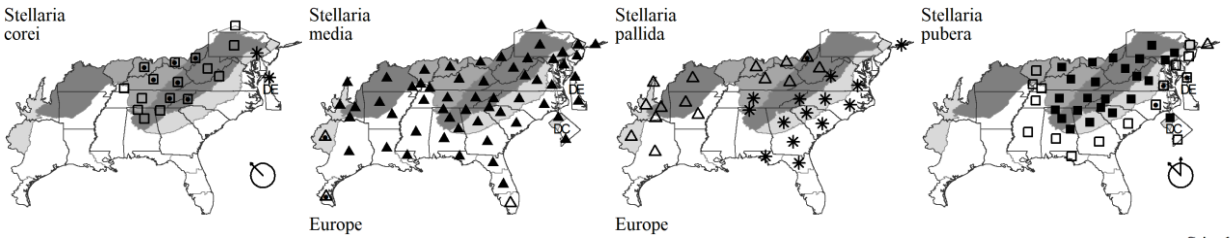
Stellaria corei Shinners. TENNESSEE STARWORT. **Hab:** Cove forests and seepages at moderate to high elevations, rarely escaped from cultivation. **Dist:** W. VA, WV, and sw. PA west to OH and IN, south to w. NC, e. and c. TN, and n. AL. **Phen:** Apr-Jun. **Tax:** Cronquist (1991) reports that *S. corei* has a chromosome number of 2n = 60, as opposed to 2n = 30 for *S. pubera*. In mountain coves, *S. corei* and *S. pubera* sometimes

grow intermixed; they are best regarded as species. **Comm:** Both *Stellaria corei* and *Stellaria pubera* have an interesting seasonal growth form, producing short and relatively small-leaved flowering shoots in the spring (which wither following fruiting), followed by taller, more vigorous summer shoots with larger and tougher leaves and lacking flowers, which persist until autumn. Some of the description in various manuals of differences in petiole length and leaf size and shape between the two species is obscured or complicated by these seasonal differences; more careful observation is needed. **Syn:** = FNA5, K1, K3, K4, NE, NY, Pa, RAB, Tn, Va, W, WV; = *Alsine tennesseensis* (C. Mohr) Small – S, misapplied; = *Stellaria pubera* Michaux var. *silvatica* (Béguinot) Weatherby – C, F; = *Stellaria silvatica* (Béguinot) Maguire – G, preoccupied. NatureServe G4 (Apparently Secure).

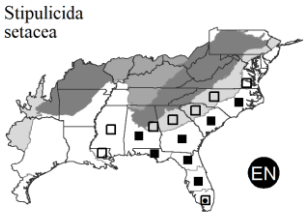
* ***Stellaria media*** (Linnaeus) Villars. COMMON CHICKWEED. **Hab:** Disturbed areas, gardens, fields, bottomlands, moist forests. **Dist:** Native of Europe. **Phen:** Jan-Dec. **Syn:** = Ar, Fl4, FNA5, GrPl, Il, K4, Mi, NcTx, NE, NY, Pa, Tn, Tx, Va, WH3; = *Stellaria media* ssp. *media* – K1; < *Alsine media* Linnaeus – S; < *Stellaria media* (Linnaeus) Villars – C, G, RAB, W, WV; < *Stellaria media* var. *media* – F. NatureServe GNRTNR (Not Yet Ranked).

* ***Stellaria pallida*** (Dumortier) Piré. LESSER CHICKWEED. **Hab:** Disturbed areas, gardens, fields. **Dist:** Native of Europe. **Phen:** Jan-Dec. **Comm:** Cronquist (1991) reports that *S. pallida* has a chromosome number of 2n = 22, as opposed to 2n = 40-44 for *S. media*. **Syn:** = Ar, C, Fl4, FNA5, Il, K4, Mi, NcTx, Pa, Va, WH3; = *Stellaria media* ssp. *pallida* (Dumortier) Ascherson & Graebner – K1; = *Stellaria prostrata* Baldwin – G; < *Alsine media* Linnaeus – S; ? *Stellaria apetala* Ucria ex Roemer – G, misapplied; < *Stellaria media* (Linnaeus) Villars – RAB, W, WV; >< *Stellaria media* var. *glaberrima* G. Beck – F, misapplied.

Stellaria pubera Michaux. STAR CHICKWEED, COMMON STARWORT, GIANT CHICKWEED, GREAT CHICKWEED. **Hab:** Bottomland forests, moist slopes, coves, hammocks. **Dist:** NJ west to IL, south to Panhandle FL and AL. **Phen:** Apr-Jun. **ID Notes:** Both *Stellaria corei* and *Stellaria pubera* have an interesting seasonal growth form, producing short and relatively small-leaved flowering shoots in the spring (which wither following fruiting), followed by taller, more vigorous summer shoots with larger and tougher leaves and lacking flowers, which persist until autumn. Some of the description in various manuals of differences in petiole length and leaf size and shape between the two species is obscured or complicated by these seasonal differences; more careful observation is needed. **Syn:** = FNA5, G, Il, K1, K3, K4, NY, Pa, RAB, Tn, Va, W, WH3, WV; = *Alsine pubera* (Michaux) Britton – S; = *Stellaria puber* Michaux – Fl4, K4; = *Stellaria pubera* var. *pubera* – C, F. NatureServe G5 (Secure).



Stipulicida Michaux 1803 (WIREPLANT)



A genus of 2 species, herbs, of se. North America. References: Bittrich (1993) in Kubitzki, Rohwer, & Bittrich (1993); James (1957); Judd (1983); Poindexter, Bennett, & Weakley (2014); Swanson & Rabeler (2005) in FNA5 (2005); Ward (2001).

Identification Notes: *Stipulicida* is immediately recognizable by its very wiry, dichotomously branched stems, the stem leaves reduced to subulate scales 0.5-2 mm long. Often overlooked is the basal winter rosette of spatulate leaves, to 15 mm long and 4 mm wide.

Stipulicida setacea Michaux. COASTAL PLAIN WIREPLANT. **Hab:** Xeric sands of longleaf pine sandhills, dry pine flatwoods, maritime forests, very dry clayey roadbanks in the outer Piedmont. **Dist:** Se. VA south to s. FL, west to e. LA (Florida parishes). **Phen:** May-Aug. **Comm:** A variety, var. *filiformis* (Nash) D.B. Ward, endemic to c. Peninsular FL, is sometimes recognized, but is here considered a form of var. *setacea* (see synonymy and references). **Syn:** = K4, Poindexter, Bennett, & Weakley (2014); = *Stipulicida setacea* var. *setacea* – Fl4, FNA5, K1, K3, Va, WH3, James (1957), Judd (1983); > *Stipulicida filiformis* Nash – S; < *Stipulicida setacea* Michaux – C, RAB; >< *Stipulicida setacea* Michaux – S, including var. lacerata but not var. filiformis; > *Stipulicida setacea* var. *filiformis* – Ward (2001); > *Stipulicida setacea* var. *setacea* – Ward (2001). NatureServe G4G5T4T5 (Apparently Secure).

297a. AMARANTHACEAE A.L. de Jussieu 1789 (AMARANTH FAMILY) [in CARYOPHYLLALES]

A family of about 65 genera and 900 species, mostly herbs, but including shrubs and trees, nearly cosmopolitan, but most diverse in subtropical and temperate regions (Judd & Ferguson 1999).References: Fuentes-Bazan, Mansion, & Borsch (2012); Fuentes-Bazan, Uotila, & Borsch (2012); Judd & Ferguson (1999); Kühn in Kubitzki, Rohwer, & Bittrich (1993); Robertson & Clemants (2003) in FNA4 (2003b); Townsend in Kubitzki, Rohwer, & Bittrich (1993).

Subfamily Amaranthoideae
Tribe Celosieae: *Celosia.*
Tribe Amarantheae, subtribe Amaranthinae: *Amaranthus.*
Tribe Amarantheae, subtribe Aervinae: *Achyranthes.*
Subfamily Gomphrenoideae
Tribe Gomphrenae, subtribe Froelichiinae: *Alternanthera*, *Froelichia*, *Guellimenea.*
Tribe Gomphrenae, subtribe Gomphreninae: *Blutaparon*, *Gomphrena*, *Iresine.*

297a. AMARANTHACEAE

1 Leaves mostly or entirely alternate (the lower sometimes opposite).
  2 Flowers unisexual (plants either monoecious or dioecious); utricles 1-seeded ..... ***Amaranthus***
  2 Flowers bisexual (plants hermaphroditic); utricles (2) 3+-seeded ..... ***Celosia***
1 Leaves opposite.
  3 Flowers unisexual (plants dioecious); inflorescences terminal, diffuse panicles ..... ***Iresine***
  3 Flowers bisexual (plants hermaphroditic); inflorescences axillary or terminal, either glomerules or dense spikes.
    4 Inflorescences pedunculate simple or compound spikes, elongate, at least 2× as long as broad.
      5 Tepals glabrous or glabrate ..... ***Achyranthes***
      5 Tepals densely lanate ..... ***Froelichia***
    4 Inflorescences sessile or pedunculate, globose or cylindric heads, < 2× as long as broad.
      6 Inflorescences either sessile and axillary (subtended by a single leaf) or pedunculate (without any leaves immediately subtending the head) ..... ***Alternanthera***
      6 Inflorescences terminal, with a pair of leaves immediately subtending the head. ..... ***Gomphrena***

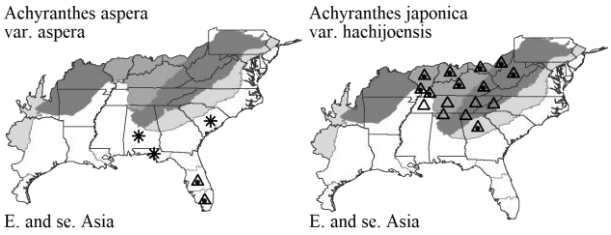
Achyranthes Linnaeus 1753 (CHAFF-FLOWER)

A genus of 6-8 species, of warm temperate and tropical regions of the Old World. References: Robertson (2003c) in FNA4 (2003b); Townsend in Kubitzki, Rohwer, & Bittrich (1993).

1 Pseudostaminode margins entire, denticulate, or slightly 2-lobed at the tip ..... ***Achyranthes japonica var. hachijoensis***
1 Pseudostaminode margins fimbriate at the tip. ..... ***Achyranthes aspera var. aspera***

* ***Achyranthes aspera*** Linnaeus *var*. ***aspera***. BLUNT-LEAVED ACHYRANTHES. **Hab:** Disturbed upland areas, waste areas around wool-combing mills. **Dist:** Native of Asia. **Syn:** = FNA4, K1, K2, K4, WH3, WI; = *Achyranthes indica* – Bah; = *Centrostachys indica* (Linnaeus) Standley – S. NatureServe G5T5 (Secure).

* ***Achyranthes japonica*** (Miquel) Nakai *var*. ***hachijoensis*** Honda. JAPANESE CHAFF-FLOWER. **Hab:** Bottomland forests, disturbed areas. **Dist:** Native of e. Asia. Escaped in KY and WV (Mingo and Wayne counties) (Medley et al. 1985), n. AL (Limestone County) (Barger et al. 2019), nc. GA, s. OH, s. IN, and s.IL, and now acting as a serious invasive species (Evans & Taylor 2011). **Phen:** Jul-Sep. **Syn:** = FNA4, K1, K3, K4, Tn; < *Achyranthes japonica* – C, Il. NatureServe GNRTNR (Not Yet Ranked).



Alternanthera Forsskål 1775 (CHAFF-FLOWER, JOYWEED)

A genus of about 100 species, tropical and warm temperate, especially in America. References: Clemants (2003c) in FNA4 (2003b); Townsend in Kubitzki, Rohwer, & Bittrich (1993).

1 Inflorescences borne on peduncles 1-7 cm long, these from the leaf axils or terminal. ..... ***Alternanthera philoxeroides***
1 Inflorescences sessile, in the leaf axils.
  3 Tepals dimorphic; tepal hairs barbed.
    4 Leaf blades longer than broad; tepals 3-5 mm long, densely villous ..... ***Alternanthera caracasana***
    4 Leaf blades as broad as long; tepals 5-7 mm long, sparsely villous ..... ***Alternanthera pungens***
  3 Tepals monomorphic; tepal hairs not barbed.
    5 Mature fruit included within the tepals; spikes globular; stems sericeous ..... ***Alternanthera paronychioides***
    5 Mature fruit exserted between the tepals; spikes narrow, short-cylindric; stems glabrous to pubescent in lines (the nodes also pubescent) ..... ***Alternanthera sessilis***

* ***Alternanthera caracasana*** Kunth. **Hab:** Disturbed areas. **Dist:** Native of South America. Reported for Coastal Plain of SC, and in s. Coastal Plain of GA (Jones & Coile 1988) and for NC (FNA, K) and MD (K). **Phen:** Jun-Oct. **Syn:** = Bah, FNA4, GrPl, K1, K3, K4, NcTx, Tx, WH3; = *Achyranthes repens* Linnaeus – S, misapplied. NatureServe G5 (Secure).

* ***Alternanthera paronychioides*** A. Saint-Hilaire. **Hab:** Disturbed areas, wet or dry flats, beaches. **Dist:** Native of tropical America. **Phen:** Jul-Oct. **Syn:** = Ar, Bah, FNA4, WH3; = *Achyranthes polygonoides* (Linnaeus) Lamarck – S, misapplied; = *Alternanthera ficoidea* (Linnaeus) Palisot de Beauvois – K4; = *Alternanthera polygonoides* (Linnaeus) R. Brown ex Sweet – G, RAB, Tx, misapplied; > *Alternanthera paronychioides* St.-Hilaire var. *paronychioides* – K1. NatureServe GNR (Not Yet Ranked).

* ***Alternanthera philoxeroides*** (Martius) Grisebach. ALLIGATOR-WEED. **Hab:** Floating in mats on the surface of the waters of blackwater rivers, sloughs, ditches, ponds, and in very moist soil of ditches and shores. **Dist:** Native of tropical America. This plant is a serious weed of natural areas.

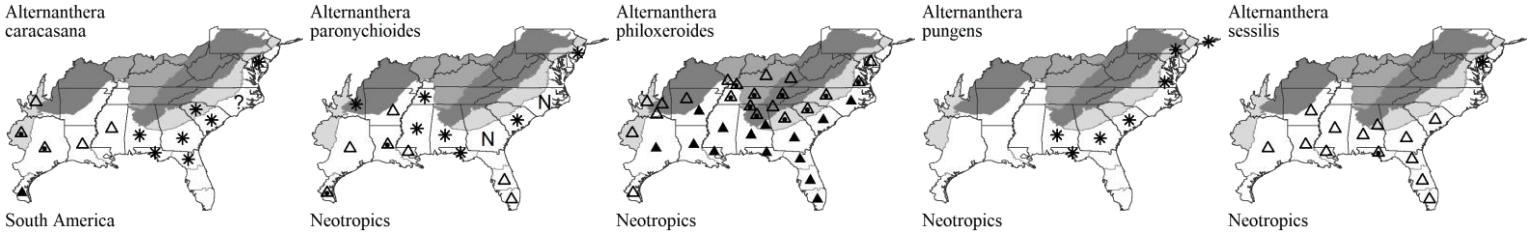
Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

297a. AMARANTHACEAE

Phen: Mar-Oct. **Syn:** = Ar, C, FNA4, Il, K1, K3, K4, NcTx, RAB, Tn, Tx, Va, WH3; = *Achyranthes philoxeroides* (Martius) Standley – S. NatureServe GNR (Not Yet Ranked).

* ***Alternanthera pungens*** Kunth. **Hab:** Field edges, parking lots, other disturbed areas. perhaps only a waif at least northward. **Dist:** Native of tropical America. Known from scattered locations in AL, FL, LA, NY, and TX (Clemants in FNA 2003b); native of tropical America. Reported for Sumter and Tift counties, GA (Carter, Baker, & Morris 2009). **Syn:** = FNA4, K1, K3, NE, NY, Tx, WH3; > *Achyranthes leiantha* (Seubert) Standley – S; > *Achyranthes repens* Linnaeus – S. NatureServe GNR (Not Yet Ranked).

* ***Alternanthera sessilis*** (Linnaeus) R. Brown ex A.P. de Candolle. SESSILE JOYWEED. **Hab:** Disturbed wet muck. **Dist:** Native of the Tropics. First reported for SC by Nelson & Kelly (1997). Apparently now known in the Southeast from SC, FL, AL, MS, LA, TX (Brown & Marcus 1998) and GA (Jones & Coile 1988). **Syn:** = Ar, FNA4, GW2, K1, K3, K4, WH3. NatureServe G5 (Secure).



Amaranthus Linnaeus 1753 (AMARANTH, PIGWEED)

A genus of about 60 species, all annual herbs, of tropical and temperate regions. References: Bayón (2015); Costea & Tardif (2003b); Costea & Tardif (2008); Costea, Sanders, & Waines (2001a); Costea, Sanders, & Waines (2001b); Henrickson (1999); Mosyakin & Robertson (2003) in FNA4 (2003b); Sauer (1955); Townsend in Kubitzki, Rohwer, & Bittrich (1993); Waselkov & Olsen (2014).

Unkeyed waifs: *Amaranthus muricatus*

1 Plants dioecious; [subgenus *Acnida*]..... ***Key A***
1 Plants monoecious (the pistillate and staminate flowers intermingled, or in separate inflorescences on the same plant); [subgenera *Albersia* and *Amaranthus*] ..... ***Key B***

Key A - *Amaranthus*, subgenus *Acnida*

1 Plants pistillate.
  2 Tepals present and well-developed (usually 5 present, at least the outer tepals >2 mm long and with a visible midvein).
    3 Tepals 1 or 2, lanceolate to linear; [subgenus *Acnida*, section *Acnida*]..... ***Amaranthus tuberculatus***
    3 Tepals 5, at least the inner spatulate; [subgenus *Acnida*, section *Saueranthus*].
      ..... ***Amaranthus palmeri***
  2 Tepals lacking, or rudimentary (often only 1-2 present, these <1 (2) mm long and lacking a visible midvein); subgenus *Acnida*, section *Acnida*].
    5 Seeds 2-3 mm long; utricle 2.5-4 mm long..... ***Amaranthus cannabinus***
    5 Seeds 0.7-1.2 mm long; utricle 1-2.5 mm long.
      6 Utricle with conspicuous and regular longitudinal ridges; bract > 1.5 mm long, with a stout midrib not far excurrent beyond the bract blade.....
        ..... ***Amaranthus australis***
      6 Utricle smooth or irregularly tuberculate; bract < 1.5 mm long, with a slender excurrent midrib
        ..... ***Amaranthus tuberculatus***
1 Plants staminate (some identifications following this lead may not be reliable).
  8 Outer tepals with prominent midribs, usually longer than the inner tepals; bracts >2 mm long (or 1-2 mm long in *A. tuberculatus*), mostly with prominent midribs.
    10 Bracts ca. 4 mm long, equaling or exceeding the outer tepals..... ***Amaranthus palmeri***
    10 Bracts ca. 2 mm long, shorter than the outer tepals..... ***Amaranthus tuberculatus***
  8 Outer tepals without prominent midribs, not appreciably longer than the inner tepals; bracts <2 mm long, the midribs usually not prominent (except sometimes in *A. australis*).
    11 Bracts < 1 mm long; midribs scarcely excurrent..... ***Amaranthus cannabinus***
    11 Bracts > 1mm long; midribs often conspicuously excurrent.
      13 Bracts with moderately prominent midribs; midribs of outer tepals excurrent..... ***Amaranthus australis***
      13 Bracts with slender midribs; midribs of outer sepals not excurrent..... ***Amaranthus tuberculatus***

Key B - *Amaranthus*, subgenera *Albersia* and *Amaranthus*

1 Inflorescences axillary clusters of glomerules (sometimes leafy terminal spikes also present); [subgenus *Albersia*].
  2 Pistillate flowers usually with 3 tepals; utricles usually regularly dehiscent (indehiscent in *A. blitum*).
    3 Utricles indehiscent; leaf blades usually deeply notched at the tip.
      ..... ***Amaranthus blitum ssp. emarginatus***
    3 Utricles dehiscent; leaf blades obtuse, acuminate, or very shallowly notched at the tip.
      ..... ***Amaranthus albus***
  2 Pistillate flowers usually with (4-) 5 tepals; utricles usually indehiscent or tardily dehiscent (regularly dehiscent in *A. blitoides*).
    6 Inflorescence axes thickened, becoming indurate at maturity..... ***Amaranthus crassipes var. crassipes***
    6 Inflorescence axes not thickened, not indurate at maturity.

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

..... ***Amaranthus blitoides***

1 Inflorescences terminal spikes or panicles, leafless or nearly so at least in the distal portions (axillary spikes or clusters usually also present).
10 Utricles indehiscent; tepals of pistillate flowers usually 2-3 (5 in *A. spinosus*); inflorescence bracts shorter than the tepals.
11 Stems with paired nodal spines; tepals of pistillate flowers 5; [subgenus *Amaranthus*] ..... ***Amaranthus spinosus***
11 Stems lacking spines; tepals of pistillate flowers 2-3; [subgenus *Albersia*].
12 Utricles distinctly rugose, equaling or slightly exceeding the tepals; terminal inflorescences usually thin and interrupted ..... ***Amaranthus viridis***
12 Utricles smooth to faintly rugose (occasionally wrinkled or rugose in dried material), distinctly exceeding the tepals; terminal inflorescences usually thick and dense (or thin and interrupted in some forms of *A. blitum*).
13 Utricles subglobose to obovate, compressed; seeds filling the fruit almost completely; leaf blades usually deeply notched at the tip; annual.
..... ***Amaranthus blitum ssp. emarginatus***
13 Utricles ellipsoid, slightly to distinctly inflated; seeds filling only the proximal portions of the fruit; leaf blades shallowly notched at the tip; short-lived perennials, or annuals ..... ***Amaranthus deflexus***
10 Utricles dehiscent; tepals of pistillate flowers usually 5 (3-5 in *A. powellii*); inflorescence bracts exceeding the tepals (shorter than the tepals in some cultivated forms); [subgenus *Amaranthus*].
15 Fully developed inflorescences large and robust, usually brightly colored (red, purple, occasionally white or yellow, rarely green); bracts usually not exceeding style branches at maturity (occasionally longer than the style branches in *A. hypochondriacus*); seeds white, ivory, red, brown, or black; [cultivated, only weakly naturalized].
..... ***Amaranthus cruentus***
15 Fully developed inflorescences moderately large, usually green (rarely with some whitish or reddish coloration); bracts exceeding the style branches and tepals; seeds brown or black; [wild and weedy].
18 Tepals of pistillate flowers obtuse, rounded, or slightly notched at the tip; plants rather densely pubescent ..... ***Amaranthus retroflexus***
18 Tepals of pistillate flowers acute, acuminate, or aristate at the tip; plants slightly pubescent when young, becoming glabrous or nearly so.
19 Bracts 2-4 mm long; inflorescences usually soft and lax, with spreading branches ..... ***Amaranthus hybridus ssp. hybridus***
19 Bracts 4-7 mm long; inflorescences usually stiff, with erect branches ..... ***Amaranthus powellii***

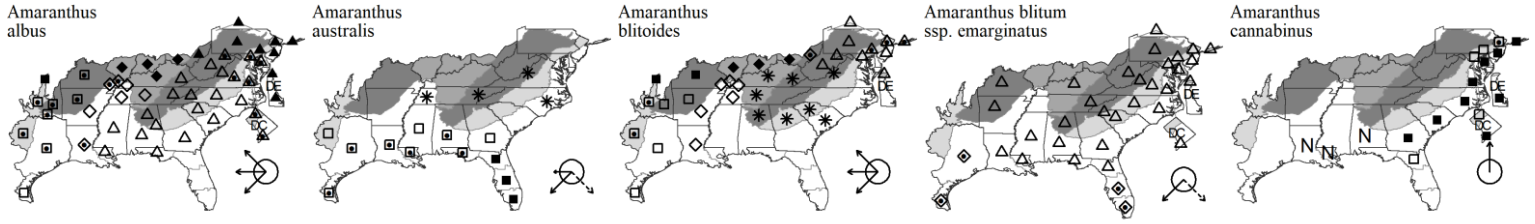
Amaranthus albus Linnaeus. TUMBLEWEED AMARANTH. **Hab:** Disturbed areas, agricultural fields. **Dist:** Central North America, the native distribution difficult to determine. **Phen:** Jul-Dec. **Syn:** = Ar, C, FNA4, G, GrPl, Il, K1, K3, K4, Mi, Mo2, NcTx, NE, NY, Pa, Tn, Va, W, WH3, Bayón (2015), Costea & Tardif (2003b); > *Amaranthus albus* Linnaeus – Tx; > *Amaranthus albus* var. *albus* – F; < *Amaranthus graecizans* Linnaeus – RAB, misapplied; > *Amaranthus pubescens* (Uline & Bray) Rydberg – Tx.

Amaranthus australis (A. Gray) J.D. Sauer. SOUTHERN WATER-HEMP, CARELESS. **Hab:** Tidal marshes, freshwater wetlands (swamps, strands, sloughs, marshes), ditches, disturbed areas. **Dist:** E. NC, TN, LA, and TX south into West Indies, Mexico, and n. South America; perhaps adventive in some of our range, from an original distribution on the Gulf Coast, in FL, and southward into the New World tropics. **Phen:** May-Aug. **Comm:** This annual can get as large as 9 m tall and 30 cm diameter at the base of the stem! **Syn:** = FNA4, GW2, K1, K3, K4, NcTx, WH3, Sauer (1955); > *Acnida alabamensis* Standley – S; > *Acnida cuspidata* Bertero ex Sprengel – S, Tx. NatureServe G5 (Secure).

Amaranthus blitoides S. Watson. MATWEED AMARANTH, PROSTRATE PIGWEED. **Hab:** Disturbed areas, roadsides. **Dist:** Sc. United States and Mexico. **Phen:** Jun-Oct. **Syn:** = Ar, C, FNA4, Il, K1, K3, K4, Mi, Mo2, NcTx, NE, NY, Pa, S, Tx, Bayón (2015), Costea & Tardif (2003b); < *Amaranthus graecizans* Linnaeus – F, GrPl, RAB, misapplied.

* ***Amaranthus blitum*** Linnaeus *ssp.* ***emarginatus*** (Uline & W.L. Bray) Carretero, Muñoz Garmendia, & Pedrol. PURPLE AMARANTH, LIVID AMARANTH. **Hab:** Disturbed habitats. **Dist:** Native of the tropics. First reported from South Carolina by Hill & Horn (1997). Reported for greenhouses and outdoor areas for c. KY (Adanick & Medley 2020). **Phen:** Sep-Oct. **Syn:** = *Amaranthus blitum* Linnaeus ssp. *emarginatus* (Uline & W.L. Bray) Carretero, Muñoz Garmendia, & Pedrol var. *emarginatus* – K3, NE; < *Amaranthus blitum* – C, FNA4, K1, NY, Pa, Va; < *Amaranthus blitum* Linnaeus ssp. *emarginatus* (Uline & W.L. Bray) Carretero, Muñoz Garmendia, & Pedrol – Mo2, WH3, Costea & Tardif (2003b); < *Amaranthus lividus* – Ar, Bah, F, G, RAB, misapplied.

Amaranthus cannabinus (Linnaeus) J.D. Sauer. SALT-MARSH WATER-HEMP. **Hab:** Salt, brackish, and freshwater tidal marshes, especially along the banks of tidal guts. **Dist:** ME south to ne. FL (Duval County). **Phen:** Jul-Dec. **ID Notes:** Extremely variable in size, flowering and fruiting at heights ranging from 3 dm to 4 m tall. The stem can reach 10 cm in diameter at the base. **Syn:** = C, FNA4, GW2, K1, K3, K4, NE, NY, Pa, RAB, Va, WH3, Sauer (1955); = *Acnida cannabina* Linnaeus – F, G, S. NatureServe G5 (Secure).



* ***Amaranthus crassipes*** Schlechtendal *var.* ***crassipes***. SPREADING AMARANTH. **Hab:** Shores and wet areas. **Dist:** Probably introduced from tropical America. **Tax:** Var. *warnockii* (I.M. Johnston) Henrickson occurs in the Chihuahuan Desert region. **Syn:** = K3; = *Amaranthus crassipes* ssp. *crassipes* – K4, Bayón (2015); < *Amaranthus crassipes* – Bah, C, FNA4, G, GW2, K1, RAB, S, Tx, WH3. NatureServe G5 (Secure).

* ***Amaranthus cruentus*** Linnaeus. RED AMARANTH, BLOOD AMARANTH, PURPLE AMARANTH. **Hab:** Disturbed areas, old gardens. **Dist:** Native of Central America. **Phen:** Jul-Oct. **Syn:** = C, F, FNA4, Il, K1, K3, K4, Mi, Mo2, NE, NY, Pa, RAB, S, Tx, WV, Bayón (2015), Costea & Tardif (2003b). NatureServe GNR (Not Yet Ranked).

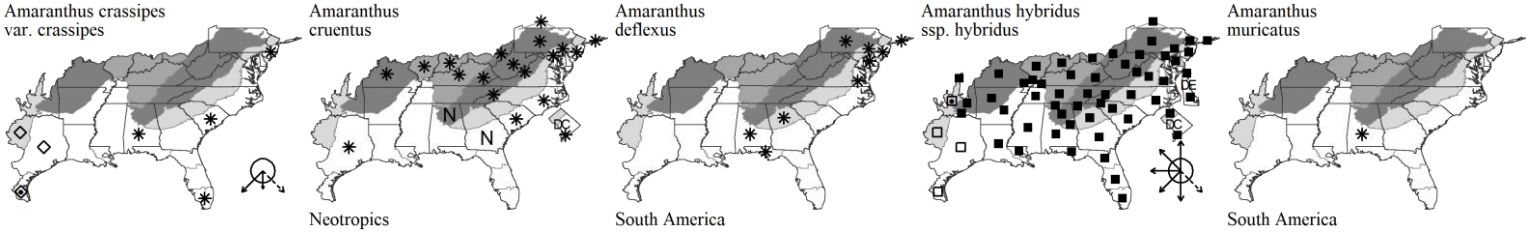
* ***Amaranthus deflexus*** Linnaeus. LARGE-FRUIT AMARANTH, ARGENTINE AMARANTH. **Hab:** Disturbed areas, ballast. **Dist:** Native of South America. Reported for VA by Virginia Botanical Associates (2019). **Phen:** Jul-early Oct. **Syn:** = C, F, FNA4, G, K1, K3, K4, NE, NY, Pa, WH3, Bayón (2015). NatureServe GNR (Not Yet Ranked).

Amaranthus hybridus Linnaeus *ssp.* ***hybridus***. SMOOTH AMARANTH, SLIM AMARANTH, GREEN AMARANTH, SMOOTH PIGWEED. **Hab:** Disturbed areas. **Dist:** Original distribution obscure because of its very weedy nature, but apparently native in eastern North America. **Phen:** Jul-Oct. **Syn:** =

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

NE, NY, Bayón (2015), Costea & Tardif (2003b); < *Amaranthus hybridus* – Ar, C, F, FNA4, G, GrPl, Il, K1, K3, K4, Mi, NcTx, Pa, RAB, S, Tn, Tx, Va, W, WH3. NatureServe G5?TNR (Not Yet Ranked).

* ***Amaranthus muricatus*** (Moquin-Tandon) Hieronymus. MURICATE AMARANTH. **Hab:** Disturbed areas, on ballast, probably only a waif. **Dist:** Native of s. South America. **Syn:** = FNA4, K3, K4, Bayón (2015). NatureServe GNR (Not Yet Ranked).



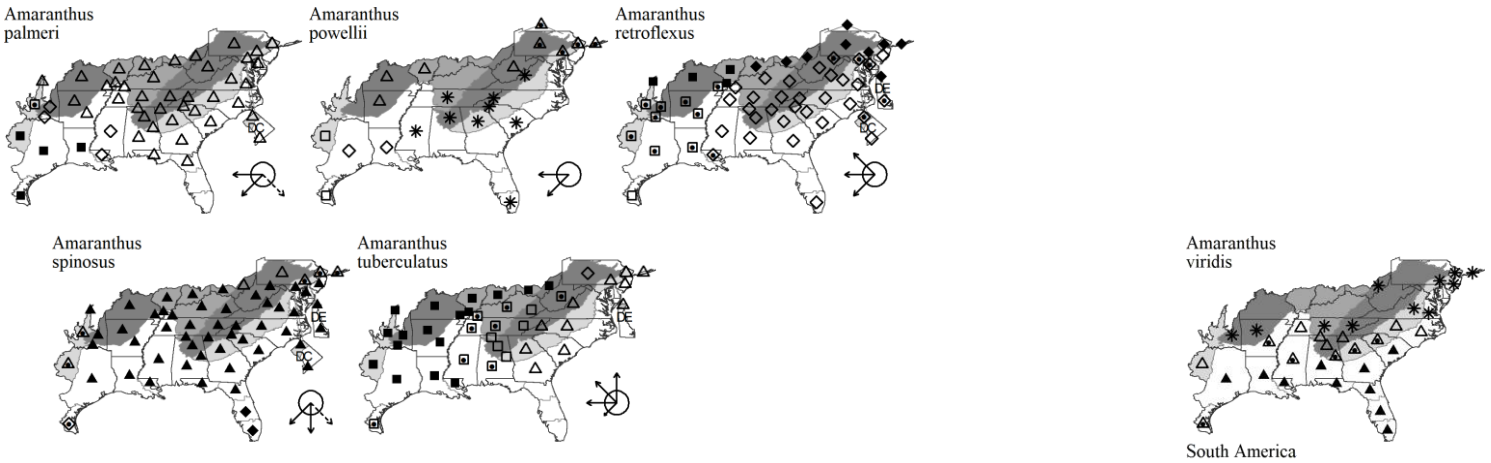
Amaranthus palmeri S. Watson. CARELESS-WEED, PALMER'S AMARANTH. **Hab:** Arroyos, riverbanks, and disturbed areas; eastwards adventive in fields and disturbed areas. **Dist:** Native of c. and sw. North America and the Neotropics. **Phen:** Aug-Oct. **Syn:** = Ar, C, F, FNA4, G, GrPl, Il, K1, K3, K4, Mo2, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, WH3, Sauer (1955). NatureServe G5 (Secure).

Amaranthus powellii S. Watson. GREEN AMARANTH, POWELL'S AMARANTH. **Hab:** Disturbed areas. **Dist:** Native of w. and sc. North America. Widespread and common in PA (Rhoads & Klein 1993); many earlier reports of *A. retroflexus* may actually pertain to this species. **Phen:** Jul-Oct. **Syn:** = Ar, C, F, FNA4, G, GrPl, Il, K1, K3, K4, Mi, Pa, Tx, Bayón (2015); = *Amaranthus powellii* ssp. *powellii* – Mo2, NE, NY, Costea & Tardif (2003b). NatureServe G5T5 (Secure).

Amaranthus retroflexus Linnaeus. ROUGH PIGWEED, REDROOT, REDROOT AMARANTH. **Hab:** Disturbed areas. **Dist:** Native of c. and e. North America, now nearly worldwide in distribution and the original native range difficult or impossible to determine. **Phen:** May-Oct. **Syn:** = Ar, C, F, FNA4, G, GrPl, Il, K1, K3, K4, Mi, Mo2, NcTx, NE, NY, Pa, RAB, S, Tn, Va, W, WH3, Bayón (2015), Costea & Tardif (2003b); > *Amaranthus retroflexus* var. *retroflexus* – Tx; > *Amaranthus retroflexus* Linnaeus var. *salicifolius* I.M. Johnston – Tx. NatureServe G5 (Secure).

* ***Amaranthus spinosus*** Linnaeus. SPINY AMARANTH, QUELITE ESPINOSO. **Hab:** Fields, gardens, roadsides, barnyards, pastures. **Dist:** Native of tropical America. **Phen:** Jul-Oct. **Syn:** = Ar, Bah, C, F, FNA4, G, GrPl, Il, K1, K3, K4, Mo2, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, Bayón (2015), Costea & Tardif (2003b). NatureServe G5 (Secure).

Amaranthus tuberculatus (Moquin-Tandon) J.D. Sauer. INLAND WATER-HEMP. **Hab:** Swamps, bottomlands, fields, disturbed areas. **Dist:** The exact boundaries of its native distribution are now obscure, perhaps approximately OH west to ND south to MS and TX. **Phen:** Jul-Oct. **Tax:** The two forms (sometimes treated as varieties or species) are discussed by Costea & Tardif (2003b) and Waselkov & Olsen (2014). **Syn:** = Ar, C, FNA4, GW2, K3, K4, Mi, Mo2, NE, NY, RAB, Tn, W; > *Acnida altissima* – G; > *Acnida altissima* (Riddell) Moquin-Tandon ex Standley var. *altissima* – F; > *Acnida altissima* var. *prostrata* (Uline & Bray) Fernald – F; > *Acnida altissima* var. *subnuda* (S. Watson) Fernald – F; > *Acnida concatenata* Moquin-Tandon – S; > *Acnida subnuda* (S. Watson) Standley – G, S; > *Acnida tamariscina* (Nuttall) Wood – G, S, Tx, misapplied; > *Amaranthus rudis* J.D. Sauer – GrPl, Il, K1, NcTx, Pa; > *Amaranthus tamariscinus* Nuttall – Sauer (1955), misapplied; > *Amaranthus tuberculatus* (Moquin-Tandon) J.D. Sauer – GrPl, K1, Pa, Sauer (1955); > *Amaranthus tuberculatus* var. *prostratus* (Uline & Bray) Mohlenbrock – Il; > *Amaranthus tuberculatus* var. *rudis* (J.D. Sauer) Costea & Tardif – Costea & Tardif (2003b), Waselkov & Olsen (2014); > *Amaranthus tuberculatus* var. *subnudus* (S. Watson) Mohlenbrock – Il; > *Amaranthus tuberculatus* var. *tuberculatus* – Il, Costea & Tardif (2003b), Waselkov & Olsen (2014).



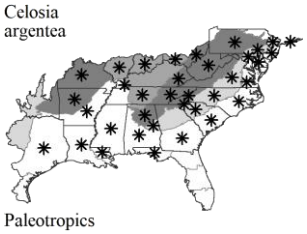
* ***Amaranthus viridis*** Linnaeus. SLENDER AMARANTH, TROPICAL GREEN AMARANTH. **Hab:** Disturbed areas. **Dist:** Native of South America. **Syn:** = Ar, Bah, C, F, FNA4, G, K1, K3, K4, Mi, Mo2, NE, NY, RAB, Tx, WH3, Bayón (2015), Costea & Tardif (2003b); = *Amaranthus gracilis* Desfontaines – S.

Celosia Linnaeus 1753 (COCKSCOMB, WOOLFLOWER)

A genus of about 45 species, of tropical and warm temperate regions of America and Africa. References: Robertson (1981); Robertson (2003a) in FNA4 (2003b); Townsend in Kubitzki, Rohwer, & Bittrich (1993).

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated

297a. AMARANTHACEAE



* ***Celosia argentea*** Linnaeus. COCKSCOMB, CELOSIA, CRESTA DE GALLO. **Hab:** Commonly cultivated, rarely escaped or persistent in disturbed areas, such as along creeks. **Dist:** Native of the Tropics. **Phen:** Jul-Nov. **Tax:** *C. cristata* (with inflorescence distorted into a crest, cockscomb, fanlike, or elaborately lobed, rather than of crowded spikes) is clearly derived from *C. argentea*; it has been variously treated as a species, variety, or form. **Comm:** The '*cristata*' form is popular in gardens and institutional landscaping, but is not universally appreciated; Stace (2010) calls it "probably the world's ugliest plant". **Syn:** = Ar, Bah, Il, Pa, Tx, WH3; > *Celosia argentea* Linnaeus – C, FNA4, G, K1, K3, K4, NY, RAB, Judd & Ferguson (1999), Robertson (1981); > *Celosia argentea* var. *argentea* – F, Mo2; > *Celosia argentea* Linnaeus var. *cristata* (Linnaeus) Kuntze – F, Mo2; > *Celosia cristata* – C, FNA4, G, K1, K3, K4, NE, NY, Judd & Ferguson (1999), Robertson (1981).

Froelichia Moench 1794 (COTTONWEED, SNAKE-COTTON)

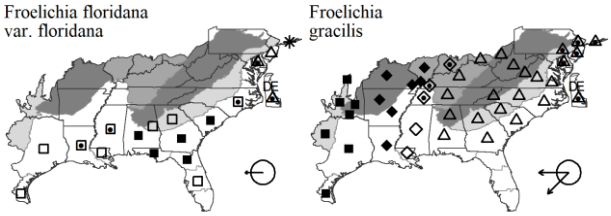
A genus of about 18 species, annual, perennials, and shrubs, of tropical, subtropical, and warm temperate America. References: McCauley & Ballard (2007a); McCauley & Ballard (2007b); McCauley (2003) in FNA4 (2003b); McCauley (2004); Robertson (1981); Townsend in Kubitzki, Rohwer, & Bittrich (1993).

2 Mature perianth slightly oblique apically, with irregularly and deeply cut (''spiny'') lateral wings; flowers 2.4-3.8 mm long; stems slender, branched from base (except in depauperate specimens with only 1 slender stalk); floral spikes 3-ranked; bracteoles glabrous, not pubescent distally; stem pubescence grayish-white ..... ***Froelichia gracilis***

2 Mature perianth symmetrical, with irregularly dentate to crenulate lateral wings; flowers 3.5-6 mm long; stems stout with one or more erect to decumbent branches from ground level; floral spikes 5-ranked (rarely 3-ranked); bracteoles glabrous to sparsely or densely pubescent distally; stem pubescence grayish-white or brownish. ..... ***Froelichia floridana var. floridana***

Froelichia floridana (Nuttall) Moquin-Tandon *var*. ***floridana***. FLORIDA COTTONSEED, COMMON COTTONWEED. **Hab:** Longleaf pine sandhills, sandy fields, sandy roadsides. **Dist:** S. NC south to n. FL, and west to LA, north in the interior to w. TN; disjunct (probably introduced) in DE, e. MD, s. NJ, and NY (Long Island). **Phen:** Jun-Oct. **Tax:** *Froelichia floridana* var. *campestris* Small is more midwestern, ranging from OH, IN, WI, and SD south to KY, AR, and TX; it is sometimes treated at species or variety rank, or lumped into *F. floridana*, as by McCauley (2004). Additionally, see *Froelichia floridana* var. *pallescens*. **Syn:** = Robertson (1981); < *Froelichia floridana* (Nuttall) Moquin-Tandon – FNA4, NcTx, NY, RAB, S, WH3, McCauley & Ballard (2007a), McCauley & Ballard (2007b), McCauley (2004); < *Froelichia floridana* (Nuttall) Moquin-Tandon var. *floridana* – C, F, G, GrPl, K1, K3, K4, Tx, Tx.

Froelichia gracilis (Hooker) Moquin-Tandon. SLENDER COTTONWEED. **Hab:** Dry soils; eastwards adventive in vacant lots, sandy fields, railroad banks. **Dist:** Native of mw. United States, the eastern limit of its native distribution uncertain. **Phen:** Jun-Oct. **Syn:** = Ar, C, F, FNA4, G, GrPl, Il, K1, K3, K4, Mi, Mo2, NcTx, NE, NY, Pa, RAB, Tn, Va, W, WV, McCauley & Ballard (2007a), McCauley & Ballard (2007b), McCauley (2004); = *Froelichia braunii* Standley – Tx. NatureServe G5 (Secure).



Gomphrena Linnaeus 1753 (GLOBE-AMARANTH)

A genus of about 100-120 species, of the tropics and subtropics of America and Australia (naturalized elsewhere). References: Clemants (2003d) in FNA4 (2003b); Townsend in Kubitzki, Rohwer, & Bittrich (1993).

1 Heads 20-28 mm in diameter; stems erect ..... ***Gomphrena globosa***

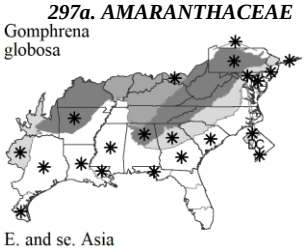
1 Heads 8-16 mm in diameter; stems prostrate or decumbent ..... ***Gomphrena serrata***

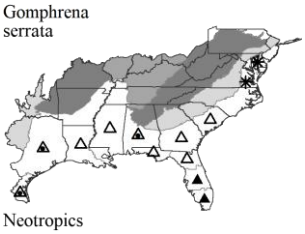
* ***Gomphrena globosa*** Linnaeus. GLOBE-AMARANTH. **Hab:** Disturbed areas. **Dist:** Native of s. Asia. Introduced and known from scattered locations in s. PA (Rhoads & Klein 1993). Also reported for VA (Kartesz 1999) and MD (Reed1961b). **Phen:** Jul-Sep. **Syn:** = Bah, C, F, FNA4, G, K1, K3, K4, NcTx, NE, NY, Tx. NatureServe GNR (Not Yet Ranked).

* ***Gomphrena serrata*** Linnaeus. ARRASA CON TODO. **Hab:** Sandy woodlands and disturbed areas. **Dist:** Native of tropical America. Reported for chrome ore piles in Newport News, VA (Reed 1961, Virginia Botanical Associates 2019), where presumably only a waif. **Syn:** = FNA4, K3, K4, WH3; > *Gomphrena decumbens* Jacquin – Tx; > *Gomphrena dispersa* Standley – S, Tx. NatureServe G5 (Secure).

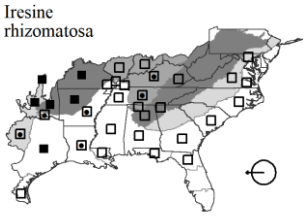
Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

297a. AMARANTHACEAE





Iresine P. Browne 1856 (BLOODLEAF)



A genus of about 80 species of tropical and temperate regions (especially America). References: Clemants (2003e) in FNA4 (2003b); Townsend in Kubitzki, Rohwer, & Bittrich (1993).

Iresine rhizomatosa Standley. BLOODLEAF. **Hab:** Moist interdune thickets, hammocks, edges of maritime forests, moist thickets inland, floodplain forests, riverbanks and river scour, bluff forests of the Coastal Plain. **Dist:** MD south to FL, west to se. TX; also inland from KY and TN west and south to KS and n. TX. **Phen:** Aug-Oct. **Syn:** = Ar, C, F, FNA4, G, GrPl, Il, K1, K3, K4, Mo2, NcTx, RAB, S, Tn, Tx, Va, WH3. NatureServe G5 (Secure).

297b. CHENOPODIACEAE Ventenat 1799 (GOOSEFOOT FAMILY) [in CARYOPHYLLALES]

A family of about 100 genera and about 1500 species, herbs and shrubs, cosmopolitan, but especially in xeric and/or saline areas. Sometimes recently included in the Amaranthaceae, but each traditional family is monophyletic and there seems no reason to combine them.References: Fuentes-Bazan, Mansion, & Borsch (2012); Fuentes-Bazan, Uotila, & Borsch (2012); Judd & Ferguson (1999); Kühn in Kubitzki, Rohwer, & Bittrich (1993); Piirainen, Liebisch, & Kadereit (2017); Welsh, Crompton, & Clemants (2003) in FNA4 (2003b).

Chenopodiaceae
- Subfamily Betoideae: *Beta*
- Subfamily Chenopodioideae: *Atriplex, Blitum, Chenopodiastrum, Chenopodium, Cycloloma, Dysphania, Oxybasis, Spinacia*
- Subfamily Suaedoideae: *Suaeda*
- Subfamily Salicornioideae: *Salicornia, Sarcocornia*
- Subfamily Camphorosmoideae: *Bassia, Spirobassia*
- Subfamily Salsoloideae: *Kali*

{ADD *Dysphania* to KEY}

1 Leaves opposite, reduced to scales a few mm long, clasping and appressed against the succulent stem; flowers in groups of 3, sunken into the stem; [subfamily *Salicornioideae*]. ..... ***Salicornia***
1 Leaves alternate, not reduced to scales; flowers not sunken into the stem.
2 Fruit enclosed and concealed by paired accrescent bracteoles (these usually deltoid, diamond-shaped, or ovoid); [subfamily *Chenopodioideae*]. ..... ***Atriplex***
2 Fruit enclosed by the persistent calyx.
4 Leaves sessile, linear, entire, succulent or not.
5 Leaves spine-tipped with a sharp spine > (0.5) 1 mm long; [subfamily *Salsoloideae*]..... ***Salsola***
5 Leaves not spine-tipped.
6 Leaves glabrous; [subfamily *Suaedoideae*] ..... ***Suaeda***
6 Leaves pubescent to villous; [subfamily *Camphorosmoideae*]. ..... ***Bassia***
4 Leaves petiolate, lanceolate or wider, the larger leaves generally toothed, not succulent or only slightly so.
9 Fruiting calyx winged horizontally..... ***Dysphania atriplicifolia***
9 Fruiting calyx not winged, the lobes flat, keeled, or hooded.
10 Plants aromatic, leaves and perianth with stalked glandular hairs and/or subsessile glands..... ***Dysphania***
10 Plants non-aromatic (but sometimes fetid), vesicular hairy (farinose) or glabrous.
13 Flowers often dimorphic, in lateral flowers perianth segments 3 (-5), seeds either vertical or horizontal in the fruit; stamens 1-3..... ***Oxybasis***
13 Flowers not dimorphic, perianth segments 5, seeds exclusively horizontal in the fruit; stamens almost always 5.
14 Young stems and leaves not farinose (with vesicular trichomes that become totally collapsed when dry, and are caducous and therefore rarely present at maturity); perianth segments with prominent midvein visible inside; seeds distinctly pitted to sometimes rugulose or almost smooth .... ***Chenopodiastrum***
14 Young stems and leaves densely farinose (covered with vesicular globose trichomes that become cup-shaped when dry and are mostly persistent at maturity); perianth segments without prominent midvein visible inside; seeds smooth or striate and somewhat rugulose, sometimes pitted..... ***Chenopodium***

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Atriplex Linnaeus 1753 (ORACH)

A genus of about 300 species, herbs and shrubs, of cosmopolitan distribution. References: Clemants (1992); Judd & Ferguson (1999); Kühn in Kubitzki, Rohwer, & Bittrich (1993).; Welsh (2003) in FNA4 (2003b).

Identification Notes: A number of idiosyncratic characters are used in the identification of the species of *Atriplex*. Many important characters are associated with the mature fruits. The fruit is closely invested by 2 bracteoles, which are variously shaped and ornamented. Mature seeds are dimorphic in most of our species, with larger brown seeds and smaller black seeds. The radicle of the seeds is variously apical, lateral, or basal (which can be seen by observing the seed through the clarified bracteoles or with strong transmitted light).

Unkeyed waifs: *Atriplex rosea*, *Atriplex tatarica*

1 Leaves white to gray, densely and finely scurfy, especially on the upper surface.
  3 Fruiting bracteoles (3.5-) 4.5-7 mm long, 3.5-5.6 mm wide, longer than broad; faces with or without appendages..... ***Atriplex mucronata***
  3 Fruiting bracteoles 2.5-4.5 mm long, 2.6-5 mm wide, as wide as or wider than long; faces with appendages..... ***Atriplex pentandra***
1 Leaves usually green on both surfaces, glabrous or only sparingly powdery or scurfy; [subgenus *Atriplex*, section *Teutliopsis*].
  .....***Atriplex patula***

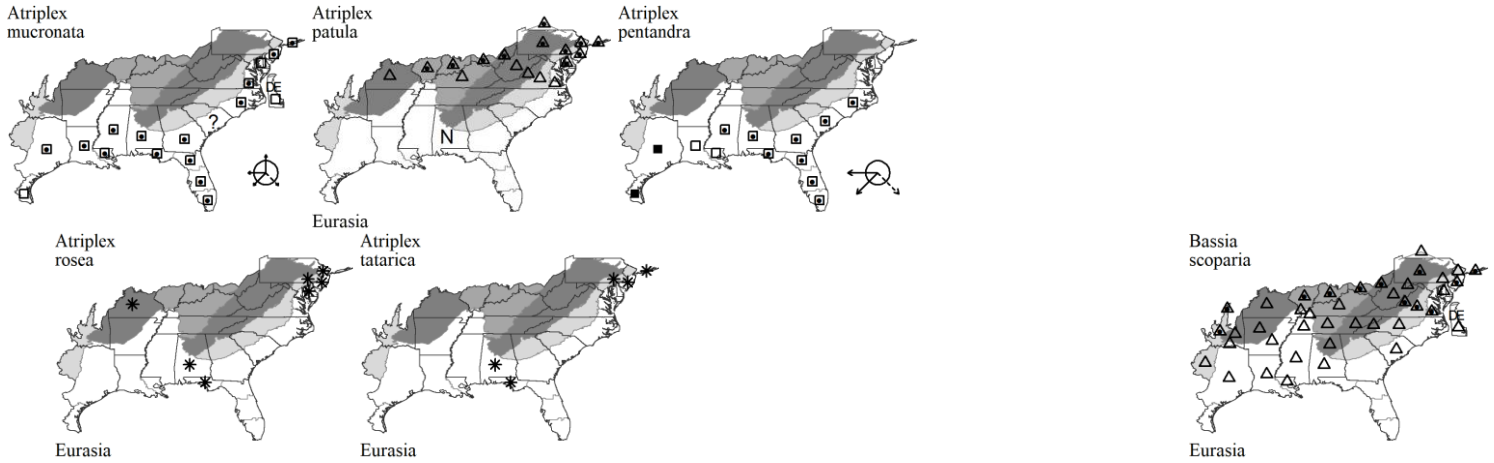
Atriplex mucronata Rafinesque. SEABEACH ORACH, QUELITE. **Hab:** Ocean beaches, island-end flats. **Dist:** NH south to FL west to TX; Bahamas. **Phen:** Jul-frost. **Comm:** This species and *A. pentandra* are closely related, and have been variously treated as species, subspecies, varieties, and forms. **Syn:** = FNA4, NY, Va; = *Atriplex arenaria* Nuttall – Tx; < *Atriplex arenaria* Nuttall – Bah, C, G, GW2, RAB, S, Clemants (1992); < *Atriplex cristata* Humboldt and Bonpland ex Willdenow – K1, NE; < *Atriplex mucronata* Rafinesque – K2, K4.

* ***Atriplex patula*** Linnaeus. SPEAR ORACH. **Hab:** Disturbed areas, inland saline areas. **Dist:** Native of Eurasia. **Phen:** Jul-frost. **Syn:** = C, FNA4, Il, K1, K3, K4, Mi, NE, NY, Pa, S, Va, Clemants (1992); = *Atriplex patula* var. *patula* – F, G; < *Atriplex patula* Linnaeus – RAB, W. NatureServe G5 (Secure).

Atriplex pentandra (Jacquin) Standley. SEABEACH ORACH. **Hab:** Ocean beaches, island-end flats. **Dist:** NC to FL, west to TX; West Indies; South America. **Phen:** Jul-Nov. **Tax:** This species and *A. mucronata* are closely related, and have been variously treated as species, subspecies, varieties, and forms. **Syn:** = Bah, FNA4, WH3; < *Atriplex arenaria* Nuttall – C, G, GW2, RAB, S, Clemants (1992); < *Atriplex cristata* Humboldt and Bonpland ex Willdenow – K1; < *Atriplex mucronata* Rafinesque – K3, K4; > *Atriplex pentandra* (Jacquin) Standley – Tx; > *Atriplex texana* – Tx; > *Atriplex wardii* Standley – Tx.

* ***Atriplex rosea*** Linnaeus. TUMBLING SALTWEED, RED ORACH. **Hab:** Disturbed areas, on ballast. **Dist:** Native of Eurasia. **Phen:** Aug-Oct. **Syn:** = FNA4, GrPl, Il, K3, K4, Mi, NE, NY, Tx, WH3. NatureServe GNR (Not Yet Ranked).

* ***Atriplex tatarica*** Linnaeus. TARTARIAN ORACH. **Hab:** Introduced on ballast at scattered localities, including AL, FL (Escambia County), NJ, and PA (FNA). **Dist:** Native of Eurasia. **Phen:** Jul-Oct. **Syn:** = FNA4, NE, NY, WH3; = *Atriplex lampa* – S; > *Atriplex lampa* – K3, K4, misapplied; > *Atriplex tatarica* Linnaeus – K3, K4.

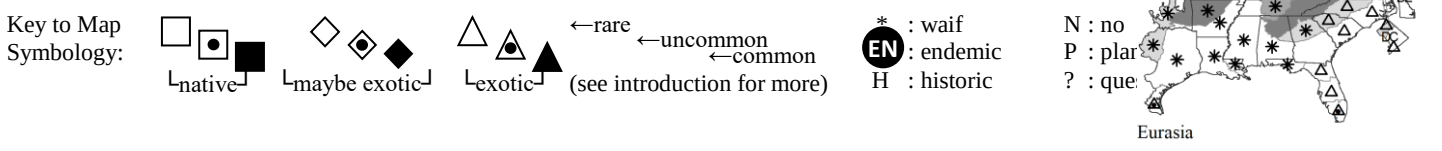


Bassia Allioni 1766 (BASSIA)

A genus of about 21 species, herbs and dwarf shrubs, of Europe, Asia, Africa, and North America. All or part (the annuals) of *Kochia* are now sometimes merged into *Bassia* (Kadereit & Freitag 2011; Judd & Ferguson 1999). References: Blackwell, Baechle, & Williamson (1978); Collins & Blackwell (1979); Judd & Ferguson (1999); Kadereit & Freitag (2011); Kühn in Kubitzki, Rohwer, & Bittrich (1993); Mosyakin (2003c) in FNA4 (2003b); Mosyakin (2003d) in FNA4 (2003b).

* ***Bassia scoparia*** (Linnaeus) A.J. Scott. SUMMER-CYPRESS, KOCHIA, MEXICAN FIREWEED. **Hab:** Disturbed areas, waste ground, particularly along railroad tracks, also in waste areas near wool-combing mill. **Dist:** Native of Eurasia. Reported for SC (Berkeley Co.) by Pittillo & Brown (1988). **Phen:** Jun-Aug. **Syn:** = K3, K4, Mi, NY, Va, Judd & Ferguson (1999), Kadereit & Freitag (2011); = *Kochia scoparia* (Linnaeus) Schrader – C, F, G, GrPl, Il, K1, NcTx, NE, Pa, Tn, W, Blackwell, Baechle, & Williamson (1978); > *Kochia scoparia* ssp. *scoparia* – Ar, FNA4; > *Kochia scoparia* var. *culta* Farwell – Tx; > *Kochia scoparia* var. *scoparia* – Tx. NatureServe GNR (Not Yet Ranked).

Chenopodiastrum S. Fuentes, Uotila, & Borsch 2012



297b. CHENOPODIACEAE

A genus of 13-15 species, annual and perennial herbs, of cosmopolitan distribution. References: Bassett & Crompton (1982); Clemants & Mosyakin (2003a) in FNA4 (2003b); Fuentes-Bazan, Mansion, & Borsch (2012); Fuentes-Bazan, Uotila, & Borsch (2012); Mosyakin (2013).

* ***Chenopodiastrum murale*** (Linnaeus) S. Fuentes, Uotila, & Borsch. NETTLELEAF GOOSEFOOT, SOWBANE. **Hab:** Disturbed areas. **Dist:** Native of Europe, Asia, and n. Africa. **Phen:** May-Nov. **Syn:** = K3, K4, NY, Fuentes-Bazan, Uotila, & Borsch (2012), Mosyakin (2013); = *Chenopodium murale* Linnaeus – Ar, Bah, C, F, FNA4, G, Il, K1, Mi, NcTx, NE, Pa, RAB, S, Tn, Tx, W, WH3, Bassett & Crompton (1982), Piirainen, Liebisch, & Kadereit (2017). NatureServe GNR (Not Yet Ranked).

Chenopodium Linnaeus 1753 (GOOSEFOOT, LAMB'S-QUARTERS, PIGWEED)

A genus of about 140 species, herbs, shrubs, and small trees, of nearly cosmopolitan distribution. The genus (as traditionally circumscribed) has been determined to be paraphyletic (unless *Atriplex* is included, leading to the segregation of several monophyletic genera (Fuentes-Bazan, Mansion, & Borsch 2012; Fuentes-Bazan, Uotila, & Borsch 2012). References: Bassett & Crompton (1982); Clemants & Mosyakin (2003a) in FNA4 (2003b); Fuentes-Bazan, Mansion, & Borsch (2012); Fuentes-Bazan, Uotila, & Borsch (2012); Judd & Ferguson (1999); Kadereit et al (2010); Kühn in Kubitzki, Rohwer, & Bittrich (1993).; Mosyakin & Clemants (1996); Wahl (1954).

1 Seeds arranged vertically or both horizontally and vertically in the fruit; leaf blades glabrous or occasionally sparsely farinose.
..... ***Oxybasis glauca***

1 Seeds arranged horizontally in the fruit; leaf blades usually farinose.
7 Primary leaves linear, linear-lanceolate, at least 2-3× as long as wide, usually untoothed and unlobed (but often with 2 basal lobes in *C. foggii*); [subsection *Leptophylla*].
..... ***Chenopodium pratericola***

7 Primary leaves ovate, rhombic, triangular, or lanceolate, usually with basal lobes and often also with additional teeth on the margins.
11 Seeds honeycomb-pitted; [subsection *Favosa*].
..... ***Chenopodium berlandieri var. boscianum***

11 Seeds smooth or areolate.
17 Leaves triangular.
..... ***Chenopodiastrum murale***

17 Leaves ovate to broadly ovate, rhombic, or lanceolate, variously lobed or toothed.
19 Leaf blades without teeth, except for the often present basal lobes or teeth.
20 Leaves not aromatic; flowers in each glomerule in markedly different stages of development; [subsection *Standleyana*] .....
..... ***Chenopodium standleyanum***

20 Leaves strongly malodorous; flowers in each glomerule in similar stages of development; [subsection *Chenopodium*]..... ***Chenopodium vulvaria***

19 Leaf blades with lateral teeth and often basal lobes; [subsection *Chenopodium*].
24 Plant sparsely branched, with an erect habit; inflorescences in paniculate spikes; lower leaves lobed or toothed; upper leaves triangular and toothed..
..... ***Chenopodium album var. album***

24 Plant densely branched from base; inflorescences in paniculate arching branches; lower leaves with a few lobes or teeth; upper leaves lanceolate and entire ..... ***Chenopodium album var. missouriense***

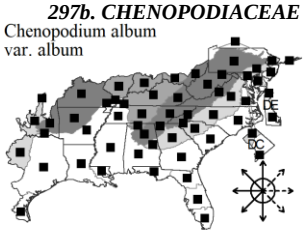
Chenopodium album Linnaeus *var. **album***. LAMB'S-QUARTERS, PIGWEED. **Hab:** Disturbed soils, gardens. **Dist:** Even with the '*missouriense*' entity removed, *Chenopodium album* var. *album* likely includes both native and alien races and is now distributed nearly worldwide. **Phen:** Jun-Nov. **Syn:** = K1, K3, K4, Tn, Bassett & Crompton (1982), Wahl (1954); = *Chenopodium album* Linnaeus – Il, NcTx, Pa, Tx; > *Chenopodium albescens* Small – Tx; < *Chenopodium album* Linnaeus – Ar, Bah, FNA4, G, Mi, NE, NY, Pa, RAB, W, WH3; > *Chenopodium album* Linnaeus – C; > *Chenopodium giganteum* Don – Tx, Wahl (1954); > *Chenopodium opulentum* Schrader – C.

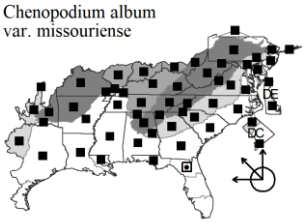
Chenopodium album Linnaeus *var. **missouriense*** (Aellen) I.J. Bassett & C.W. Crompton. **Hab:** Disturbed areas, gardens. **Dist:** Widely distributed in eastern North America. **Phen:** Jun-Nov. **Syn:** = K1, K3, K4, Tn, Bassett & Crompton (1982); = *Chenopodium missouriense* Aellen – C, GrPl, Il, NcTx, Pa, Tx, Wahl (1954); < *Chenopodium album* Linnaeus – Ar, FNA4, G, Mi, NE, NY, Pa, RAB, W, WH3; > *Chenopodium album* var. *lanceolatum* (Muhlenberg ex Willdenow) Coss. & Germ. – Wahl (1954); > *Chenopodium album* Linnaeus var. *missouriense* (Aellen) I.J. Bassett & C.W. Crompton – Wahl (1954); > *Chenopodium paganum* – F, S, misapplied.

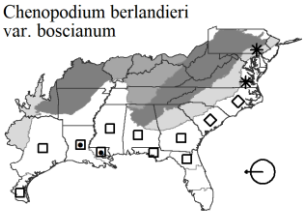
Chenopodium berlandieri Moquin-Tandon *var. **boscianum*** (Moquin-Tandon) H.A. Wahl. **Hab:** Beaches, marshes. **Dist:** FL west to e. TX; with scattered occurrences farther north (these of unknown nativity). **Phen:** Aug-Sep. **Syn:** = FNA4, K1, K3, K4, NcTx, Tx, Wahl (1954); < *Chenopodium album* Linnaeus – RAB; < *Chenopodium berlandieri* Moquin-Tandon – Pa, Va, WH3; < *Chenopodium standleyanum* Aellen – GrPl.

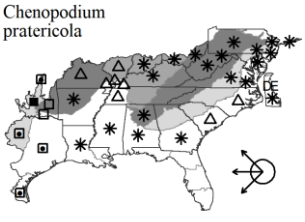
Chenopodium pratericola Rydberg. DESERT GOOSEFOOT, NARROWLEAF GOOSEFOOT. **Hab:** Sandy soils, roadsides, disturbed areas. **Dist:** Native of w. North America. Maine and ON west to YT, south to FL, TX, and CA, introduced in the eastern part of that distribution. **Phen:** May-Nov. **Syn:** = Ar, FNA4, GrPl, Il, K1, K3, K4, Mi, NY, Pa, Bassett & Crompton (1982); = *Chenopodium desiccatum* A. Nelson var. *leptophylloides* (J. Murray) H.A. Wahl – RAB, Tx, misapplied; = *Chenopodium pratericola* var. *pratericola* – Wahl (1954); ? *Chenopodium leptophyllum* (Moquin-Tandon) Nuttall ex S. Watson – F, G, misapplied; < *Chenopodium pratericola* Rydberg – C.

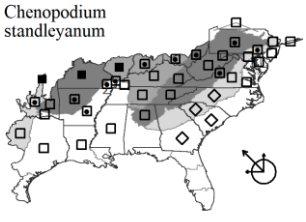
Chenopodium standleyanum Aellen. WOODLAND GOOSEFOOT. **Hab:** Rock outcrops, steep slopes, bluffs, dry to mesic woodlands, shaded disturbed soils. **Dist:** QC west to ND, south to FL and e. TX. **Syn:** = Ar, C, FNA4, G, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, W, Bassett & Crompton (1982); < *Chenopodium boscianum* – F, S, misapplied; < *Chenopodium standleyanum* Aellen – GrPl.



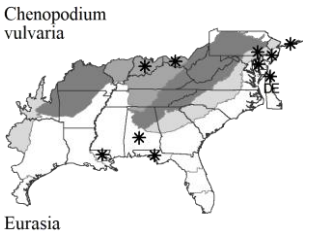








* ***Chenopodium vulvaria*** Linnaeus. STINKING GOOSEFOOT. **Hab:** Disturbed areas. **Dist:** Native of Eurasia. Introduced at scattered locations in eastern North America, as in MD, PA, DE, FL (FNA 2003b). **Phen:** Aug-Nov. **Syn:** = C, FNA4, K1, K3, K4, Mi, NcTx, NY, Tx, WH3, Bassett & Crompton (1982), Wahl (1954). NatureServe GNR (Not Yet Ranked).



Dysphania R. Brown 1810

A genus of about 32 species, annual and perennial herbs, nearly cosmopolitan, mostly in the tropics, subtropics, and warm temperate areas. The exclusion of *Dysphania* from *Chenopodium* and its placement in a separate tribe (Dysphanieae) is strongly supported (Fuentes-Bazan, Mansion, & Borsch 2012; Kadereit et al. 2010; Uotila et al. 2021). The classification of sections follows Uotila et al. (2021). References: Bassett & Crompton (1982); Clemants & Mosyakin (2003b) in FNA4 (2003b); Fuentes-Bazan, Mansion, & Borsch (2012); Fuentes-Bazan, Uotila, & Borsch (2012); Judd & Ferguson (1999); Kadereit et al (2010); Kühn in Kubitzki, Rohwer, & Bittrich (1993).; Uotila et al (2021); Wahl (1954).

1 Leaves deeply pinnately lobed, the lobes linear; plant perennial; mature calyx shallowly toothed, obovoid-urceolate, reticulate-veiny; [section *Adenois*]..... ***Dysphania multifida***
1 Leaves serrate to sinuate-pinnatifid, the lobes broad-based and triangular-tapered; plant annual; mature calyx deeply lobed, neither reticulate nor prominently veined.
2 Flowers in a slender thyrsoid inflorescence of lateral cymes; [section *Botryoides*]..... ***Dysphania botrys***
2 Flowers either solitary and spaced along the inflorescence axis, or in dense glomerules arranged secondarily into spikes and panicles.
3 Flowers solitary, sessile, and spaced along the inflorecence axis; calyx lobes strongly keeled, at maturity with a continuous, horizontal, scarious wing; [section *Adenois*]..... ***Dysphania atriplicifolia***
3 Flowers in dense glomerules arranged secondarily into spikes and panicles; calyx lobes not winged.
4 Leaf blades 2-8 cm long; seeds mostly horizontal; stems 3-15 dm tall; [section *Adenois*].
5 Inflorescences foliose throughout; primary leaves not lobed..... ***Dysphania ambrosioides***
5 Inflorescences leafless (leaves in the inflorescence absent or shorter than the glomerules); primary leaves regularly lobed..... ***Dysphania anthelmintica***
4 Leaf blades 0.5-2.7 cm long; seeds vertical; stems 0.5-5 dm tall; [section *Dysphania*].
6 Perianth segments rounded..... ***Dysphania pumilio***
6 Perianth segments keeled and/or crested
7 Perianth segments keeled only..... ***Dysphania carinata***
7 Perianth segments both keeled and crested..... ***Dysphania cristata***

Dysphania ambrosioides (Linnaeus) Mosyakin & Clemants. MEXICAN-TEA, EPAZOTE. **Hab:** Disturbed habitats; common, probably native southward. **Dist:** Widespread in North America to South America, the original range unclear. **Syn:** = Ar, FNA4, Il, Mi, NE, NY, Pa, Tn, Va; = *Chenopodium ambrosioides* var. *ambrosioides* – F; < *Ambrina ambrosioides* (Linnaeus) Spach – S; < *Chenopodium ambrosioides* – C, G, NcTx, RAB, Tx, W, WH3, Bassett & Crompton (1982), Wahl (1954); < *Chenopodium ambrosioides* var. *ambrosioides* – K1; < *Dysphania ambrosioides* (Linnaeus) Mosyakin & Clemants – K3, K4. NatureServe GNRTNR (Not Yet Ranked).

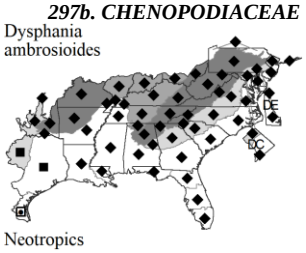
Dysphania anthelmintica (Linnaeus) Mosyakin & Clemants. WORMSEED, EPAZOTE. **Hab:** Dunes, also in disturbed areas. **Dist:** NY south to FL, west to TX; Mexico, West Indies, Bermuda, Central America; scattered inland in North America probably as an introduction. **Phen:** Jun-Oct. **Syn:** = FNA4, Il, NE, NY; = *Chenopodium ambrosioides* var. *anthelminticum* (Linnaeus) A. Gray – F; < *Ambrina ambrosioides* (Linnaeus) Spach – S; < *Chenopodium ambrosioides* – Bah, C, G, NcTx, RAB, Tx, W, WH3, Wahl (1954); < *Chenopodium ambrosioides* var. *ambrosioides* – K1; < *Dysphania ambrosioides* (Linnaeus) Mosyakin & Clemants – K3, K4.

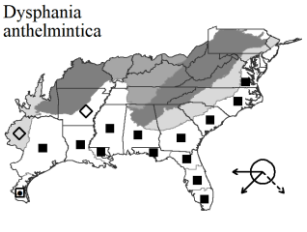
Dysphania atriplicifolia (Sprengel) G. Kadereit, Sukhorukov, & Uotila. WINGED-PIGWEED, TUMBLE RINGWING. **Hab:** River-banks, sandy fields, railroad banks, maritime dunes. **Dist:** Native of c. and w. North America, adventive in the eastern part of our area. **Phen:** May-Nov. **Tax:** This species was formerly placed in the monotypic genus *Cycloloma*, but Uotila et al. (2021) showed convincingly its inclusion in *Dysphania*. **Syn:** = Uotila et al (2021); = *Cycloloma atriplicifolium* (Sprengel) Coulter – C, F, FNA4, G, GrPl, GW2, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Va, WV. NatureServe G5 (Secure).

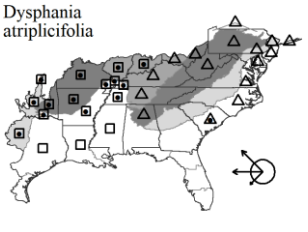
* ***Dysphania botrys*** (Linnaeus) Mosyakin & Clemants. JERUSALEM-OAK, FEATHER-GERANIUM. **Hab:** Disturbed areas, ship's ballast. **Dist:** Native of Eurasia. **Phen:** Aug-Oct. **Syn:** = FNA4, Il, K3, K4, Mi, NE, NY, Pa; = *Botrydium botrys* (Linnaeus) Small – S; = *Chenopodium botrys* Linnaeus – C, F, G, GrPl, K1, NcTx, RAB, Tx, Bassett & Crompton (1982), Wahl (1954). NatureServe GNR (Not Yet Ranked).

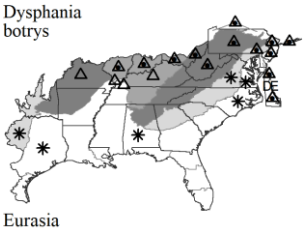
* ***Dysphania carinata*** (R. Brown) Mosyakin & Clemants. KEELED GOOSEFOOT. **Hab:** Disturbed area. **Dist:** Native of Australia. **Phen:** Sep-Oct. **Syn:** = Ar, FNA4, K3, K4; = *Chenopodium carinatum* R. Brown – K1.

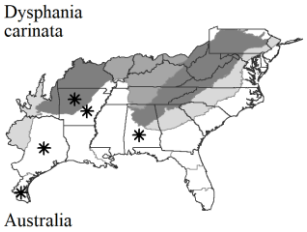
Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated







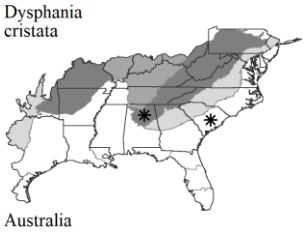


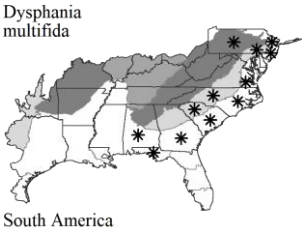


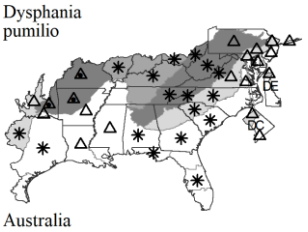
* ***Dysphania cristata*** (F. Mueller) Mosyakin & Clemants. CRESTED GOOSEFOOT. **Hab:** Wool mill waste areas, other disturbed areas. **Dist:** Native of Australia. **Phen:** Jul. **Syn:** = FNA4, K2, K4, NE; = *Chenopodium cristatum* (F. Mueller) F. Mueller – K1.

* ***Dysphania multifida*** (Linnaeus) Mosyakin & Clemants. CUTLEAF GOOSEFOOT, SCENTED GOOSEFOOT. **Hab:** Disturbed areas. **Dist:** Native of South America. **Phen:** Jul-Nov. **Syn:** = FNA4, K3, K4, NE, NY; = *Chenopodium multifidum* Linnaeus – C, K1, WH3, Wahl (1954); = *Roubieva multifida* (Linnaeus) Moquin-Tandon – F, RAB, S. NatureServe GNR (Not Yet Ranked).

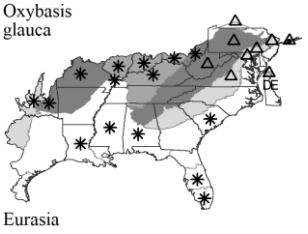
* ***Dysphania pumilio*** (R. Brown) Mosyakin & Clemants. CLAMMY GOOSEFOOT. **Hab:** Disturbed areas. **Dist:** Native of Australia. First reported for SC by Hill & Horn (1997). Also known from DC. **Phen:** Jul-Aug. **Syn:** = Ar, FNA4, Il, K3, K4, Mi, NE, NY, Pa, Va; = *Chenopodium pumilio* R. Brown – C, G, K1, NcTx, Tx, WH3, Wahl (1954); < *Chenopodium carinatum* R. Brown – F, misapplied.







Oxybasis Karelin & Kirilov 1841



A genus of 6-10 species, annual herbs, widespread. References: Bassett & Crompton (1982); Clements & Mosyakin (2003a) in FNA4 (2003b); Fuentes-Bazan, Uotila, & Borsch (2012); Kurtto & Uotila (2019); Mosyakin (2013); Wahl (1954).

* ***Oxybasis glauca*** (Linnaeus) S. Fuentes, Uotila, & Borsch. OAKLEAF GOOSEFOOT. **Hab:** Disturbed areas. **Dist:** Native of Eurasia. **Phen:** Aug-Oct. **Tax:** Kurto & Uotila (2019) separate *Oxybasis glauca* and *Oxybasis salina* at species rank, a conclusion followed here. **Syn:** = Kurtto & Uotila (2019); = *Chenopodium glaucum* ssp. *glaucum* – NE; = *Chenopodium glaucum* var. *glaucum* – FNA4, Mi; = *Oxybasis glauca* (Linnaeus) S. Fuentes, Uotila, & Borsch ssp. *glauca* – NY, Mosyakin (2013); = *Oxybasis glauca* var. *glauca* – K3, K4; < *Chenopodium glaucum* Linnaeus – C, F, G, GrPl, K1, Pa, Tx, WH3, WV, Bassett & Crompton (1982); < *Oxybasis glauca* (Linnaeus) S. Fuentes, Uotila, & Borsch – Fuentes-Bazan, Uotila, & Borsch (2012).

Salicornia Linnaeus 1753 (GLASSWORT)

A genus of about 40-50 species, succulent herbs, of cosmopolitan distribution. Here circumscribed to include *Sarcocornia*, following Piirainen, Liebisch, & Kadereit (2017). References: Alonso & Crespo (2008); Ball (2003a) in FNA4 (2003b); Judd & Ferguson (1999); Kadereit et al (2007); Kühn in Kubitzki, Rohwer, & Bittrich (1993); Piirainen, Liebisch, & Kadereit (2017).

1 Perennial from a horizontal rhizome; central flower (of each group of 3) slightly or not at all longer than the 2 lateral flowers; [subgenus *Amerocornia*]..... ***Salicornia ambigua***

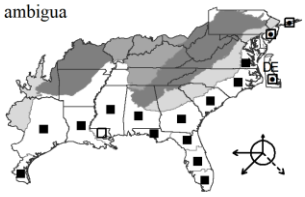
1 Annual from a taproot; central flower (of each group of 3) considerably longer than the 2 lateral flowers; [subgenus *Salicornia*] ***Salicornia bigelovii***

Salicornia ambigua Michaux. WOODY GLASSWORT, PERENNIAL GLASSWORT, GUINEA-BEAD, WILD CORAL. **Hab:** Coastal salt marshes, primarily in salt pannes. **Dist:** NH south to FL, west to TX (at least); south through the West Indies to n. South America. **Phen:** Jul-Oct. **Tax:** Ball in FNA (2003b) treats all North American *Sarcocornia* as *Sarcocornia pacifica*, which is also present on the Pacific coast of North America. *Sarcocornia perennis* is restricted to the Pacific and Atlantic coasts of North America, as well as being in Europe, sw. Asia, and Africa. Alonso & Crespo (2008) clarify the species-level taxonomy of *Sarcocornia* in a paper focused on South America, and treat eastern North American material as *Sarcocornia ambigua*, a conclusion here followed, except that we also accept the inclusion of *Sarcocornia* in *Salicornia* (Piirainen, Liebisch, & Kadereit 2017). **Syn:** = NE, NY, Piirainen, Liebisch, & Kadereit (2017); = *Sarcocornia ambigua* (Michaux) M.Á. Alonso & M.B. Crespo – K4, WH3, Alonso & Crespo (2008); ? *Salicornia perennis* P. Miller – S, Judd & Ferguson (1999), misapplied to East Coast material; ? *Salicornia virginica* Linnaeus – Bah, C, F, G, GW2, RAB, Tx, misapplied; >< *Sarcocornia pacifica* (Standley) A.J. Scott – FNA4, K3, Va, misapplied to East Coast material; >< *Sarcocornia perennis* (P. Miller) A.J. Scott – K1, misapplied to East Coast material.

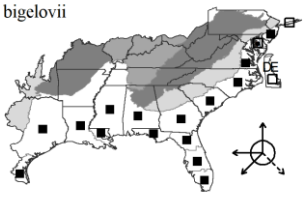
Salicornia bigelovii Torrey. DWARF GLASSWORT, DWARF SALTWORT. **Hab:** Salt pannes in coastal marshes. **Dist:** ME (NS?) south to FL, west to TX; West Indies; also CA. **Phen:** Jul-Oct. **Syn:** = Bah, C, F, FNA4, G, GW2, K1, K3, K4, NE, NY, RAB, S, Tx, Va, WH3, Judd & Ferguson (1999). NatureServe G5 (Secure).

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Salicornia ambigua

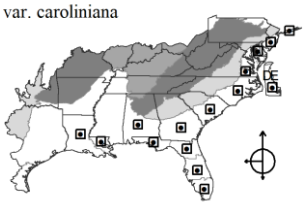


Salicornia bigelovii



Salsola Linnaeus 1753 (SALTWORT)

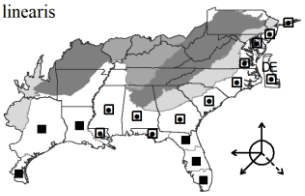
Salsola kali var. caroliniana



A genus of about 30 species, herbs, and shrubs, of Europe, Asia, n. Africa, and America. A proposal by Akhani, Greuter, & Roalson (2007, 2014) that would have resulted is use of the genus name Kali P. Miller for our taxa was overruled by the establishment of *S. kali* as the conserved type of *Salsola*. References: Akhani, Greuter, & Roalson (2007); Akhani, Greuter, & Roalson (2014); Judd & Ferguson (1999); Kühn in Kubitzki, Rohwer, & Bittrich (1993).; Mosyakin (2003e) in FNA4 (2003b).

Salsola kali Linnaeus *var*. ***caroliniana*** (Walter) Nuttall. SOUTHERN SALTWORT. **Hab:** Upper beaches, fore-dunes, and island-end flats, rarely inland in disturbed areas. **Dist:** MA to FL, west to TX and Mexico; Eurasia, n. Africa; introduced on the west coast of North America. Often considered to be introduced in North America, but it may well be a native. **Phen:** Jun-frost. **Syn:** = F; = *Kali tragus* (Linnaeus) ssp. *pontica* (Pallas) Mosyakin – K4; < *Salsola kali* Linnaeus – C, RAB, S, Tx, Judd & Ferguson (1999); < *Salsola kali* Linnaeus ssp. *pontica* (Pallas) Mosyakin – FNA4, K1, K3, NE, NY; < *Salsola kali* Linnaeus var. *kali* – G.

Suaeda linearis



Suaeda Forsskål ex Scopoli 1777 (SEA-BLITE)

A genus of about 100 species, herbs and subshrubs, of cosmopolitan distribution. References: Ferren & Schenk (2003) in FNA4 (2003b); Fisher et al (1997); Hopkins & Blackwell (1977); Judd & Ferguson (1999); Kühn in Kubitzki, Rohwer, & Bittrich (1993).

Suaeda linearis (Elliott) Moquin-Tandon. SOUTHERN SEA-BLITE. **Hab:** Island-end flats, marsh edges, brackish flats, rarely adventive inland in disturbed areas. **Dist:** ME south to FL, west to TX, and south into Mexico; West Indies. **Phen:** Aug-Dec. **Syn:** = Bah, C, F, FNA4, G, GW2, K1, K3, K4, NE, NY, RAB, Tx, Va, WH3, Hopkins & Blackwell (1977), Judd & Ferguson (1999); = *Dondia linearis* (Elliott) Heller – S. NatureServe G5 (Secure).

304. AIZOACEAE Martinov 1820 (FIG-MARIGOLD FAMILY) [in CARYOPHYLLALES]

A family of about 128 genera and about 1850-2500 species, mostly succulent herbs and subshrubs, of tropical and subtropical regions, especially in s. Africa and Australia. References: Boetsch (2002); Ferren (2003a) in FNA4 (2003b); Hartmann in Kubitzki, Rohwer, & Bittrich (1993); Klak, Hanáček, & Bruyns (2017); Vivrette, Bleck, & Ferren (2003) in FNA4 (2003b).

2 Leaves linear, lanceolate, or oblanceolate, the blade > 3× as long as wide; [subfamily *Sesuvioideae*] ..... ***Sesuvium***
2 Leaves orbicular, obovate, or triangular-ovate, the blade < 2.5× as long as wide.
..... ***Trianthema portulacastrum***

Sesuvium Linnaeus 1759 (SEA-PURSLANE)

A genus of about 14 species, especially in tropical and subtropical coastal areas. Here circumscribed to include *Cypselea*, following Bohley, Winter & Kadereit (2017). References: Boetsch (2002); Bohley, Winter, & Kadereit (2017); Ferren (2003a) in FNA4 (2003b); Ferren (2003b) in FNA4 (2003b); Hartmann in Kubitzki, Rohwer, & Bittrich (1993).

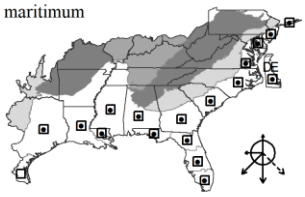
4 Flowers and fruits on pedicels (3-) 5-20 mm long; plants perennial, rooting at nodes; styles and locules 5. ..... ***Sesuvium portulacastrum***
4 Flowers and fruits sessile (or on pedicels to 1 mm long); plants annual, not rooting at nodes; styles and locules 2-3.
..... ***Sesuvium maritimum***

Sesuvium maritimum (Walter) Britton, Sterns, & Poggenburg. SMALL SEA-PURSLANE, SLENDER SEA-PURSLANE. **Hab:** Island end flats and sea beaches, salt flats; less typically inland (AL, LA) in saline marshes or seeps (associated with salt domes). **Dist:** NY south to s. FL, west to TX, south to Mexico (Yucatan); West Indies. **Phen:** May-Dec (-Apr). **Syn:** = Bah, C, F, Fl5, FNA4, G, GW2, Il, K1, K3, K4, NE, NY, RAB, S, Tx, Va, WH3, Boetsch (2002), Bohley, Winter, & Kadereit (2017). NatureServe G5 (Secure).

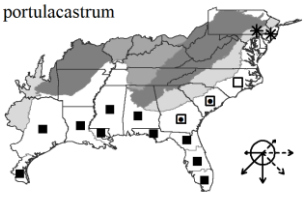
Sesuvium portulacastrum (Linnaeus) Linnaeus. LARGE SEA-PURSLANE, SHORELINE SEA-PURSLANE. **Hab:** Island end flats and sea beaches; less typically inland (LA) in saline marshes or seeps (associated with salt domes). **Dist:** A pantropical coastal species, in North America from e. NC south to s. FL, west to e. TX; also in the West Indies and south into the tropics (introduced on ballast in se. PA). Essentially cosmopolitan on tropical and subtropical shores. **Phen:** May-Dec. **Syn:** = Bah, Fl5, FNA4, GW2, K1, K3, K4, Mo2, RAB, S, WH3, Boetsch (2002), Bohley, Winter, & Kadereit (2017). NatureServe G5 (Secure).

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Sesuvium maritimum

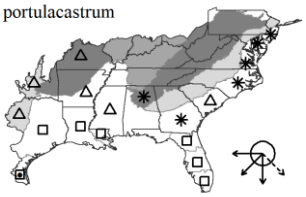


Sesuvium portulacastrum



Trianthema Linnaeus 1753 (HORSE-PURSLANE)

Trianthema portulacastrum



A genus of about 17-20 species, of tropical and warm temperate areas, especially Australia. References: Boetsch (2002); Ferren (2003c) in FNA4 (2003b); Hartmann in Kubitzki, Rohwer, & Bittrich (1993); Hartmann, Meve, & Liede-Schumann (2011).

Trianthema portulacastrum Linnaeus. HORSE-PURSLANE, CENECILLA. **Hab:** Saline flats, disturbed areas. **Dist:** Native of the Old World and New World tropics, the limits of its native distribution unclear. **Phen:** Apr-Nov. **Syn:** = Ar, Bah, C, F, Fl5, FNA4, G, GrPl, GW2, K1, K3, K4, NcTx, RAB, S, Tx, WH3, Boetsch (2002), Hartmann, Meve, & Liede-Schumann (2011). NatureServe G5 (Secure).

305. PHYTOLACCACEAE R. Brown 1818 (POKEWEED FAMILY) [in CARYOPHYLLALES]

A family of about 18 genera and 70 species, herbs, shrubs, vines, and trees, of tropical and warm temperate regions, especially America. References: Nienaber & Thieret (2003) in FNA4 (2003b); Rohwer in Kubitzki, Rohwer, & Bittrich (1993).

Phytolacca Linnaeus 1753 (POKEWEED)

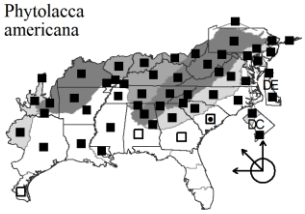
A genus of about 25 species, herbs, shrubs, and trees, of tropical and warm temperate regions. References: Caulkins & Wyatt (1990); Hardin (1964a); Nienaber & Thieret (2003) in FNA4 (2003b); Rogers (1985); Rohwer in Kubitzki, Rohwer, & Bittrich (1993).

1 Fruiting pedicels (6-) 7-12 (-15) mm long; raceme (not including the peduncle) 10-20 (-25) cm long, divergent or drooping in flower and fruit (or ascending in flower); [widespread in our area]..... ***Phytolacca americana***
1 Fruiting pedicels (2-) 4-6 (-7) mm long; raceme (not including the peduncle) (3-) 6-9 (-13) cm long, erect (rarely divergent) in flower and fruit; [restricted northwards to maritime habitats, but more general southward, as in FL]..... ***Phytolacca rigida***

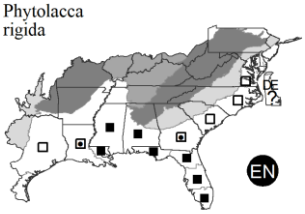
Phytolacca americana Linnaeus. COMMON POKEWEED. **Hab:** In a wide variety of natural and disturbed habitats, usually associated with exposed mineral soil. **Dist:** ME, ON, s. MN, and NE south to FL and sc. TX. **Phen:** May-Nov. **Comm:** An abundant 'native weed' occurring throughout e. North America, *P. americana* is widely dispersed by birds and quickly colonizes exposed mineral soil even in undisturbed forests, such as on tree-fall tip-up mounds or flood scours. It is most abundant, however, as a weed of urban, suburban, and agricultural disturbances. The berries and mature stems are poisonous; the young stems have been used as a potherb and the purple berries as a source of ink. **Syn:** = C, F, G, GrPl, Il, Mi, Pa, S, Tn, W, WV, Hardin (1964a), Rogers (1985); = *Phytolacca americana* var. *americana* – Ar, FNA4, K1, K3, K4, NE, NY, Va, Caulkins & Wyatt (1990); < *Phytolacca americana* Linnaeus – Fl5, GW2, NcTx, RAB, Tx, WH3. NatureServe G5T5 (Secure).

Phytolacca rigida Small. MARITIME POKEWEED. **Hab:** Dune slacks, dune slopes, edges of tidal marshes, disturbed areas on barrier islands, xeric sandhills near the coast. **Dist:** DE (reportedly), se. VA south to FL and west to TX in the Southeastern Coastal Plain. **Phen:** May-Dec. **Tax:** Caulkins & Wyatt (1990) reduced *P. rigida* to varietal rank, but it seems distinct at species rank. **Comm:** In the northern parts of our area, in NC and VA, *P. rigida* is rather rare, limited to the vicinity of the coast, and less weedy than *P. americana*. **Syn:** = S, Hardin (1964a), Rogers (1985); = *Phytolacca americana* var. *rigida* (Small) Caulkins & Wyatt – FNA4, K1, K3, K4, Va, Caulkins & Wyatt (1990); < *Phytolacca americana* Linnaeus – Fl5, GW2, RAB, Tx, WH3.

Phytolacca americana



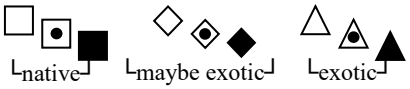
Phytolacca rigida



308. NYCTAGINACEAE A.L. de Jussieu 1789 (FOUR-O'CLOCK FAMILY) [in CARYOPHYLLALES]

A family of about 31 genera and 400 species, trees, shrubs, vines, and herbs, of tropical, subtropical, and (less commonly) warm temperate regions, especially diverse in the New World. Tribal classification follows Douglas & Spellenberg (2010). References: Bittrich & Kühn in Kubitzki, Rohwer, & Bittrich (1993); Bogle (1974); Douglas & Spellenberg (2010); Spellenberg (2003) in FNA4 (2003b).

Key to Map Symbology:



←rare ←uncommon ←common (see introduction for more)

* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable

X : extirpated

3 Flowers < 3 mm long, lacking involucral bracts subtending the petaloid calyx ..... ***Boerhavia***
3 Flowers > 10 mm long, with involucral bracts (in *Mirabilis* these simulating a calyx, subtending the petaloid calyx). ..... ***Mirabilis***

Boerhavia Linnaeus 1753 (SPIDERLING)

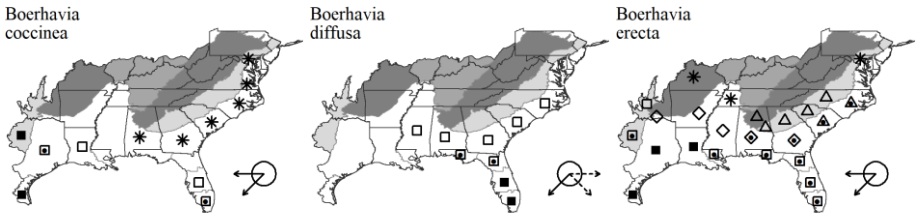
A genus of about 20-40 species, annual and perennial herbs, of tropical, subtropical, and warm temperate regions of the Old and New World. References: Bittrich & Kühn in Kubitzki, Rohwer, & Bittrich (1993); Bogle (1974); Spellenberg (2003b) in FNA4 (2003b).

1 Fruit truncate at the apex, glabrous, with longitudinal ribs acute and winglike; annual ..... ***Boerhavia erecta***
1 Fruit rounded at apex, stipitate-glandular, with longitudinal ribs rounded; perennial.
2 Leaves well-distributed throughout the plant; inflorescences axillary and terminal; branches spreading-villous or hispid to minutely and finely pubescent ..... ***Boerhavia coccinea***
2 Leaves mostly concentrated in the basal ½ of the plant; inflorescences mostly terminal; branches glabrate or glabrous ..... ***Boerhavia diffusa***

Boerhavia coccinea P. Miller. WINEFLOWER. **Hab:** Beaches, shell middens, coastal strands (in FL), elsewhere in disturbed areas, adventive on ballast. **Dist:** FL, West Indies; Central and South America. Contrary to the statement in Radford, Ahles, & Bell (1968) that this species is "apparently not established," it is well established on the Wilmington (New Hanover County, NC) waterfront. **Phen:** Jun-Sep. **Syn:** = Bah, Fl5, FNA4, K1, K3, K4, RAB; = *Boerhaavia coccinea* – S, Tx, orthographic variant; < *Boerhavia diffusa* Linnaeus – NcTx.

Boerhavia diffusa Linnaeus. RED SPIDERLING, SPREADING HOGWEED. **Hab:** Longleaf pine sandhills, vacant lots, road shoulders, other dry disturbed areas. **Dist:** Pantropical and subtropical, in North America from se. NC south to s. FL, west to s. MS. **Syn:** = Bah, Fl5, FNA4, K1, K3, K4, WH3, Bogle (1974); < *Boerhavia diffusa* Linnaeus – NcTx.

Boerhavia erecta Linnaeus. ERECT SPIDERLING, SMOOTH HOGWEED. **Hab:** Sandy fields, roadsides, disturbed areas, railroad yards. **Dist:** NC south to FL, west to TX and AZ, likely only introduced in the northern portions of our area (see map). **Phen:** May-Oct. **Syn:** = Ar, Bah, Fl5, FNA4, K1, K3, K4, NcTx, RAB, Bogle (1974); = *Boerhaavia erecta* – G, GrPl, S, Tx, orthographic variant. NatureServe G5 (Secure).



Mirabilis Linnaeus 1753 (UMBRELLA-WORT, FOUR-O'CLOCK)

A genus of about 55-60 species, annual and perennial herbs, of warm temperate America and s. Asia. References: Bittrich & Kühn in Kubitzki, Rohwer, & Bittrich (1993); Le Duc (1995); Spellenberg (2003e) in FNA4 (2003b).

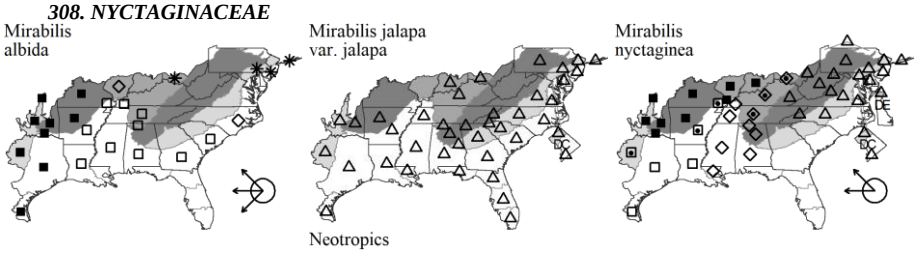
1 Petaloid calyx with a narrow tube 3-4 cm long, the spreading portion to 5 cm in diameter; involucre with 1 flower, not expanding in fruit; [section *Mirabilis*] ..... ***Mirabilis jalapa var. jalapa***
1 Petaloid calyx with a broad tube < 0.5 cm long, the spreading portion < 1.5 cm in diameter; involucre with 3-5 flowers, expanding in fruit; [section *Oxybaphus*].
3 Leaves cordate at the base, 1-2× as long as wide; [introduced, of disturbed habitats] ..... ***Mirabilis nyctaginea***
3 Leaves cuneate at the base, 2.5-6× as long as wide; [native, of dry sandy or calcareous habitats, sometimes disturbed] ..... ***Mirabilis albida***

Mirabilis albida (Walter) Heimerl. WILD FOUR-O'CLOCK, PALE UMBRELLA-WORT, WHITE FOUR-O'CLOCK. **Hab:** Sandhills, limestone glades and barrens, prairies, pastures, adjacent disturbed dry soils. **Dist:** S. SC south to GA, west to TX, north in the interior to c. TN, IA, and KS. **Phen:** May-Oct. **Syn:** = Ar, C, F, FNA4, GrPl, K1, K3, K4, Mi, NcTx, NY, RAB, Tn, Bogle (1974); = *Allionia albida* Walter – S; = *Oxybaphus albidus* (Walter) Sweet – G; > *Mirabilis aggregata* – Tx, misapplied; > *Mirabilis albida* (Walter) Heimerl – Il, NE, Tx; > *Mirabilis hirsuta* – Il, NE; > *Mirabilis pauciflora* (Buckley) Standley – Tx.

* ***Mirabilis jalapa*** Linnaeus *var*. ***jalapa***. GARDEN FOUR-O'CLOCK, MARVEL-OF-PERU, MORNING-ROSE. **Hab:** Disturbed areas, or persistent at former garden sites. **Dist:** Native of tropical America. **Phen:** Jun-Nov (-May). **Tax:** A second variety is not known from our area. **Syn:** = Ar, FNA4; < *Mirabilis jalapa* Linnaeus – Bah, C, F, Fl4, G, Il, K1, K3, K4, NcTx, NE, NY, Pa, RAB, S, Va, WH3, Bogle (1974); > *Mirabilis japala* – Tx; > *Mirabilis lindheimeri* (Standley) Shinners – Tx.

Mirabilis nyctaginea (Michaux) MacMillan. HEART-LEAVED UMBRELLA-WORT, HEARTLEAF FOUR-O'CLOCK. **Hab:** Upland prairies, streambanks, riverbanks, also in disturbed situations (as eastwards) such as railroad embankments, other disturbed areas. **Dist:** MI, WI, ON, and AB south to LA, TX, and NM, the exact native distribution obscured by subsequent spread. André Michaux collected this species from bluffs of the Tennessee River in 1795, suggesting native status for that area. **Phen:** May-Oct. **Syn:** = Ar, C, F, FNA4, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, Tn, Va, W, WV, Bogle (1974); = *Allionia nyctaginea* Michaux – S; = *Oxybaphus nyctagineus* (Michaux) Sweet – G; > *Mirabilis collina* Shinners – Tx; > *Mirabilis nyctaginea* (Michaux) MacMillan – Tx.

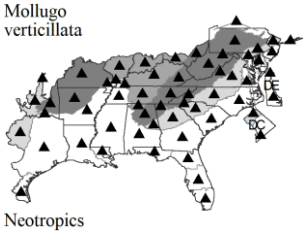
Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



309. MOLLUGINACEAE Bartling 1825 (CARPETWEED FAMILY) [in CARYOPHYLLALES]

A family of about 13-14 genera and 120-125 species, herbs, of tropical and warm temperate areas. References: Boetsch (2002); Endress & Bittrich in Kubitzki, Rohwer, & Bittrich (1993); Vincent (2003b) in FNA4 (2003b).

Mollugo Linnaeus 1753 (CARPETWEED)



A genus of about 35 species, annual herbs, of tropical and subtropical regions of both hemispheres, introduced in temperate regions. References: Endress & Bittrich in Kubitzki, Rohwer, & Bittrich (1993); Vincent (2003b) in FNA4 (2003b).

* ***Mollugo verticillata*** Linnaeus. CARPETWEED, INDIAN-CHICKWEED. **Hab:** Fields, disturbed areas, drawdown zones on river- and pond-shores. **Dist:** Native of tropical America. **Phen:** May-Dec. **Syn:** = Ar, C, F, Fl5, FNA4, G, GrPl, GW2, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV, Boetsch (2002). NatureServe G5 (Secure).

310. MONTIACEAE Rafinesque 1820 (MONTIA FAMILY) [in CARYOPHYLLALES]

A family of about 14 genera and 250 species, annual and perennial herbs and subshrubs, primarily of the Southern Hemisphere, but also occurring in North America and e. Asia. References: Carolin in Kubitzki, Rohwer, & Bittrich (1993); Hershkovitz (2019); Nyffeler & Eggli (2010); Packer (2003a) in FNA4 (2003b).

1 Leaves terete, alternate; subshrubs with woody bases ..... ***Phemeranthus***
1 Leaves flat, opposite or alternate; herbs.
  2 Stems with 2 opposite cauline leaves; petals 6-14 mm long ..... ***Claytonia***
  2 Stems with > 2 leaves, opposite or alternate; petals 1-6 mm long ..... ***Montia***

Claytonia Linnaeus 1753 (SPRING-BEAUTY)

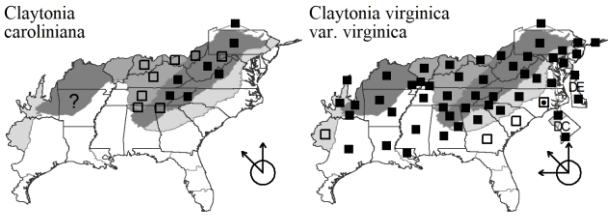
A genus of about 33 species (with an additional 20 infraspecific taxa), annual and perennial herbs, of North America and e. Asia. References: Carolin in Kubitzki, Rohwer, & Bittrich (1993); Davis (1966); Lewis & Suda (1968); Lewis, Oliver, & Suda (1967); Miller & Chambers (2006); Miller (2003a) in FNA4 (2003b); Schneider (2019); Snyder (1992a); Yatskievych, Evans, & Witsell (2013).

3 Cauline leaves (5-) 7-20 cm long (including the poorly differentiated petiole), the blade > 8× as long as wide; leaves 1-10 (-20) cm wide ..... ***Claytonia virginica var. virginica***
3 Cauline leaves 3-6 (-11) cm long (including the evident petiole), the blade narrowly diamond-shaped, 2.5-6 (-8)× as long as wide; leaves 10-15 (-30) mm wide ..... ***Claytonia caroliniana***

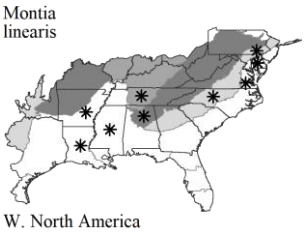
Claytonia caroliniana Michaux. CAROLINA SPRING-BEAUTY. **Hab:** Moist forests, especially northern hardwood forests and cove forests at moderate to high elevations. **Dist:** NS west to MN, south to w. NC, e. TN, and n. GA; disjunct (?) in AR (see discussion). **Phen:** Mar-May. **Tax:** The history of reports of this species from AR (Gentry et al. 2013, Miller & Chambers 2006, Smith 1988, Smith, 1994, Evans, & Witsell 2013) is complex and multi-faceted. It is the name that was applied to plants of *C. arkansana* before the description of *C. ozarkensis*, but has also sometimes been applied to wide-leaved plants of *C. virginica* (corresponding to *C. virginica* forma *robusta* (Somes) Palmer & Steyermark). More recently it has been applied to a few curious specimens that fit the morphology of *C. caroliniana* more closely than that of *C. arkansana* or *C. virginica*, but occur in or near the range of *C. arkansana*. It is possible that these represent hybrids between *C. arkansana* and *C. virginica* and further study is warranted. **Syn:** = C, F, FNA4, G, K3, K4, Mi, NE, NY, Pa, RAB, S, Va, W, Davis (1966), Miller & Chambers (2006), Snyder (1992a); > *Claytonia caroliniana* var. *caroliniana* – K1; > *Claytonia caroliniana* Michaux var. *lewisii* McNeill – K1.

Claytonia virginica Linnaeus *var.* ***virginica***. SPRING-BEAUTY. **Hab:** Moist forests, lawns. **Dist:** NS west to MN, south to GA and TX. **Phen:** (Jan-) Feb-Apr (-May). **Tax:** Differences in ploidy and subtle differences in morphology have been used to differentiate two varieties in the more widespread white-to-pink-flowered plants, and this may be warranted but needs more careful study using modern techniques. Var. *virginica* has chromosome numbers of n=8 and polyploid and polyploid/aneuploid derivatives of that number, broader leaves [the widest leaves on a plant 5-10 (-20) mm wide], and a broader distribution (NS west to MN, south to sw. GA and TX. Var. *acutiflora* A.P. de Candolle has chromosome numbers of n=6, n=7, and polyploid and polyploid/aneuploid derivatives of those numbers, narrower leaves [the widest leaves on a plant 1-2 (-4) mm wide], and a more restricted, southerly distribution (north to VA and IL). Wide-leaved plants, corresponding to *C. virginica* f. *robusta* (Somes) Palmer & Steyermark, have been confused with plants of both *C. arkansana* and *C. caroliniana* in Arkansas in the past. **Syn:** = K3, K4, Snyder (1992a); = *Claytonia virginica* – F, G, Il, Mo1, Pa, RAB, Tx, Va, W, Miller & Chambers (2006); > *Claytonia media* (A.P. de Candolle) Link – S; < *Claytonia virginica* – Ar,

FNA4, GrPl, Mi, NcTx, NE, NY, Schneider (2019); > *Claytonia virginica* var. *acutiflora* – C, K1; > *Claytonia virginica* var. *simsii* (Sweet) R.J. Davis – Davis (1966); > *Claytonia virginica* Linnaeus var. *virginica* – C, K1, Davis (1966).



Montia Linnaeus 1753 (BLINKS, MONTIA)



A genus of about 10-20 species, annual herbs (or perennial by rooting at the nodes), of nearly cosmopolitan distribution in temperate regions. References: Carolin in Kubitzki, Rohwer, & Bittrich (1993); Miller (2003b) in FNA4 (2003b).

* ***Montia linearis*** (Douglas ex Hooker) Greene. NARROW-LEAVED MONTIA. **Hab:** Lawns, disturbed areas. **Dist:** Native of western North America. Also in c. TN (Chester, Wofford, & Kral 1997). **Syn:** = Ar, FNA4, Il, K1, K3, K4, NE. NatureServe G5 (Secure).

Phemeranthus Rafinesque 1814 (ROCK-PINK, FAMEFLOWER)

A genus of about 25 species, herbs and dwarf shrubs, mainly of North America (1 species in Argentina). Our North American "Talinums" are not closely related to the broad-leaved type of *Talinum* and are transferred to *Phemeranthus* (Kiger 2001). Adaptation of our native species of *Phemeranthus* to different rock substrates is discussed by Ware & Pinion (1990). References: Carolin in Kubitzki, Rohwer, & Bittrich (1993); Carter & Murdy (1985); Hershkovitz & Zimmer (2000); Kiger (2001); Kiger (2003a) in FNA4 (2003b); Murdy & Carter (1985); Murdy & Carter (2001); Price & Ferguson (2012); Rose & Standley (1911); Ware (1967); Wilson (1932).

2 Stamens 4-8; flowers open in late afternoon ..... ***Phemeranthus parviflorus***
2 Stamens 12-80; flowers variously open from early or late afternoon.
  3 Style 2-3.5 mm long, shorter than or about the same length as the stamens; stamens 12-30; flowers open from 3 to 7 p.m. (Daylight Savings Time) ..... ***Phemeranthus teretifolius***
  3 Style 3.8-7 mm long; stamens 25-80 (-90); flowers open from about 1 to 7 p.m. (Daylight Savings Time).
    4 Stigma distinctly 3-lobed; mature seeds covered with a dull gray coating; flowers opening 3 to 7 p.m. (Daylight Savings Time); [of calcareous rock outcrops] . ..... ***Phemeranthus calcaricus***
    4 Stigma subcapitate; mature seeds brown-black and lustrous; flowers open from about 1 to 7 p.m. (Daylight Savings Time); [of noncalcareous rocks]. ..... ***Phemeranthus mengesii***

Phemeranthus calcaricus (S. Ware) Kiger. CEDAR-GLADE ROCK-PINK, LIMESTONE FAMEFLOWER. **Hab:** Calcareous glades. **Dist:** C. TN south to n. AL; disjunct in n. AR; disjunct in nc. TX. **Comm:** A tetraploid species, probably derived from *P. calycinus* Engelmann. **Syn:** = Ar, FNA4, K3, K4, Tn, Kiger (2001); = *Talinum calcaricum* S. Ware – K1, Murdy & Carter (2001), Ware (1967). NatureServe G3 (Vulnerable).

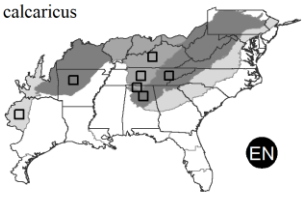
Phemeranthus mengesii (W. Wolf) Kiger. LARGE-FLOWERED ROCK-PINK. **Hab:** In shallow soil over felsic rocks (granite) or sandstone (in GA and AL), or Altamaha Grit (GA), where periodically wet by seepage; rare (locally common in GA). **Dist:** C. and w. SC south to c. GA (where it extends into the Coastal Plain on outcrops of Altamaha Grit), west to n. AL and sc. TN. **Phen:** Jun-Sep. **Comm:** *P. mengesii* and *P. parviflorus* Nuttall of the midwestern United States (and disjunct as far east as AL) are apparently the parents of the allotetraploid *P. teretifolius*. Diploid and tetraploid populations are known of this taxon; further investigation is needed to determine if the tetraploids are allotetraploids or autotetraploids. **Syn:** = K3, K4; = *Talinum mengesii* W. Wolf – S, Murdy & Carter (2001), Ware (1967), Wilson (1932); < *Phemeranthus mengesii* (W. Wolf) Kiger – FNA4, Kiger (2001); < *Talinum mengesii* W. Wolf – K1.

Phemeranthus parviflorus (Nuttall) Kiger. SMALL-FLOWERED ROCK-PINK, PRAIRIE ROCK-PINK. **Hab:** Acidic glades and ledges. **Dist:** MN, SD, and WY south to w. LA, s. TX, NM, AZ, and Mexico; disjunct east of the Mississippi River in c. AL (Chilton and Coosa counties). **Phen:** Apr-Sep. **Tax:** The AL populations, substantially disjunct from the rest of the species' distribution and alleged to have morphological differences (stigmas 3 or at least strongly 3-lobed vs. single and capitate, smaller flowers and more elongate stems), need additional and modern study; Murdy & Carter (1985) considered them to be conspecific with *Phemeranthus parviflorus*. **Comm:** A diploid species. **Syn:** = Ar, FNA4, Il, K3, K4, Kiger (2001); = *Talinum parviflorum* Nuttall – C, F, G, GrPl, K1, NcTx, Tx, Murdy & Carter (1985), Murdy & Carter (2001), Wilson (1932); > *Talinum appalachianum* W. Wolf – Ware (1967); > *Talinum parviflorum* Nuttall – Ware (1967). NatureServe G5 (Secure).

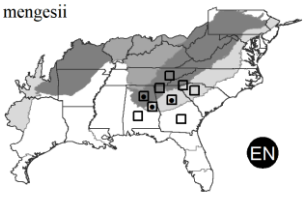
Phemeranthus teretifolius (Pursh) Rafinesque. APPALACHIAN ROCK-PINK. **Hab:** In shallow soil over felsic or mafic rocks (granite, gneiss, schist, granite, diabase, greenstone, metabasalt, sandstone, Altamaha grit), especially where periodically wet by seepage (often in mats of the moss *Grimmia*). **Dist:** DE (at least formerly), se. PA, and WV, south to se. TN, GA (where it extends into the Coastal Plain on outcrops of Altamaha Grit), and AL, in the Appalachians and adjacent provinces. **Phen:** Jun-Sep. **Tax:** *P. teretifolius* is an allotetraploid, probably derived from hybridization of the diploids *P. mengesii* and *P. parviflorus* followed by polyploidization. **Syn:** = FNA4, K3, K4, Pa, Va, Kiger (2001); = *Talinum teretifolium* Pursh – C, F, G, K1, RAB, S, W, WV, Murdy & Carter (2001), Ware (1967), Wilson (1932). NatureServe G4 (Apparently Secure).

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

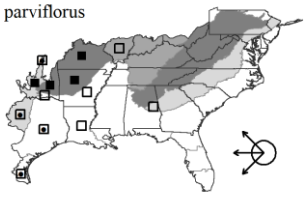
Phemeranthus calcaricus



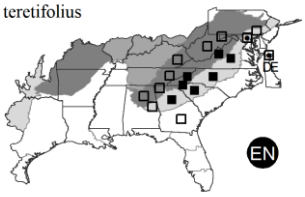
Phemeranthus mengesii



Phemeranthus parviflorus



Phemeranthus teretifolius

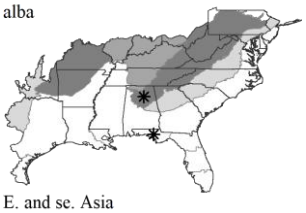


312. BASELLACEAE Rafinesque 1837 (MADEIRA-VINE FAMILY) [in CARYOPHYLLALES]

A family of 4 genera and about 20 species, fleshy perennial vines and herbs, of the tropics and subtropics. References: Nyffeler & Eggli (2010); Sperling & Bittrich in Kubitzki, Rohwer, & Bittrich (1993); Vincent (2003a) in FNA4 (2003b).

Basella Linnaeus 1753 (VINE-SPINACH)

Basella alba



A genus of 5 species, perennial vines, of the tropics and subtropics. References: Sperling & Bittrich in Kubitzki, Rohwer, & Bittrich (1993); Vincent (2003a) in FNA4 (2003b).

* ***Basella alba*** Linnaeus. VINE-SPINACH. **Hab:** Disturbed areas, grown as a vegetable, and rarely found as a waif. **Dist:** Native of s. Asia. Reported for Calhoun County, AL (AL Atlas in prep.; Kartesz 2010) and Panhandle FL (Franck et al. 2016). **Syn:** = Bah, Fl5, FNA4, K3, K4. NatureServe GNR (Not Yet Ranked).

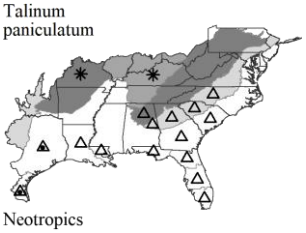
314. TALINACEAE Doweld 2003 (FAMEFLOWER FAMILY) [in CARYOPHYLLALES]

A family of about 2 genera and 35 species, herbs and shrubs, primarily of the Southern Hemisphere, but also occurring in North America and e. Asia. References: Carolin in Kubitzki, Rohwer, & Bittrich (1993); Nyffeler & Eggli (2010); Packer (2003a) in FNA4 (2003b).

1 Leaves linear, terete, 1-2 mm wide; plants to 5 dm tall; [native] ..... ***Phemeranthus***
1 Leaves obovate or elliptic, 20 mm or more wide; plants to 8 dm tall; [alien, persistent or escaped] ..... ***Talinum***

Talinum Adanson 1763 (JEWELS-OF-OPAR)

Talinum paniculatum



A genus of about 15 species, herbs, and dwarf shrubs, mainly of Africa but with 3 species of the New World tropics and sw. United States and Mexico (Price & Ferguson 2012). References: Carolin in Kubitzki, Rohwer, & Bittrich (1993); Kiger (2003b) in FNA4 (2003b); Price & Ferguson (2012); Wilson (1932).

* ***Talinum paniculatum*** (Jacquin) Gaertner. JEWELS-OF-OPAR, PINK BABY'S-BREATH. **Hab:** Fairly commonly cultivated, locally escaped to disturbed areas and garden edges. **Dist:** Native of the West Indies. **Phen:** Jun-Oct. **Syn:** = Fl5, FNA4, K3, K4, S, Tx, WH3, Wilson (1932); > *Talinum paniculatum* var. *paniculatum* – K1. NatureServe GNRTNR (Not Yet Ranked).

315. PORTULACACEAE A.L. de Jussieu 1789 (PURSLANE FAMILY) [in CARYOPHYLLALES]

A family of 1 genus and 40-100 species, annual and perennial herbs, primarily of the Southern Hemisphere, but also occurring natively in North America and e. Asia. References: Carolin in Kubitzki, Rohwer, & Bittrich (1993); Nyffeler & Eggli (2010); Packer (2003a) in FNA4 (2003b).

1 Flowers sessile or subsessile; capsule circumscissile ..... ***Portulaca***
1 Flowers pedicelled; capsule opening longitudinally.
  2 Flowers borne on a scape, with cymose branching ..... ***Talinaceae***
  2 Flowers solitary or in racemes ..... ***Montiaceae***

Portulaca Linnaeus 1753 (PURSLANE, PORTULACA)

A genus of about 40-100 species, annual and perennial herbs, nearly cosmopolitan, but especially in tropical, subtropical, and warm temperate regions. *Portulaca* flowers open only for a few hours each on sunny days (Matthews & Levins 1985). References: Banfi, Galasso, & Soldano (2011); Bradley, Matthews, & Anderson (2019) in Weakley et al (2019a); Carolin in Kubitzki, Rohwer, & Bittrich (1993); Danin, Baker, & Baker (1978); Matthews & Ketron (1991); Matthews & Levins (1985); Matthews & Levins (1986); Matthews (2003) in FNA4 (2003b); Matthews, Faircloth, & Allison (1991); Matthews, Ketron, & Zane (1992a); Matthews, Ketron, & Zane (1992b); Matthews, Ketron, & Zane (1993).

1 Plants in flower.
  2 Petals yellow, orange, copper, bronze, or white.

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

3 Flowers > 25 mm across (individual petals > 15 mm long).
..... ***Portulaca grandiflora***
3 Flowers < 20 mm across (individual petals < 12 mm long).
..... ***Portulaca oleracea***
2 Petals pink to purple.
8 Flowers > 25 mm across (individual petals > 15 mm long)..... ***Portulaca grandiflora***
8 Flowers < 20 mm across (individual petals < 12 mm long).
9 Leaves flattened in cross-section, > 2.5 mm wide, elliptic..... ***Portulaca amilis***
9 Leaves terete to hemispherical in cross-section, usually < 2 mm wide, linear to lanceolate.
..... ***Portulaca pilosa***

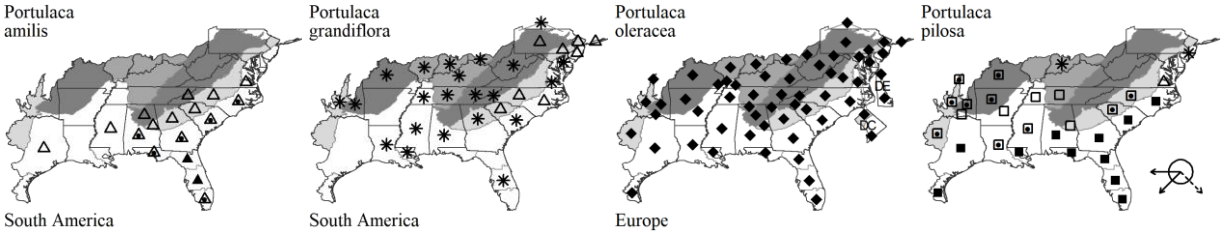
1 Plants in fruit.
14 Leaves flattened in cross-section, > 2.5 mm wide, obovate to spatulate.
15 Trichomes at nodes conspicuous; seeds round, < 0.6 mm wide; leaves ellipic, with an acute to acuminate apex ..... ***Portulaca amilis***
15 Trichomes at nodes inconspicuous; seeds elongate, > 0.6 mm long; leaves spatulate, with a rounded apex ..... ***Portulaca oleracea***
14 Leaves terete to hemispherical in cross-section, usually < 2 mm wide, linear to lanceolate.
17 Seeds > 0.65 mm wide.
..... ***Portulaca grandiflora***
17 Seeds < 0.65 mm wide
..... ***Portulaca pilosa***

* ***Portulaca amilis*** Spegazzini. BROADLEAF PINK PURSLANE. **Hab:** Sandy fields, lawns, and other dry, sandy, disturbed habitats. **Dist:** Native of South America. Matthews & Levins (1985) describe the spread of this alien species in North America, apparently from an introduction in North Carolina (the earliest North American collection in 1932 in Robeson County, NC). Reported for Lowndes County, MS (Whitson 2010). **Phen:** May-Sep. **Syn:** = FNA4, K1, K3, K4, Va, WH3, Bradley, Matthews, & Anderson (2019) in Weakley et al (2019a), Matthews & Levins (1985). NatureServe GNR (Not Yet Ranked).

* ***Portulaca grandiflora*** Hooker. ROSE-MOSS, CULTIVATED PURSLANE. **Hab:** In sandy soil or around granitic flatrocks, other disturbed areas. **Dist:** Native of Argentina. **Phen:** Jul-Sep. **Syn:** = C, Fl5, FNA4, G, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, WH3, Bradley, Matthews, & Anderson (2019) in Weakley et al (2019a), Matthews & Levins (1985). NatureServe GNR (Not Yet Ranked).

* ***Portulaca oleracea*** Linnaeus. COMMON PURSLANE, GARDEN PURSLANE, PUSSLEY, PURSLEY. **Hab:** Gardens, disturbed areas, cracks in sidewalks; partly native in our area (different genotypes, sometimes treated as varieties, subspecies, or species, appear to have different areas of origin but are now widely distributed by introduction). **Phen:** May-Nov. **Tax:** The appropriate taxonomic treatment of variation in *P. oleracea* s.l. remains unclear. In North America, *P. oleracea* (in the broad sense) is a widespread, sometimes noxious weed, probably representing native and introduced genotypes, treated as multiple subspecies by some authors. In North America, these genotypes appear to have intermixed; in our area (at least), the recognition of infraspecific taxa has been considered unwarranted, difficult, and unmeaningful (see Matthews, Ketron, & Zane 1993); see Danin & Anderson (1986) for a contrasting opinion. **Comm:** During the Great Depression, *P. oleracea* was eaten extensively in the Valley of Virginia and elsewhere in our region as a potherb. **Syn:** = NY, S; < *Portulaca oleracea* Linnaeus – Ar, Bah, C, F, FNA4, G, Il, K1, K3, K4, Mi, NcTx, NE, Pa, RAB, Tn, Va, W, WH3, WV, Bradley, Matthews, & Anderson (2019) in Weakley et al (2019a), Matthews & Levins (1985), Matthews, Ketron, & Zane (1993); > *Portulaca oleracea* Linnaeus – GrPl, Tx; > *Portulaca oleracea* ssp. *granulato-stellata* (Poellnitz) Danin & H.G. Baker – Danin, Baker, & Baker (1978), orthographic variant; > *Portulaca oleracea* ssp. *impolita* Danin & H.G. Baker – Danin, Baker, & Baker (1978); > *Portulaca oleracea* ssp. *nitida* Danin & H.G. Baker – Danin, Baker, & Baker (1978); > *Portulaca oleracea* ssp. *oleracea* – Danin, Baker, & Baker (1978); > *Portulaca oleracea* ssp. *papillato-stellata* Danin & H.G. Baker – Danin, Baker, & Baker (1978), orthographic variant; > *Portulaca retusa* Engelmann – GrPl, Tx.

Portulaca pilosa Linnaeus. KISS-ME-QUICK. **Hab:** Disturbed sandy soils, calcareous glades. **Dist:** NC south to s. FL, west to NM, north in the interior to c. TN, AR, and OK, and in Central America; the native range perhaps obscure. **Phen:** May-Oct. **Tax:** See Matthews, Ketron, & Zane (1992a) for a further discussion of this species. **Syn:** = Ar, Bah, FNA4, K1, K3, NcTx, RAB, S, Tn, WH3, Bradley, Matthews, & Anderson (2019) in Weakley et al (2019a), Matthews & Levins (1985); > *Portulaca mundula* I.M. Johnston – GrPl, Tx. NatureServe G5 (Secure).



317. CACTACEAE A.L. de Jussieu 1789 (CACTUS FAMILY) [in CARYOPHYLLALES]

A family of about 110-139 genera and about 1450-1800 species, perennial herbs, shrubs, vines, and trees, endemic to tropical, subtropical, and temperate America (a single species, *Rhipsalis baccifera*, occurring as well in Africa, Madagascar, and Sri Lanka, presumably as a result of long-distance dispersal from the Americas), with centers of diversity in sw. United States-n. Mexico, s. South America, and the West Indies. The base chromosome number for the family is *n*=11. References: Anderson (2001); Barthlott & Hunt in Kubitzki, Rohwer, & Bittrich (1993); Benson (1982); Fenstermacher (2016); Hunt et al (2006); Nyffeler & Eggli (2010); Parfitt & Gibson (2003a) in FNA4 (2003b).

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated

Opuntia P. Miller 1754 (PRICKLY-PEAR CACTUS)

Contributed by Lucas C. Majure

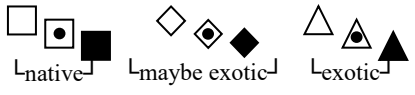
A genus of approximately 150-200 species, perennial herbs, shrubs, and trees, widespread in the Americas from s Canada to Patagonia, Argentina, which originated in southern South America and eventually spread to North American arid regions; subsequently occupied edaphically xeric regions of the eastern US (sandy soils, rock outcrops, saline soils, etc.). The genus represents the most widespread taxon in all of Cactaceae. Hybridization and polyploidization are common in this clade. Economically important, numerous species have been introduced worldwide as forage for livestock, as well as for ornamentals and agricultural products. References: Adanick & Medley (2020); Anderson (2001); Barthlott & Hunt in Kubitzki, Rohwer, & Bittrich (1993); Benson (1982); Britton & Rose (1920); Doyle (1990); Majure & Puente (2014); Majure (2012); Majure (2014); Majure et al. (2012a, 2012b, 2012c, 2013); Majure et al (2017); Pinkava (2003b) in FNA4 (2003b); Pinkava (2003e) in FNA4 (2003b); Ward (2009e).

Identification Notes: *Opuntia* species are notoriously difficult to identify and are best-identified using live material with information regarding population morphological variation. Three-dimensional characters are most often lost in dried herbarium specimens, which make their identification using those materials more problematic. *Opuntia ellisiana* Griffiths is commonly planted as an ornamental in n. FL but is not covered here, as no escaped populations are known. *Opuntia santa-rita* (Griffiths & Hare) Rose, purple prickly pear, is sometimes planted as an ornamental in the eastern United States. Various additional cultivated species may be encountered and may weakly naturalize.

1 Plants forming low, spreading shrubs.
  2 Tepals yellow with red or maroon bases adaxially.
    ..... ***Opuntia cespitosa***
  2 Tepals entirely yellow or greenish yellow.
    6 Terminal cladodes easily disarticulating, 0.8-11.1 cm × 0.6-3.4 cm, often cylindrical or only moderately flattened; spines strongly retrorsely barbed; terminal cladodes with 1-2 areoles per diagonal row at the widest point of the cladode ..... ***Opuntia drummondii***
    6 Terminal cladodes disarticulating or not, 3.1-17.7 cm × 2-9 cm, strongly flattened; spines retrorsely barbed (to the touch) or not; cladodes with 3-4 areoles per diagonal row at the widest point of the cladode.
      7 Seeds with funicular envelope smooth, only moderate, if any, protrusion of the cotyledons and hypocotyl, cladodes typically scalloped-margined, elliptical or rotund in outline, spines delicate, 0.7-0.9 mm in diameter; [restricted to the outer Gulf Coastal and Atlantic Coastal Plain] ..... ***Opuntia mesacantha ssp. lata***
      7 Seeds with funicular envelope bumpy, cotyledons and hypocotyl noticeably protruding, cladodes typically smooth-margined, obovate or rotund in outline, spines stout, 0.95-1.3 mm in diameter; [of Atlantic Southern Piedmont, FL panhandle along the coast west to coastal MS and e. LA, otherwise mostly inner Gulf Coastal and Atlantic Coastal Plain] ..... ***Opuntia mesacantha ssp. mesacantha***
1 Plants forming erect or ascending shrubs or small trees.
  11 Spines white (at least on second year's growth), generally round at the base and thus round in cross section, strongly retrorsely barbed or not; glochids stramineous-colored; mature fruit red, greenish yellow or pink; [restricted to FL] ..... ***Opuntia austrina***
  11 Spines white or yellow (on second year's growth), often flattened at the base and thus lacunar or elliptical in cross section; glochids bright yellow; mature fruit usually dark purple or dark pink; [of coastal areas and also commonly cultivated].
    12 Glochid pattern generally of an adaxial crescent in the areole, i.e, glochids forming a dense fascicle in the upper portion of the areole, not widely separated throughout, exserted or not from the areole; spines yellow, sometimes with dark lateral banding; cladodes typically tuberculate with scalloped margins; [native, collectively widespread in coastal areas and also occasionally cultivated].
      13 Cladodes spiny throughout, the spines 0-11 per areole, generally curved and spreading from the areole margins, the marginal spines usually strongly flattened at the base, then with 1-4 central spines, which are dark yellow and commonly with dark brown or black bands towards to base and middle of the spine ..... ***Opuntia stricta var. dillenii***
      13 Cladodes usually few-spined, spines mostly 0-3 per areole, generally straight, produced erect from the areole or only slightly spreading, usually rounded, slightly twisted, or only slightly flattened at base, yellow ..... ***Opuntia stricta var. stricta***
    12 Glochid pattern generally of a pin-cushion type, with the glochids widely separated and exerted from the areole; spines white with dark bases or yellow; cladodes not strongly tuberculate, the margins smooth not scalloped; [cultivated widely, and seemingly introduced in remote areas on barrier islands of SC, NC, and se. VA].
      ..... ***Opuntia lindheimeri***

Opuntia austrina Small. SOUTHERN PRICKLY PEAR, FLORIDA PRICKLY-PEAR. **Hab:** Florida scrub, longleaf pine sandhills, and transitional areas between Florida scrub, longleaf pine sandhills and pine flatwoods, dunes, shell middens, in deep, sandy soils. **Dist:** Apparently endemic to FL occurring throughout most of the state but most common in the peninsula and mostly absent from the Panhandle. **Phen:** Late Mar-May; Jul-Nov. **Comm:** *Opuntia austrina* is an erect shrub or treelet, and often semaphore-like with a primary central trunk and most of the branches towards the top of the plant, but growth form is highly variable in this species and some plants are "shrubbier" with lower branches than others; tuberous roots often present, as compared to *O. mesacantha*, which is a low, spreading species that has fibrous roots. Some plants of *O. austrina* can reach heights of up to 2 m. *Opuntia austrina* has frequently been confused with *O. stricta* var. *stricta* (e.g., see Y) due to its large size and the often straight, rounded (in cross-section) spines, which are similar to those of *O. stricta* var. *stricta*. Also, both species occur sympatrically along parts of the Atlantic Coast. This species has been heavily impacted in parts of its distribution by the cactus moth, *Cactoblastis cactorum* Berg. A diploid species (2*n*=22). See Majure et al. (2017) for extensive discussion about variation in the species that has led to the extensive synonymy. **Syn:** = Majure et al (2017); > *Opuntia ammophila* – K3, K4, S, Ward (2009e); > *Opuntia atrocapensis* Small – S; > *Opuntia austrina* Small – K3, K4, S, Ward (2009e); > *Opuntia cumulicola* Small – S, S; < *Opuntia humifusa* (Rafinesque) Rafinesque – WH3; > *Opuntia humifusa* (Rafinesque) Rafinesque var. *ammophila* (Small) L.D. Benson – FNA4, K1, Benson (1982), Doyle (1990); > *Opuntia humifusa* (Rafinesque) Rafinesque var. *austrina* (Small) Dress – K1, Benson (1982), Doyle (1990); >< *Opuntia humifusa* (Rafinesque) Rafinesque var. *humifusa* – FNA4; > *Opuntia nitens* Small – S; > *Opuntia pisciformis* Small – S; > *Opuntia polycarpa* Small – S; > *Opuntia turgida* Small – S.

Opuntia cespitosa Rafinesque. COMMON EASTERN PRICKLY-PEAR. **Hab:** Limestone and chalk outcrops, dolomite outcrops, glades, sandy or blackland prairies, upland hardwood or mixed hardwood-pine forests in dry, clay soils. **Dist:** This is the most common species (a tetraploid, 2*n* = 44) in the eastern United States; it has traditionally been considered conspecific with *O. humifusa*. **Phen:** May-Jun; Aug-Dec (-Feb). **Comm:** *O. cespitosa* is most common west of the Appalachian Mountains and is found throughout most of the Midwestern states, east of the MS river. *O.*

Key to Map Symbology: 

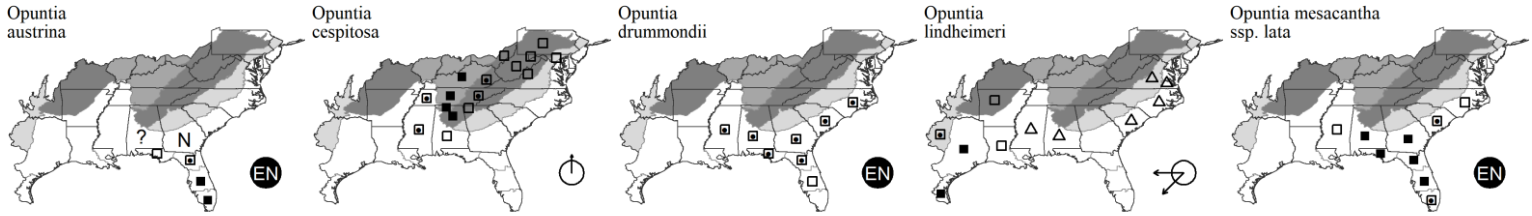
* : waif N : no X : extirpated
EN : endemic P : planted
H : historic ? : questionable

cespitosa can be differentiated from *O. humifusa* by its yellow tepals that are basally tinged red, crimson or red-brown, as well as dark brown or red glochids and the presence of spines (note: populations in Bibb Co., AL tend to have lighter colored glochids as in *O. humifusa* or *O. mesacantha*). Vegetatively, it is most similar to *O. mesacantha* ssp. *mesacantha*, from which this allopolyploid may be partially derived, although floral features are quite different, and *O. cespitosa* does not have the strongly retrorsely-barbed spines common in *O. mesacantha*. This species also can be confused with certain forms of *O. macrorhiza*, another putative parent of *O. cespitosa*; both species have yellow inner tepals basally tinged red adaxially. **Syn:** = K4, NY, Majure et al (2017); < *Opuntia compressa* – RAB; > *Opuntia compressa* – WV; < *Opuntia compressa* (Salisbury) J.F. Macbride var. *compressa* – G; < *Opuntia humifusa* (Rafinesque) Rafinesque – C, F, GrPl, Il, K3, Mi, Pa, Tn, W, WH3; > *Opuntia humifusa* (Rafinesque) Rafinesque – Ward (2009e); < *Opuntia humifusa* (Rafinesque) Rafinesque var. *humifusa* – FNA4, K1, Va, Benson (1982), Doyle (1990); > *Opuntia opuntia* (Linnaeus) H. Karsten – S.

Opuntia drummondii Graham. DUNE PRICKLY-PEAR, SAND-BUR PRICKLY-PEAR, LITTLE PRICKLY-PEAR, CREEPING CACTUS. **Hab:** Dunes on barrier islands, less commonly inland on river-associated sands and on granite outcrops. **Dist:** This species is found most commonly along coastal dune systems and Gulf Coast barrier islands but also inland along riverine sands, and rarely on granite outcrops (often associated with *O. mesacantha* subsp. *mesacantha*). **Phen:** Apr-Jun; Aug-Oct. **Comm:** As mentioned by Small (1933) and Radford, Ahles, & Bell (1968), this little coastal cactus is inconspicuous and often becomes attached by its retrorsely barbed-spines to the pants or shoes of people walking through the dunes. It can inflict painful wounds, the spines not easily removed from flesh or clothing because of the retrorse barbs. *O. drummondii* sometimes forms hybrid swarms with *O. mesacantha* on coastal dunes (see Y for additional discussion). *O. drummondii* is easily separated from other species in the eastern US by the production of very small cladodes with strongly retrorsely barbed spines; the cladodes easily disarticulate at the nodes and are often dispersed vegetatively forming clones of the parent plants. This species most often has fibrous root systems but sometimes produces small tubers as well. *O. drummondii* is most easily confused with *O. nemoralis* Griffiths of coastal w. LA, AR, MO, and TX. Intermediates between *O. drummondii* and *O. mesacantha* subsp. *mesacantha* have been found along the Atlantic and Gulf coasts and on granite in n. GA. Found throughout the Atlantic and Gulf Coastal Plain, but mostly absent from the FL peninsula, forming a disjunction between the Gulf and Atlantic coasts. A species with diploid, triploid, and tetraploid populations (2*n*=22, 33, 44). **Syn:** = K4, RAB, Majure et al (2017); = *Opuntia pusilla* (Haworth) Haworth – Fl5, FNA4, K1, K3, WH3, Doyle (1990), Ward (2009e), apparently misapplied; > *Opuntia drummondii* Graham – S; > *Opuntia tracyi* Britton – S. NatureServe G4 (Apparently Secure).

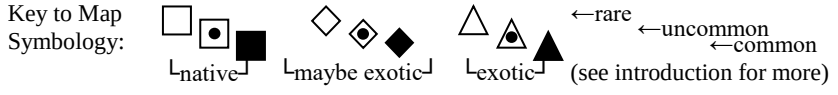
Opuntia lindheimeri Engelmann. TEXAS PRICKLY-PEAR. **Hab:** Disturbed areas, where persistent or spreading from cultivation (Majure et al. 2011), but also apparently early introduced by native Americans or early settlers on coastal dunes and sand barrens on barrier islands. **Dist:** Native of sc. United States south into Mexico. Although found along the coast in NC (New Hanover Co., where it grows with *O. drummondii*), SC, and VA (Henrico and Isle of Wight cos.), the origin(s) of those populations is unknown. The native range of *O. engelmannii* var. *lindheimeri* is the western US (although occurring in coastal w LA) and Mexico, so it seems unlikely that the coastal Atlantic populations are native; however, certain populations along the SC coast can be found in quite isolated locations (P. McMillan, pers. comm.). Small (1933) reported *O. cantabrigiensis* Lynch from dunes near Beaufort, NC, based on a fragmentary 1930 collection accompanied by a photograph. Similar plants were apparently seen near Beaufort by Engelmann, prior to 1856. Benson (1982) refers the collection tentatively to *O. lindheimeri* Engelmann var. *cuija* (Griffiths & Hare) L.D. Benson, treated in K as *O. engelmannii* Salm-Dyck ex Engelmann var. *cuija* Griffiths & Hare, a native of Mexico. Benson (1982) also stated, however, that it could also be var. *lindheimeri* (primarily of TX and Mexico), or, indeed, *O. tuna* (Linnaeus) P. Miller (native to the West Indies). Benson (1982) failed to relocate the plant in the field in 1956, but stated there was "insufficient time for a thorough search." Unless relocated, the identity of the plant will probably remain a mystery, as well as whether it represents a native species, an established population from aboriginal use, or a more recent introduction or adventive. **Phen:** May-Jun; Aug-Nov (-Feb). **Syn:** = GrPl, K4; = *Opuntia engelmannii* Salm-Dyck ex Engelmann var. *lindheimeri* (Engelmann) B.D. Parfitt & Pinkava – FNA4, NcTx, Tx; > *Opuntia cantabrigiensis* – S; > *Opuntia lindheimeri* Engelmann – S.

Opuntia mesacantha Rafinesque *ssp.* ***lata*** (Small) Majure. PRICKLY-PEAR. **Hab:** Coastal dunes and scrub, sandhills, borders of pine flatwoods, scrub, coastal islands (FL, GA, SC), riverine sands. **Dist:** Ssp. *lata* is restricted to the outer Atlantic and Gulf Coastal Plains and the FL peninsula. **Phen:** (Mid Mar-) Apr-May (-Jun); Jul-Feb. **Comm:** Co-occurs with *O. austrina* in parts of the FL peninsula. A diploid taxon (2*n* = 22). **Syn:** = K4, Majure et al (2017); < *Opuntia compressa* – RAB; < *Opuntia compressa* (Salisbury) J.F. Macbride var. *compressa* – G; < *Opuntia humifusa* (Rafinesque) Rafinesque – C, F, Fl5, K3, Pa, W, WH3; < *Opuntia humifusa* (Rafinesque) Rafinesque var. *humifusa* – FNA4, K1, Va, Benson (1982), Doyle (1990); > *Opuntia impedita* Small – S.



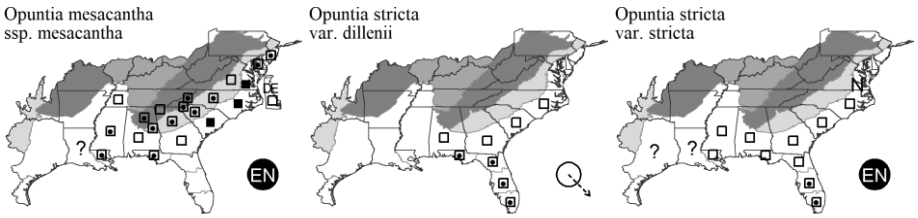
Opuntia mesacantha Rafinesque *ssp.* ***mesacantha***. PRICKLY-PEAR. **Hab:** Granite outcrops, coastal dunes and scrub, longleaf pine sandhills, pine forests in sandy soils, Gulf Coast barrier Islands (AL, FL panhandle, MS), riverine sands. **Dist:** S. NJ south to sc. GA, c. AL, c. and n. MS, and se. TN; disjunct in FL Panhandle, s. AL, s. MS; disjunct in w. LA. Throughout the southern Piedmont, Atlantic and Gulf Coastal Plain, but absent from the FL peninsula forming a disjunction between the Gulf and Atlantic coasts, as in *O. drummondii*, with which this subspecies is often associated, at least along the coast and in certain Piedmont populations on granite. See McAvoy (2021) for details of DE occurrence. **Phen:** Apr-Jun; Jun-May. **Comm:** This is the most common species in the Atlantic and Gulf Coastal Plain and Atlantic Southern Piedmont. *O. mesacantha* is a low-spreading shrub with typically spiny cladodes with 1-2 spines per areole (although populations exist with individuals with up to 6 or more spines per areole, while other population may consist of nearly spineless plants), those spines generally, but not always, strongly retrorsely barbed. This species was mostly referred to as *O. humifusa* var. *austrina* or *O. humifusa* var. *humifusa* by Benson (1982). Vegetative propagules of this taxon have been found widely dispersed in coastal areas after hurricanes. This is a tetraploid taxon (2*n*=44). **Syn:** = K4, Majure et al (2017); < *Opuntia compressa* – RAB; < *Opuntia compressa* (Salisbury) J.F. Macbride var. *compressa* – G; < *Opuntia humifusa* (Rafinesque) Rafinesque – C, F, Fl5, K2, Pa, Tn, W, WH3; > *Opuntia humifusa* (Rafinesque) Rafinesque – Ward (2009e); < *Opuntia humifusa* (Rafinesque) Rafinesque var. *humifusa* – FNA4, FNA4, K1, Va, Benson (1982), Doyle (1990); > *Opuntia pollardii* Britton & Rose – G, S, Ward (2009e).

Opuntia stricta (Haworth) Haworth *var.* ***dillenii*** (Ker Gawler) L.D. Benson. COASTAL PRICKLY PEAR, SHELL MIDDEN PRICKLY-PEAR, YAAXPAKAN. **Hab:** Coastal dunes and coastal scrub, occasionally in water-logged saline soils of mangroves. **Dist:** Var. *dillenii* is most common in



the Caribbean region but makes its way into the se. US along both the Atlantic (north to e. SC) and Gulf coasts (of the FL peninsula and panhandle and coastal AL). **Phen:** Apr-Jun; Aug-Dec (-Feb). **Tax:** A hexaploid taxon (2*n*=66). AL, FL, GA, SC. 2n=66. **ID Notes:** *O. stricta* var. *dillenii* is typically a larger, more robust plant than *O. stricta* var. *stricta*. **Syn:** = Bah, K1, K4, Tx, Benson (1982), Doyle (1990), Ward (2009e); < *Opuntia stricta* – Fl5, FNA4, K2, S, WH3. NatureServe G4?T4? (Apparently Secure).

Opuntia stricta (Haworth) Haworth *var*. ***stricta***. COASTAL PRICKLY PEAR, SHELL MIDDEN PRICKLY-PEAR. **Hab:** Coastal dunes and coastal scrub, shell middens in salt marshes of the Gulf Coast, occasionally in water-logged saline soils of mangroves. **Dist:** Se. NC (reports from VA are based on a misidentification) south to s. FL, west to e. LA. **Phen:** Apr-Jun; Aug-Dec (-Feb). **Comm:** *O. stricta* is introduced throughout the world, in the Americas occurring throughout the Antilles, se. US, parts of coastal TX and eastern Mexico, northern South America, Ecuador, and Peru. Mostly restricted to coastal areas from se. NC to e. LA in our area, unless planted as an ornamental; coastal hammocks, shell middens, coastal dunes, barrier islands. Small (1933) recorded *O. stricta* (as *O. tunoidea*) from NC, and the species is still present in dune scrub and grasslands in the southern counties. The restricted distribution of this species in the se. US likely is the result of its lack of cold tolerance (Majure, pers. obs.). This species has long been used as a food source for native peoples; Small (1933) identifies it as the "the prickly-pears the early Spanish records tell us the aborigines feasted on for three months of each year and also cured, like figs, for food when out of season". *O. stricta* has been heavily impacted by the non-native cactus moth, *Cactoblastis cactorum*. Two varieties of *O. stricta*, *O. stricta* var. *stricta* and *O. stricta* var. *dillenii*, are recognized in our area, which sometimes are elevated to species level. Although the distinction of *O. stricta* var. *dillenii* is mostly straightforward in the Antilles, intermediate morphotypes and overlapping populations of the two in the southeastern U.S. make differentiation into species very difficult. Both taxa can sometimes produce spineless cladodes, but *O. stricta* var. *dillenii* tends to have more tuberculate stems. More taxonomic and genetic work needs to be carried out on this species complex. *O. stricta* has been involved in numerous hybridization events throughout its range (see Majure et al. 2012c). Intermediates between *O. stricta* and *O. mesacantha* ssp. *mesacantha* have been found in coastal AL (Majure, pers. obs.). Var. *stricta* is apparently restricted to the se. US along the coast, although spineless material from the Caribbean is often attributed to it. Inland material in sw. MS (Adams Co.) may be the result of escaped individuals from ornamental plantings. Vegetative propagules of this taxon have been found widely dispersed in coastal areas after hurricanes (Majure, pers. obs.). This taxon is hexaploid (2*n*=66). **ID Notes:** This species forms an erect or ascending shrub from 1-2 (-3) m tall, which are generally highly branching. The gray-green, dull color of the pads, yellow spines, and dark purple fruit can help distinguish this species from *O. austrina*, with which it is sometimes associated on the FL Atlantic Coast. **Syn:** = K1, K4, Tx, Benson (1982), Doyle (1990), Ward (2009e); < *Opuntia stricta* – Fl5, FNA4, K3, WH3; >< *Opuntia stricta* – S; > *Opuntia tunoidea* Gibbes – S. NatureServe G4?TNR (Not Yet Ranked).



318. NYSSACEAE A.L. de Jussieu ex Dumortier 1829 (TUPELO FAMILY) [in CORNALES]

A family of 5 genera and 22 species, trees and shrubs, of e. Asia, se. Asia, e. North America, and Central America. The circumscription and recognition of this family has been controversial; Nyssaceae has sometimes been included in a broadly circumscribed Cornaceae, but this appears to be phylogenetically incorrect (Xiang et al. 2002). References: Tucker (2016d) in FNA12 (2016); Xiang et al (2002).

Nyssa Linnaeus 1753 (TUPELO, SOUR GUM, BLACK GUM)

A genus of about 8-10 species, trees and shrubs, of e. North America, e. Asia, se. Asia, and Central America. The only other members of the genus are 2-4 e. and se. Asian species and a single species of Costa Rica (Hammel & Zamora 1990; Wen & Stuessy 1993). References: Burckhalter (1992); Eyde (1966); Tucker & Park (2016) in FNA12 (2016); Ward (2008b); Wen & Stuessy (1993); Zhou et al (2018); Zhou, Xiang, & Wen (2020).

Identification Notes: *Nyssa sylvatica* is often mistaken (especially as seedlings, saplings, or fire-sprouts) for *Diospyros virginiana*, because of their similar, alternate, glossy-green, acuminate leaves. *Nyssa* can be distinguished by its three vascular bundle scars per leaf scar (vs. one *Diospyros*), leaves often with a few irregular teeth (vs. never toothed), leaves pale to medium green beneath (vs whitish-green beneath), leaves lacking reddish to dark glands on the midrib above and the petiole (vs. present), and leaves glabrous or nearly so below (vs. glabrate to tomentose with curly hairs) (McKenney 1967).

1 Petioles of mature leaves 3-6 cm long; leaves to 30 cm long and 15 cm wide, at least the larger on a tree normally > 8 cm wide, often with a few irregular teeth, these typically located near the widest part of the blade ..... ***Nyssa aquatica***
1 Petioles of mature leaves 0.5-2.0 (-2.5 cm) long; leaves to 18 cm long and 10 cm wide, the largest leaves on a tree rarely > 7 cm wide, generally entire, rarely with a few irregular teeth, these typically located toward the leaf apex.
  2 Fruits 20-40 mm long, yellow, orange, or red when mature, the stone winged; pistillate flowers and fruits 1 per peduncle; trees often multiple-trunked, the trunks crooked; mature leaves densely pubescent beneath ..... ***Nyssa ogeche***
  2 Fruits 6-15 mm long, blue-black when mature, the stone slightly ridged to nearly smooth; pistillate flowers (1-) 2-5 per peduncle; trees typically single-trunked, the trunk fairly straight; mature leaves glabrous to pubescent beneath.
    3 Pistillate flowers and fruits (2-) 3-5 (-8) per peduncle; leaves with thin texture, pliable, typically widest near the middle, the apex typically acuminate, the margins often with a few irregular teeth near the apex (though sometimes an entire tree with no toothed leaves); trunk not swollen or buttressed at base (even when growing in moist or wet habitats); bark of large trees rough, divided by deep vertical and horizontal furrows into a pattern of squarish checks; [trees of dry to mesic upland forests, less commonly in bottomlands or other wetlands, where flooding occurs at most occasionally and is of short duration; throughout our area] ..... ***Nyssa sylvatica***

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

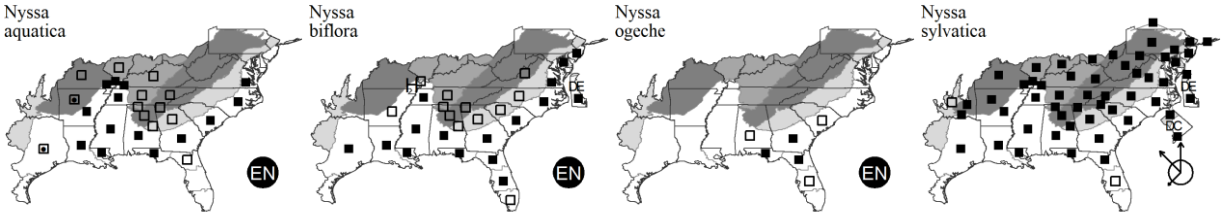
3 Pistillate flowers and fruits (1-) 2 (-3) per peduncle; leaves with thick texture, rather stiff, typically widest beyond the middle, the apex typically obtuse, the margins entire (rarely with a few teeth on vigorous sprouts); trunk swollen or buttressed at base; bark of large trees rough, a vertical ridge-furrow pattern most prominent; [trees of swamps with periodic or seasonal flooding; mostly on the Coastal Plain]. ..... ***Nyssa biflora***

Nyssa aquatica Linnaeus. WATER TUPELO, TUPELO GUM, COTTON GUM. **Hab:** River swamps, less typically in isolated upland ponds, where inundated for substantial periods of time. **Dist:** Se. VA south to Panhandle FL, west to se. TX, north in the Mississippi Embayment to se. MO, s. IL, and e. KY, primarily on the Coastal Plain, but with scattered locations in other physiographic provinces, such as in sc. TN. **Phen:** Apr-May; Sep-Oct. **Syn:** = Ar, C, F, Fl5, FNA12, GW2, Il, K1, K3, K4, Mo2, RAB, S, Tn, Tx, Va, WH3, Burckhalter (1992), Eyde (1966), Ward (2008b), Wen & Stuessy (1993); = *Nyssa uniflora* Wangenheim – G. NatureServe G5 (Secure).

Nyssa biflora Walter. SWAMP TUPELO, WATER GUM, SWAMP BLACK GUM. **Hab:** Blackwater river swamps, depressions in pinelands, pocosins, either where inundated for substantial periods of time or in more-or-less permanently saturated organic peaty soils. **Dist:** NJ south to s. FL, west to e. TX, primarily on the Coastal Plain, but scattered inland to c. NC, w. SC, c. TN, w. KY (Clark et al. 2005), se. MO, and c. AR. **Phen:** Apr-Jun; Aug-Oct. **Syn:** = FNA12, G, Il, K1, K3, K4, Mo2, S, Va, Burckhalter (1992); = *Nyssa biflora* ssp. *biflora* – Zhou et al (2018); = *Nyssa biflora* var. *biflora* – Ward (2008b); = *Nyssa sylvatica* Marshall var. *biflora* (Walter) Sargent – C, F, RAB, Tn, Tx, Eyde (1966), Wen & Stuessy (1993); < *Nyssa sylvatica* Marshall var. *biflora* (Walter) Sargent – Fl5, GW2, WH3.

Nyssa ogeche Bartram ex Marshall. OGEECHEE LIME, OGEECHEE TUPELO, OGEECHEE PLUM. **Hab:** River swamps and wet forests with peaty soils, also in upland depression ponds. **Dist:** A Southeastern Coastal Plain endemic: se. SC south to c. peninsular FL, west to s. AL. **Phen:** Apr; Aug-Oct. **Syn:** = Fl5, FNA12, GW2, K1, K3, K4, RAB, WH3, Burckhalter (1992), Eyde (1966), Ward (2008b), Wen & Stuessy (1993); > *Nyssa acuminata* Small – S; > *Nyssa ogeche* Bartram ex Marshall – S. NatureServe G4G5 (Apparently Secure).

Nyssa sylvatica Marshall. SOUR GUM, BLACK GUM, PEPPERIDGE. **Hab:** Dry or mesic upland forests, less commonly in bottomlands, pine savannas, or upland depressions, where occasionally inundated briefly. **Dist:** S. ME west to MI and se. WI, south to c. peninsular FL, west to e. TX and e. OK; disjunct in Chiapas). **Phen:** Apr-Jun; Aug-Oct. **Tax:** The status of varieties recognized by previous authors (such as Fernald 1950) needs reassessment; *N. sylvatica* is quite variable in morphology and ecology, at least some of the morphologic variation correlated with geography and ecology, but not so far readily tractable taxonomically. In the Mountains of our area, *N. sylvatica* is typically found in dry woodlands, such as pine-oak/heath, with xerophytic species such as *Pinus virginiana* and *Quercus montana*. In the outer Coastal Plain of the Carolinas, a swamp variant of *N. sylvatica* often occurs in wet savannas with *Pinus serotina*, where often mistaken (because of the wetland habitat and some superficial similarities) for *N. biflora*. **ID Notes:** The leaves turn a brilliant orange-red in fall (often a few on any tree coloring prematurely in Jul or Aug). . **Syn:** = Ar, FNA12, G, K1, K3, K4, Meso4.1, Mi, Mo2, NcTx, NY, Pa, S, Va, WV, Burckhalter (1992), Ward (2008b), Zhou et al (2018); = *Nyssa sylvatica* var. *sylvatica* – C, Fl5, GW2, RAB, Tn, Tx, WH3, Eyde (1966), Wen & Stuessy (1993); > *Nyssa sylvatica* var. *caroliniana* (Poiret) Fernald – F, Il; > *Nyssa sylvatica* var. *dilatata* Fernald – F; > *Nyssa sylvatica* var. *sylvatica* – F, Il.



320. HYDRANGEACEAE Dumortier 1829 (HYDRANGEA FAMILY) [in CORNALES]

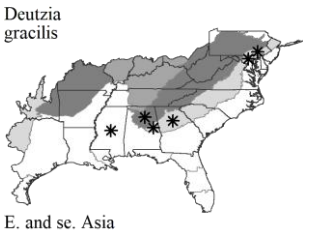
A family of about 17 genera and 190-220 species, trees, shrubs, vines, and herbs, primarily north temperate. As here interpreted, the family Hydrangeaceae includes two well-marked groups, the Hydrangeae (including *Decumaria* and *Hydrangea*) and the Philadelpheae (including *Deutzia* and *Philadelphus*). This group has been shown by molecular research to be unrelated to the Saxifragaceae, and to have its closest affinities to the Loasaceae, Cornaceae, and Nyssaceae (Xiang et al. 2002; Soltis, Xiang, & Hufford 1995; Morgan & Soltis 1993). References: Freeman (2016a) in FNA12 (2016); Hufford (2004) in Kubitzki et al (2004); Soltis, Xiang, & Hufford (1995); Spongberg (1972); Xiang et al (2002).

1 Woody vine, climbing by aerial rootlets; petals 7-10; [tribe *Hydrangeae*] ..... ***Hydrangea barbara***
1 Shrub; petals 4-5 (rarely 10 or many in the cultivars of *Deutzia* and *Philadelphus*).
2 Pubescence of leaves and twigs stellate; stamens 10; [a cultivated alien, rarely escaped]; [tribe *Philadelpheae*] ..... ***Deutzia***
2 Pubescence of leaves and twigs simple; stamens 8-10 (*Hydrangea*) or 25-90 (*Philadelphus*); [natives and aliens].
3 Leaf blades 10-30 cm long; inflorescences of 25-many flowers; stamens 8-10; [tribe *Hydrangeae*] ..... ***Hydrangea***
3 Leaf blades 3-8 cm long; inflorescences of 1-7 flowers; stamens 25-90; [tribe *Philadelpheae*] ..... ***Philadelphus***

Deutzia Thunberg 1781 (DEUTZIA)

A genus of about 60 species, shrubs, mainly Asian. References: Brock (2022); Hufford (2004) in Kubitzki et al (2004); McGregor (2016a) in FNA12 (2016).

* ***Deutzia gracilis*** Siebold & Zuccarini. SLENDER DEUTZIA. **Hab:** Disturbed areas. **Dist:** Native of Japan and China. **Phen:** Apr-Jun. **Syn:** = FNA12, K3, K4. NatureServe GNR (Not Yet Ranked).



Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Hydrangea Linnaeus 1753 (HYDRANGEA, SEVENBARK)

A genus of about 45 species, shrubs and lianas, of e. North America and e. Asia. Molecular analyses have long suggested that *Hydrangea* as usually interpreted is polyphyletic (Soltis, Xiang, & Hufford 1995; Samain, Wanke, & Goetghebeur 2010) and should either be circumscribed more broadly to include other genera in tribe Hydrangeeae that are phylogenetically embedded (including, in our area, *Decumaria*), an approach that has been further developed and formalized by De Smet et al. (2015). Alternatively, *Hydrangea* s.l. could be separated into multiple, monophyletic segregate genera, an approach promoted by Ohba & Akiyama (2016). For now, we have followed the broad approach (with generic and sectional circumscriptions follow De Smet et al. 2015). If split, our species would end up in 4 genera: *Hydrangea* s.s. (*arborescens*, *cinerea*, *radiata*, and *quercifolia*), *Decumaria* (*barbara*), *Heteromalla* (*paniculata*), and *Hortensia* (*macrophylla*). See Dirr (2004) and van Gelderen & van Gelderen (2004) for information on cultivated hydrangeas. References: Freeman (2016b) in FNA12 (2016); Hufford (2004) in Kubitzki et al (2004); McClintock (1957); McGregor (2016b) in FNA12 (2016); Ohba & Akiyama (2016); Pilatowski (1982); Samain, Wanke, & Goetghebeur (2010).

Identification Notes: *Hydrangea barbara* is readily distinguished from the other opposite-leaved, woody vines in our flora (*Gelsemium*, *Trachelospermum*, *Lonicera*, *Bignonia*, *Campsis*, and *Clematis*) by its leaves (simple, ovate, and usually serrate) and climbing structures (adventitious roots).

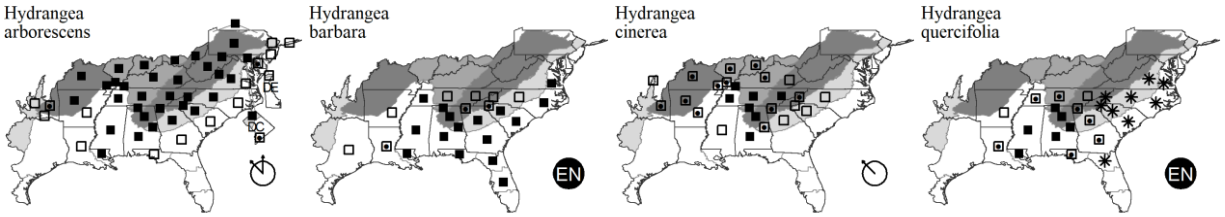
1 Woody vine, climbing by adventitious roots; petals 7-10; [section *Decumaria* of clade *Hydrangea* I; or genus *Decumaria*] ..... ***Hydrangea barbara***
1 Shrub; petals 4-5.
  2 Leaves pinnately lobed, the lobes toothed; inflorescence a panicle; large sterile flowers many (> 20 per inflorescence), borne throughout the inflorescence; [section undetermined (*"incertae sedis"*) of clade *Hydrangea* I; or genus *Hydrangea* s.s.] ..... ***Hydrangea quercifolia***
  2 Leaves unlobed, merely toothed; inflorescence a corymb (except *H. paniculata*); large sterile flowers absent to relatively few (0-15 per inflorescence), borne around the periphery of the corymb (except *H. paniculata*).
    4 Lower leaf surface glabrous or inconspicuously puberulent, appearing green; trichomes of the lower leaf surface restricted to the midrib and major veins; sterile flowers absent, or, if present, usually < 1 cm in diameter ..... ***Hydrangea arborescens***
    4 Lower leaf surface variously pubescent, appearing white or gray; trichomes of the lower leaf surface on veins and interveinal areas; sterile flowers usually present, large and showy, usually greater than 1 cm in diameter. ..... ***Hydrangea cinerea***

Hydrangea arborescens Linnaeus. SMOOTH HYDRANGEA, NORTHERN WILD HYDRANGEA, SEVENBARK. **Hab:** Forests, especially around rock outcrops and along streambanks. **Dist:** NJ, s. NY, OH, IN, IL, MO, and se. KS south to e. NC, c. SC, c. GA, Panhandle FL, s. AL, LA, and OK. **Phen:** May-Jul. **Syn:** = Ar, Fl5, FNA12, Il, K1, K3, K4, NE, NY, Pa, S, Tn, Va, W, WH3, Pilatowski (1982); = *Hydrangea arborescens* ssp. *arborescens* – RAB, McClintock (1957); = *Hydrangea arborescens* var. *arborescens* – C, G, WV; > *Hydrangea arborescens* var. *arborescens* – F; > *Hydrangea arborescens* var. *oblonga* Torrey & A. Gray – F.

Hydrangea barbara (Linnaeus) B. Schulz. CLIMBING HYDRANGEA, WOODVAMP, DECUMARY. **Hab:** Swamp forests and bottomlands, moist forests in the mountains. **Dist:** Se. VA south to FL and west to LA, s. AR, and e. TX (Singhurst, Keith, & Holmes 2005), inland to nw. SC, se. TN, and w. TN. **Phen:** May-Jun; Jul-Oct. **ID Notes:** This handsome vine climbs to the tops of trees via adventitious roots. The opposite leaves are somewhat fleshy in texture. **Syn:** = K4; = *Decumaria barbara* Linnaeus – Ar, C, F, Fl5, FNA12, G, GW2, K1, K3, RAB, S, Tn, Tx, Va, W, WH3. NatureServe G5 (Secure).

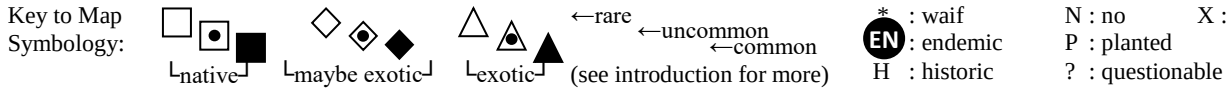
Hydrangea cinerea Small. ASHY HYDRANGEA, SOUTHERN WILD HYDRANGEA. **Hab:** Rocky forests and rock outcrops, roadbanks, perhaps strictly or mostly associated with mafic or calcareous rocks. **Dist:** Sw. NC, c. IN, c. IL, and c. MO south to n. SC, sc. AL, and c. AR. **Phen:** May-Jul (-Aug). **Syn:** = FNA12, Il, K1, K3, NE, S, Tn, W, Pilatowski (1982); = *Hydrangea arborescens* ssp. *discolor* (Seringe) McClintock – RAB, McClintock (1957); = *Hydrangea arborescens* Linnaeus var. *deamii* E. St. John – F; = *Hydrangea arborescens* var. *discolor* Seringe – C, G; < *Hydrangea arborescens* Linnaeus – GrPl.

Hydrangea quercifolia Bartram. OAKLEAF HYDRANGEA. **Hab:** Native in hammocks, moist forests, also in disturbed areas, thickets, or forests adjacent to urban or suburban areas. **Dist:** C. and sw. TN, south through w. GA, AL, and MS to Panhandle FL and e. LA; scattered elsewhere as a remnant or escape from cultivation. **Phen:** May-Jul. **Comm:** Boufford & Wood (1977) describe a purportedly native occurrence in nw. SC, but it seems more likely to be an escape from cultivation (R. Clark, pers. comm.). This southeastern native is a spectacular garden plant, frequently planted, rarely escaping or persisting. **Syn:** = Ar, C, F, Fl5, FNA12, G, K1, K3, K4, NE, S, Tn, WH3. NatureServe G5 (Secure).



Philadelphus Linnaeus 1753 (MOCK-ORANGE)

A genus of 65 (or fewer) species, shrubs, of north temperate areas. The most recent monographer of the genus, Hu (1954-1955) recognizes many species and varieties on the basis of minor differences in pubescence. Many of the recognized taxa are based only on cultivated material. The native distributions of the varieties have little phytogeographic coherence, and several varieties are often reported from the same site, suggesting that they reflect merely variation within a population (if genetically based at all). For instance, Hu recognizes three varieties in *P. hirsutus* and five in *P. inodorus*, but these seem to be no more than forms. As Hu writes, "the formerly recognized species, *P. grandiflorus* Willd., and *P. laxus* Schrad., are merely different forms of a species with heterogeneous leaf shape, size, and margins. Fostered by growers, propagated and distributed through cuttings, these forms have maintained their distinction in gardens since their discoveries. But when they are projected on the spectrum of variations



exhibited by a large number of specimens collected from the homeland of *P. inodorus* Linn. they appear to be nothing but a few transitional forms. In this paper, these forms are treated as varieties." Hu's "varieties" should be treated as forms or cultivars, if recognized at all. I have taken a conservative approach, though variation in several of our native species could use additional study. References: Hu (1954-1956); Hufford (2004) in Kubitzki et al (2004); Weakley & Henrickson (2016) in FNA12 (2016); Weakley (2002).

1 Axillary buds exposed above the petiole base (best observed in mature long-shoot leaves, not always visible in axils of young leaves or on short-shoot leaves); twigs of the current year villous-hirsute; seeds not caudate; style 1, clavate, 4-6 mm long; [calcareous and mafic sites]; [subgenus *Deutzioides*] ..... ***Philadelphus hirsutus***

1 Axillary buds contained within a distinct pouch directly below the petiole (best observed in mature, long-shoot leaves); twigs of the current year glabrous; seeds with caudate tails about as long as the embryo; styles 4, 6-16 mm long, the 4 branches 1.5-8 mm long; [ecologically more generalist collectively, including calcareous and mafic sites[; [subgenus *Philadelphus*].

3 Flowers 1-3 (-9) in a cymule; stamens 60-90; styles 10-16 mm long; style lobes 0.8-1.0 mm wide ..... ***Philadelphus inodorus***

3 Flowers 5-9 in a determinate raceme; stamens 20-50; styles 6-10 mm long; style lobes 0.3-0.9 mm wide.

4 Bark of the current year brown, exfoliating in its second year; flowers fragrant ..... ***Philadelphus coronarius***

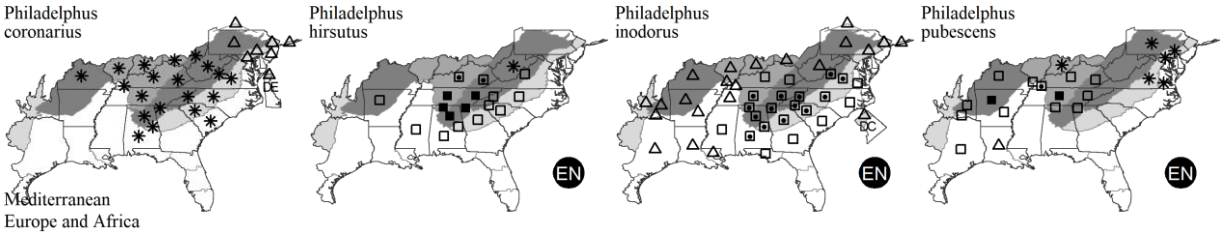
4 Bark of the current year gray, not exfoliating later; flowers not fragrant or only slightly so ..... ***Philadelphus pubescens***

* ***Philadelphus coronarius*** Linnaeus. EUROPEAN MOCK-ORANGE. **Hab:** Cultivated (though more so in the past than now), and sometimes escaped or persisting around old homesites. **Dist:** Native of the Caucasus Mountains and possibly s. Europe. *P. coronarius* is the most commonly cultivated *Philadelphus* in our area, though it is currently considered rather old-fashioned. **Phen:** May-Jul. **Syn:** = C, FNA12, Il, K1, K3, K4, Mi, NE, NY, Pa, Va. NatureServe GNR (Not Yet Ranked).

Philadelphus hirsutus Nuttall. HAIRY MOCK-ORANGE, CUMBERLAND MOCK-ORANGE. **Hab:** Bluffs, rock outcrops, rocky woodlands, often with seepage, over mafic or calcareous rocks. **Dist:** A Southern Appalachian species: sw. VA and KY south and west to w. NC, TN, n. GA, and n. AL. **Phen:** Apr-May; Jun-Aug. **Tax:** *P. sharpianus* Hu, known from e. TN and nc. AR, is similar to *P. hirsutus*, allegedly differing in the hypanthium glabrous (vs. more or less pubescent), the leaves strigose-pilose above, glabrous or sparsely strigose or with the nerves only villous beneath (vs. scabrous-hirsute above, uniformly villous beneath); it is probably best considered only a form of *P. hirsutus*. *P. hirsutus* is cultivated and it may escape outside of the range stated. **Syn:** = Ar, C, F, FNA12, G, K3, K4, RAB, S, Tn, Va, W; > *Philadelphus hirsutus* Nuttall – K1; > *Philadelphus hirsutus* Nuttall – Hu (1954-1956); > *Philadelphus hirsutus* var. *intermedius* Hu – Hu (1954-1956); > *Philadelphus hirsutus* var. *nanus* Hu – Hu (1954-1956); > *Philadelphus sharpianus* Hu – K1, Hu (1954-1956); > *Philadelphus sharpianus* Hu var. *parviflorus* Hu – Hu (1954-1956).

Philadelphus inodorus Linnaeus. APPALACHIAN MOCK-ORANGE. **Hab:** Rich forests and woodlands, rocky bluffs over mafic or calcareous rocks, and also cultivated and persistent. **Dist:** VA and TN south to Panhandle FL (Gadsden, Liberty, and Jackson counties), GA, and s. AL (and according to C, also in e. PA). **Phen:** Apr-May; Jun-Aug. **Comm:** *P. floridus* Beadle, known from nw. GA, is similar to *P. inodorus*, allegedly differing in the pedicels and hypanthium pubescent (vs. glabrous); it is probably only a form of *P. inodorus*. **Syn:** = Ar, C, Fl5, FNA12, G, K3, K4, Mi, NE, NY, Pa, RAB, Tn, Va, W, WH3; > *Philadelphus floridus* Beadle – Il, K1, S, Hu (1954-1956); > *Philadelphus gloriosus* Beadle – S; > *Philadelphus grandiflorus* Willdenow – S; > *Philadelphus inodorus* Linnaeus – Il, K1; > *Philadelphus inodorus* var. *carolinus* Hu – Hu (1954-1956); > *Philadelphus inodorus* var. *grandiflorus* (Willdenow) A. Gray – F, Hu (1954-1956); > *Philadelphus inodorus* var. *inodorus* – F, S, Hu (1954-1956); > *Philadelphus inodorus* var. *laxus* (Schrader) Hu – Hu (1954-1956); > *Philadelphus inodorus* var. *strigosus* Beadle – S, Hu (1954-1956).

Philadelphus pubescens Loiseleur-Deslongchamps. OZARK MOCK-ORANGE, HAIRY MOCK-ORANGE. **Hab:** Limestone bluffs; also naturalizing near ornamental plantings in suburban woodlands. **Dist:** E. TN, KY, nw. GA (Jones & Coile 1988), n. AL (Barger et al. 2019), MO, OK, and AR, west of the Blue Ridge. Also scattered as a horticultural plant locally escaping. **Comm:** It has been documented from TN counties adjacent to both VA and NC, and is likely to be found in VA, at least. **Syn:** = Ar, FNA12, Mi, NcTx, NE, NY, Pa, Tx; > *Philadelphus intectus* Beadle – S; > *Philadelphus intectus* var. *intectus* – Hu (1954-1956); > *Philadelphus intectus* var. *pubigerus* Hu – Hu (1954-1956); > *Philadelphus latifolius* Schrader ex A.P. de Candolle – S; > *Philadelphus pubescens* Loiseleur-Deslongchamps – Il; > *Philadelphus pubescens* var. *intectus* (Beadle) A.H. Moore – K1, K3, K4, Tn; > *Philadelphus pubescens* var. *pubescens* – K1, K3, K4, Tn, Hu (1954-1956); > *Philadelphus pubescens* var. *verrucosus* (Schrader) Hu – K4, Hu (1954-1956); > *Philadelphus verrucosus* Schrader – Il.



324. CORNACEAE Berchtold ex J. Presl 1825 (DOGWOOD FAMILY) [in CORNALES]

Derick B. Poindexter, Zack E. Murrell, and Alan S. Weakley

A family of 5-6 genera (as here interpreted) and about 50-85 species, trees, shrubs, lianas, and subshrubs, semicosmopolitan (mainly northern hemisphere). The Cornaceae is best circumscribed to exclude *Nyssa*, which probably is not even sister to Cornaceae (Xiang et al. 2002; Fu et al. 2019). The generic limits within core Cornaceae have long been controversial. The segregate genera of *Cornus* used here date back to 1756-1839, and in the southeastern United States, Small (1903, 1913, 1933) treated our native species in *Cynoxylon* and *Svida*. Phylogenetic analyses show that *Cornus* treated very broadly is monophyletic, but various clades within it are also monophyletic and have ages and levels of genetic and morphologic divergence generally regarded as warranting generic distinction. Fu et al. (2019) estimated that the five major clades (including four in our area) have divergence times of 60-75 million years ago (about at the end of the Cretaceous). Yu et al. (2017) estimated that the major clades in Cornaceae (including the separation between *Alangium* and *Cornus* s.l.) date to 66-85 million years ago, with the exception of a more recent split between the

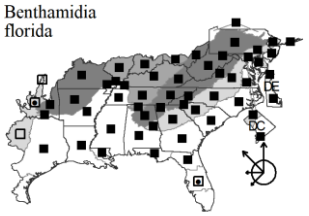
Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

big-bracted dogwoods (here treated as *Benthamidia*) and the dwarf cornels (here treated as *Chamaepericlymenum*). In all other families of the Cornales, clades with divergence times of such age are universally treated as separate genera, and separation times of half that are often accorded genus rank. Based on our increased knowledge of the age and distinctiveness of these groups, it seems almost certain that the traditional 'subgenera' will be recognized by consensus in the future as warranting generic rank, and we treat them so here. That consensus has not yet arrived: Eyde's (1987) irritated and impassioned defense of a "broad *Cornus*" remains influential and is still followed by many -- though its reasoning seems increasingly irrelevant following a third of a century's elucidation of the relationships within Cornaceae and related families. Cornaceae is represented in the southeastern United States by native members of three of the five major clades (here treated as genera: Swida, Benthamidia, and Chamaepericlymenum) and by a fourth clade (genus Cornus sensu stricto). References: Eyde (1987); Fu et al (2019); Kubitzki et al (2004); Murrell & Poindexter (2016) in FNA12 (2016); Thomas et al (2021); Xiang et al (2002); Yu et al (2017).

1 Leaves alternate (the internodes typically short and therefore the leaves looking nearly whorled) ..... ***Swida alternifolia***
1 Leaves opposite.
  3 Inflorescence subtended by 4 showy (white, creamy, or pink) bracts. ..... ***Benthamidia***
  3 Inflorescence with green, tan, or brown (non-petaloid) bracts.
  ..... ***Swida***

Benthamidia Spach 1839 (BIG-BRACTED DOGWOOD)

A genus of about 7 species, trees, of Asia, e. North America, w. North America, and montane Mexico. See Cornaceae for discussion of generic treatment. We here circumscribe *Benthamidia* broadly to include the syncarpous, big-bracted dogwoods of e. Asia, sometimes separated as genus *Dendrobenthamia* Hutchinson. References: Murrell & Poindexter (2016) in FNA12 (2016).



Benthamidia florida (Linnaeus) Spach. FLOWERING DOGWOOD. **Hab:** In a wide variety of dry to moist forests and woodlands, especially over acidic substrates. **Dist:** ME west to MI, south to c. peninsular FL and e. TX. **Phen:** Mar-May; Sep-Oct. **Tax:** Populations in the Sierra Madre Oriental of ne. Mexico (Coahuila, Nuevo Léon, San Luis Potosí, Tamaulipas, Veracruz) sometimes treated as conspecific with *Benthamidia florida* (variously as a subspecies, a variety, or not distinguished taxonomically at all) warrant recognition based on morphology and disjunction as *Cornus urbiniana* J.N. Rose -- a combination in *Benthamidia* is available only at variety rank: *Benthamidia florida* var. *urbiniana* (J.N. Rose) H. Hara. **Comm:** *Benthamidia florida* has been impacted since the 1980s by widespread infection by the dogwood anthracnose fungus (*Discula destructiva*). **Syn:** = NE; = *Cornus florida* Linnaeus – Ar, C, F, Fl5, FNA12, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NY, Pa, RAB, Tn, Tx, Va, W, WH3, WV, Ferguson (1966c), Ferguson (1966d), Godfrey (1988); = *Cornus florida* ssp. *florida* – Pais, Whetten, & Xiang (2016); = *Cynoxylon floridum* (Linnaeus) Rafinesque ex B.D. Jackson – S. NatureServe G5 (Secure).

Swida Opiz 1838

A genus of about 32 species, shrubs and trees, of North America, Central America, n. and w. South America, and Eurasia. See Cornaceae for discussion of generic treatment. References: Murrell & Poindexter (2016) in FNA12 (2016).

1 Leaves alternate (the internodes typically short and therefore the leaves looking nearly whorled) ..... ***Swida alternifolia***
1 Leaves opposite.
  2 Veins usually 5 or more per leaf side.
  ..... ***Swida amomum***
  2 Veins usually 3-4 per leaf side.
    6 Trichomes appressed or slightly raised on the lower leaf surface.
    ..... ***Swida foemina***
    6 Trichomes erect on the lower leaf surface.
      9 Petioles 3-7 mm long; leaf veins evenly spaced ..... ***Swida asperifolia***
      9 Petioles 8-25 mm long; leaf veins emanate from the basal half of the leaf ..... ***Swida drummondii***

Swida alternifolia (Linnaeus f.) Small. ALTERNATE-LEAF DOGWOOD, PAGODA CORNEL, PAGODA DOGWOOD. **Hab:** Mesic to dry-mesic forests. **Dist:** NL (Newfoundland) west to MN, south to Panhandle FL, AL, s. MS, and AR. **Phen:** Apr-Jun; Jun-Sep. **Syn:** = NE; = *Cornus alternifolia* Linnaeus f. – Ar, C, F, Fl5, FNA12, G, Il, K1, K3, K4, Mi, NY, Pa, RAB, Tn, Va, W, WH3, WV, Ferguson (1966c), Ferguson (1966d), Godfrey (1988); = *Svida alternifolia* – S, orthographic variant. NatureServe G5 (Secure).

Swida amomum (P. Miller) Small. SILKY DOGWOOD. **Hab:** Shores, streams, bottomlands. **Dist:** NY and MA west to IN, south to GA, Panhandle FL, and MS. **Phen:** May-Jul; Aug-Sep. **Syn:** = *Cornus amomum* P. Miller – F, Fl5, FNA12, G, Il, K1, K3, K4, RAB, Tn, Va, W, WH3, WV; = *Cornus amomum* P. Miller ssp. *amomum* – GW2, Mi, NY, Pa, Ferguson (1966c), Ferguson (1966d), Godfrey (1988); = *Cornus amomum* var. *amomum* – C; = *Svida amomum* – S; = *Swida amomum* (P. Miller) Small var. *amomum* – NE. NatureServe G5 (Secure).

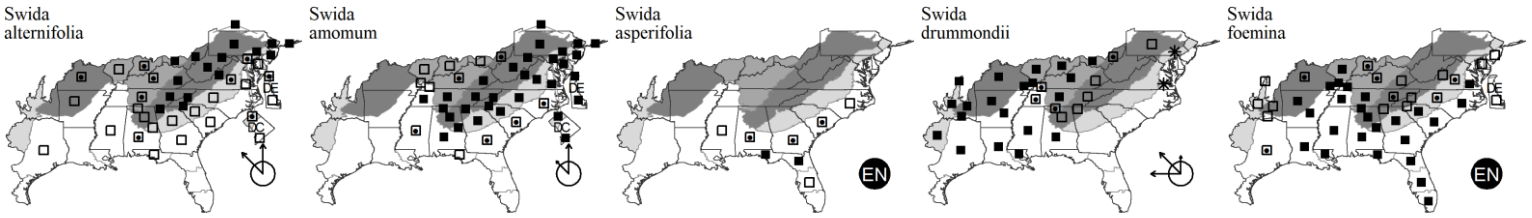
Swida asperifolia (Michaux) Small. EASTERN ROUGHLEAF DOGWOOD. **Hab:** Mesic calcareous forests and thickets, shell middens, calcareous hammocks. **Dist:** Se. NC south to n. peninsular FL, west to s. AL. **Phen:** Apr-Jun; Aug-Sep. **Tax:** Nash (1896) collected *S. asperifolia* Michaux at River Junction, Florida; based upon conflicting reports of fruit colors given by Chapman (1860) and Coulter and Evans (1890) for the two rough-leaved dogwoods (*S. asperifolia* and *S. drummondii*), Nash decided to name the rough-leaved dogwood with blue fruit as *C. microcarpa*. However, Michaux's (1803) description, even without reference to fruit color, is clearly attributable to this species, as its locality was given as 'Carolinae inferioris'. The populations of this rough-leaved dogwood in NC and SC have morphology intermediate between *S. foemina* and *S. asperifolia* and these should possibly be attributed to a hybrid origin. More analysis needs to be done on this complex. **Syn:** = *Cornus asperifolia* Michaux – Fl5,

324. CORNACEAE

FNA12, K1, K3, K4, RAB, WH3, Ferguson (1966c), Ferguson (1966d), Godfrey (1988); = *Cornus foemina* P. Miller ssp. *microcarpa* (Nash) J.S. Wilson – GW2; = *Svida microcarpa* (Nash) Small – S. NatureServe G4 (Apparently Secure).

Swida drummondii (C.A. Meyer) Soják. MIDWESTERN ROUGHLEAF DOGWOOD. **Hab:** Open woodlands and glades over calcareous rocks (limestone, calcareous shale); also naturalized in wetlands and slopes along old railroad tracks (in VA). **Dist:** NY, ON, and SD south to e. TN, nw. GA, LA, and TX. Reported as naturalized in City of Alexandria, VA (Simmons et al. 2020). **Phen:** Apr-Jul; Aug-Oct. **Syn:** = *Cornus drummondii* C.A. Meyer – Ar, C, FNA12, G, GrPl, GW2, Il, K1, K3, K4, Mi, NcTx, NY, Pa, Tx, Ferguson (1966c), Ferguson (1966d); > *Cornus drummondii* C.A. Meyer – F; > *Cornus priceae* Small – F; > *Svida asperifolia* – S, misapplied; > *Svida priceae* (Small) Small – S. NatureServe G5 (Secure).

Swida foemina (P. Miller) Rydberg. SOUTHERN SWAMP DOGWOOD. **Hab:** Swamps, streambanks, marshes, alluvial forests. **Dist:** DE south to s. FL, west to TX, and north in the interior to TN, s. IN, s. IL, AR, and se. OK. **Phen:** Mar-Jun; Jul-Oct. **Tax:** Although the name *Cornus foemina* P. Miller predates *C. stricta* Lamarck, it is very unclear what plant was intended by that name (the description is very obscure and no type is available), so *C. foemina* should arguably be rejected as a nomen dubium. Until and unless such an action is taken, it is arguably best to use *C. foemina*, the course followed here. **Syn:** = *Cornus foemina* P. Miller – Ar, F, Fl5, FNA12, Il, K1, K3, K4, Tn, Tx, WH3; = *Cornus foemina* P. Miller ssp. *foemina* – GW2, W, Ferguson (1966c), Ferguson (1966d); = *Cornus stricta* Lamarck – C, G, RAB, Va; = *Svida stricta* (Lamarck) Small – S.



325. BALSAMINACEAE A. Richard 1822 (TOUCH-ME-NOT FAMILY) [in ERICALES]

A family of 2 genera and 850-1000 species, primarily of the Old World tropics. References: Fischer in Kubitzki et al (2004).

Impatiens Linnaeus 1753 (JEWELWEED, TOUCH-ME-NOT, SNAPWEED, BALSAM)

A genus of 850-1000 species, herbs and subshrubs, primarily tropical and north temperate Old World. References: Fischer in Kubitzki et al (2004).

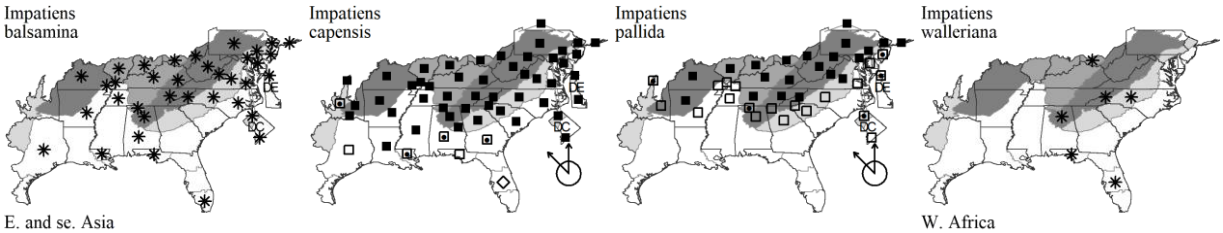
1 Corolla purple, pink, or white; plants 3-6 (-8) dm tall; stems puberulent or glabrous; [cultivated alien, rarely escaped].
  2 Sepal spur strongly recurved; stems puberulent ..... ***Impatiens balsamina***
  2 Sepal spur slightly curved; stems glabrous or with widely scattered hairs ..... ***Impatiens walleriana***
1 Corolla yellow or orange (rarely cream or white); plant mostly 5-25 dm tall; stems glabrous; [native].
  3 Flowers orange (rarely orange-yellow or white); calyx spur (colored) 7-10 mm long, curved forward parallel to the calyx sac ..... ***Impatiens capensis***
  3 Flowers yellow (rarely cream or white); calyx spur (colored) 4-6 mm long, at a right angle to the calyx sac ..... ***Impatiens pallida***

* ***Impatiens balsamina*** Linnaeus. GARDEN BALSAM, ROSE BALSAM. **Hab:** Frequently cultivated, sometimes escaped as a waif or "throw-out". **Dist:** Native of s. Asia. **Phen:** Jun-Nov. **Syn:** = Ar, C, F, Fl5, G, Il, K1, K3, K4, Mi, Mo2, NcTx, NY, Pa, RAB, S, WH3, WV. NatureServe GNR (Not Yet Ranked).

Impatiens capensis Meerburgh. ORANGE JEWELWEED, ORANGE TOUCH-ME-NOT, SPOTTED TOUCH-ME-NOT. **Hab:** Moist forests, bottomlands, cove forests, streambanks, bogs. **Dist:** NL (Newfoundland) west to SK, NT, and BC, south to SC, Panhandle FL, AL, TX, CO, ID, and OR. **Phen:** May-Nov. **ID Notes:** Within the portion of our area where *I. capensis* and *I. pallida* overlap, the two species often occur in mixed populations. *I. capensis* tends to have the leaf apices and crenulations more rounded than *I. pallida*, but the character is overlapping and variable. **Syn:** = Ar, C, F, Fl5, GrPl, GW2, Il, K1, K3, K4, Mi, Mo2, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, W, WH3, WV; = *Impatiens biflora* Walter – G, S. NatureServe G5 (Secure).

Impatiens pallida Nuttall. YELLOW JEWELWEED, YELLOW TOUCH-ME-NOT, PALE TOUCH-ME-NOT. **Hab:** Cove forests, streambanks, seepages, moist forests, bogs, roadsides. **Dist:** NS and QC west to SK, south to e. VA, wc. NC, TN, WV, n. AR, and OK. **Phen:** Jul-Sep. **Comm:** A white form (f. *speciosa*) is occasionally encountered. **Syn:** = Ar, C, F, G, GrPl, GW2, Il, K1, K3, K4, Mi, Mo2, NE, NY, Pa, RAB, S, Tn, Va, W, WV. NatureServe G5 (Secure).

* ***Impatiens walleriana*** Hooker f. GARDEN IMPATIENS, BIZZIE-LIZZIE. **Hab:** Suburban woodlands, weakly spreading from horticultural plantings. **Dist:** Native of Africa. **Syn:** = Fl5, K1, K3, K4, Mi, WH3. NatureServe GNR (Not Yet Ranked).



Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more)

* : waif EN : endemic H : historic

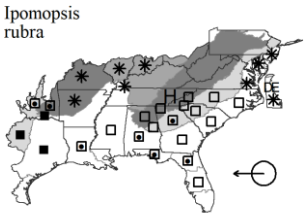
N : no P : planted ? : questionable X : extirpated

329. POLEMONIACEAE A.L. de Jussieu 1789 (JACOB'S-LADDER FAMILY) [in ERICALES]

A family of 18 genera and 350-380 species, herbs, vines, and shrubs (rarely trees), mainly of temperate North America, but extending into tropical America and also in Eurasia. All genera in our flora are in subfamily *Polemoniodeae*. References: Grant (1997); Grant (1998); Prather, Ferguson, & Jansen (2000); Wilken in Kubitzki et al (2004); Wilson (1960a).

1 Leaves simple and entire.
..... ***Phlox***
1 Leaves compound or deeply pinnatifid.
3 Leaf segments ovate or elliptic, 5-16 mm wide; corolla blue; [subfamily *Polemonioideae*; tribe *Polemoniae*]..... ***Polemonium***
3 Leaf segments linear, most ca. 1 mm wide; corolla red, yellow, blue, or white.
..... ***Ipomopsis***

Ipomopsis Michaux 1803 (STANDING-CYPRESS)



A genus of about 30 species, herbs, mainly of w. North America (1 species in se. North America, 1 in w. South America); an example of the affinities of the Sandhill flora to that of the dry sw. United States. References: Grant (1956); Sorrie, Weakley, & Bradley (2018); Wilken in Kubitzki et al (2004).

Ipomopsis rubra (Linnaeus) Wherry. STANDING-CYPRESS, SPANISH-LARKSPUR. **Hab:** Longleaf pine sandhills, sand rims of Carolina bays, dolomitic glades and woodlands, dunes, dry sandy and rocky woodlands and openings, roadbanks, disturbed areas. **Dist:** Sc. NC south to c. peninsular FL, west to TX and OK, spread from cultivation in other areas to the north (including sites in the Piedmont and Mountains of GA and NC). **Phen:** May-Aug (-Sep); Aug-Sep. **Comm:** Sorrie, Weakley, & Bradley (2018) discussed the biogeography, habitats, and nativity of the species. **Syn:** = Ar, Fl5, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, RAB, Tx, W, WH3, Grant (1956); = *Gilia rubra* (Linnaeus) A.A. Heller – C, F, G, S. NatureServe G4G5 (Apparently Secure).

Phlox Linnaeus 1753 (PHLOX)

A genus of about 70 species, herbs (and creeping subshrubs), of temperate North America (with 1 species in ne. Asia). References: Ferguson, Krämer, & Jansen (1999); Levin (1966); Levin (1967); Turner (1998 [2000]); Ward (2012a); Wherry (1955); Wilken in Kubitzki et al (2004).

Key based on Wherry (1955) and other sources.

1 Stems woody or suffrutescent, trailing or decumbent; leaves to 25 mm long (-60 mm long in *P. bifida*), to 3 (-5) mm wide, generally with short-shoots or fascicles of leaves in the axils of leaves of the sterile shoots.
2 United portion of the style 5-12 mm long, the cleft portion ca. 1 mm long.
..... ***Phlox subulata***
2 United portion of the style 1.5-4 mm long, the cleft portion 0.5-2 mm long.
6 Fertile shoots (10-) 15-30 cm tall; upper leaves oblong-lanceolate, up to 12-25 mm long, 1.5-3 mm wide on sterile shoots, 2.5-5 mm wide on fertile shoots; pubescence of the inflorescence mostly with conspicuously glandular tips..... ***Phlox nivalis ssp. hentzii***
6 Fertile shoots (3-) 8-12 (-15) cm tall; upper leaves linear-lanceolate, up to 8-12 mm long, 0.5-1.5 mm wide on sterile shoots, 1.5-3 mm wide on fertile shoots; pubescence of the inflorescence mostly with finely glandular tips..... ***Phlox nivalis ssp. nivalis***
1 Stems herbaceous, erect or decumbent; leaves (at least the larger) > 25 mm long and/or > 5 mm wide, generally lacking axillary fascicles of leaves.
7 Style long, (12-) 14-26 mm long, the united portion 3-30× as long as the cleft portion; stamens equaling or exceeding the corolla tube (thus in part exserted).
10 Leaf margin ciliate-serrulate; lateral veins of the leaves readily apparent, these joining to form a connecting vein parallel to the leaf margin.
11 Bracts of the inflorescence pubescent with glandular hairs; corolla tube glabrous; leaves opposite; nodes usually 8-15; leaves usually 2-3× as long as wide.
..... ***Phlox amplifolia***
11 Bracts of the inflorescence pubescent with non-glandular hairs; corolla tube pubescent (rarely glabrous); leaves subopposite (at least near the inflorescence); nodes usually 15-40; leaves usually 3-4× as long as wide..... ***Phlox paniculata***
10 Leaf margin smooth or slightly rough; lateral veins of the leaves not readily apparent, not forming a connecting vein parallel to the leaf margin.
12 Flowering shoots arising from decumbent stems; nodes below the inflorescence 3-7
13 Sterile, decumbent stems short; nodes (3-) 4 (-5); lower leaves long-petioled..... ***Phlox ovata***
13 Sterile, decumbent stems elongate; nodes (5-) 6 (-7); lower leaves short-petioled ..... ***Phlox pulchra***
12 Flowering shoots arising from rhizomes; nodes below the inflorescence 7 or more.
14 Cymes several, the lower on rather short and uniform peduncles, thus the inflorescence as a whole subcylindric in outline.
..... ***Phlox maculata ssp. pyramidalis***
14 Cymes solitary or several, if several then the lower on long peduncles, thus the inflorescence as a whole broadly rounded or even flat-topped.
16 Calyx subcylindric, the sepals fairly broad, with a rather weak midrib, the junction-membranes thin, narrow, becoming markedly plicate-keeled.....
..... ***Phlox carolina***
16 Calyx subcampanulate, the sepals narrow with a well-developed midrib, the junction-membranes firm, broad and flat (to slightly plicate-keeled).....
..... ***Phlox glaberrima***
7 Style short, 1-4 mm long, the united portion 1-1.5 (-2)× as long as the cleft portion; stamens shorter than the corolla tube (thus included).
17 Upper leaves alternate; annual; corollas red, white, bright purple, purplish-pink, or variegated.
..... ***Phlox drummondii var. peregrina***
17 Upper leaves opposite or subopposite; perennial; corollas blue, lavender, or pink; [native, mostly of forests, woodlands, or roadbanks].

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

24 Sterile shoots rooting at the nodes; leaves broad-elliptic, ca. 2-3× as long as wide; sepals acuminate to very slightly awned, the awn 0-0.5 mm long; corolla tube glabrous.
.....***Phlox divaricata var. laphamii***
24 Sterile shoots not rooting at the nodes; leaves narrowly ovate, lanceolate, or linear, ca. 4-10× as long as wide; sepals awned, the awn 0.5-3.0 mm long; corolla glabrous, pilose, or glandular-pubescent.
26 Cymes compact, the lowest branches short, < 0.5 cm long; corolla glabrous; pedicels 1-6 mm long.
27 Leaves and bracts oblong-elliptic to lanceolate, acute to obtuse (rarely acuminate), the larger 20-40 (-50) mm long, 4-8 (-12) mm wide, ca. 5× as long as wide; bracts below the inflorescence hiding the calyces ..... ***Phlox amoena***
27 Leaves and bracts linear to lanceolate, acuminate, the larger 35-45 mm long, 3-5 mm wide, ca. 10× as long as wide; bracts below the inflorescence not hiding the calyces.....***Phlox lighthipei***
26 Cymes open, the lowest branches elongate, > 1 cm long; corolla usually glandular-pubescent or pilose (rarely glabrous); pedicels 1-8 (-12) mm long
28 Leaves largest below the middle of the stem..... ***Phlox floridana***
28 Leaves largest above the midpoint of the stem.
29 Plants glabrous..... ***Phlox pilosa ssp. detonsa***
29 Plants pubescent with glandular and/or nonglandular hairs.
31 Upper stem leaves mostly linear, the base rounded or truncate; stems with non-glandular hairs towards the base, grading to glandular hairs towards the tip of the stem..... ***Phlox pilosa ssp. pilosa***
31 Upper stem leaves ovate-lanceolate, subcordate and broadest at the base; stems pubescent throughout with glandular hairs .....
.....***Phlox pilosa ssp. ozarkana***

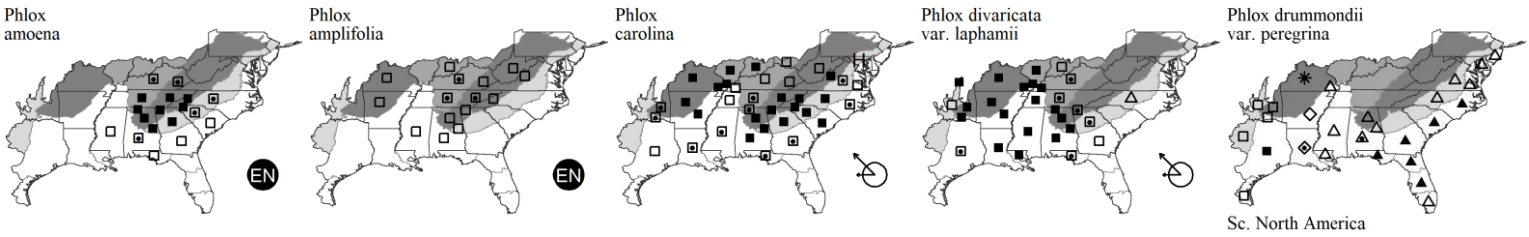
Phlox amoena Sims. HAIRY PHLOX, CHALICE PHLOX. **Hab:** Dry woodlands and forests, roadbanks, longleaf pine sandhills. **Dist:** W. NC west to s. KY, south to Panhandle FL and MS. **Phen:** Apr-Jun; Jun-Jul. **Syn:** = C, F, G, S, Tn, W; = *Phlox amoena* ssp. *amoena* – K1, K3, K4, Levin (1966), Wherry (1955); < *Phlox amoena* Sims – Fl5, RAB, WH3. NatureServe G4TNR (Not Yet Ranked).

Phlox amplifolia Britton. BROADLEAF PHLOX. **Hab:** Moist forests, particularly over mafic or calcareous rocks. **Dist:** W. VA west to s. IN and se. MO, south to w. NC, AL, and n. AR. **Phen:** Jun-Aug. **Syn:** = Ar, C, F, G, K1, K3, K4, RAB, S, Tn, Va, W, WV, Wherry (1955). NatureServe G3G5 (Apparently Secure).

Phlox carolina Linnaeus. CAROLINA PHLOX, THICK-LEAF PHLOX, GIANT PHLOX. **Hab:** Forests, woodlands, woodland borders, barrens. **Dist:** VA, WV, IL and MO south to s. GA, Panhandle FL, s. AL, s. MS, se. LA and e. TX. **Phen:** May-Jul. **Syn:** = G, RAB, S, W; > *Phlox carolina* ssp. *alta* Wherry – K1, Wherry (1955); > *Phlox carolina* ssp. *angusta* Wherry – Il, K1, Tx, Wherry (1955); > *Phlox carolina* ssp. *carolina* – K1, Wherry (1955); > *Phlox carolina* ssp. *turritella* Wherry – K1, Wherry (1955); > *Phlox carolina* var. *angusta* (Wherry) D.B. Ward – Ward (2012a); > *Phlox carolina* var. *carolina* – Ward (2012a); < *Phlox glaberrima* Linnaeus – C, Fl5, K4, WH3; < *Phlox glaberrima* Linnaeus ssp. *interior* (Wherry) Wherry – K3.

Phlox divaricata Linnaeus *var.* ***laphamii*** Alph. Wood. WESTERN BLUE PHLOX. **Hab:** Rich, moist soils of forests and open woodlands. **Dist:** W. GA, c. TN, wc. KY, w. IN, WI, MN, and se. SD south to FL Panhandle, s. AL, s. MS, s. LA, and se. TX. **Phen:** Apr-Jun. **Tax:** The documented distinction between var. *divaricata* and var. *laphamii* is morphologically relatively trivial, but is well-correlated with geography. **Syn:** = C, F, G, Tn; = *Phlox divaricata* ssp. *laphamii* (Wood) Wherry – GrPl, Il, K1, Pa, Tx, Levin (1966), Levin (1967), Wherry (1955); < *Phlox divaricata* Linnaeus – Fl5, K3, K4, S, WH3. NatureServe G5T3T5 (Apparently Secure).

Phlox drummondii Hooker *var.* ***peregrina*** Shinners. ANNUAL PHLOX, DRUMMOND PHLOX. **Hab:** Dry sandy soils of roadsides, fields, disturbed areas. **Dist:** S. OK south to s. TX, eastwards as an escape from horticultural use. **Phen:** Apr-Sep. **Syn:** = Turner (1998 [2000]); < *Phlox drummondii* Hooker – Ar, F, Fl5, G, Il, Mi, RAB, S, Va, WH3; < *Phlox drummondii* ssp. *drummondii* – K1, K3, NE, Wherry (1955); > *Phlox drummondii* ssp. *drummondii* – Tx; > *Phlox drummondii* Hooker var. *peregrina* Shinners – Tx. NatureServe G5T5 (Secure).



Phlox floridana Bentham. **Hab:** Longleaf pine sandhills, pine flatwoods, hammocks, limestone glade margins. **Dist:** Sw. GA and se. AL south to FL Panhandle and nw. peninsular FL. **Phen:** Apr-Nov. **Syn:** = Fl5, K1, K3, K4, S, WH3, Levin (1966), Wherry (1955). NatureServe G3 (Vulnerable).

Phlox glaberrima Linnaeus. SMOOTH PHLOX. **Hab:** Wet forests and woodlands, especially bottomlands. **Dist:** MD, OH, IN, IL, WI, and MO south to Panhandle FL, LA, and OK. **Phen:** Apr-Jun; Jun-Jul. **Syn:** = Ar, F, G, S, Tn, Va, W; > *Phlox carolina* Linnaeus var. *triflora* (Michaux) Wherry – F; < *Phlox glaberrima* Linnaeus – C, Fl5, K4, WH3; > *Phlox glaberrima* ssp. *glaberrima* – K1, K3, RAB, Wherry (1955); > *Phlox glaberrima* Linnaeus ssp. *interior* (Wherry) Wherry – Il, K1, K3, Wherry (1955); > *Phlox glaberrima* ssp. *triflora* (Michaux) Wherry – K1, K3, RAB, Wherry (1955); > *Phlox glaberrima* Linnaeus var. *interior* Wherry – F.

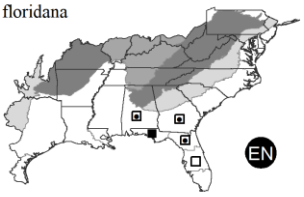
Phlox lighthipei Small. LIGHTHIPE'S PHLOX. **Hab:** Longleaf pine sandhills, other dry to moist sandy soils. **Dist:** S. SC south to n. FL, west to s. AL. **Phen:** Apr-May; Jun-Jul. **Syn:** = S; = *Phlox amoena* ssp. *lighthipei* (Small) Wherry – K1, K3, K4, Levin (1966), Wherry (1955); < *Phlox amoena* Sims – Fl5, RAB, WH3. NatureServe G4TNR (Not Yet Ranked).

Phlox maculata ssp. pyramidalis (J.E. Smith) Wherry. LEAFY MEADOW PHLOX. **Hab:** Moist forests and openings. **Dist:** PA, OH, s. IN, and se. MO, south to NC, n. GA, and TN. **Phen:** Jul-Sep. **Syn:** = Il, K1, K3, Mo1, RAB, Tn, Wherry (1955); = *Phlox maculata* var. *purpurea* Fernald – F, G, WV; < *Phlox maculata* – C, Pa, S, Va. NatureServe G5T4T5 (Apparently Secure).

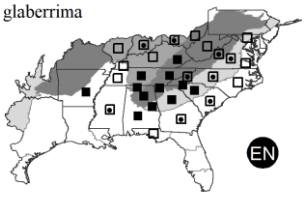
Phlox nivalis ssp. hentzii (Nuttall) Wherry. TRAILING PHLOX. **Hab:** Rock outcrops, thin soils of rocky woodlands, roadbanks. **Dist:** Sc. VA west to n. AL, south to c. peninsular FL and s. AL. **Phen:** Mar-May. **Syn:** = K1, K3, K4, Wherry (1955); = *Phlox nivalis* Loddiges ex Sweet var. *hentzii* (Nuttall) D.B. Ward – RAB, Ward (2012a); < *Phlox hentzii* – G; < *Phlox nivalis* – C, F, Fl5, S, Va, W, WH3. NatureServe G4T4 (Apparently Secure).

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated

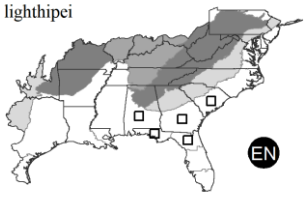
Phlox floridana



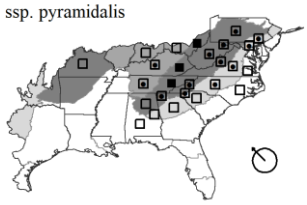
Phlox glaberrima



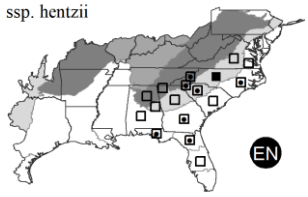
Phlox lighthipei



Phlox maculata ssp. pyramidalis



Phlox nivalis ssp. hentzii



Phlox nivalis G. Loddiges *ssp. **nivalis***. PINELAND PHLOX. **Hab:** Longleaf pine sandhills, other dry woodlands, roadbanks. **Dist:** Nc. NC south to Panhandle FL. **Phen:** (Late Feb-) Mar-May. **Comm:** A third taxon, *P. nivalis* ssp. *texensis* Lundell is endemic in e. TX. **Syn:** = K1, K3, K4, Wherry (1955); = *Phlox nivalis* Loddiges ex Sweet var. *nivalis* – RAB, Ward (2012a); < *Phlox hentzii* – G; < *Phlox nivalis* – C, F, Fl5, Mi, S, Va, W, WH3. NatureServe G4T4 (Apparently Secure).

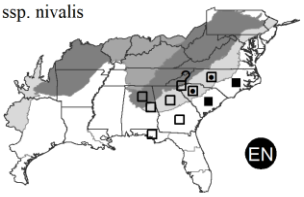
Phlox ovata Linnaeus. MOUNTAIN PHLOX, APPALACHIAN PHLOX, ALLEGHENY PHLOX. **Hab:** Moist forests, woodlands, woodland borders, and barrens. **Dist:** PA to NC and ne. TN in the Appalachians; disjunct in OH and IN. **Phen:** May-Jun; Jul. **Comm:** See Locklear (2011) for a discussion of the nomenclatural issue involving *P. ovata* and *P. latifolia*. **Syn:** = C, F, G, K3, K4, Mi, Pa, RAB, S, Tn, Va, W, WV, Wherry (1955); = *Phlox latifolia* Michaux – K1, NE. NatureServe G4 (Apparently Secure).

Phlox paniculata Linnaeus. GARDEN PHLOX. **Hab:** Streambanks, moist forests, woodlands, and woodland borders. **Dist:** S. NY west to IL and MO, south to e. NC, w. SC, n. GA, n. MS, and AR. **Phen:** Jun-Oct; Sep-Nov. **Syn:** = Ar, C, F, G, GrPl, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Va, W, WV, Wherry (1955). NatureServe G5 (Secure).

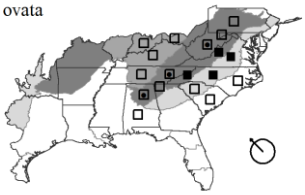
Phlox pilosa Linnaeus *ssp. **detonsa*** (A. Gray) Wherry. GULF COAST PHLOX. **Hab:** Dry woodlands. **Dist:** Panhandle FL west to e. TX. **Phen:** Mar-May. **Syn:** = K1, Tx, Levin (1966), Wherry (1955); < *Phlox pilosa* – Fl5, S, WH3; < *Phlox pilosa* Linnaeus ssp. *pilosa* – K3, K4.

Phlox pilosa Linnaeus *ssp. **ozarkana***. OZARK PHLOX. **Hab:** Glades, savannas, woodlands, disturbed areas. **Dist:** MO and se. KS south through e. OK and AR to n. LA; disjunct east of the Mississippi River from c. TN south to c. GA and c. AL. **Phen:** Apr-May. **Syn:** = GrPl, K1, K3, K4, Tn, Levin (1966), Wherry (1955); < *Phlox pilosa* – S; < *Phlox pilosa* var. *pilosa* – C, F, G. NatureServe G5T4? (Apparently Secure).

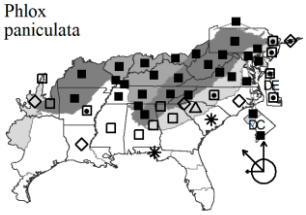
Phlox nivalis ssp. nivalis



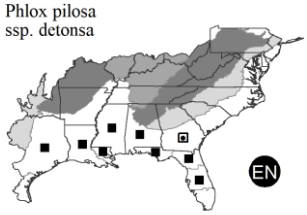
Phlox ovata



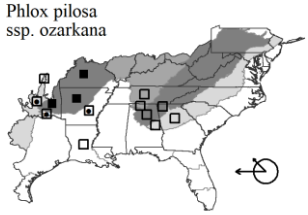
Phlox paniculata



Phlox pilosa ssp. detonsa



Phlox pilosa ssp. ozarkana

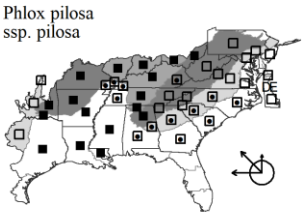


Phlox pilosa Linnaeus *ssp. **pilosa***. DOWNY PHLOX. **Hab:** Dry to mesic woodlands and forests, roadbanks. **Dist:** PA west to se. ND, south to GA and c. TX. **Phen:** Apr-May; May-Jun. **Syn:** = Ar, GrPl, Il, K1, Mi, NcTx, NE, NY, Tn, Tx, Levin (1966), Wherry (1955); < *Phlox pilosa* – Pa, RAB, S, Va, W, WH3; < *Phlox pilosa* Linnaeus ssp. *pilosa* – K3, K3, K4; < *Phlox pilosa* var. *pilosa* – C, F, G. NatureServe G5T5 (Secure).

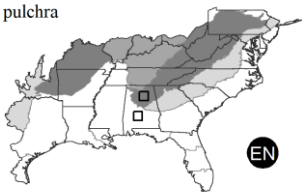
Phlox pulchra Wherry. ALABAMA PHLOX. **Hab:** {habitat}. **Dist:** Endemic to c. AL. **Syn:** = K1, K3, K4. NatureServe G1 (Critically Imperiled).

Phlox subulata Linnaeus. MOSS PHLOX, MOUNTAIN-PINK. **Hab:** Dry and exposed rock outcrops, rocky flood-scoured riversides, dry woodlands over a wide variety of rocks, shale barrens. **Dist:** NY and OH south to w. NC and TN; escaped or naturalized more widely from horticultural use. **Phen:** Mar-May. **Comm:** The infraspecific taxa that are sometimes recognized (see synonymy) seem poorly correlated with morphology and geography and are here synonymized pending further study. **Syn:** = Ar, Il, K4, Mi, Pa, RAB, S, Tn, Va, W; > *Phlox brittonii* Small – S; > *Phlox subulata* ssp. *australis* (Wherry) Wherry – K1, Wherry (1955); > *Phlox subulata* ssp. *brittonii* (Small) Wherry – K1, K3, Pa, Wherry (1955); > *Phlox subulata* ssp. *setacea* (Linnaeus) Locklear – K3; > *Phlox subulata* ssp. *subulata* – K1, K3, NE, NY, Pa, Wherry (1955); > *Phlox subulata* var. *australis* – G; > *Phlox subulata* var. *brittonii* – F, WV; > *Phlox subulata* var. *ciliata* Wherry – G; > *Phlox subulata* var. *setacea* (Linnaeus) Brand – C; > *Phlox subulata* var. *subulata* – C, F, WV.

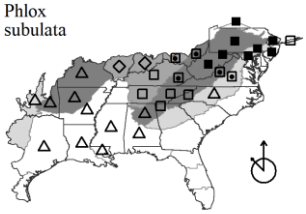
Phlox pilosa ssp. pilosa



Phlox pulchra



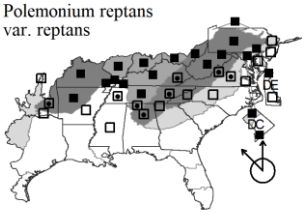
Phlox subulata



Polemonium Linnaeus 1753 (JACOB'S-LADDER)

A genus of about 25 species, of temperate regions of North America and Eurasia. References: Davidson (1950); Wilken in Kubitzki et al (2004); Worley, Ghazvini, & Schemske (2009).

Polemonium reptans var. reptans



Polemonium reptans Linnaeus *var. **reptans***. SPREADING JACOB'S-LADDER. **Hab:** Moist, nutrient-rich forests, such as bottomlands and rich slopes. **Dist:** NY west to MN, south to VA, nc. NC, nw. GA, AL, and e. OK. **Phen:** Apr-Jun; Jun-Jul. **Syn:** = Ar, C, K1, K3, NE, NY, Tn, Va; > *Polemonium longii* Fernald – F, K4; < *Polemonium reptans* – F, G, GrPl, Il, Mi, Pa, RAB, S, W, WV; > *Polemonium reptans* Linnaeus var. *reptans* – K4.

Key to Map Symbology:

* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable

X : extirpated

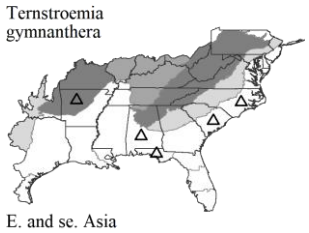
332. PENTAPHYLACACEAE Engler 1897 (PENTAPHYLAX OR SAKAKI FAMILY) [in ERICALES]

A family of 12 genera and ca. 340 species, of the tropics and subtropics (a few of warm temperate areas), mainly of Asia and America. There is nomenclatural dispute over whether to use the name Pentaphylacaceae (which is conserved) or the older Ternstroemiaceae. References: Weitzman, Dressler, & Stevens in Kubitzki et al (2004).

Ternstroemia Mutis ex Linnaeus f. 1782 (SAINTEDWOOD)

A genus of about 90 species, shrubs and trees, native of tropical and subtropical Asia, Africa, and America. References: Ming & Bartholomew (2007).

* ***Ternstroemia gymnanthera*** (Wight & Arnott) Beddome. TERNSTROEMIA, JAPANESE CLEYERA. **Hab:** Moist forests, bluffs, bottomlands, swamps. **Dist:** Native of e. and se. Asia (China south into se. Asia). Locally and aggressively naturalizing at Kalmia Gardens, Coker College, Hartsville, Darlington County, SC, where perhaps planted as long ago as the 1930s. Serviss et al. (2018c) report its naturalization in AR. **Tax:** Material cultivated and naturalizing in the se. United States does not key perfectly to *T. gymnanthera*, and may represent other species (such as *T. luteoflora* L.T. Ling), hybrids, or horticultural selections out of the normal morphological range of wild *T. gymnanthera* at least as described in the Flora of China (Ming & Bartholomew 2007). **Syn:** = Fl5, K1, Ming & Bartholomew (2007); ? *Cleyera japonica* – K3, K4. NatureServe GNR (Not Yet Ranked).



333. SAPOTACEAE A.L. de Jussieu 1789 (SAPODILLA FAMILY) [in ERICALES]

A family of about 53-54 genera and 1100-1250 species, trees and shrubs, primarily tropical (rarely temperate), of Old World and New World. References: Elisens, Whetstone, & Wunderlin (2009) in FNA8 (2009); Govaerts, Frodin, & Pennington (2001); Pennington (2004) in Kubitzki et al (2004).

{Chrysophyllum, Manilkara, Mimusops, Pouteria, Sideroxylon}

Sideroxylon Linnaeus 1754 (BUMELIA, BUCKTHORN, BULLY)

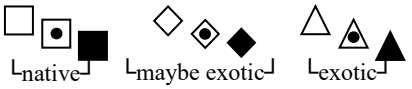
As defined broadly by Pennington (1991), *Sideroxylon* includes about 75 species, widely distributed in the New World and Old World Tropics (our species are the northern tip of a "tropical iceberg"). Pennington found that no consistent set of characters could be used to separate *Bumelia* from other New World genera (such as *Mastichodendron* and *Dipholis*), and that the New World segregate genera were also not separable from several Old World genera. The Linnaean *Sideroxylon* has nomenclatural priority. References: Allison (2006a); Anderson (1996); Clark (1942); Corogin & Judd (2014); Corogin (2015); Cronquist (1945a); Cronquist (1949); Elisens & Jones (2009) in FNA8 (2009); Godfrey (1988); Govaerts, Frodin, & Pennington (2001); Lakela (1963); Pennington (1991).

Identification Notes: Ket based in part on Corogin (2015).

4 Lower leaf surfaces hairy only when leaves are very young, quickly sloughing all or most hairs to become entirely glabrous or with hairs only on the midvein.
  6 Berries (7-) 9-16 mm long; central corolla lobe 1.8-2.0 mm long; leaf trichomes transparent and colorless, often flattened in ×-section (use at least 20× magnification); stomatal chamber openings closed to a narrow slit, the guard cells not visible through the opening; [widespread in our region] ..... ***Sideroxylon lycioides***
  6 Berries 4-9 mm long; central corolla lobe 1.1-1.3 mm long; leaf trichomes opaque, light brown to gray, mostly terete in ×-section; stomatal chamber openings wide and elliptic, the guard cells visible through the opening; [moist to wet habitats, SC, GA, and FL west to sw. LA] ..... ***Sideroxylon reclinatum ssp. reclinatum***
4 Lower leaf surfaces persistently (through the season) hairy (on the surface and not just on the midvein, either slightly to densely sericeous to woolly.
  12 Leaf vein reticulum evident but not boldly conspicuous, highest-order veins quaternary; stomatal chamber openings closed to a narrow slit, guard cells not visible through opening ..... ***Sideroxylon thornei***
  12 Leaf vein reticulum conspicuous, highest-order veins quinternary; stomatal chamber openings wide and elliptic, guard cells visible through opening. ..... ***Sideroxylon lanuginosum ssp. lanuginosum***

Sideroxylon lanuginosum Michaux *ssp.* ***lanuginosum***. EASTERN GUM BUMELIA, EASTERN GUM BULLY. **Hab:** Dry upland forests and woodlands, glades, bluffs, prairies and saline barrens, roadsides, pastures, rises in bottomland forests. **Dist:** E. GA, KY, and KS, south to nc. FL and e. and nc. TX. **Syn:** = Corogin (2015); = *Bumelia lanuginosa* (Michaux) Persoon ssp. *typica* – Cronquist (1949); < *Bumelia lanuginosa* (Michaux) Persoon – S; > *Bumelia lanuginosa* ssp. *lanuginosa* – K4, Godfrey (1988); < *Bumelia lanuginosa* (Michaux) Persoon ssp. *typica* – Cronquist (1945a); > *Bumelia lanuginosa* (Michaux) Persoon var. *lanuginosa* – C, F, G; >< *Bumelia lanuginosa* (Michaux) Persoon var. *lanuginosa* – Clark (1942); > *Bumelia lanuginosa* (Michaux) Persoon var. *oblongifolia* (Nuttall) R.B. Clark – Il; > *Bumelia lanuginosa* (Michaux) Persoon var. *oblongifolia* (Nuttall) R.B. Clark - C, F, G, V > S. – Govaerts, Frodin, & Pennington (2001); > *Bumelia rufa* Rafinesque – Clark (1942); < *Sideroxylon lanuginosum* – Ar, Fl5, WH3, Pennington (1991); > *Sideroxylon lanuginosum* Michaux ssp. *albicans* (Sargent) Kartesz & Gandhi – K1; >< *Sideroxylon lanuginosum* Michaux ssp. *albicans* (Sargent) Kartesz & Gandhi – K3; >< *Sideroxylon lanuginosum* ssp. *oblongifolium* – FNA12, K1, K3, NcTx, Govaerts, Frodin, & Pennington (2001).

Sideroxylon lycioides Linnaeus. BUCKTHORN BUMELIA, BUCKTHORN BULLY, CAROLINA BUCKTHORN. **Hab:** Maritime forests, maritime scrub, river bluffs, swamp margins, usually in circumneutral soil (over shell hash, coquina limestone, marl, or limestone), in the Piedmont and Mountains in rich, mesic forests over mafic or calcareous rocks. **Dist:** Se. VA south to Panhandle FL, west to se. TX, north in the interior to s. IN, s. IL, and se.

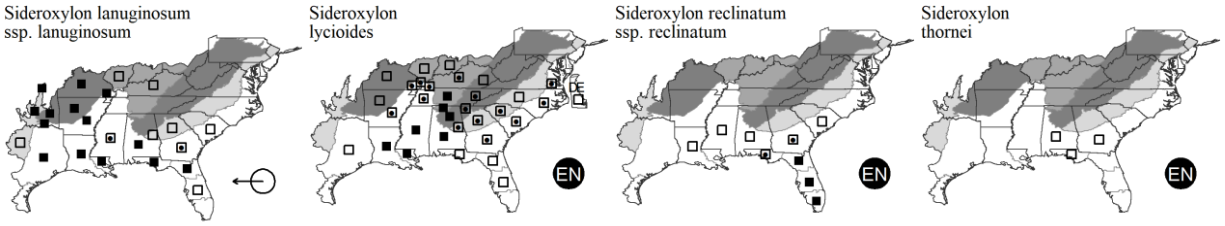
Key to Map Symbology:  native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more)

* : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

MO, mostly on the Coastal Plain, but extending (in our area in NC and SC) to the upper Piedmont and north in the interior (primarily on limestone) to KY and TN. **Phen:** Jun-Aug; Sep-Nov. **ID Notes:** This species is extremely variable in leaf shape; though described in most works as up to 10-12 cm long and up to 4 cm wide, the leaves can be to 15 cm long and 8 cm wide. The leaf apex can be acuminate, acute, rounded, or notched. **Syn:** = Ar, Fl5, FNA12, K1, K3, K4, Tn, Va, WH3, Govaerts, Frodin, & Pennington (2001), Pennington (1991); = *Bumelia lycioides* (Linnaeus) Persoon – C, G, GW2, Il, RAB, S, Cronquist (1945a), Godfrey (1988); > *Bumelia cassinifolia* Small – Clark (1942); > *Bumelia lycioides* (Linnaeus) Persoon – Tx; > *Bumelia lycioides* var. *ellipsoidalis* R.B. Clark – Clark (1942); > *Bumelia lycioides* var. *lycioides* – F, Clark (1942); > *Bumelia lycioides* var. *virginiana* Fernald – F, Clark (1942); > *Bumelia smallii* R.B. Clark – F, Tx, Clark (1942). NatureServe G5 (Secure).

Sideroxylon reclinatum Michaux *ssp.* ***reclinatum***. SMOOTH BUMELIA, FLORIDA BULLY. **Hab:** Floodplain forests and river margins. **Dist:** Ssp. *reclinatum* ranges from s. SC and se. GA south to s. peninsular FL. **Phen:** Apr-Jun; Jul-Aug. **Tax:** See extensive discussion in Corogin & Judd (2014). **Syn:** = Fl5, FNA12, K1, K3, K4, WH3, Corogin & Judd (2014), Corogin (2015), Govaerts, Frodin, & Pennington (2001); > *Bumelia microcarpa* Small – S; < *Bumelia reclinata* (Michaux) Ventenat – GW2, Clark (1942); > *Bumelia reclinata* (Michaux) Ventenat – S; < *Bumelia reclinata* (Michaux) Ventenat var. *reclinata* – Cronquist (1945a), Godfrey (1988); < *Sideroxylon reclinatum* – Pennington (1991). NatureServe G4G5TNR (Not Yet Ranked).

Sideroxylon thornei (Cronquist) T.D. Pennington. GEORGIA BULLY, THORNE'S BUMELIA, SWAMP BUMELIA. **Hab:** Bottomlands and limesink depressions, particularly over calcareous substrates. **Dist:** E. GA south to Panhandle FL, and west to s. AL. **Phen:** May-Jun; Sep-Nov. **Tax:** The validity of this species was supported by Anderson (1996). **Syn:** = Fl5, FNA12, K1, K3, WH3, Anderson (1996), Corogin (2015), Govaerts, Frodin, & Pennington (2001), Pennington (1991); = *Bumelia thornei* Cronquist – Cronquist (1949), Godfrey (1988); < *Bumelia lanuginosa* (Michaux) Persoon ssp. *typica* – Cronquist (1945a); < *Bumelia lanuginosa* (Michaux) Persoon var. *lanuginosa* – Clark (1942). NatureServe G3 (Vulnerable).



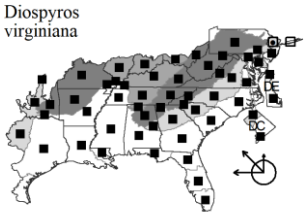
334. EBENACEAE Gürke 1891 (EBONY FAMILY) [in ERICALES]

A family of 2-6 genera and 500-600 species, trees and shrubs, distributed in tropical and subtropical (rarely warm temperate) regions. References: Eckenwalder (2009) in FNA8 (2009); Wallnöfer in Kubitzki et al (2004).

Diospyros Linnaeus 1753 (PERSIMMON)

A genus of 500-600 species, trees and shrubs, of tropical and subtropical regions (with very few exceptions). The genus includes a variety of tropical trees called ebony in the wood trade. References: Eckenwalder (2009) in FNA8 (2009); Spongberg (1977); Wallnöfer in Kubitzki et al (2004).

Identification Notes: Seedlings and fire sprouts of *Diospyros virginiana* are superficially very similar to *Nyssa sylvatica*, but can be separated in the following ways: bundle scar 1 per bud scar, narrowly crescent-shaped (vs. *Nyssa* with 3 distinct, circular, bundle scars arranged in a broad V pattern), leaves never with teeth (vs. *Nyssa* leaves sometimes with a few irregular teeth), leaves glabrate to tomentose with curly hairs (vs. glabrous or with a few straight, forward-pointing hairs), leaves with sessile to short-stipitate glands on upper surface of midrib and outer petiole, later becoming necrotic spots (vs. leaves without glands).



Diospyros virginiana Linnaeus. AMERICAN PERSIMMON, POSSUMWOOD. **Hab:** Dry forests and woodlands, longleaf pine sandhills, prairies, disturbed places, floodplain and mesic forests, fencerows, roadsides, other disturbed areas. **Dist:** CT, PA, OH, IN, IL, MO, and e. KS south to s. FL and TX. **Phen:** Apr-Jun; Sep-Dec (and persisting). **Tax:** East of the Mississippi River, *D. virginiana* var. *virginiana* has leaves cuneate to rounded at the base, with glabrous or glabrescent surfaces; mostly west of the Mississippi River and perhaps eastward along the Coastal Plain, *D. virginiana* var. *pubescens* (Pursh) Nuttall has leaves subcordate, and persistently pubescent. Though these differences seem relatively trivial, they are consistent, geographically correlated, and may be worthy of varietal recognition. Other varieties have been named based on fruit size and ripening time. Var. *platycarpa* Sargent of floodplain forests in the Mississippi River drainage, with exceptionally large and early-ripening fruits, may warrant recognition. **Comm:** Persimmons are famous for their sweet and edible fruits, and infamous for the bitter-astringency of the not fully ripe fruit. The species is dioecious, the male trees appear to reach a greater size than the females. The wood is one of the heaviest and hardest in e. North America. **Syn:** = Ar, Fl5, FNA8, GrPl, GW2, K1, K3, K4, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, W, WH3, WV; > *Diospyros mosieri* Small – S; > *Diospyros virginiana* Linnaeus – S; > *Diospyros virginiana* var. *platycarpa* Sargent – Il; > *Diospyros virginiana* var. *pubescens* (Pursh) Nuttall – Il; > *Diospyros virginiana* var. *virginiana* – C, F, G, Il, Spongberg (1977). NatureServe G5 (Secure).

335. PRIMULACEAE Batsch 1794 (PRIMROSE FAMILY) [in ERICALES]

As broadly circumscribed to include Myrsinaceae and Samolaceae, cosmopolitan in distribution. Following the discovery that various herbaceous and largely temperate genera (*Lysimachia* , *Trientalis*, *Anagallis*, and *Samolus*, etc.) traditionally placed in Primulaceae actually were more closely related to the largely tropical and woody Myrsinaceae, various authors, including Källersjö, Bergqvist, & Anderberg (2000) and Martins, Oberprieler, & Hellwig (2003) proposed the transfer of these genera respectively to Myrsinaceae and Theophrastaceae. Angiosperm Phylogeny Group (2009, 2016) alternatively merges Samolaceae and Myrsinaceae into Primulaceae, and recognizes variation at the subfamilial and tribal ranks; this approach

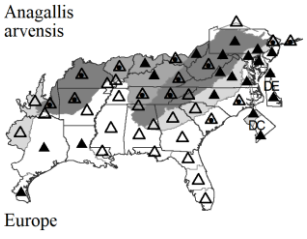
335. PRIMULACEAE

is followed here. References: Anderberg in Kubitzki et al (2004); APG I (1998); APG (2009); Channell & Wood (1959); Cholewa & Kelso (2009) in FNA8 (2009); Cholewa (2009a) in FNA8 (2009); Cholewa, Pipoly, & Ricketson (2009) in FNA8 (2009); Källersjö, Bergqvist, & Anderberg (2000); Martins, Oberprieler, & Hellwig (2003); Ståhl & Anderberg (2004) in Kubitzki et al (2004); Ståhl & Källersjö (2004); Yan et al (2018).

1 Shrub or tree; [of FL, s. GA, s. AL, LA, se. TX, and southward] ..... ***Ardisia***

1 Herb; [collectively widespread].
- 5 Aquatic; leaves pectinate (deeply pinnatifid into linear segments); [subfamily *Primuloideae*] ..... ***Hottonia inflata***
- 5 Terrestrial (though sometimes in wetlands or submersed for short periods of time); leaves entire or shallowly toothed.
  - 6 Leaves strictly in a basal rosette or basally disposed (with a basal rosette and smaller stem leaves).
    - 8 Inflorescence a raceme or a panicle of racemes; larger leaves basal and smaller leaves on the stem; [subfamily *Theophrastidoideae*, tribe *Samoleae*] ..... ***Samolus***
    - 8 Inflorescence an umbel; leaves strictly basal; [subfamily *Primuloideae*] ..... ***Primula***
  - 6 Leaves all or chiefly cauline; [subfamily *Myrsinoideae*]
    - 10 Leaves all or chiefly alternate; flowers white or whitish.
      - 11 Flowers solitary and nearly sessile in leaf axils ..... ***Centunculus***
      - 11 Flowers in a terminal raceme ..... ***Lysimachia***
    - 10 Leaves all or chiefly opposite or whorled; flowers yellow, blue, red, or whitish.
      - 13 Flowers blue or red ..... ***Anagallis***
      - 13 Flowers yellow.
        - 14 Flowers lacking staminodes; filaments either connate below or free (*Lysimachia thyrsiflora*); leaves "punctate" with sinuous, elongate markings (visible with the naked eye, but more readily observed with 10 × magnification and ideally with transmitted light). ..... ***Lysimachia***
        - 14 Flowers with staminodes alternating with the stamens; filaments free; leaves not "punctate" (see above). ..... ***Steironema***

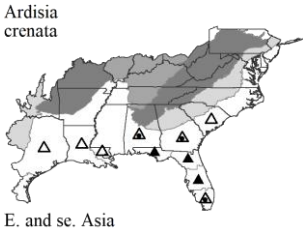
Anagallis Linnaeus 1753 (PIMPERNEL)



A genus of about 6 species, annual herbs, of Eurasia. The genus is here recognized, rather than being included in a very broad *Lysimachia*, but given a narrower circumscription based on the phylogeny of Yan et al. (2018). References: Cholewa (2009e) in FNA8 (2009); Jiménez-López et al (2022); Manns & Anderberg (2007); Yan et al (2018).

* ***Anagallis arvensis*** Linnaeus. SCARLET PIMPERNEL, COMMON PIMPERNEL, HIERBA DEL PÁJARO. **Hab:** Lawns, fields, disturbed areas. **Dist:** Native of Europe. **Phen:** (Mar-) Apr-Nov. **Tax:** The taxonomy and distributions of this taxon and the closely related *A. foemina* (sometimes treated as a subspecies, variety, or form) are complicated by differences of opinion about distinguishing characteristics. **Syn:** = *Anagallis arvensis* Linnaeus ssp. *arvensis* – K1, S, Va; = *Anagallis arvensis* var. *arvensis* – C, G; = *Lysimachia arvensis* (Linnaeus) U. Manns & A. Anderberg – NY, Jiménez-López et al (2022), Manns & Anderberg (2007); < *Anagallis arvensis* Linnaeus – Ar, F, Fl5, FNA8, GrPl, GW2, Il, Meso4.1, Mi, NcTx, Pa, RAB, Tn, Tx, W, WH3; < *Lysimachia arvensis* (Linnaeus) U. Manns & A. Anderberg – K3, K4, NE.

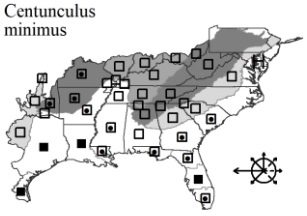
Ardisia Swartz 1788 (ARDISIA)



A genus of 400-500, trees and shrubs, of tropical America, Asia, and Australia. References: Pipoly & Ricketson (2009a) in FNA8 (2009); Ståhl & Anderberg (2004) in Kubitzki et al (2004).

* ***Ardisia crenata*** Sims. CORAL ARDISIA, CORALBERRY, SPICEBERRY, HEN'S EYES, MARLBERRY, SCRATCHTHROAT. **Hab:** Moist suburban forests, floodplains, mesic flatwoods, moist forests. **Dist:** Native of Asia. Naturalized from horticultural use in s. GA (Carter, Baker, & Morris 2009), s. AL (Barger et al. 2012), e. SC (Beaufort County) (Bradley et al. [in prep.]), FL Panhandle, and FL peninsula. **Phen:** May-Jun; Jul-Dec. **Comm:** This species is a very serious invasive. **Syn:** = Fl5, FNA8, K1, K3, K4, WH3, WI. NatureServe GNR (Not Yet Ranked).

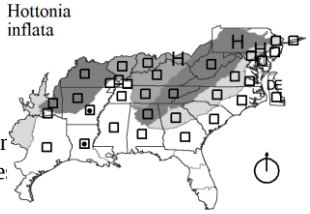
Centunculus Linnaeus 1753 (CHAFFWEED, PIMPERNEL)



A genus of about 25 species, annual and perennial herbs, semi-cosmopolitan in distribution. Recently, *Centunculus* has often been submerged into *Anagallis*, or both submerged into a very broad *Lysimachia*. We here recognize it, but with an augmented circumscription including many species (outside our area) traditionally placed in *Anagallis*, following the phylogenetic results of Yan et al. (2019). References: Cholewa (2009e) in FNA8 (2009); Manns & Anderberg (2007); Yan et al (2018).

Centunculus minimus Linnaeus. CHAFFWEED, FALSE-PIMPERNEL. **Hab:** Ditches, wet disturbed areas, savannas, pond margins. **Dist:** This species occurs in widely scattered areas, nearly cosmopolitan. **Phen:** (Feb-) Mar-Aug. **Syn:** = C, F, G, GrPl, RAB, S, Tx, W; = *Anagallis minima* (Linnaeus) E.H. Krause – Ar, Fl5, FNA8, GW2, Il, K1, Meso4.1, NcTx, Tn, Va, WH3; = *Lysimachia minima* (Linnaeus) U. Manns & A. Anderberg – K3, K4, NE, Manns & Anderberg (2009). NatureServe G5 (Secure).

Hottonia Linnaeus 1753 (WATER-VIOLET)



Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : plar; ? : que

335. PRIMULACEAE

A genus of 2 species, aquatic herbs, of North America and Eurasia. References: Anderberg in Kubitzki et al (2004); Cholewa (2009c) in FNA8 (2009).

Hottonia inflata Elliott. FEATHERFOIL, WATER-VIOLET. **Hab:** Slow-moving or stagnant waters of swamps, millponds, beaverponds, sag ponds, oxbows, rivers, probably dispersed by waterfowl, primarily in the Coastal Plain, very rarely in the Piedmont and Mountains. **Dist:** ME south to GA, west to TX, inland up the Mississippi Embayment to IL, and at other scattered locations inland (as w. WV, and especially around the Great Lakes). Townsend (1995) documented its first SC record. **Phen:** Apr-Jul; May-Aug. **Comm:** The species shows large population fluctuations, and may be essentially ephemeral at many locations. **Syn:** = Ar, C, F, FNA8, G, GW2, Il, K1, K3, K4, NE, NY, Pa, RAB, S, Tn, Tx, Va, WV. NatureServe G4 (Apparently Secure).

Lysimachia Linnaeus 1753 (LOOSESTRIFE)

A genus of about 140 species, herbs (rarely shrubs), cosmopolitan. Hao et al. (2004) showed that the traditional subgeneric classification of *Lysimachia* is highly artificial, and that *Glaux* is embedded within *Lysimachia*. Yan et al. (2018), in a strongly sampled, Bayesian analysis, presented a phylogeny which supports retention of *Trientalis* ('clade XI'), *Steironema* ('clade IX'), a broadened *Centunculus* ('clade VIII'), and a narrowed *Anagallis* ('clade VII') as a series of basal grade clades to a still very diverse and heterogeneous *Lysimachia* ('clades I, II, III, IV, V, and VI'), including *Glaux* ('clade III'). It seems to us a better choice to retain the traditionally recognized and phylogenetically supported genera *Trientalis*, *Steironema*, *Centunculus*, and *Anagallis* than to combine them in to a hyperdiverse *Lysimachia* in the broadest sense possible. References: Cholewa (2009f) in FNA8 (2009); Coffey & Jones (1980); Estes, Shaw, & Mausert-Mooney (2015); Hao et al (2004); Manns & Anderberg (2009); Ståhl & Anderberg (2004) in Kubitzki et al (2004); Yan et al (2018).

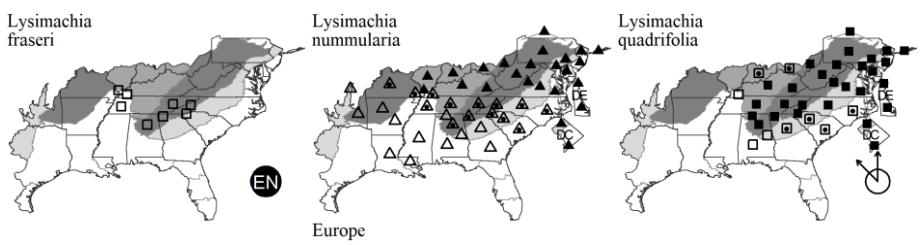
1 Leaves alternate (or with some opposite or subopposite); flowers white.
..... ***Centunculus***

1 Leaves opposite or whorled; flowers yellow, white, pink, red, or blue.
  5 Leaves < 2 cm long (and distinctly longer than wide); flowers red, blue, white, or pink.
  ..... ***Anagallis***
  5 Leaves > 2 cm long (sometimes less in *L. nummularia*, and then orbicular, and about as wide as long); flowers yellow
    7 Leaves nearly round; plant trailing, rooting at nodes
    ..... ***Lysimachia nummularia***
    7 Leaves linear, lanceolate, elliptic, or ovate; plant erect (or trailing and rooting at the nodes in *L. radicans*, which has lanceolate leaves).
      9 Flowers in a terminal raceme or panicle, subtended by bracts much smaller than the stem leaves.
      ..... ***Lysimachia fraseri***
      9 Flowers axillary, all or most of them subtended by leaves similar in shape to (though often somewhat smaller than) stem leaves not subtending flowers (or with flowers in axillary, peduncled, densely-flowered racemes in *L. thyrsiflora*).
        15 Stem leaves opposite; leaves not "punctate" (as described below). ..... ***Steironema***
        15 Stem leaves whorled (in adult plants – juvenile plants with opposite leaves or a mixture of opposite and whorled); leaves "punctate" with sinuous, elongate markings (visible with the naked eye, but more readily observed with 10 × magnification).
        ..... ***Lysimachia quadrifolia***

Lysimachia fraseri Duby. FRASER'S LOOSESTRIFE. **Hab:** Hardwood forests, forest edges and roadbanks, thin soils around rock outcrops, usually flowering only when exposed to extra sunlight by a tree-fall light gap or other canopy opening. **Dist:** W. NC and e. TN south to n. SC, n. GA, and AL; disjunct in s. IL and nw. TN (Stewart County) (Chester, Wofford, & Kral 1997). **Phen:** Jun-Aug; Sep-Oct. **Comm:** This rare species is limited in NC to the mountains south of the Asheville Basin, especially in the escarpment gorges of Macon and Jackson counties. Potentially the largest and coarsest of our *Lysimachia* (up to 2 meters tall), *L. fraseri* usually occurs as much smaller seedlings and non-flowering individuals. When a tree-fall light gap occurs, individuals flower and fruit. Even seedlings can be separated from the more common and widespread *L. quadrifolia* by the following characteristics (all best observed at 10×): leaves with a narrow, translucent red border, upper internodes of the stem glandular-puberulent, and backlit leaf without sinuous, translucent lineations (*L. quadrifolia*: leaves without red border, upper internodes sparsely pubescent with longer, nonglandular hairs, or rarely a few of the hairs with slightly bulbous tips, and backlit leaf with numerous sinuous, translucent lineations). **Syn:** = FNA8, GW2, Il, K1, K3, K4, RAB, S, Tn, W. NatureServe G3 (Vulnerable).

* ***Lysimachia nummularia*** Linnaeus. CREEPING JENNY, CREEPING CHARLIE, MONEYWORT. **Hab:** Lawns, pastures, seepages, other moist, disturbed places. **Dist:** Native of Europe. **Phen:** May-Aug; Aug-Sep. **ID Notes:** The leaves have many minute, maroon dots (glandular punctae). **Syn:** = Ar, C, F, FNA8, G, GrPl, GW2, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Va, W. NatureServe GNR (Not Yet Ranked).

Lysimachia quadrifolia Linnaeus. WHORLED LOOSESTRIFE. **Hab:** A wide variety of forests and openings, including pine savannas of the outer Coastal Plain, ranging from moist to very dry. **Dist:** ME west to WI and MN, south to SC, c. GA, AL, and TN. **Phen:** May-Aug; Aug-Oct. **Tax:** *L.* ×*radfordii* H.E. Ahles, a hybrid of *L. loomisii* × *quadrifolia*, is morphologically intermediate between its parents. **ID Notes:** Although the species normally has whorled leaves, immature and small plants often have opposite leaves only. See *L. fraseri* for discussion of vegetative features useful in distinguishing the two species. **Syn:** = C, F, FNA8, G, GW2, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Va, W, WV. NatureServe G5 (Secure).



Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more)

* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable

X : extirpated

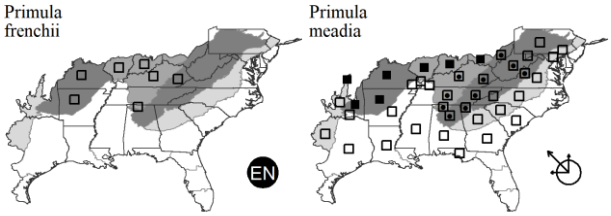
Primula Linnaeus 1753 (SHOOTING STAR)

A genus of about 450 species, primarily of the temperate Northern Hemisphere. Mast et al. (2004) show that *Dodecatheon* is nested within *Primula*, and is closely related to (and derived from) *Primula* subgenus *Auriculastrum*, apparently via a relatively simple alteration of the corolla for buzz-pollination. References: Fassett (1944); Kelso (2009b) in FNA8 (2009); Mast & Reveal (2007); Mast et al (2004); Oberle & Esselman (2011); Reveal (2009) in FNA8 (2009).

3 Leaves cordate, subcordate, or abruptly narrowed to the petiole; seeds mostly rounded ..... ***Primula frenchii***
3 Leaves long-cuneate at the base, gradually narrowed to the petiole; seeds mostly angled ..... ***Primula meadia***

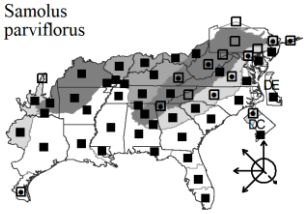
Primula frenchii (Vasey) A.R. Mast & Reveal. FRENCH'S SHOOTING-STAR. **Hab:** Sandstone rockhouses, ledges, cliffs. **Dist:** IN, IL, and MO south through KY to AL and AR. **Phen:** Apr-Jun. **Syn:** = Ar, K4, Ky, Mast & Reveal (2007); = *Dodecatheon frenchii* (Vasey) Rydberg – FNA8, Il, K1, K3, Oberle & Esselman (2011); = *Dodecatheon meadia* Linnaeus var. *frenchii* Vasey – C, F, G, Fassett (1944). NatureServe G3? (Vulnerable).

Primula meadia (Linnaeus) A.R. Mast & Reveal. EASTERN SHOOTING STAR. **Hab:** Rich forests, woodlands, and rock outcrops (primarily calcareous or mafic), especially with nutrient-rich seepage, prairies, bluffs. **Dist:** MD and PA west to s. WI, se. MN, IA, and OK, south to sc. SC, n. GA, n. FL (Gadsden County), AL, and TX. **Phen:** Late Mar-early Jun; late May-Jun. **Tax:** Segregate taxa (at species and varietal rank) included here may have merit and warrant re-study. **Syn:** = Ar, Fl5, K4, Ky, Mi, NY, Va, WH3, Mast & Reveal (2007); = *Dodecatheon meadia* – FNA8, K3, NcTx, Pa, RAB, Tx, W, WV, Oberle & Esselman (2011); > *Dodecatheon brachycarpa* Small – S; > *Dodecatheon hugeri* Small – S; > *Dodecatheon meadia* – S; > *Dodecatheon meadia* ssp. *brachycarpum* (Small) R. Knuth – K1; > *Dodecatheon meadia* ssp. *meadia* – K1; > *Dodecatheon meadia* Linnaeus var. *brachycarpum* (Small) Fassett – C, F, G, GrPl, Il, Fassett (1944); > *Dodecatheon meadia* var. *genuinum* – Fassett (1944); > *Dodecatheon meadia* Linnaeus var. *meadia* – C, F, G, GrPl, Il, Fassett (1944); > *Dodecatheon meadia* var. *obesum* Fassett – Fassett (1944).



Samolus Linnaeus 1753 (WATER-PIMPERNEL)

A genus of about 10-15 species, herbs and subshrubs, nearly cosmopolitan. References: Cholewa (2009b) in FNA8 (2009); Henrickson (1983); Ståhl & Källersjö (2004).



Samolus parviflorus Rafinesque. WATER-PIMPERNEL, BROOKWEED. **Hab:** Stream banks, tidal freshwater and oligohaline marshes, pools in floodplains, calcareous seepage swamps, interdune ponds. **Dist:** NB west to BC, south to Central America; c. and s. South America; Bahamas. **Phen:** Apr-Oct. **Tax:** Sometimes treated as a subspecies or other component of the European *S. valerandi*; the American plant is sufficiently distinct to warrant specific status. Cholewa in FNA8 (2009) states: "Some taxonomists include this species within the European *S. valerandi*; that species has larger flowers and capsules, fewer racemes, and staminodes occurring in clusters of one to three. No specimens have been found of true European *S. valerandi* in the flora area; previous specimens labeled as *S. valerandi* are native species, usually *S. parviflorus*". A different opinion is expressed by Jones et al. (2012), who prefer to treat *S. parviflorus* within a broadly circumscribed *S. valerandi*. If treated at species rank (as here), the name *S. floribundus* has also sometimes been used for the North American taxon at species rank; *S. parviflorus* has nomenclatural priority over *S. floribundus* by a month. **Syn:** = Ar, Bah, F, FNA8, GrPl, GW2, Il, K3, Mi, Pa, RAB, Tn, Tx, Va, W, WV; = *Samolus floribundus* Kunth – C, G, Meso4.1, S; = *Samolus valerandi* Linnaeus ssp. *parviflorus* (Rafinesque) Hultén – Fl5, K1, NcTx, NE, WH3; < *Samolus valerandi* – K4, NY.

Steironema Rafinesque 1821 (LOOSESTRIFE)

A genus of about 8 species, perennial herbs, of North America. *Steironema* has occasionally been accorded genus rank in eastern North American floras (notably Small 1933, Gleason & Cronquist 1952, and Mohlenbrock 2014), but has more usually been included in *Lysimachia*. The morphologic differences from *Lysimachia* are more profound than the superficially similar flowers suggest. Yan et al. (2018) shows *Steironema* and *Trientalis* in a clade basal to *Centunculus*, *Anagallis*, and *Lysimachia* (in a narrower sense). References: Cholewa (2009f) in FNA8 (2009); Estes, Shaw, & Mausert-Mooney (2015); Yan et al (2018).

1 Leaves linear, 1-7 mm wide, 10-20× longer than wide, mid-cauline leaves sessile or short petiolate, petioles when present 1-5 mm long.
  2 Stems 2-10 dm tall; petioles with cilia at base only, rarely ciliate their entire length, cilia not extending onto margins of leaf bases; flowers 16-26 mm in diameter ..... ***Steironema quadriflorum***
  2 Stems 1-3 dm tall; petioles ciliate their full length with cilia usually extending distally onto margins of leaf base; flowers 7-20 mm in diameter.
    3 Leaves 1-2 (-3) mm wide; flowers 7-14 mm in diameter ..... ***Steironema gramineum***
    3 Leaves 3-7 mm wide; flowers 11-20 mm in diameter ..... ***Steironema lanceolatum***
1 Leaves lanceolate, narrowly elliptic-lanceolate, or narrowly oblong, 5-60 mm wide, mostly 1.5-10× longer than wide, mid-cauline leaves usually with well-developed petioles 5-20+ mm long (except in *L. lanceolata* where petioles are mostly <5 mm long).

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

4 Petioles ciliate along their entire length.
5 Leaves ovate to ovate-lanceolate, 17-60 mm wide ..... ***Steironema ciliatum***
5 Leaves narrowly oblong, elliptic, lanceolate, or oblanceolate, 5-20 mm wide.
6 Plants lacking creeping rhizomes; stem bases usually somewhat swollen and >4 mm in diameter, often with adventitious roots; leaf bases mostly rounded to broadly cuneate; petioles ciliate mostly only in basal half but sometimes with a few cilia extending into distal half of petiole; plants of wetlands ..... ***Steironema hybridum***
6 Plants with well-developed long-creeping rhizomes; stem bases not swollen, <4 mm in diameter, lacking adventitious roots; leaf bases cuneate; petioles evenly ciliate from petiole base to apex and extending onto lower leaf edge; plants of mesic to dry sites, rarely of wet areas ..... ***Steironema lanceolatum***
4 Petioles eciliate or with cilia confined to the proximal half (or less) only.
7 Stems decumbent to prostrate and often rooting at the nodes; corolla lobes 3-5 mm long ..... ***Steironema radicans***
7 Stems erect or sometimes reclining on other vegetation but not prostrate and rooting at the nodes; corolla lobes 5-12 mm long.
8 Cilia extending up proximal half of petioles; plants of wetlands to mesic forests; stem bases usually somewhat swollen and often with adventitious roots .... ***Steironema hybridum***
8 Cilia absent from petioles (or only extending 2-3 mm up the petiole), restricted to the nodal region between opposing petiole bases; plants of dry to mesic upland habitats; stem bases not swollen, lacking adventitious roots.
9 Leaves narrowly lanceolate, bases cuneate and generally gradually contracted to the petiole, widest point located near the middle to just below the middle of the blade, 4-9× longer than wide, mid-cauline leaves 5-12 mm wide ..... ***Steironema species 1***
9 Leaves ovate to ovate-lanceolate, bases rounded to truncate, abruptly contracted to the petiole, widest point located in the proximal one-quarter to one-third of the blade, 1.5-4.5× longer than wide, mid-cauline leaves 15-44 mm wide ..... ***Steironema tonsum***

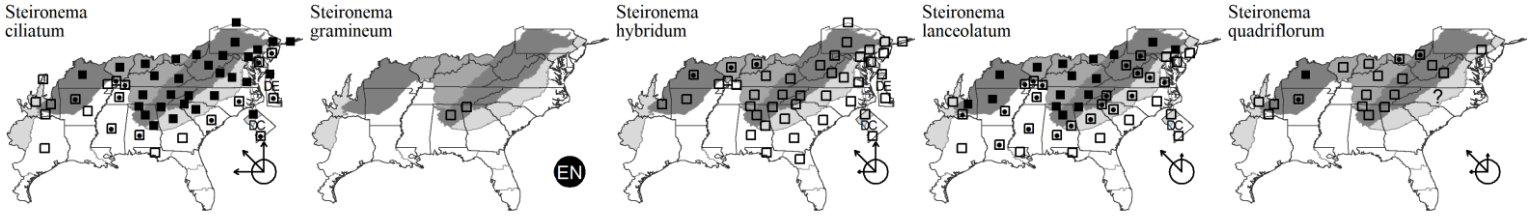
Steironema ciliatum (Linnaeus) Baudo. FRINGED LOOSESTRIFE. **Hab:** Mesic forests, especially bottomlands and coves dominated by hardwoods. **Dist:** NL (Newfoundland) west to AK, south to GA, Panhandle FL, AL, MS, AR, KS, NE, CO, NM, UT, ID, and OR. **Phen:** May-Sep; Aug-Oct. **Syn:** = G, Il, S; = *Lysimachia ciliata* Linnaeus – Ar, C, F, Fl5, FNA8, GrPl, GW2, K1, K3, K4, Mi, NE, NY, Pa, RAB, Tn, Tx, Va, W, WH3, WV, Coffey & Jones (1980), Estes, Shaw, & Mausert-Mooney (2015). NatureServe G5 (Secure).

Steironema gramineum Greene. GRASSLEAF YELLOW-LOOSESTRIFE. **Dist:** Endemic to ne. AL (Little River Canyon area) and Floyd County, GA. **Syn:** = S; = *Lysimachia graminea* (Greene) Handel-Mazzetti – FNA8, K1, K3, K4, Coffey & Jones (1980), Estes, Shaw, & Mausert-Mooney (2015). NatureServe G1Q (Critically Imperiled).

Steironema hybridum (Michaux) Rafinesque ex B.D. Jackson. LOWLAND LOOSESTRIFE. **Hab:** Mesic hardwood forests, sinkhole and depression ponds, wet meadows, other wet areas. **Dist:** ME and s. QC west to AB and WA, south irregularly to ne. FL, Panhandle FL, AR, NE, and AZ. **Phen:** May-Sep; Sep-Oct. **Syn:** = G, Il, S; = *Lysimachia hybrida* Michaux – Ar, C, F, FNA8, GrPl, K1, K3, K4, Mi, NE, NY, Pa, Tn, Va, W, WV, Coffey & Jones (1980), Estes, Shaw, & Mausert-Mooney (2015); = *Lysimachia lanceolata* var. *hybrida* (Michaux) A. Gray – GW2, RAB, WH3; < *Lysimachia hybrida* Michaux – Fl5. NatureServe G5 (Secure).

Steironema lanceolatum (Walter) Gray. LANCELEAF LOOSESTRIFE. **Hab:** Mesic to relatively dry forests, mafic and calcareous fens, bogs, forest edges, roadbanks, primarily on circumneutral soils. **Dist:** NJ, PA, OH, MI, and WI south to GA, Panhandle FL, AL, MS, LA, and ne. TX. **Phen:** May-Aug; Sep-Oct. **Syn:** = G, Il; = *Lysimachia lanceolata* Walter – Ar, C, F, FNA8, K1, K3, K4, Mi, NcTx, Pa, Tn, Tx, Va, W, WV, Coffey & Jones (1980), Estes, Shaw, & Mausert-Mooney (2015); = *Lysimachia lanceolata* var. *lanceolata* – GW2, RAB, WH3; < *Lysimachia lanceolata* Walter – Fl5; > *Steironema heterophyllum* (Michaux) Baudo – S; > *Steironema lanceolatum* (Walter) Gray – S. NatureServe G5 (Secure).

Steironema quadriflorum (Sims) A.S. Hitchcock. SMOOTH LOOSESTRIFE, FOUR-FLOWERED LOOSESTRIFE. **Hab:** Wet meadows and calcareous fens, stream banks, prairie meadows. **Dist:** MA, s. ON, MI, and ND south to w. VA, WV, nw. GA, AL, and AR; mainly north and west of the Ohio River, very rare and scattered in or east of the Appalachians. Reported for c. NC by Coffey & Jones (1980), based on 2 specimens; the records seem unlikely. **Phen:** Jun-Sep. **Syn:** = Il; = *Lysimachia quadriflora* Sims – Ar, C, F, FNA8, GrPl, K1, K3, K4, Mi, NE, NY, Pa, Tn, Va, W, WV, Coffey & Jones (1980), Estes, Shaw, & Mausert-Mooney (2015); = *Steironema quadriflora* (Sims) A.S. Hitchcock – G. NatureServe G5? (Secure).



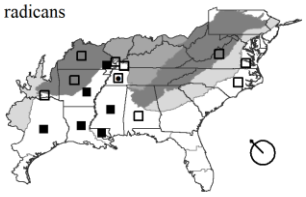
Steironema radicans (Hooker) A. Gray. TRAILING LOOSESTRIFE. **Hab:** Moist forests, swamps, marshes, eastwards in mountain sinkhole ponds and interdunal ponds. **Dist:** The main distribution of this species is in the Mississippi Embayment, from MO and w. TN south to MS, AR, LA, and e. TX; disjunct occurrences in e. and w. VA and e. NC are curious. **Phen:** (May-) Jun-Sep. **Syn:** = G, Il, S; = *Lysimachia radicans* Hooker – Ar, C, F, FNA8, K1, K3, K4, Tn, Tx, Va, W, Coffey & Jones (1980), Estes, Shaw, & Mausert-Mooney (2015). NatureServe G4G5 (Apparently Secure).

Steironema species 1. LEWIS'S LOOSESTRIFE. **Hab:** Dry oak-hickory woodlands on ridges and upper slopes in dry, cherty, acid soils. **Dist:** Endemic to Lewis and Maury counties, TN and Blount County, AL. **Phen:** May-Aug; Jul-Sep. **Comm:** See Estes, Shaw, & Mausert-Mooney (2015) for detailed information. **Syn:** = *Lysimachia lewisii* D. Estes,J.T. Shaw, & C. Mausert-Mooney – K4, Tn, Estes, Shaw, & Mausert-Mooney (2015). NatureServe G2 (Imperiled).

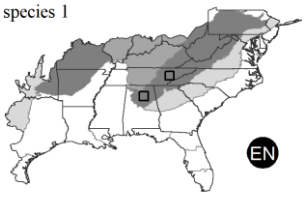
Steironema tonsum (Alph. Wood) E.P. Bicknell ex Britton. SOUTHERN LOOSESTRIFE, APPALACHIAN LOOSESTRIFE. **Hab:** Moist to dry upland forests, especially over calcareous or mafic rocks. **Dist:** Sc. VA, sw. VA, and KY south to SC, wc. GA, and e. TN. The range is centered on the Southern Appalachians, but the species is essentially absent from the higher mountains – a "doughnut range". **Phen:** May-Jul; Aug-Oct. **Syn:** = S; = *Lysimachia tonsa* (Alph. Wood) Alph. Wood ex R. Knuth – C, F, FNA8, K1, K3, K4, RAB, Tn, Va, W, WV, Coffey & Jones (1980), Estes, Shaw, & Mausert-Mooney (2015); =? *Steironema intermedium* Kearney – G. NatureServe G4 (Apparently Secure).

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more)
* : waif
EN : endemic
H : historic
N : no
P : planted
? : questionable
X : extirpated

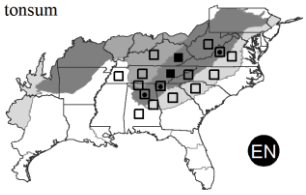
Steironema radicans



Steironema species 1



Steironema tonsum



336. THEACEAE Mirbel 1816 (TEA FAMILY) [in ERICALES]

With a more circumscribed definition (excluding Pentaphylacaceae), a family of about 9 genera and 200-450 species, trees and shrubs, of primarily tropical and subtropical regions of the Old and New Worlds. References: Li et al (2019); Prince & Parks (2001); Prince (2009) in FNA8 (2009); Stevens, Dressler, & Weitzman in Kubitzki et al (2004); Zhang et al (2022).

1 Leaves deciduous, medium green above, herbaceous in texture.
..... ***Stewartia***
1 Leaves evergreen, dark green above, coriaceous in texture.
3 Leaves ovate to elliptic (broadest at or below the middle), 1-3× as long as wide, slightly to strongly acuminate, 5-10 (-15) cm long; [introduced shrub, planted in upland soils]; [tribe *Theeae*] ..... ***Camellia***
3 Leaves oblanceolate to narrowly elliptic (broadest at or above the middle), 2.5-4× as long as wide, acute to obtuse (rarely slightly acuminate), 8-30 cm long; [small to large tree, native in acidic Coastal Plain wetlands]; [tribe *Gordonieae*] ..... ***Gordonia***

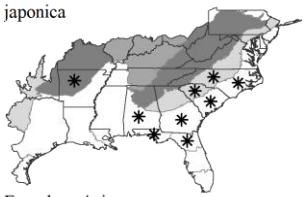
Camellia Linnaeus 1753 (CAMELLIA, TEA)

A genus of about 100-300 species, shrubs and trees, of se. Asia. References: Stevens, Dressler, & Weitzman in Kubitzki et al (2004); Zhang et al (2022).

2 Petals basally connate (0.5-1.5 cm); stamens connate basally; ovary glabrous; flowering mid-winter to spring; flowers dropping as a whole after blooming; leaves relatively larger; [section *Camellia*] ..... ***Camellia japonica***
2 Petals distinct or nearly so; stamens separate or barely connate basally; ovary villous; flowering fall to early winter; flowers with petals dropping individually after blooming; leaves relatively smaller; [section *Paracamellia*] ..... ***Camellia sasanqua***

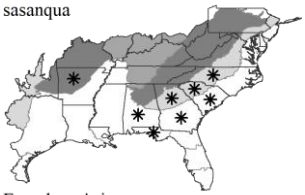
* ***Camellia japonica*** Linnaeus. CAMELLIA. **Hab:** Frequently cultivated, sometimes persistent around old home sites, at least weakly spreading near cultivated plants (Diamond 2013). **Dist:** Native of China and Japan. **Phen:** Dec-Apr. **Syn:** = K1, K3, K4. NatureServe GNR (Not Yet Ranked).
* ***Camellia sasanqua*** Thunberg. SASANQUA CAMELLIA. **Dist:** Reported as introduced in NC, SC, GA, and FL (Kartesz 1999). Byrd & Diamond (2018) report its naturalization in AL. **Phen:** Oct-Dec. **Syn:** = K1, K3, K4. NatureServe GNR (Not Yet Ranked).

Camellia japonica



E. and se. Asia

Camellia sasanqua

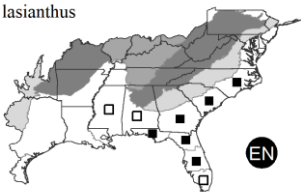


E. and se. Asia

Gordonia J. Ellis 1771 (LOBLOLLY BAY, GORDONIA)

As recircumscribed, a genus of 2 species, trees, of se. North America and Central America (*Gordonia brandegeei* H. Keng). The other 20-70 species of se. Asian trees and shrubs previously assigned to *Gordonia* are actually in a different tribe and are reassigned to *Polyspora* (Yang et al. 2004; Choo et al. 2020). References: Choo et al (2020); Prince (2009) in FNA8 (2009); Stevens, Dressler, & Weitzman in Kubitzki et al (2004); Yang et al (2004); Zhang et al (2022).

Gordonia lasianthus



Identification Notes: *Gordonia* is one of the "bay trees" so typical of acid Coastal Plain wetlands of our area – the other two being Sweet Bay (*Magnolia virginiana* of the Magnoliaceae) and Swamp Red Bay (*Tamala palustris* of the Lauraceae). *Gordonia* can be distinguished from the other two species by its smooth leaves, serrate toward the tip, odorless when crushed (vs. pubescent leaves, entire-margined, aromatic when crushed). *Gordonia* is also distinctive in its narrow, conical crown, resembling *Liriodendron* or *Chamaecyparis*, and its medium-gray, deeply furrowed bark. Most individuals of *Gordonia* have at least a few orange-red leaves visible, at any season.

Gordonia lasianthus (Linnaeus) J. Ellis. LOBLOLLY BAY, GORDONIA. **Hab:** Pocosins, bayheads, acidic, organic-rich swamp forests, wet pine savannas, bay forests. **Dist:** Ne. NC south to s. peninsular FL, west to s. MS (Sorrie & Leonard 1999), a Southeastern Coastal Plain endemic. **Phen:** Jul-Sep; Sep-Oct. **Comm:** Peat-filled Carolina bays and large peat dome pocosins from se. VA to e. GA typically have *Gordonia* as an important tree, surpassed in abundance and importance only by *Pinus serotina*. On deep peats, *Gordonia* individuals are stunted and reach sizes hardly larger

Key to Map Symbology:

* : waif
EN : endemic
H : historic
N : no
P : planted
? : questionable
X : extirpated

than pocosin shrubs. **ID Notes:** Trees almost always have a few orange-red leaves at whatever season. The toothed margin immediately separates Gordonia from other "bays": *Magnolia* and *Tamala*. **Syn:** = Fl5, FNA8, GW2, K1, K3, K4, RAB, S, WH3. NatureServe G5 (Secure).

Stewartia I. Lawson 1753 (STEWARTIA, WILD CAMELLIA)

A genus of about 20 species (if circumscribed to include *Hartia*), trees and shrubs, of temperate e. Asia and e. North America. Both our species of *Stewartia* are very attractive shrubs. The other species of the genus are Asian. Lin et al. (2019) show *S. malacodendron* as basal to the rest of the genus (if *Hartia* is included in *Stewartia*), and *Stewartia ovata* as basal to *Stewartia* s.s.; Li et al. (2002a) and Prince (2002) show different tree topologies and relationships. References: Li et al (2002a); Lin et al (2019a); Prince (2002); Prince (2009) in FNA8 (2009); Spongberg (1974); Stevens, Dressler, & Weitzman in Kubitzki et al (2004); Zhang et al (2022).

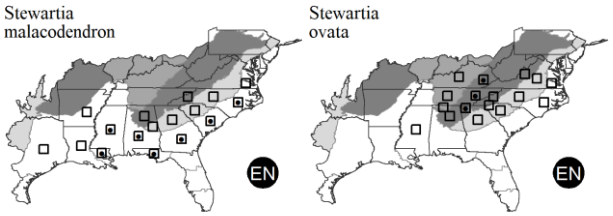
Identification Notes: The leaves are borne in horizontal planes, reminiscent of *Benthamidia (Cornus) florida* and *Swida (Cornus) alternifolia*. The leaves of both species are obscurely serrate or crenate, and also conspicuously and copiously ciliate-margined.

1 Style 1, with a 5-lobed stigma; seeds 5-7 mm long, shiny, plump, angled; fruit lobes rounded; leaves mostly 4-10 cm long, with 7-8 pairs of lateral veins; petioles narrowly winged (0.1-1 mm wide), not enclosing and concealing the terminal and lateral buds; calyx subtended by 2 persistent bracts, each 2-4 mm long; seeds shiny ..... ***Stewartia malacodendron***

1 Styles 5, separate; seeds 8-10 mm long, dull, flat, thin (to slightly winged); fruit lobes angled; leaves mostly 7-15 cm long, with 5-7 pairs of lateral veins; petioles widely winged (1-2 mm wide), enclosing and concealing the terminal and lateral buds; calyx subtended by 1 persistent bract, 11-14 mm long; seeds dull..... ***Stewartia ovata***

Stewartia malacodendron Linnaeus. SILKY CAMELLIA, VIRGINIA STEWARTIA. **Hab:** Mesic forests, especially on beech-dominated bluffs or 'upland islands' in Coastal Plain swamps, steepheads, bayheads. **Dist:** Primarily Coastal Plain, se. VA south to FL, west to se. TX, but extending inland to the Piedmont of GA, NC, and SC and the Mountains of AL and NC. **Phen:** Apr-Jun; Sep-Oct. **Tax:** In the phylogenetic tree of *Stewartia, S. malacodendron* is the first-branching taxon in the genus, not closely related to *S. ovata*. **Syn:** = Ar, Fl5, FNA8, K1, K3, K4, RAB, Tx, Va, W, WH3, Spongberg (1974); = *Stewartia malachodendron* – C, F, G, orthographic variant; = *Stuartia malachodendron* – S, orthographic variant. NatureServe G4 (Apparently Secure).

Stewartia ovata (Cavanilles) Weatherby. MOUNTAIN CAMELLIA, MOUNTAIN STEWARTIA. **Hab:** Mesic forests, especially along streams and on acidic bluffs, often in openings in rhododendron thickets ('hells'), in the Coastal Plain of VA restricted to ravines. **Dist:** Primarily Appalachian: e. KY, sc. VA, e. VA south to c. NC, w. SC, e. and c. TN to n. GA and n. AL, avoiding, however, the higher mountains, and extending into the Coastal Plain in e. VA. The species is most abundant in the Cumberland Plateau of s. KY and TN. **Phen:** Late Jun-Jul; Aug-Sep. **Syn:** = C, F, FNA8, G, K1, K3, K4, RAB, Tn, Va, W, Spongberg (1974); = *Malachodendron pentagynum* (L'Héritier) Small – S. NatureServe G4 (Apparently Secure).



337. SYMPLOCACEAE Desfontaines 1820 (SWEETLEAF FAMILY) [in ERICALES]

A family of 1 genus and about 250-300 species, trees and shrubs, of tropical and warm temperate America and Asia. References: Almeda & Fritsch (2009) in FNA8 (2009); Nooteboom in Kubitzki et al (2004).

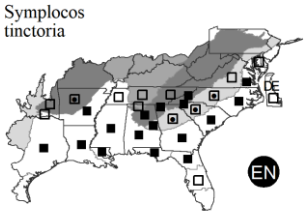
Symplocos Jacquin 1760 (SWEETLEAF)

A genus of about 300 species, trees and shrubs, of tropical and warm temperate America and Asia. Wang et al. (2004) found that the affinities of *S. tinctoria* are with South American species of subgenus *Epigenia*, rather than with east Asian species of subgenus *Hopea*, section *Palaeosymplocos*. References: Almeda & Fritsch (2009) in FNA8 (2009); Harbison (1931); Hardin (1966); Nooteboom in Kubitzki et al (2004); Wang et al (2004).

Identification Notes: The foliage of *S. tinctoria* has a sweet taste, and an odor and taste similar to green apples. Sometimes the leaves are glossy and appear subcoriaceous, somewhat resembling *Kalmia latifolia*.

Symplocos tinctoria (Linnaeus) L'Héritier. SWEETLEAF, HORSESUGAR, DYEBUSH. **Hab:** Moist bottomland forests, pocosin edges, mesic forests, ridgetop pine and oak/pine forests, pine flatwoods, longleaf pine sandhills. **Dist:** DE south to n. FL and west to e. TX and se. OK. The range in our area is discontinuous and interesting, the species rather abundant in the Coastal Plain throughout our area, and in the Mountains of NC and SC (absent from the VA mountains!), but present in the Piedmont only near its borders with the other provinces and in scattered sites in the central Piedmont. Plants in the part of the distribution in the Southern Appalachians have been described as var. *ashei* Harbison on the basis of hairier leaves, stems, and fruits; the correlation of morphology and biogeography is suggestive of varietal distinction reflecting past history of the species in our area (see Hardin 1966). **Phen:** Mar-May; Aug-Sep. **Tax:** Var. *ashei*, with mainly or strictly montane distribution, needs additional taxonomic consideration; see Hardin (1966) and Harbison (1931). **ID Notes:** The leaves have a subcoriaceous and rather evergreen appearance, but are only

semi-evergreen or tardily deciduous. As the name implies, the leaves are somewhat sweet (especially near the midvein), but the sweetness seems variable from plant to plant, season to season, and taster to taster. Whether sweet or not, the 'green apple' taste is distinctive and is helpful (once learned) in distinguishing this rather nondescript shrub or small tree. Where protected from fire, *S. tinctoria* can reach considerable size, to at least 20 cm in diameter and 12 m tall, with longitudinally striped bark. **Syn:** = Ar, C, Fl5, GW2, K1, K3, NY, RAB, S, Tn, Tx, Va, W, WH3, Hardin (1966); > *Symplocos tinctoria* (Linnaeus) L'Héritier var. *ashei* Harbison – Harbison (1931); > *Symplocos tinctoria* var. *pygmaea* Fernald – F, G; > *Symplocos tinctoria* var. *tinctoria* – F, G, Harbison (1931). NatureServe G5 (Secure).



338. DIAPENSIACEAE Lindley 1836 (DIAPENSIA FAMILY) [in ERICALES]

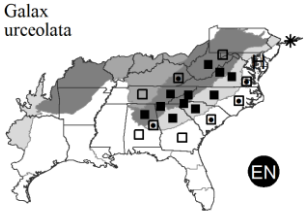
A family of 6 genera and about 15 species, subshrubs and perennial herbs, largely arctic and north temperate. References: Nesom (2009g) in FNA8 (2009); Scott in Kubitzki et al (2004); Scott & Day (1983); Ye et al (2022).

2 Leaves orbicular, rounded or with a slight point at the apex, finely serrate (4-8 teeth per cm), the teeth not prominently mucronate, the venation palmate (with 5+ palmate veins radiating from the deeply cordate leaf base); flowers in racemes; [widespread] ..... ***Galax urceolata***

2 Leaves broadly elliptic, generally emarginate (slightly notched) at the apex, coarsely serrate (1-4 teeth per cm), the teeth prominently mucronate, the venation pinnate (with 1 main vein from the rounded, truncate, or shortly cuneate leaf base); flowers solitary; [native to humid gorges along the escarpment between the Mountains and Piedmont, sometimes cultivated and becoming established elsewhere] ..... ***Shortia***

Galax Sims 1804 (GALAX)

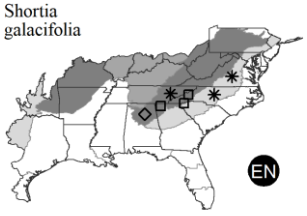
A monotypic genus, a perennial herb, endemic to eastern North America. References: Barringer & Galloway (2017); Burton & Husband (1999); Nesom (1983); Nesom (2009h) in FNA8 (2009); Scott in Kubitzki et al (2004); Scott & Day (1983); Servick et al (2015); Soltis, Bohm, & Nesom (1983).



Galax urceolata (Poiret) Brummitt. GALAX. **Hab:** Mountain forests, rock outcrops, nearly ubiquitous in the Mountains, more restricted in habitat elsewhere, moist to dry slopes in the Piedmont and Coastal Plain, often associated with *Kalmia latifolia* or *Rhododendron maximum*. **Dist:** The genus consists of this single species, with a range centered in the Southern Appalachians, occurring in NC, SC, GA, AL, e. TN, KY, VA, WV, and MD. **Phen:** May-Jul; Aug-Oct. **Comm:** Diploid and tetraploid races exist, and both are present in our area (Nesom 1983). In NC, diploids are the predominant race in the Mountains, the s. Piedmont, and the s. and c. Coastal Plain; tetraploids predominate along the Blue Ridge Escarpment, the n. Piedmont, and the n. Coastal Plain. In SC, diploids occur in the Coastal Plain and Piedmont, tetraploids in the mountains and escarpment. In GA, the pattern is similar, with diploids extending farther into the Piedmont and tetraploids restricted to the Mountains and upper Piedmont. In AL, only diploids are known. In VA, however, tetraploids occupy the Coastal Plain and e. Piedmont, diploids in the upper Piedmont and Mountains. A study of the flavonoids supported the idea that the tetraploid is an autopolyploid derivative of the diploid. Because of the close morphologic similarity, substantially sympatric distributions, and apparent general absence of demonstrable ecologic differentiation between the two races, it seems best not to attempt to taxonomically distinguish them (Nesom 1983; Soltis, Bohm, & Nesom 1983; Burton & Husband (1999;). "Galax-pulling" (the gathering of the often bronze-colored evergreen leaves for the florist trade) is an important folk industry in the mountains. **Syn:** = FNA8, K1, K3, K4, NE, NY, Tn, Va, W, Scott & Day (1983); = *Galax aphylla* Linnaeus – C, F, G, RAB, S, WV, misapplied. NatureServe G5 (Secure).

Shortia Torrey & A. Gray 1842 (SHORTIA, OCONEE BELLS)

A genus of 5 species (if *Schizocodon* is excluded, as here), perennial herbs or subshrubs, of e. Asia and the Southern Appalachians. The closest relatives of our species are two Japanese species: *S. uniflora* (Maximowicz) Maximowicz and *S. rotundifolia* (Maximowicz) Makino. References: Barnes (1990); Davies (1952); Gaddy et al (2019); Hatley (1977); Higashi, Ikeda, & Setoguchi (2015); Nesom (2009i) in FNA8 (2009); Scott in Kubitzki et al (2004); Scott & Day (1983).



Shortia galacifolia Torrey & A. Gray. SOUTHERN SHORTIA, OCONEE BELLS. **Hab:** On moist slopes, creekbanks, and rock outcrops in humid escarpment gorges with high rainfall, generally in deep shade under *Rhododendron maximum* and *R. minus*, at elevations (in NC) of 350-650m. **Dist:** This species occurs in Transylvania and Jackson counties, NC, Oconee and Pickens counties, SC, and Rabun County, GA, where it occurs in the remarkable escarpment gorges region, at elevations from 200-650m (formerly at lower elevations, now submerged under Lake Jocassee). **Phen:** Mar-Apr; Jul-Aug. **Comm:** Most of the population of this species, including the type locality, was destroyed in the early 1960's by the construction of Lake Jocassee (Zahner & Jones 1983). In the gorge tributaries of the Eastatoe, Toxaway, Horsepasture, and Thompson rivers, *Shortia* can sometimes form a dense groundcover covering acres. Various outlying locations, such as in NC (Swain and Macon counties), VA (Amherst County), and TN (Blount, Monroe, and McMinn counties) are not considered native, and are adventive or the result of persistence after cultivation. A recently discovered population in DeKalb County, AL may represent a natural occurrence and needs additional investigation of its nativity (Barger et al. 2012); for the moment it has been mapped as questionably native/alien in AL. The species is prized by gardeners, and survives well outside its natural range. **Syn:** = K4, Gaddy et al (2019); = *Shortia galacifolia* Torrey & A. Gray var. *galacifolia* – FNA8, K1, K3, NE, Davies (1952); < *Sherwoodia galacifolia* (Torrey & A. Gray) House – S; < *Shortia galacifolia* Torrey & A. Gray – C, G, RAB, W, Hatley (1977), Scott & Day (1983). NatureServe G3T2T3 (Imperiled).

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

339. STYRACACEAE A.P. de Candolle & Sprengel 1821 (STORAX FAMILY) [in ERICALES]

A family of about 11 genera and 160 species, trees and shrubs, of warm temperate and tropical regions of America, Mediterranean Europe, se. Asia, Malesia. References: Fritsch in Kubitzki et al (2004); Fritsch (2009) in FNA8 (2009).

1 Corolla lobes 4; fruit elongate, winged, 2.5-5 cm long; petioles 15-25 mm long ..... ***Halesia***
1 Corolla lobes 5; fruit globose, not winged, 0.5-0.9 cm in diameter; petioles 2-10 mm long ..... ***Styrax***

Halesia J. Ellis ex Linnaeus 1759 (SILVERBELL, SNOWDROP TREE)

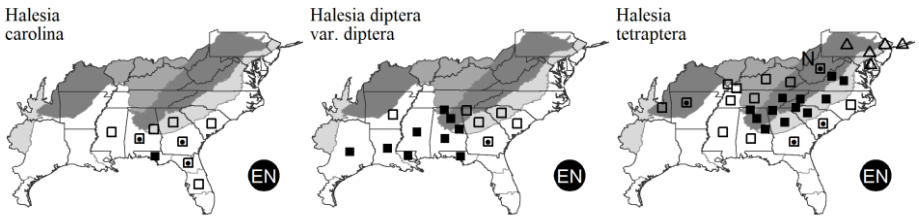
A genus of about 4 species, trees and shrubs, of e. North America and e. Asia. The genus was named to honor Stephen Hales; it therefore seems more appropriate to pronounce the genus with three syllables (the accent on the first) than the commonly heard four, which thoroughly distorts the honoree's name. The number of taxa in our area and their appropriate taxonomic level are in dispute; recent analyses vary from 2-5, with specific or varietal status. References: Fritsch & Lucas (2000); Fritsch (2009) in FNA8 (2009); Godfrey (1988); Reveal & Seldin (1976); Sargent (1921a).

1 Petals united only basally, the lobes longer than the tube; fruits broadly 2-winged (and sometimes also with 2 narrow wings or ridges alternating with the 2 broad wings); leaves broadly obovate to suborbicular, 1-2× as long as wide. ..... ***Halesia diptera var. diptera***
1 Petals united for most of their length, the tube longer than the lobes; fruits narrowly or broadly 4-winged; leaves elliptic-oblong, ca. 2× as long as wide.
  3 Corolla 7-10 (-12) mm long, the style strongly exserted (1/3 to 1/2 the length of the corolla tube beyond its mouth), the anthers at the mouth of the corolla tube or slightly exserted; fruit obovate in outline, broadest toward the tip, strongly narrowed to the base, narrowly winged ..... ***Halesia carolina***
  3 Corolla (12-) 15-30 mm long, the style included or slightly exserted, the anthers within the mouth of the corolla tube; fruit ellipsoid to slightly obovate in outline, broadest near the middle, broadly winged ..... ***Halesia tetraptera***

Halesia carolina Linnaeus. LITTLE SILVERBELL. **Hab:** Sandy alluvial forests, calcareous hammocks. **Dist:** S. SC south to Panhandle FL, west to s. MS. **Phen:** Mar-Apr; Sep-Oct. **Syn:** = Fl5, K1, WH3, Godfrey (1988), Reveal & Seldin (1976); = *Halesia parviflora* Michaux – GW2, RAB, S; < *Halesia carolina* Linnaeus – FNA8, K3, K4, Fritsch & Lucas (2000).

Halesia diptera J. Ellis *var.* ***diptera***. COMMON TWO-WING SILVERBELL. **Hab:** Bottomland forests, forested edges of brackish marshes. **Dist:** Var. *diptera* ranges from s. SC south to Panhandle FL, west to n. AL, sw. AR, and e. TX. **Phen:** Mar-May; Jul-Sep. **Syn:** = Godfrey (1988), Reveal & Seldin (1976); < *Halesia diptera* J. Ellis – Fl5, FNA8, GW2, K1, K3, K4, RAB, S, Tx, WH3.

Halesia tetraptera J. Ellis. COMMON SILVERBELL, MOUNTAIN SILVERBELL. **Hab:** Moist slopes, coves, creek-banks, bottomlands. **Dist:** W. VA, s. WV, and s. IL, south to FL and s. MS (and cultivated elsewhere); disjunct in AR and OK. **Phen:** Mar-May; Aug-Sep. **Tax:** Two varieties or species have sometimes been recognized (see synonymy): "*monticola*," a large tree, restricted to the Southern Appalachians (and especially the Great Smoky Mountains), the corolla (18-) 20-30 mm long, the style included, the anthers well inside the mouth of the corolla tube, and "*tetraptera*," a smaller tree more widely distributed, the corolla (12-) 15-20 mm long, the style slightly exserted, the anthers just within the mouth of the corolla tube. Most studies have judged them too intergradient to be practically delimited. **Syn:** = C, Va; = *Halesia carolina* Linnaeus – F, G, RAB, W, WV; < *Halesia carolina* Linnaeus – FNA8, Il, K4, Mi, NE, NY, Pa, Tn, Fritsch & Lucas (2000); > *Halesia carolina* Linnaeus – S; > *Halesia monticola* (Rehder) Sargent – S; > *Halesia tetraptera* Ellis var. *monticola* (Rehder) Reveal & Seldin – K1, Reveal & Seldin (1976); > *Halesia tetraptera* Ellis var. *tetraptera* – K1, Reveal & Seldin (1976).



Styrax Linnaeus 1753 (SNOWBELL, STORAX)

A genus of about 120-130 species, trees and shrubs, of s. Europe, Malesia, se. Asia, se. North America, and tropical America. Nicolson & Steyskal (1976) discussed at length the grammatical gender of the genus, and concluded that it should be treated as masculine. References: Fritsch (2009) in FNA8 (2009); Gonsoulin (1974); Nicolson & Steyskal (1976).

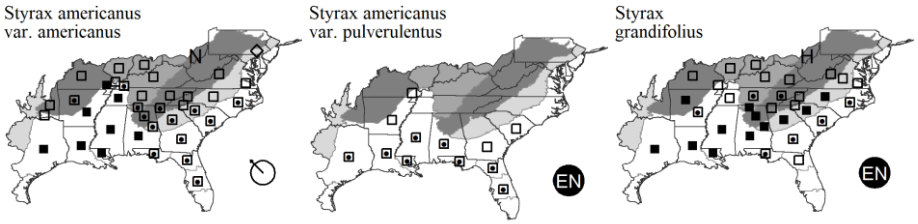
2 Leaves generally broadly obovate, sometimes broadly ovate, 5-14 cm long, 4-10 cm wide, the apices acute to short-acuminate, densely and finely pubescent beneath, giving the underside of the leaf a pale color; inflorescence usually of 5-20 flowers ..... ***Styrax grandifolius***
2 Leaves narrowly elliptic to ovate or obovate, usually 2-8 cm long, 1-4 cm wide, the apices short- to long-acuminate, glabrous or sparsely pubescent beneath (to densely pubescent and then giving the underside of the leaf a rusty color in var. *pulverulentus*); inflorescence usually of 1-7 flowers.
  3 Leaves oblong-elliptic, glabrous or sparsely pubescent on the undersurfaces and petioles, the margins usually distantly toothed toward the apices; pedicels 10-14 mm long; calyces essentially glabrous; new growth glabrous to sparsely pubescent ..... ***Styrax americanus var. americanus***
  3 Leaves elliptic to ovate to oblanceolate or obovate, sparsely to densely scurfy-hairy on the undersurfaces and petioles, margins entire to serrate; pedicels 4-6 mm long; calyces and pedicels densely scurfy-hairy; new growth densely matted pubescent ..... ***Styrax americanus var. pulverulentus***

Key to Map Symbology: □ native; ◇ maybe exotic; △ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Styrax americanus Lamarck *var*. ***americanus***. AMERICAN SNOWBELL, AMERICAN STORAX. **Hab:** Swamp forests, pocosin edges, depression wetlands, other moist to wet habitats. **Dist:** Var. *americanus* ranges from ne. WV, OH, s. IN, s. IL, s. MO, south to s. FL and e. TX. **Phen:** Apr-Jun; Jul-Sep. **Comm:** See discussion below on var. *pulverulentus* and the existence of transitional plants. **Syn:** = C, Va; = *Styrax americana* – S; = *Styrax americana* var. *americana* – F, Gonsoulin (1974); < *Styrax americana* – Ar, G, GW2, RAB, Tx, Tx, W; < *Styrax americanum* – Il; < *Styrax americanus* – Fl5, FNA8, K1, K3, K4, Tn, WH3.

Styrax americanus Lamarck *var*. ***pulverulentus*** (Michaux) Perkins ex Rehder. DOWNY AMERICAN SNOWBELL. **Hab:** Wet pine flatwoods. **Dist:** 'Good' var. *pulverulentus* ranges from SC south to s. FL and west to e. TX and se. MO; some plants in NC and SC are transitional between the two varieties and will not be easily assigned. **Phen:** Apr-May; Jul-Sep. **Syn:** = C, Gonsoulin (1974); = *Styrax americana* var. *americana* – Gonsoulin (1974); = *Styrax pulverulenta* Michaux – S; < *Styrax americana* – Ar, G, GW2, RAB, Tx, Tx, W; < *Styrax americanus* – Fl5, FNA8, K1, K3, K4, WH3.

Styrax grandifolius Aiton. BIGLEAF SNOWBELL, BIGLEAF STORAX. **Hab:** Mesic to dry upland forests, bluffs. **Dist:** Se. VA south to ne. FL and. Panhandle FL, west to e. TX, north to se. MO. **Phen:** Apr-May; Aug-Sep. **Syn:** = Ar, C, Fl5, FNA8, K1, K3, K4, Tn, Va, WH3; = *Styrax grandifolia* – F, G, RAB, S, W, Gonsoulin (1974); < *Styrax grandifolium* – Il. NatureServe G5 (Secure).



340. SARRACENIACEAE Dumortier 1829 (PITCHERPLANT FAMILY) [in ERICALES]

A family of 3 genera and about 22 species, perennial insectivorous herbs, of e. North America (*Sarracenia*), w. North America (*Darlingtonia*), and ne. South America (*Heliamphora*). References: Kubitzki et al (2004); Mellichamp (2009b) in FNA8 (2009); Neyland & Merchant (2006); Schnell (2002b).

Sarracenia Linnaeus 1753 (PITCHERPLANT)

A genus of about 11 species, perennial insectivorous herbs, of e. North America. The sections that have sometimes been recognized do not accord with recent findings about clades and relationships within *Sarracenia*, so are not recognized here. The status of *Sarracenia* as a genus with intense horticultural interest is responsible for both conservation challenges and opportunities facing taxa in the genus. Interest in color forms by collectors and growers is also responsible for the naming of many taxa at variety rank that are merely coloration forms. References: Bell & Case (1956); Bell (1949); Bell (1952); Carstens & Satler (2013); Case & Case (1976); Catalani (2004); Cheek (1994); Cheek (2001); Godt & Hamrick (1999); McDaniel (1971); McPherson & Schnell (2011); McPherson (2006); McPherson (2007); Mellichamp & Case (2009) in FNA8 (2009); Mellichamp (2008); Naczi et al (1999); Neyland & Merchant (2006); Reveal (1993b); Rice (2018); Romanowski (2002); Schnell & Determann (1997); Schnell (1979); Schnell (1981); Schnell (1993); Schnell (1998); Schnell (2002a); Schnell (2002b); Wood (1960).

Identification Notes: Hybrids between the various species of pitcherplants are relatively frequent; see Bell (1952), Bell & Case (1956), Mellichamp (2008), Mellichamp in FNA (2009), and McPherson & Schnell (2011) for further discussion. They are usually rather easy to determine in geographic context, since they show intermediacy in characters, and usually are found in close proximity to both parents.

Sarracenia - Key to Sarracenia

1 Pitchers mostly decumbent; lateral wing of the pitcher very prominent; petals maroon to pink.
  2 Pitchers prominently marked with white on the hood; hood of the pitcher globose; orifice formed by the fusion of the hood margins ..... ***Sarracenia psittacina***
  2 Pitchers not marked with white on the hood; hood of the pitcher expanded and erect; orifice not involving the hood margins; [*S. purpurea* complex]. ..... ***Sarracenia rosea***
1 Pitchers erect; lateral wing of the pitcher generally not prominent; petals maroon, red, or yellow.
  6 Pitchers with white (or whitish and translucent) patches toward the summit of the pitcher and behind the orifice and/or on the hood. ..... ***Sarracenia leucophylla***
  6 Pitchers without white or translucent patches toward the summit of the pitcher.
    9 Petals yellow; pitcher hood 4-10 (-14) cm wide.
      10 Phyllodia (nonpitcher leaves) many per plant and forming a rosette, 5-18 cm long, strongly curved, usually curving 45-90 degrees; scapes taller than the pitchers; [inland, from sw. NC and e. TN south and west to n. and wc. GA and c. AL] ..... ***Sarracenia oreophila***
      10 Phyllodia (nonpitcher leaves) rare, only a few per plant (if present at all), 12-30 cm long, straight to slightly curved; scapes shorter than the pitchers; [of the Coastal Plain and rarely Piedmont, from se. VA southward to n. FL and west to e. TX].
        11 Narrowed base of the hood not purple-spotted, its sides revolute but not rolled backward and nearly touching; blade of the hood ovate, slightly cordate basally; [of the Coastal Plain, from s. AL west to e. TX] ..... ***Sarracenia alata***
        11 Narrowed base of the hood usually purple-spotted, its sides strongly rolled backward (away from the orifice) such that they nearly touch; blade of the hood broadly reniform to orbicular-reniform, broadly cordate basally; [of the Coastal Plain and rarely Piedmont, from se. VA southward to n. FL and west to se. MS] ..... ***Sarracenia flava***
    9 Petals maroon; pitcher hood < 4 cm wide (except *S. alabamensis* ssp. *alabamensis*, which can be up to 8.8 cm wide).
      13 Pitcher background color yellow, the upper pitcher weakly or not veined on the outer surface; [of c. AL (Autauga, Chilton, and Elmore counties)] ..... ***Sarracenia alabamensis ssp. alabamensis***

Key to Map Symbology: □ native; ◇ maybe exotic; △ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

13 Pitchers background color tan, the upper pitcher strongly reticulately veined on the outer surface; [of s. AL, s. MS, and w. FL].....
.....***Sarracenia alabamensis ssp. wherryi***

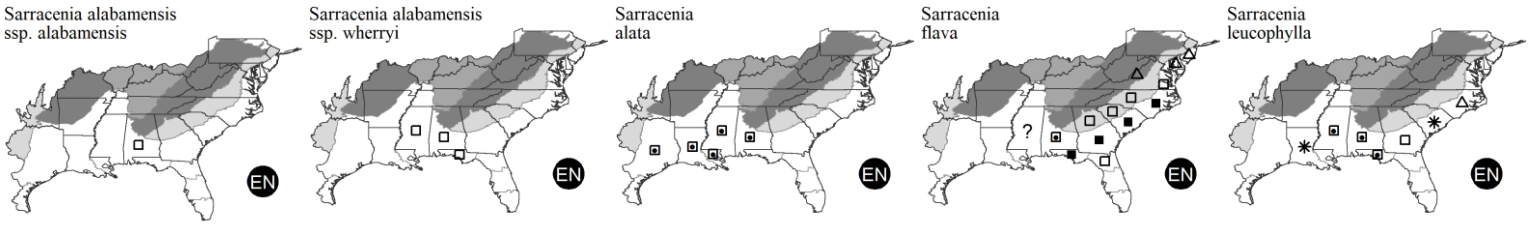
Sarracenia alabamensis F.W. Case & R.B. Case *ssp. **alabamensis***. ALABAMA PITCHERPLANT, ALABAMA CANEBRAKE PITCHERPLANT. **Hab:** Seepage bogs. **Dist:** Endemic to c. AL (Autauga, Chilton, and Elmore counties). **Phen:** Apr-May (-Jun). **Comm:** See Case (2005). **Syn:** = FNA8, K3, K4, Case & Case (1976), Rice (2018); = *Sarracenia rubra* Walter ssp. *alabamensis* (F.W. Case & R.B. Case) Schnell – K1, McPherson & Schnell (2011), Schnell (2002b); < *Sarracenia rubra* – GW2, S, McDaniel (1971), Wood (1960).

Sarracenia alabamensis F.W. Case & R.B. Case *ssp. **wherryi*** F.W. Case & R.B. Case. WHERRY'S PITCHERPLANT. **Hab:** Seepage bogs and pine savannas. **Dist:** FL Panhandle, s. AL, and s. MS. **Phen:** Apr-May. **Comm:** See Case (2005). **Syn:** = FNA8, K3, Case & Case (1976), Rice (2018); = *Sarracenia rubra* Walter ssp. *wherryi* (F.W. Case & R.B. Case) D.E. Schnell – Fl5, K1, WH3, McPherson & Schnell (2011), Schnell (2002b); < *Sarracenia rubra* – GW2, S, McDaniel (1971), Wood (1960).

Sarracenia alata Alph. Wood. PALE PITCHERPLANT. **Hab:** Pine savannas, seepage bogs. **Dist:** S. AL west to e. TX. **Phen:** Mar-Apr. **Tax:** Carstens & Satler (2013) argued that this species as defined includes two cryptic species, one east of the Mississippi River (*S. alata* s.s.) and one west of the Mississippi River (*Sarracenia* sp. nov.). The western segregate has not been named. **Syn:** = FNA8, GW2, K1, K3, K4, NcTx, Tx, McDaniel (1971), Schnell (2002b), Wood (1960); = *Sarracenia sledgei* Macfarlane – S, Bell (1949); > *Sarracenia alata* Alph. Wood – Carstens & Satler (2013); > *Sarracenia alata* var. *alata* – McPherson & Schnell (2011); > *Sarracenia alata* var. *atrorubra* S. McPherson & D.E. Schnell – McPherson & Schnell (2011); > *Sarracenia alata* var. *cuprea* S. McPherson & D.E. Schnell – McPherson & Schnell (2011); > *Sarracenia alata* var. *nigropurpurea* P. D'Amato ex S. McPherson & D.E. Schnell – McPherson & Schnell (2011); > *Sarracenia alata* var. *ornata* S. McPherson & D.E. Schnell – McPherson & Schnell (2011); > *Sarracenia alata* var. *rubrioperculata* S. McPherson & D.E. Schnell – McPherson & Schnell (2011); > *Sarracenia species 1* – Carstens & Satler (2013). NatureServe G4 (Apparently Secure).

Sarracenia flava Linnaeus. YELLOW PITCHERPLANT, TRUMPETS, TRUMPET-LEAF, TRUMPET-FLOWER, SIDE SADDLE FLOWER. **Hab:** Pine savannas, seepage bogs, pocosins. In the remote centers of peat domes and large peat-filled Carolina bays in NC, *Sarracenia flava* is sometimes very abundant, occasionally the dominant plant over areas exceeding several square kilometers. **Dist:** Se. VA south to n. FL and west to s. AL and se. MS. **Phen:** (Late Feb-) Mar-early May; May-Jun. **Tax:** The many named varieties are best considered forms. **Syn:** = C, F, Fl5, FNA8, G, GW2, K1, K3, K4, RAB, Va, W, WH3, Bell (1949), McDaniel (1971), Wood (1960); < *Sarracenia flava* Linnaeus – S; > *Sarracenia flava* var. *atropurpurea* (Bull) C.R. Bell – McPherson & Schnell (2011), Schnell (2002b); > *Sarracenia flava* var. *cuprea* D.E. Schnell – McPherson & Schnell (2011), Schnell (2002b); > *Sarracenia flava* var. *flava* – McPherson & Schnell (2011), Schnell (2002b); > *Sarracenia flava* var. *maxima* Bull ex Masters – McPherson & Schnell (2011), Schnell (2002b); > *Sarracenia flava* var. *ornata* Bull ex Masters – McPherson & Schnell (2011), Schnell (2002b); > *Sarracenia flava* var. *rubricorpora* D.E. Schnell – McPherson & Schnell (2011), Schnell (2002b); > *Sarracenia flava* var. *rugelii* (Shuttleworth ex de Candolle) Masters – McPherson & Schnell (2011), Schnell (2002b).

Sarracenia leucophylla Rafinesque. WHITETOP PITCHERPLANT, CRIMSON PITCHERPLANT. **Hab:** Wet pine savannas. **Dist:** Sw. GA, w. FL, s. AL, and se. MS, a Gulf Coastal Plain endemic; introduced in eastern NC (and likely to be found elsewhere outside its natural range). Sometimes planted in natural areas by carnivorous plant enthusiasts outside of its natural range, such as in the Coastal Plain of NC, where it has been seen in at least 3 localities. The NC population on Croatan National Forest, Carteret Co. was apparently introduced in the 1980s; it is not known whether this species will spread in NC, but it is still persisting (as of 2015) and has been independently "discovered" several times. **Phen:** Early Mar-late Apr. **Syn:** = Fl5, FNA8, GW2, K1, K3, K4, WH3, McDaniel (1971), Schnell (2002b), Wood (1960); = n/a – RAB; = *Sarracenia drummondii* Croom – S, Bell (1949); > *Sarracenia leucophylla* var. *alba* (Hort. T. Baines ex R. Hogg & T. Moore) J. Pietropaolo & P. Pietropaolo ex S. McPherson & D.E. Schnell – McPherson & Schnell (2011); > *Sarracenia leucophylla* var. *leucophylla* – McPherson & Schnell (2011). NatureServe G3 (Vulnerable).

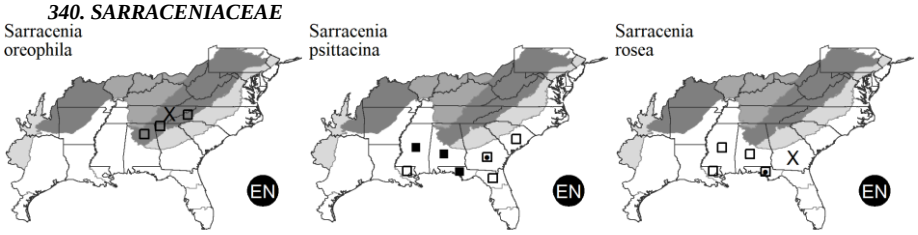


Sarracenia oreophila Wherry. GREEN PITCHERPLANT. **Hab:** Seepage bogs, sandy shores of shallow streams. **Dist:** A montane-piedmontane sibling of *S. flava*, known from sw. NC, se. TN (where presumed extirpated from the state), n. GA, and c. and ne. AL (Govus 1987, Wherry 1933, Schnell 1980b, Dennis 1980, Catalani 2004). **Phen:** Apr-May; Jun-Jul. **Syn:** = FNA8, GW2, K1, K3, K4, W, Bell (1949), McDaniel (1971), Schnell (2002b), Wood (1960); = n/a – RAB; < *Sarracenia flava* Linnaeus – S; > *Sarracenia oreophila* var. *oreophila* – McPherson & Schnell (2011); > *Sarracenia oreophila* var. *ornata* S. McPherson & D.E. Schnell – McPherson & Schnell (2011).

Sarracenia psittacina Michaux. PARROT PITCHERPLANT. **Hab:** Savannas, less commonly on floating peat mats. **Dist:** This distinctive species is distributed primarily in the East Gulf Coastal Plain, but ranges east to the Atlantic Coastal Plain of e. GA (Bullock County), in close proximity to the SC border. **Phen:** Late Mar-May. **Tax:** Var. *okefenokeensis* may have merit, but needs additional study. **Syn:** = Fl5, FNA8, GW2, K1, K3, K4, S, WH3, Bell (1949), McDaniel (1971), Schnell (2002b), Wood (1960); = n/a – RAB; > *Sarracenia psittacina* var. *okefenokeensis* S. McPherson & D.E. Schnell – McPherson & Schnell (2011); > *Sarracenia psittacina* var. *psittacina* – McPherson & Schnell (2011). NatureServe G4 (Apparently Secure).

Sarracenia rosea Naczi, F.W. Case, & R.B. Case. ROSE PITCHERPLANT. **Hab:** Wet pine savannas and seepage bogs. **Dist:** Sw. GA and Panhandle FL west to s. MS and (?) e. LA. **Phen:** Mar-Apr. **Comm:** Schnell (1993) distinguished the RAB, distinctive East Gulf Coastal Plain population (with short peduncles, white stigmas, and pale pink petals) as *S. purpurea* ssp. *venosa* var. *burkii* Schnell; Naczi et al. (1999) elevated this to species rank, as *S. rosea*. See Naczi et al. (1999) and Schnell (1993) for more detailed information and color photographs. Naczi et al.'s (1999) treatment of this taxon at specific rank is supported by the greater genetic distance found by Godt and Hamrick (1999) and morphologic and genetic analyses (Ellison et al. 2004). See MacRoberts & MacRoberts (2004) for a detailed discussion about old LA collections of *S. purpurea* or *S. rosea*. **Syn:** = Fl5, FNA8, K3, WH3; = *Sarracenia purpurea* Linnaeus ssp. *purpurea* var. *burkii* Schnell – K1; = *Sarracenia purpurea* ssp. *venosa* (Rafinesque) Fernald var. *burkii* Schnell – McPherson & Schnell (2011), Schnell & Determann (1997), Schnell (2002b); < *Sarracenia purpurea* – GW2, S, Bell (1949), McDaniel (1971), Wood (1960); < *Sarracenia purpurea* Linnaeus var. *purpurea* – Reveal (1993b).

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



343. CLETHRACEAE Klotzsch 1851 (CLETHRA FAMILY) [in ERICALES]

A monogeneric family of 65-95 species, shrubs and trees, primarily of tropical America and Asia. Sometimes combined into the Cyrillaceae. References: Anderberg & Zhang (2002); Schneider & Bayer in Kubitzki et al (2004); Sleumer (1967b); Tucker & Jones (2009) in FNA8 (2009).

Clethra Linnaeus 1753 (SWEET PEPPERBUSH, WHITE-ALDER, CLETHRA)

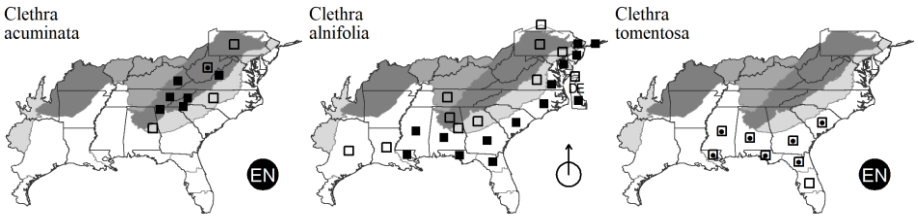
A genus of 65-95 species, shrubs and trees, primarily of tropical America and Asia. References: Schneider & Bayer in Kubitzki et al (2004); Sleumer (1967b); Tucker & Jones (2009) in FNA8 (2009).

1 Leaves oblong or elliptic, averaging 11-13 cm long and 5-7 cm wide; distance up leaf margin from the leaf base to the first tooth avg. 2.4 cm; leaf apex acuminate; inflorescence bracts exceeding the flowers; [of the Mountains] ..... ***Clethra acuminata***
1 Leaves obovate or oblong, averaging 5-9 cm long and 2-4 cm wide cm wide; distance up leaf margin from the leaf base to the first tooth avg. 3.4 cm; leaf apex obtuse to acute; inflorescence bracts shorter than the flowers; [of the Coastal Plain and rarely lower Piedmont].
2 Lower leaf surface sparsely hairy; petioles 2.5-3.5 (-6) cm long; styles 6-7 mm long, hairy at the base with straight hairs; filaments 0.2-0.3 (-0.4) mm in diameter. ..... ***Clethra alnifolia***
2 Lower leaf surface woolly-tomentose; petioles 0.5-1 (-1.5) cm long; styles 3.5-5 mm long, downy throughout; filaments 0.4-0.5 (-0.7) mm in diameter ..... ***Clethra tomentosa***

Clethra acuminata Michaux. MOUNTAIN SWEET-PEPPERBUSH, MOUNTAIN WHITE-ALDER. **Hab:** Moist forests, heath balds, streambanks, margins of rock outcrops at high elevations. **Dist:** Endemic to the Southern and Central Appalachians, *C. acuminata* ranges from sw. PA south through e. WV, w. VA, e. TN, w. NC to nw. SC, n. GA, and ne. AL. **Phen:** Jul-Aug; Sep-Oct. **Syn:** = C, F, FNA8, G, K1, K3, K4, Pa, RAB, S, Tn, Va, W, Sleumer (1967b). NatureServe G4 (Apparently Secure).

Clethra alnifolia Linnaeus. COASTAL SWEET-PEPPERBUSH, COASTAL WHITE-ALDER. **Hab:** Pocosins, blackwater swamp forests, nonriverine swamp forests. **Dist:** Primarily a southeastern Coastal Plain species, *C. alnifolia* ranges from NS and ME south to FL, west to TX; disjunct in sc. TN (Coffee County) (Chester, Wofford, & Kral 1997). **Phen:** Jun-Aug; Sep-Oct. **Syn:** = FNA8, NE, NY, S, Tn, Tx, Va; = *Clethra alnifolia* var. *alnifolia* – K4, RAB, Sleumer (1967b); < *Clethra alnifolia* Linnaeus – C, F, G, GW2, K1, K3, Pa, WH3. NatureServe G5 (Secure).

Clethra tomentosa Lamarck. DOWNY SWEET-PEPPERBUSH, DOWNY WHITE-ALDER. **Hab:** Pocosins, swamps, streambanks. **Dist:** E. SC south to FL, and west to e. LA (east of the Mississippi River). **Tax:** If recognized at varietal rank, the correct name is var. *pubescens* Aiton, which predates var. *tomentosa* (Lamarck) Michaux (Sleumer 1967b, Wilbur 1970b). **Syn:** = FNA8, S; = *Clethra alnifolia* var. *pubescens* Aiton – K4, Sleumer (1967b); = *Clethra alnifolia* var. *tomentosa* (Lamarck) Michaux – RAB; < *Clethra alnifolia* Linnaeus – Fl5, GW2, K1, K3, WH3.



344. CYRILLACEAE Lindley 1846 (TITI FAMILY) [in ERICALES]

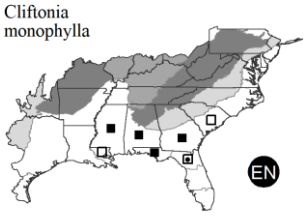
A family of 2 genera and 5 or more species, ranging from se. North America to the West Indies and n. South America (following the removal of *Purdiaea* to the Clethraceae (Anderberg & Zhang 2002). References: Anderberg & Zhang (2002); Godfrey (1988); Kubitzki et al (2004); Lemke (2009) in FNA8 (2009); Thomas (1960).

1 Lateral veins of the leaf blades scarcely or not at all apparent on either surface; flowers in terminal and axillary racemes, the racemes solitary or several at a node, not markedly radiating; fruit 5-7 mm long, 2-5 winged ..... ***Cliftonia***
1 Lateral veins of the leaf blades readily apparent on both surfaces, the main laterals neatly pinnate, the smaller veins forming a fine reticulum; flowers in lateral racemes, the racemes clustered together at the summit of the previous year's growth and radiating outward or reflexed; fruit 2-2.5 mm long, not winged ..... ***Cyrilla***

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

344. CYRILLACEAE

Cliftonia Banks ex C.F. Gaertner 1807 (BLACK TITI, BUCKWHEAT-TREE)



A monotypic genus, shrub or small tree, of se. North America. References: Kubitzki et al (2004); Lemke (2009) in FNA8 (2009); Thomas (1960).

Cliftonia monophylla (Lamarck) Britton ex Sargent. BLACK TITI, BUCKWHEAT-TREE. **Hab:** Acid bogs, bayheads, swamps, and streambanks. **Dist:** Se. SC south to n. FL, west to se. LA. **Phen:** Late Feb-May. **Syn:** = Fl5, FNA5, GW2, K1, K3, S, Tx, WH3, Thomas (1960); = n/a – RAB. NatureServe G4G5 (Apparently Secure).

Cyrilla Garden ex Linnaeus 1767 (TITI)

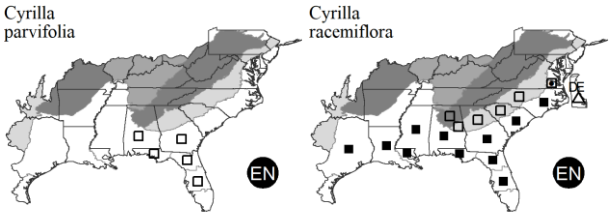
A genus of 3-10 (or more) species, trees and shrubs, of warm temperate to tropical North America, the West Indies, and n. South America. The most recent monographer (Thomas 1960) treated *Cyrilla* as monotypic, clearly the diversity of habit (from subshrubs to large forest trees) and floral structure warrant the recognition of multiple taxa at specific rank; the genus is badly in need of modern study. References: Kubitzki et al (2004); Kurz & Godfrey (1962); Lemke (2009) in FNA8 (2009); Small (1924b); Thomas (1960).

1 Leaves mostly 5-10 cm long, mostly 1-2 (-4) cm wide; racemes mostly 10-18 cm long; [of various wetland habitats, widespread in our area] ..... ***Cyrilla racemiflora***

1 Leaves mostly 0.8-4 cm long, 0.5-1 (-1.4) cm wide; racemes mostly 3-9 cm long; [flatwoods ponds, bogs, and stringers, or xeric sands of Florida scrub, s. GA and se. AL southward to Panhandle and c. peninsular FL]. ..... ***Cyrilla parvifolia***

Cyrilla parvifolia Rafinesque. LITTLELEAF TITI. **Hab:** Flatwood pond margins and along drains through wet pine savannas. **Dist:** S. GA and se. AL (Pike County) south into Panhandle FL and ne. FL (Gilchrist, Columbia, and Duval counties), disjunct in c. peninsular FL (Lake, Seminole, Orange, and Osceola counties). **Phen:** May-Jun. **Tax:** While generally very distinctive (notably in Apalachicola National Forest, FL), apparent intermediates are allegedly seen elsewhere (Thomas 1960; Kurz & Godfrey 1962); herbarium material seems straightforwardly divisible. **Syn:** = S, Kurz & Godfrey (1962), Small (1924b); < *Cyrilla parvifolia* Rafinesque – K1; < *Cyrilla racemiflora* Linnaeus – Fl5, FNA8, GW2, K3, K4, WH3, Thomas (1960).

Cyrilla racemiflora Linnaeus. TITI. **Hab:** Pocosins, swamps, lake and pine flatwood pond margins, streambanks, pine flatwoods. **Dist:** E. VA (Accomack County) south to sc. peninsular FL, west to e. TX. **Phen:** May-Jul; Sep-Oct. **Tax:** Thomas (1960) interprets this species very broadly, as also distributed in the West Indies, Belize, Mexico, and n. South America (notably the tepuis and Gran Sabana of s. Venezuela), but I interpret plants in these areas as belonging to other species. The leaves are quite variable in shape and size; the venation and glossy smoothness, however, are distinctive once learned. **Syn:** = C, G, K1, RAB, S, Tx, Va, Kurz & Godfrey (1962), Small (1924b); < *Cyrilla racemiflora* Linnaeus – Fl5, FNA12, GW2, K3, K4, WH3, Thomas (1960); > *Cyrilla racemiflora* var. *racemiflora* – F; > *Cyrilla racemiflora* var. *subglobosa* Fernald – F. NatureServe G5 (Secure).



345. ERICACEAE A.L. de Jussieu 1789 (HEATH FAMILY) [in ERICALES]

A family of about 107-124 genera and 3400-4100 species, primarily shrubs, small trees, and subshrubs, nearly cosmopolitan. The Ericaceae is very important in our area, which is one of the north temperate centers of diversity for the Ericaceae, with a great diversity of genera and species, many of them rather narrowly endemic. Along with *Quercus* and *Pinus*, various members of this family are dominant in much of our landscape. References: Cullings & Hileman (1997); Dorr & Barrie (1993); Gillespie & Kron (2010); Gillespie & Kron (2013); Judd & Kron (1993); Kron & Chase (1993); Kron et al (2002); Kron, Powell, & Luteyn (2002); Luteyn et al (1996); Stevens et al. in Kubitzki et al (2004); Tucker (2009a) in FNA8 (2009); Wood (1961).

Main Key, for use with flowering or fruiting material.

1 Plant an herb, subshrub, or sprawling shrub, not clonal by underground rhizomes (except *Gaultheria procumbens* and *Epigaea repens*), rarely > 3 dm tall; plants mycotrophic or hemi-mycotrophic (except *Epigaea*, *Gaultheria*, and *Arctostaphylos*).
  2 Plants without chlorophyll (fully mycotrophic); stems fleshy; leaves represented by bract-like scales, white or variously colored, but not green; pollen grains single; [subfamily *Monotropoideae*; tribe *Monotropeae*].
    3 Petals united; fruit nodding, a berry; flower and fruit several per stem ..... ***Monotropsis***
    3 Petals separate; fruit erect, a capsule; flower and fruit 1-several per stem.
      4 Flowers few to many, racemose; stem pubescent, at least in the inflorescence; plant yellow, orange, or red when fresh, aging or drying dark brown ..... ***Hypopitys***
      4 Flower solitary; stem glabrous; plant white (rarely pink) when fresh, aging or drying black ..... ***Monotropa***
  2 Plants with chlorophyll (hemi-mycotrophic or autotrophic); stems woody; leaves present and well-developed, green; pollen grains in tetrads (single in *Orthilia*).

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

7 Plant erect, the leaves clustered near the apex of the single stem.
8 Leaves lanceolate or oblanceolate, normally 2-4× as long as wide (sometimes proportionately less narrow in stunted individuals; fruit a capsule, borne 1-several on an erect scape above the leaves [subfamily *Monotropoideae*; tribe *Pyroleae*] ..... ***Chimaphila***
8 Leaves obovate, 1-2× as long as wide; fruit a red berry, borne on nodding axillary pedicels beneath the leaves; [subfamily *Vaccinioideae*; tribe *Gaultherieae*] ..... ***Gaultheria***
7 Plant creeping or sprawling, leaves scattered along the stems.
9 Flowers solitary and axillary; fruit a white berry; [subfamily *Vaccinioideae*; tribe *Gaultherieae*] ..... ***Gaultheria***
9 Flowers in axillary or terminal spikes or racemes; fruit a fleshy loculicidal capsule or red drupe. ..... ***Epigaea***

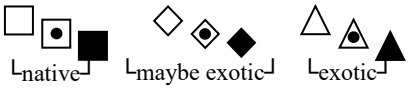
1 Plant either a shrub or tree (> 3 dm tall), or a shrub 1-3 dm tall and definitely and obviously clonal by underground rhizomes; plants not mycotrophic or hemi-mycotrophic.
11 Leaves ca. 1 mm wide, 3-12 mm long, appearing opposite, alternate, or whorled (the internodes very short, thus the leaves generally appearing whorled); petals absent; fruit a subglobose, 2-stoned drupe, 1-3 mm in diameter; branches often appearing in whorls of 3-7; [subfamily *Ericoideae*; tribe *Empetreae*] ..... ***Ceratiola***
11 Leaves either > 2 mm wide or < 5 mm long, mostly alternate or whorled; petals present; fruit not as above, mostly either a capsule or 10- or many-seeded berry; branches appearing alternate or whorled; [subfamily *Vaccinioideae*; tribe *Vaccinieae*].
13 Ovary inferior; fruit indehiscent, a fleshy berry; [blueberries and huckleberries].
14 Ovary 10 locular; seeds 10; leaves glandular-punctate, at least on the lower surface (except *G. brachycera*) ..... ***Gaylussacia***
14 Ovary 4-5 locular; seeds numerous; leaves not glandular-punctate ..... ***Vaccinium***
13 Ovary superior; fruit dehiscent, a dry capsule; [other heaths].
21 Leaves coriaceous, evergreen, shiny and dark green above.
22 Leaves sharply and distinctly serrate.
23 Pedicels slender, 7-10 mm long; filaments strongly curved just below the anthers; pith transversely diaphragmed; [subfamily *Vaccinioideae*; tribe *Lyonieae*] ..... ***Agarista populifolia***
23 Pedicels stout, 2-6 mm long; filaments straight; pith solid; [subfamily *Vaccinioideae*; tribe *Gaultherieae*] ..... ***Leucothoe***
22 Leaves entire, or obscurely and finely crenulate-serrulate.
24 Capsules elongate, > 2× as long as broad, 8-18 mm long; [subfamily *Ericoideae*; tribe *Rhodoreae*] ..... ***Rhododendron***
24 Capsules ovoid to globose or subglobose, about as long as broad, 5-8 mm long.
25 Leaves with a prominent vein running parallel to (and about 1 mm in from) the margin; [subfamily *Vaccinioideae*; tribe *Lyonieae*] ..... ***Lyonia lucida***
25 Leaves without a prominent marginal vein.
26 Corolla saucer-shaped, 10-30 mm across; leaves entire; [subfamily *Ericoideae*; tribe *Phyllodoceae*] ..... ***Kalmia***
26 Corolla narrowly urceolate, 4-6 mm across; leaves finely crenulate-serrulate; [subfamily *Vaccinioideae*; tribe *Lyonieae*]
27 Flower stalks with 2 opposite or subopposite subulate bractlets a little below the calyx; leaves glabrous below or short-pubescent on the midvein ..... ***Agarista populifolia***
27 Flower stalks with 2 opposite or subopposite triangular bractlets near the base of the pedicel; leaf lower surface punctate with stalked red glands ..... ***Pieris***
21 Leaves membranaceous or subcoriaceous, deciduous or evergreen, if subcoriaceous and evergreen, then not shiny and dark green above.
28 Capsules elongate, > 2× as long as broad, 7-23 mm long; [subfamily *Ericoideae*; tribe *Rhodoreae*] ..... ***Rhododendron***
28 Capsules ovoid to globose or subglobose, about as long as broad, or broader than long, 2-7 mm long.
29 Leaves (at least the larger) > 2.5 cm wide.
30 Pedicels with 2 bracteoles.
31 Capsule broader than long; shrub; bracteoles just below the calyx; [subfamily *Vaccinioideae*; tribe *Gaultherieae*] ..... ***Eubotrys***
31 Capsule longer than broad; tree; bracteoles generally near the middle of the pedicel; [subfamily *Vaccinioideae*; tribe *Oxydendreae*] ..... ***Oxydendrum arboreum***
30 Pedicels without bracteoles. ..... ***Lyonia***
29 Leaves < 2.5 cm wide.
34 Leaves whorled or alternate; corolla saucer-shaped, 10-20 mm across; [subfamily *Ericoideae*; tribe *Phyllodoceae*] ..... ***Kalmia***
34 Leaves alternate; corolla narrowly urceolate, 2-8 mm across. ..... ***Lyonia***

Alternate Key - to Ericaceae (including some relatives), emphasizing vegetative characters
[This key includes some related shrubs, of the Diapensiaceae, Clethraceae, and Cyrillaceae]

1 Leaves and stems lacking chlorophyll (either white or variously tinted with colors such as pink, tan, red, or violet) ..... ***Key A***
1 Leaves and stems with chlorophyll (green, though some parts may have the green pigment obscured with purple or other colors).
3 Subshrub or sprawling shrub, 0-1 (-2) dm tall, not clonal by underground rhizomes (except *Gaultheria procumbens*), though often clonal by creeping stems, or sprawling and patch-forming (many of these species are only ambiguously shrublike and are considered herbs by the casual observer) ..... ***Key C***
3 Shrub, > 3 dm tall, or 1-3 dm tall and definitely and obviously clonal by underground rhizomes ..... ***Key D***

Key A - Achlorophyllose plants

1 Flower solitary; stem glabrous; plant white (rarely pink) when fresh, aging or drying black ..... ***Monotropa uniflora***
1 Flowers few to many, racemose; stem glabrous (*Monotropsis*) or pubescent, at least in the inflorescence (*Hypopitys*); plant yellow, orange, or red when fresh, aging or drying dark brown.
2 Plant yellow, orange, or red when fresh, aging or drying dark brown; stem pubescent, at least in the inflorescence; petals separate to base ..... ***Hypopitys***
2 Plant lavender when fresh; stem glabrous; petals fused into an urceolate corolla ..... ***Monotropsis***

Key to Map Symbology: 

* : waif
EN : endemic
H : historic
N : no
P : planted
? : questionable
X : extirpated

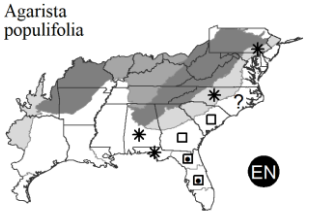
Key C - Evergreen subshrubs and sprawling shrubs

1 Plant erect, the leaves few (< 10), clustered near the apex of the single stem.
  2 Leaves obovate, 1-2× as long as wide; fruit a red berry, borne on nodding axillary pedicels beneath the leaves ..... ***Gaultheria procumbens***
  2 Leaves lanceolate or oblanceolate, normally 2-4× as long as wide (sometimes proportionately less narrow in stunted individuals; fruit a capsule, borne 1-several on an erect scape above the leaves.
  ..... ***Chimaphila maculata***
1 Plant creeping or sprawling, leaves scattered along the stems, or tufted at the base.
  5 Leaves dull green, with a pebbled texture, pilose (glabrate in age)..... ***Epigaea repens***
  5 Leaves bright shiny green (or purple), with a smooth texture, glabrous.
    6 Leaves orbicular, the venation palmate, the apex rounded or with a slight point, finely serrate (4-8 teeth per cm), the teeth not prominently mucronate; flowers in racemes; [widespread in distribution] ..... ***Galax urceolata***
    6 Leaves broadly elliptic, the venation pinnate, the apex generally emarginate (slightly notched), coarsely serrate (1-4 teeth per cm), the teeth prominently mucronate; flowers solitary; [native to humid gorges along the escarpment between the Mountains and Piedmont, sometimes cultivated and becoming established elsewhere]..... ***Shortia***

Key D - Evergreen ericaeous shrubs (either tall or obviously clonal) and trees

1 Leaves linear, needle-like, either appearing whorled (at least in part, sometimes also with nodes appearing opposite or alternate) or opposite (*Calluna*).
..... ***Ceratiola ericoides***
1 Leaves broader, alternate (or whorled or opposite in some *Kalmia*).
  5 Leaves (all of them) < 2 cm long.
    8 Twigs densely hispid; leaves hispid on both surfaces..... ***Kalmia hirsuta***
    8 Twigs glabrous to puberulent; leaves glabrous or with scattered inconspicuous hairs.
      9 Plant glaucous and bluish-green throughout; leaf undersurface lacking scattered glandular hairs; [of s. GA south to s. peninsular FL, west to e. TX] .....
      ..... ***Vaccinium darrowii***
      9 Plant dark green throughout, generally exceeding 20 mm in length; leaf undersurface with scattered glandular hairs, these sometimes very few by late in the season (best seen in the field by folding a leaf, holding the fold up to the light, and using a 10× lens); [of se. SC southward to n. FL, west to s. AL] .....
      ..... ***Vaccinium myrsinites***
  5 Leaves (at least the larger) > 3 cm long.
    10 Leaves toothed, at least toward the tip of the leaf (note that fine serrations or crenations can be obscured by revolute margins).
      11 Leaves elliptic to oblanceolate, widest near or above the middle, obtuse, acute, or short-acuminate, 1.5-7 cm long, 0.5-2.5 cm wide; leaf serrations fine and obscure; leaf surfaces with small stipitate glands (*Pieris*) or lepidote with scales (*Chamaedaphne*).
      ..... ***Pieris phillyreifolia***
      11 Leaves lanceolate or ovate, widest below the middle, short-acuminate to acuminate, 4-15 cm long, 1-5 cm wide; leaf serrations generally obvious (at least toward the acuminate leaf tip); leaf surfaces glabrous, or with non-stipitate hairs on the lower surface.
        14 Pith transversely diaphragmed; [pedicels slender, 7-10 mm long]; [filaments strongly curved just below the anthers]..... ***Agarista populifolia***
        14 Pith solid; [pedicels stout, 2-6 mm long]; [filaments straight].
          15 Leaves obtuse or acute to short-acuminate; staminal filaments almost always with at least a few unicellular hairs; calyx lobes ovate-triangular to ovate or widely so, 1.2-2.3 mm wide; racemes 0.9-5.5 cm long, with 8-44 flowers; sepals ovate, with an obtuse or rounded apex; longest petioles 2-10 (-11) mm long; [of the Coastal Plain and lower Piedmont] ..... ***Leucothoe axillaris***
          15 Leaves long-acuminate, petiole (5-) 6-16 mm long; staminal filaments merely papillose; calyx lobes ovate or ovate-triangular to oblong-triangular, 0.7-1.6 mm wide; racemes 2-10 cm long, with 17-80 flowers; longest petioles 8-15 mm long; [of the Mountains and upper Piedmont].....
          ..... ***Leucothoe fontanesiana***
    10 Leaves entire.
      18 Leaves densely lepidote on the under surface with brown scales.
      ..... ***Rhododendron minus***
      18 Leaves not lepidote beneath (*Lyonia lucida* with scattered minute scales on young leaves).
        25 Leaf blades (8-) 10-30 cm long, 3-9 cm wide, rounded to obtuse at the tip.
        ..... ***Rhododendron catawbiense***
        25 Leaf blades 2-10 (-12) cm long, 1-5 cm wide, acute, short-acuminate (or obtuse or rounded in *Cyrilla*) at the tip.
          27 Leaf with a prominent vein running the length of the margin, about 1 mm in; [shrub to 4 m tall] ..... ***Lyonia lucida***
          27 Leaf venation not as above; [shrub to small tree] {*Kalmia latifolia, Cyrilla, Cliftonia, Bejaria*}

Agarista D. Don ex G. Don 1834 (AGARISTA)



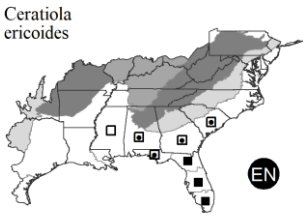
A genus of about 30 species, shrubs, primarily of tropical America, but also in Africa, Madagascar, and se. North America. Judd (1979, 1984) discusses the reasons for separating *Agarista* from *Leucothoe; Agarista* is more closely related to *Pieris* than *Leucothoe* (Judd & Kron 1996). References: Judd (1979); Judd (1984); Judd (2009c) in FNA8 (2009); Stevens et al. in Kubitzki et al (2004).

Agarista populifolia (Lamarck) Judd. AGARISTA, PIPESTEM. **Hab:** Blackwater swamps, hydric hammocks, marly spring runs and seepage ravines. **Dist:** E. SC (or se. NC?) south to ne. and c. peninsular FL. **Phen:** Apr-May; Sep-Oct. **Comm:** Reported for several locations in s. AL, likely escaped (Diamond & Woods 2009). A specimen at the University of North Carolina at Chapel Hill (NCU) is labeled as coming from a nursery, originally taken from plants in a swamp in Columbus County, NC. The record is plausible and if accepted adds the species to the state's native flora. **Syn:** = Fl5, FNA8, K1, K3, K4, WH3, Judd (1984, 1979), Luteyn et al (1996); = *Leucothoe acuminata* (Aiton) G. Don – S; = *Leucothoe populifolia* (Lamarck) Dippel – GW2, RAB. NatureServe G4G5 (Apparently Secure).

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Ceratiola Michaux 1803 (FLORIDA ROSEMARY)

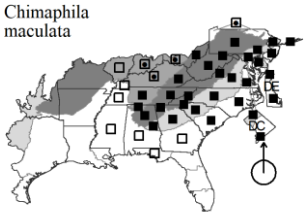
A monotypic genus, a shrub, of se. North America. References: Elisens (2009c) in FNA8 (2009); Johnson (1982); Judd & Kron (1993); Kron & Chase (1993); Stevens et al. in Kubitzki et al (2004).



Ceratiola ericoides Michaux. ROSEMARY, FLORIDA ROSEMARY, SANDHILL ROSEMARY, SAND HEATH. **Hab:** Xeric sandhills, usually in white "sugar sand". **Dist:** Ne. SC south to s. FL and west to s. MS. **Phen:** Oct-Nov. **Comm:** Its content of aromatic compounds makes it very flammable. Trapnell et al. (2007) studied genetic differentiation in the species. **Syn:** = Fl5, K1, K3, K4, RAB, S, WH3, Luteyn et al (1996). NatureServe G4 (Apparently Secure).

Chimaphila Pursh 1814 (PIPSISSEWA)

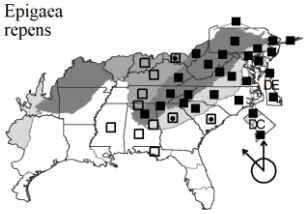
A genus of 4-5 species, subshrubs, of temperate and tropical America, and Eurasia. References: Freeman (2009d) in FNA8 (2009); Stevens et al. in Kubitzki et al (2004).



Chimaphila maculata (Linnaeus) Pursh. PIPSISSEWA, STRIPED WINTERGREEN, RAT'S BANE. **Hab:** Forests and woodlands, mostly rather xeric and acid. **Dist:** ME west to MI, south to GA, FL Panhandle, and AL. **Phen:** May-Jul; Jul-Oct. **Tax:** The populations attributed to *Chimaphila maculata* in montane areas of s. AZ, Mexico (21 states), and Central America (south to Panama) represent a far disjunct population, which also differs consistently in its narrower leaf shape and more appressed or obscure leaf teeth than eastern North American plants. I here conservatively regard the eastern North American and Mexican-Central American populations as separate at species rank; they have usually been given either species or variety rank, as *Chimaphila acuminata* (Lange) Rydberg or *Chimaphila maculata* var. *acuminata* Lange. **Syn:** = C, F, Fl5, G, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Va, W, WH3, Luteyn et al (1996); < *Chimaphila maculata* (Linnaeus) Pursh – FNA8, Meso4.1. NatureServe G5 (Secure).

Epigaea Linnaeus 1753 (TRAILING ARBUTUS)

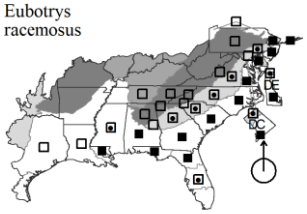
A genus of 3 species, subshrubs, in e. North America and Eurasia; the other 2 species of the genus occur in the Caucasus and Asia Minor, and in Japan. References: Judd & Kron (2009b) in FNA8 (2009); Stevens et al. in Kubitzki et al (2004).



Epigaea repens Linnaeus. TRAILING ARBUTUS, MAYFLOWER, GROUND LAUREL. **Hab:** In a wide variety of acidic forests, xeric to mesic, sandy, rocky, and loamy. **Dist:** NL (Newfoundland) and QC west to MB, south to FL Panhandle, MS, and MN. **Phen:** Late Feb-early May; Apr-Jun. **Comm:** At maturity, the fruits split along the sutures, exposing tiny brown seeds embedded in "sticky, white, placental tissue" which is "distinctly sweet to the taste;" ants are strongly attracted to the placental tissue, and in carrying it away disperse the seeds (Clay 1983). **Syn:** = C, Fl5, FNA8, G, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Va, W, WH3, WV, Luteyn et al (1996); > *Epigaea repens* var. *glabrifolia* Fernald – F; > *Epigaea repens* var. *repens* – F. NatureServe G5 (Secure).

Eubotrys Nuttall 1842 (DECIDUOUS FETTERBUSH)

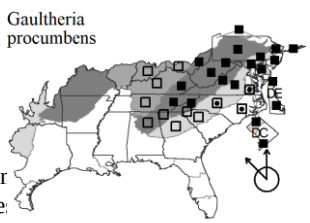
A genus of 2 species, shrubs to small trees, of e. North America. Recent molecular evidence supports the recognition of *Eubotrys* as a genus separate from *Leucothoe*, and more closely related to *Chamaedaphne*, supporting the views, based on morphological grounds, of many earlier authors (Kron et al. 2002). The genus is often treated as feminine in grammatical gender (like most Ericaceae), but the Code is unequivocal that names ending in various suffixes, including "-*botrys*" should be treated as masculine. References: Judd et al (2012); Kron et al (2002); Stevens et al. in Kubitzki et al (2004); Tucker (2009f) in FNA8 (2009).



Eubotrys racemosus (Linnaeus) Nuttall. COASTAL FETTERBUSH. **Hab:** Swamps, pocosins, streambanks, and other wet places. **Dist:** E. MA south to c. peninsular FL and west to LA, primarily on the Coastal Plain; disjunct inland, as in c. and e. TN. **Phen:** Late Mar-early Jun; Sep-Oct. **Syn:** = K4; = *Eubotrys racemosa* – C, Fl5, FNA8, G, NE, NY, Tn, Va, WH3, Judd et al (2012), orthographic (gender) variant; = *Leucothoe racemosa* (Linnaeus) A. Gray – GW2, K1, K3, Pa, RAB, Tx, W, Luteyn et al (1996); > *Eubotrys elongata* Small – S; > *Eubotrys racemosa* – S; > *Leucothoe racemosa* var. *projecta* Fernald – F; > *Leucothoe racemosa* var. *racemosa* – F. NatureServe G5 (Secure).

Gaultheria Kalm ex Linnaeus 1754 (WINTERGREEN, TEABERRY)

A genus of 115-135 species, shrubs and subshrubs, of Asia, Australia and New Zealand, South America, West Indies, Central America, and North America (primarily Asian). References: Lu et al (2019); Stevens et al. in Kubitzki et al (2004); Trock (2009) in FNA8 (2009).



Gaultheria procumbens Linnaeus. TEABERRY, WINTERGREEN, CHECKERBERRY. **Hab:** Heath balds, woodlands, and openings, usually acidic and xeric. **Dist:** NL (Newfoundland) west to MB, south to e. NC, ne. GA, AL, c. TN, KY, n. IN, and MN. **Phen:** Jun-Aug; Sep-Nov. **Syn:** = C, F, FNA8, G, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Va, W, WV, Luteyn et al (1996). NatureServe G5 (Secure).

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : plar; ? : que

Gaylussacia Kunth 1819 (HUCKLEBERRY)

A genus of ca. 50 species, shrubs, of North and South America (centered in South America). The sections and subsections follow Sleumer (1967a). A study of the phylogeny of the genus *Gaylussacia* provided some evidence for the treatment of *Gaylussacia brachycera* as a monotypic genus or within *Vaccinium*; additional study is needed. References: Camp (1935); Coville (1919); Duncan & Brittain (1966); Fernald (1911); Gajdeczka et al (2010); Godfrey (1988); Kron, Powell, & Luteyn (2002); Pooler, Dix, & Griesbach (2006); Pooler, Nicholson, & Vandegrift (2008); Sleumer (1967a); Sorrie & Weakley (2007a); Sorrie (2017a) in Weakley et al (2017); Sorrie, Weakley, & Tucker (2009) in FNA8 (2009); Stevens et al. in Kubitzki et al (2004).

2 Leaves subcoriaceous, upper surface shining, dark green, 1.5-4 cm long; bracts of the inflorescence equal to or longer than the pedicels (5-12 mm long), persistent; sepals, pedicels, bracts, and leaves stipitate-glandular and pubescent; [section *Gaylussacia*].
  3 Plant < 3 dm high. ..... ***Gaylussacia dumosa***
  3 Plant 4-10 (-15 dm) tall. ..... ***Gaylussacia mosieri***
2 Leaves membranaceous to subcoriaceous, upper surface dull, yellow-green to medium-green, 2-10 cm long; bracts of the inflorescence shorter than the pedicels, early deciduous; sepals, pedicels, bracts, and leaves with sessile glands, pubescent or not pubescent; [section *Decamerium*].
  7 Leaves glandular on both surfaces; racemes 0.5-1.5 cm long; [section *Decamerium*, subsection *Baccatae*] ..... ***Gaylussacia baccata***
  7 Leaves glandular on the lower surface only; racemes 1-5 cm long.
    10 Larger leaves mostly 2-4 cm long and 1-2 cm wide; lower leaf surface usually strongly glaucous, sparsely pubescent, with the longest nonglandular hairs < 0.27 mm long and with sessile glandular resin dots reddish-brown (at least in herbarium specimens); floral tube and calyx glaucous; shrub 2-6 (-10) dm tall .... ***Gaylussacia nana***
    10 Larger leaves mostly 3-6 cm long and 2-3.5 cm wide; lower leaf surface not glaucous, sparsely to densely pubescent, with the longest nonglandular hairs 0.46-0.64 mm long and with sessile glandular resin dots golden yellow (in herbarium specimens); floral tube and calyx not glaucous; shrub to 10 dm tall..... ***Gaylussacia tomentosa***

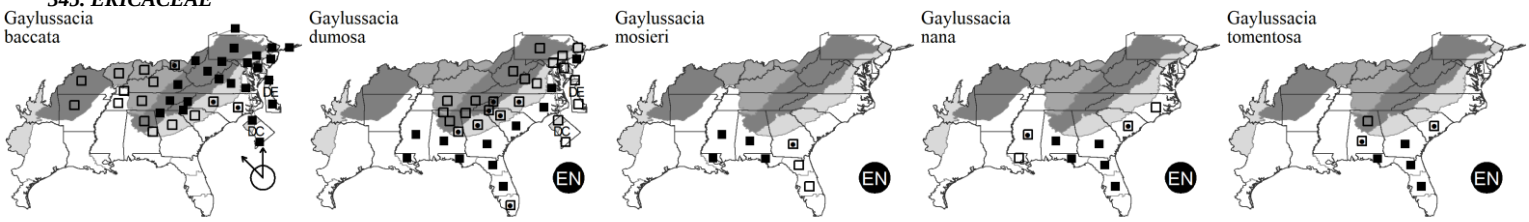
Gaylussacia baccata (Wangenheim) K. Koch. BLACK HUCKLEBERRY, CRACKLEBERRY. **Hab:** Xeric, acidic forests and woodlands, rock outcrops, to 1600m elevation. **Dist:** NL (Newfoundland) and QC west to ON and MB, south to ne. NC, nw. SC, n. GA, AL, and MO; in GA, NC, and SC it is primarily montane in distribution, but in VA it occurs throughout the state. **Phen:** Apr-Jun; Jul-Aug. **Syn:** = Ar, C, F, FNA8, G, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, Tn, Va, W, WV, Camp (1935), Duncan & Brittain (1966), Gajdeczka et al (2010), Luteyn et al (1996), Sleumer (1967a); = *Decachaena baccata* (Wangenheim) Small – S. NatureServe G5 (Secure).

Gaylussacia dumosa (Andrews) Torrey & A. Gray. SOUTHERN DWARF HUCKLEBERRY. **Hab:** Longleaf pine sandhills, pine flatwoods, other xeric to mesic, acidic forests and woodlands. **Dist:** This is one of the most common shrubs of the Southeastern Coastal Plain, with an overall range from NJ south to FL and west to e. LA, primarily in the Coastal Plain, less commonly inland (as in sc. TN and se. WV). Reported for MD and DE (Longbottom, Naczi, & Knapp 2016). **Phen:** (Dec-) Mar-Jun; Jun-Oct. **Syn:** = FNA8, K4, Tn, Va, Gajdeczka et al (2010), Sorrie & Weakley (2007a); = *Gaylussacia dumosa* (Andrews) Torrey var. *dumosa* – C, F, G, Camp (1935); = *Lasiococcus dumosus* (Andrews) Small – S; < *Gaylussacia dumosa* (Andrews) Torrey & A. Gray – Fl5, GW2, K1, K3, Pa, RAB, W, WH3, WV, Duncan & Brittain (1966), Godfrey (1988), Luteyn et al (1996), Sleumer (1967a).

Gaylussacia mosieri Small. MOSIER'S HUCKLEBERRY, HIRSUTE HUCKLEBERRY. **Hab:** Pine savannas and seepages. **Dist:** S. GA, ne. FL (Duval County), n. peninsular FL (Volusia County) west through Panhandle FL to e. LA. **Comm:** Material from Lexington County, SC originally identified as this taxon has been reassigned to *G. bigeloviana*. **Syn:** = Fl5, FNA8, GW2, K1, K3, K4, WH3, Camp (1935), Duncan & Brittain (1966), Gajdeczka et al (2010), Godfrey (1988), Luteyn et al (1996), Sleumer (1967a), Sorrie & Weakley (2007a); = *Lasiococcus mosieri* (Small) Small – S. NatureServe G4 (Apparently Secure).

Gaylussacia nana (A. Gray) Small. DWARF DANGLEBERRY. **Hab:** Xeric longleaf pine sandhills, pine flatwoods, pocosin ecotones, pine savannas. **Dist:** Se. NC (New Hanover County) (Sorrie & LeBlond 2008) and sc. SC (Berkeley and Willamsburg counties) south to n. and c. FL peninsula, FL Panhandle, and west to e. LA (Florida parishes). **Tax:** *G. nana* has a diploid chromosome complement (n=12), compared to tetraploid for *G. tomentosa* (n=12) (Luteyn et al. 1996). See Sorrie (2017a) for additional details about identification of this species and *G. tomentosa*. **Comm:** In NC, this species is somewhat disjunct from ec. SC in xeric sandhills of se. NC (on the Carolina Beach peninsula and the 421 Sandhills nw. of Wilmington). In the central and southern Coastal Plain of South Carolina, it is probably more common than *G. frondosa* (just not frequently distinguished from it) (P. McMillan, pers.comm. 2020). **Syn:** = FNA8, K1, K3, K4, Camp (1935), Duncan & Brittain (1966), Gajdeczka et al (2010), Luteyn et al (1996), Sorrie (2017a) in Weakley et al (2017); = *Decachaena nana* (A. Gray) Small – S; = *Gaylussacia frondosa* (Linnaeus) Torrey & A. Gray ex Torrey var. *nana* A. Gray – GW2, Camp (1935), Godfrey (1988); = n/a – RAB; < *Gaylussacia frondosa* (Linnaeus) Torrey & A. Gray ex Torrey – Fl5; < *Gaylussacia frondosa* (Linnaeus) Torrey & A. Gray ex Torrey var. *tomentosa* A. Gray – WH3.

Gaylussacia tomentosa (A. Gray) Pursh ex Small. HAIRY DANGLEBERRY. **Hab:** Pine flatwoods, longleaf pine sandhills, xeric coastal fringe sandhills, pocosin ecotones, pine savannas. **Dist:** Se. and ec.SC (Charleston, Dorchester, and Barnwell counties southward) south to c. peninsular FL, west to s. GA and sw. AL. **Phen:** Mar-May; Jun-Aug. **Tax:** As discussed by Godfrey (1988) and Duncan & Brittain (1966), better treated as a species than as a variety of *G. frondosa*. *G. tomentosa* has a tetraploid chromosome complement (n=24), compared to diploid for *G. nana* and *G. frondosa* (n=12) (Luteyn et al. 1996). See Sorrie (2017a) for additional information on the identification of this species and *G. nana*. **Syn:** = FNA8, K1, K3, K4, Camp (1935), Duncan & Brittain (1966), Gajdeczka et al (2010), Luteyn et al (1996), Sorrie (2017a) in Weakley et al (2017); = *Decachaena tomentosa* (Pursh ex Small) Small – S; = *Gaylussacia frondosa* (Linnaeus) Torrey & A. Gray ex Torrey var. *tomentosa* A. Gray – GW2, RAB, Godfrey (1988), Sleumer (1967a); < *Gaylussacia frondosa* (Linnaeus) Torrey & A. Gray ex Torrey – Fl5; < *Gaylussacia frondosa* (Linnaeus) Torrey & A. Gray ex Torrey var. *tomentosa* A. Gray – WH3.



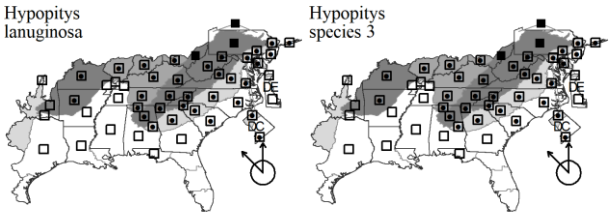
Hypopitys Crantz 1766 (PINESAP)

A genus of 6-10 species, mycoheterotrophic herbs, of circumboreal distribution. Recent molecular evidence supports its separation as a genus distinct from *Monotropa* (as has often been done in the past) (Neyland & Hennigan 2004; Broe 2014). These studies also demonstrate that several cryptic to semi-cryptic species should be recognized; plants in North America are not conspecific with those in Eurasia, and at least six species appear to be present in e. North America (Broe 2014; Klooster & Culley 2010; Haines 2011). References: Bidartondo & Bruns (2001); Broe (2014); Klooster & Culley (2010); Stevens et al. in Kubitzki et al (2004); Wallace (1975); Wallace (2009a) in FNA8 (2009).

1 Stems of living plants pink to deep red; bracts of stem yellow; stigma densely and retrorsely puberulent in a collar; funnel of stigma hairy within; flowering in the fall (late Aug-Oct); anthers held below the stigma; [broadly Appalachian] ..... ***Hypopitys lanuginosa***
1 Stems of living plants tan, yellow, or pale salmon; stigma with sparse pubescence; funnel of stigma glabrous within; flowering in the summer (May-early Aug); anthers held at height of the stigma; [collectively widespread in our area].
..... ***Hypopitys species 3***

Hypopitys lanuginosa (Michaux) Small. APPALACHIAN RED PINESAP, HAIRY PINESAP. **Hab:** Acid forests. **Dist:** ME and VT south to GA and AL (and more widespread, the precise distribution uncertain). Apparently widely distributed in eastern North America, but the precise distribution unknown. This and *H. lanuginosa* are mapped the same for now, as they are being disentangled. **Phen:** Early Aug-early Nov. **Tax:** The "Eastern Clade sensu stricto" (Broe 2014). **Syn:** = K3, K4, NE, NY, S, Broe (2014); >< *Hypopitys americana* (A.P. de Candolle) Small – S, misapplied; < *Hypopitys monotropa* – Va, misapplied to North American plants; < *Monotropa hypopithys* Linnaeus – C, F, Fl5, FNA8, G, Pa, RAB, Tn, W, WH3, WV, Luteyn et al (1996), Wallace (1975), misapplied to North American plants; < *Monotropa hypopitys* – Ar.

Hypopitys species 3. COMMON EASTERN PINESAP. **Hab:** Forests. **Dist:** Apparently widely distributed in eastern North America, but the precise distribution unknown. This and *H. lanuginosa* are mapped the same for now, as they are being disentangled. **Phen:** May-Jul (-Aug). **Tax:** The "Eastern clade" of Broe (2014), once the distinctive "Eastern Clade sensu stricto" is removed. **Syn:** < *Hypopitys americana* (A.P. de Candolle) Small – K4; >< *Hypopitys americana* (A.P. de Candolle) Small – S, misapplied; < *Hypopitys monotropa* – K3, Va, misapplied to North American plants; < *Monotropa hypopithys* Linnaeus – C, F, Fl5, FNA8, G, NcTx, Pa, RAB, Tn, Tx, W, WH3, WV, Luteyn et al (1996), Wallace (1975), misapplied to North American plants; < *Monotropa hypopitys* – Ar.



Kalmia Linnaeus 1753 (WICKY, SHEEPKILL, MOUNTAIN LAUREL, IVY, SAND-MYRTLE)

A genus of 9-11 species, shrubs, of North America and Cuba, except the circumboreal *K. procumbens* (formerly *Loiseleuria*). *Leiophyllum*, traditionally treated as a monotypic or small genus of se. United States, is better treated as a part of *Kalmia* along with the northern *Loiseleuria*, based on molecular and morphological studies (Kron & King 1996, Kron et al. 2002). While this idea may initially seem outlandish (particularly to those whose concept of *Kalmia* is based only on *Kalmia latifolia*), the morphological and habital similarities of *Leiophyllum* to *Kalmia* are striking. The foliage and wood of all species (and the smoke from burning them) are poisonous. References: Camp (1938); Ebinger (1974); Haines (2010); Kron & King (1996); Kron et al (2002); Kron, Judd, & Anderberg (2008); Liu et al (2009) in FNA8 (2009); Southall & Hardin (1974); Stevens et al. in Kubitzki et al (2004); Strand & Wyatt (1991); Wilbur & Racine (1971).

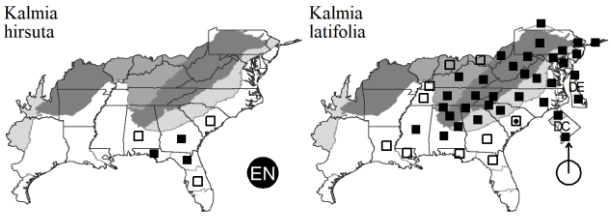
5 Leaves 0.5-1.5 cm long, 2-8 mm wide; twigs densely persistently hispid; [of the Coastal Plain of s. SC southward] ..... ***Kalmia hirsuta***
5 Leaves 2.5-12 cm long, 7-50 mm wide; twigs glabrous or puberulent (glabrescent in age); [collectively widespread in our area].
..... ***Kalmia latifolia***

Kalmia hirsuta Walter. HAIRY WICKY, KALMIELLA. **Hab:** Pine savannas and pine flatwoods. **Dist:** Se. SC (Beaufort, Jasper, Hampton, and Colleton counties) south to nc. peninsular FL, west to s. AL. **Phen:** Jun-Jul; Sep-Oct. **Tax:** The closest relatives of *K. hirsuta* are three Cuban species: *K. aggregata* (Small) Copeland, *K. ericoides* Wright ex Grisebach, and *K. simulata* (Britton & Wilson) Southall. **Syn:** = Fl5, FNA8, GW2, K1, K3, K4, RAB, WH3, Ebinger (1974), Luteyn et al (1996), Southall & Hardin (1974); = *Kalmiella hirsuta* (Walter) Small – S. NatureServe G5 (Secure).

Kalmia latifolia Linnaeus. MOUNTAIN LAUREL, IVY, CALICO-BUSH. **Hab:** Acidic forests, bluffs, bogs, along sandhill steams, and in a wide range of other habitats, nearly ubiquitous in the mountains, up to at least 1600m, more restricted in habitat in the lower Piedmont and Coastal Plain. **Dist:**

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

ME, OH, and IN south to Panhandle FL and extreme e. LA. **Phen:** Mar-Jul; Aug-Oct. **Comm:** Unlike our other species of *Kalmia*, which are strictly shrubs, *K. latifolia* reaches the stature and diameter of a small tree. **Syn:** = C, Fl5, FNA8, K1, K3, K4, NE, NY, Pa, RAB, S, Tn, Va, W, WH3, WV, Ebinger (1974), Luteyn et al (1996), Southall & Hardin (1974); > *Kalmia latifolia* var. *laevipes* Fernald – F, G; > *Kalmia latifolia* var. *latifolia* – F, G. NatureServe G5 (Secure).



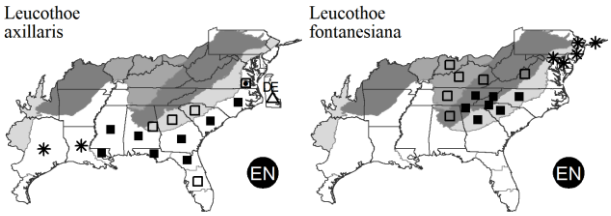
Leucothoe D. Don 1834 (FETTERBUSH, LEUCOTHOE)

A genus of 5 species, shrubs, of Japan, Himalayan Asia, w. North America, and e. North America. References: Judd et al (2013); Stevens et al. in Kubitzki et al (2004); Tucker (2009e) in FNA8 (2009).

1 Leaves obtuse or acute to short-acuminate; staminal filaments almost always with at least a few unicellular hairs; calyx lobes ovate-triangular to ovate or widely so, 1.2-2.3 mm wide; racemes 0.9-5.5 cm long, with 8-44 flowers; sepals ovate, with an obtuse or rounded apex; longest petioles 2-10 (-11) mm long; [Coastal Plain and lower Piedmont] ..... ***Leucothoe axillaris***
1 Leaves long-acuminate, petiole (5-) 6-16 mm long; staminal filaments merely papillose; calyx lobes ovate or ovate-triangular to oblong-triangular, 0.7-1.6 mm wide; racemes 2-10 cm long, with 17-80 flowers; longest petioles 8-15 mm long; [Mountains and upper Piedmont] ..... ***Leucothoe fontanesiana***

Leucothoe axillaris (Lamarck) D. Don. COASTAL DOGHOBBLE. **Hab:** Pocosins, blackwater swamp forests, and moist and acid slopes. **Dist:** A Southeastern Coastal Plain endemic: se. VA south to c. peninsular FL and west to extreme e. LA (several parish records reported for west of the Mississippi River are non-native, from cultivation). **Phen:** Late Mar-May; Sep-Oct. **Syn:** = C, Fl5, FNA8, G, GW2, K1, K3, K4, S, Va, WH3, Luteyn et al (1996); = *Leucothoe axillaris* var. *axillaris* – RAB; > *Leucothoe axillaris* var. *ambigens* Fernald – F; > *Leucothoe axillaris* var. *axillaris* – F. NatureServe G5 (Secure).

Leucothoe fontanesiana (Steudel) Sleumer. MOUNTAIN DOGHOBBLE, SWITCH-IVY. **Hab:** Moist slopes, streambanks, ravines, often associated with *Rhododendron maximum* thickets. **Dist:** A Southern Appalachian endemic: sw. VA south through w. NC and e. TN to nw. GA. **Phen:** Apr-May; Sep-Oct. **Syn:** = FNA8, GW2, K1, K3, K4, NE, NY, Tn, Va, W, Luteyn et al (1996); = *Leucothoe axillaris* var. *editorum* (Fernald & Schubert) H.E. Ahles – RAB; = *Leucothoe catesbaei* (Walter) Gray – S; = *Leucothoe editorum* Fernald & Schubert – F, G; = *Leucothoe walteri* (Willdenow) Melvin – C, Pa. NatureServe G5 (Secure).



Lyonia Nuttall 1818 (STAGGERBUSH, MALEBERRY, FETTERBUSH)

A genus of about 35 species, shrubs and small trees, of e. and se. Asia, e. North America, Mexico, and the West Indies. References: Judd (1981); Judd (2009e) in FNA8 (2009); Stevens et al. in Kubitzki et al (2004).

3 Leaves evergreen (some leaves present on wood of the previous year), coriaceous, and shining ..... ***Lyonia lucida***
3 Leaves deciduous (no leaves present on wood of the previous year), subcoriaceous, and dull.
5 Inflorescences (at least the lower) with conspicuous bracts; [mainly Coastal Plain and lower Piedmont, also Interior Highlands] ..... ***Lyonia ligustrina var. foliosiflora***
5 Inflorescences naked, or with only a few leafy bracts; [Mountains, Piedmont, and (less commonly) Coastal Plain, especially northwards] ..... ***Lyonia ligustrina var. ligustrina***

Lyonia ligustrina (Linnaeus) A.P. de Candolle *var.* ***foliosiflora*** (Michaux) Fernald. SOUTHERN MALEBERRY, HE-HUCKLEBERRY. **Hab:** Pocosins, seepage bogs, and other wet habitats. **Dist:** Se. VA south to s. FL, west to e. TX and e. OK, and (west of the mountains) north to TN and nc. AR. Var. *foliosiflora* is the usual variety on the Coastal Plain (including the fall-line sandhills). **Phen:** (Late Dec-) Apr-Jun; Sep-Oct. **ID Notes:** Rather nondescript when sterile, the gray-green hue of the leaves is a useful character, and at 5-10× magnification the appressed white hairs are an excellent diagnostic feature for *Lyonia ligustrina*. **Syn:** = Ar, FNA8, GW2, K1, K3, K4, Tn, Va, W, WH3, Judd (1981), Luteyn et al (1996); = *Arsenococcus frondosus* (Pursh) Small – S; < *Lyonia ligustrina* – C, Fl5, G, RAB, Tx; > *Lyonia ligustrina* var. *capreaefolia* (Watson) A.P. de Candolle – F; > *Lyonia ligustrina* (Linnaeus) A.P. de Candolle var. *foliosiflora* (Michaux) Fernald – F; > *Lyonia ligustrina* var. *salicifolia* (Watson) A.P. de Candolle – F. NatureServe G5T5? (Secure).

Lyonia ligustrina (Linnaeus) A.P. de Candolle *var.* ***ligustrina***. NORTHERN MALEBERRY, HE-HUCKLEBERRY. **Hab:** Mountain bogs, shrub balds, bottomlands, other moist to wet habitats, "dry" exposed ridges at high elevations. **Dist:** S. ME, s. NH, s. VT, s. and e. NY, s. OH, WV, and KY south

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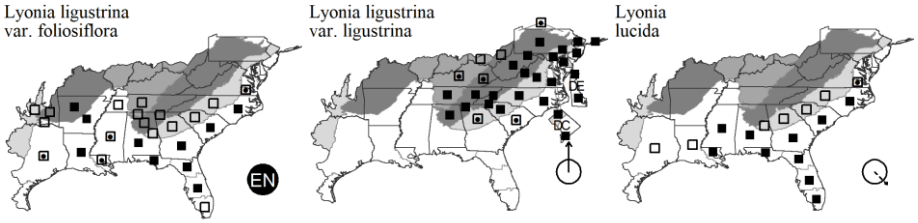
to w. and c. SC, n. GA, and ne. AL, primarily in the mountains and adjacent provinces. **Phen:** May-Jul; Sep-Oct. **Tax:** Var. *ligustrina* is the usual variety in the Mountains and Piedmont, but extends as well into the Coastal Plain in NC and SC. This variety is very variable in leaf shape and size, some populations having leaves about 3 cm long and 1.3 cm wide, others with leaves to as large as 8 cm long and 5 cm wide. The plants with smaller leaves occur in bogs and other distinctly wet habitats, while plants with large leaves occur in thin soils in high elevation heath balds and thin soils around rock outcrops (as, for instance, on Grandfather Mountain, NC). **Syn:** = F, FNA8, GW2, K1, K3, K4, NE, NY, Tn, Va, W, Judd (1981), Luteyn et al (1996); = *Arsenococcus ligustrinus* (Linnaeus) Small – S; < *Lyonia ligustrina* – C, G, Pa, RAB, WV. NatureServe G5T5? (Secure).

Lyonia lucida (Lamarck) K. Koch. SHINING FETTERBUSH. **Hab:** Pocosins, wet woodlands, blackwater swamp forests, other acidic wetlands, especially if peaty. **Dist:** Se. VA south to s. FL and west to e. and c. LA; also in w. Cuba. **Phen:** Feb-early Jun; Sep-Oct. **Comm:** Readily distinguished by the glossy, coriaceous leaves with a prominent vein running along the margins. When in flower in large numbers, the odor is cloyingly sweet. **Syn:** = C, F, Fl5, FNA8, G, GW2, K1, K3, K4, RAB, Va, WH3, Judd (1981), Luteyn et al (1996); = *Desmothamnus lucidus* (Lamarck) Small – S. NatureServe G5 (Secure).



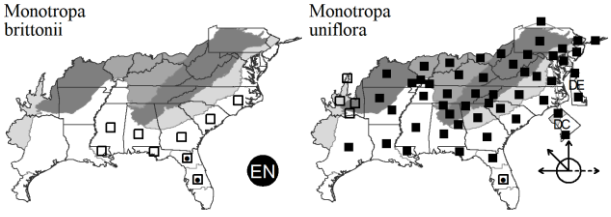
Monotropa Linnaeus 1753 (GHOST PIPES, INDIAN PIPES)

A genus of 3 or more species, mycoheterotrophic herbs, of North America, Central America, South America, and e. Asia. *Monotropa* has a primary fungal associate with the basidiomycete *Russula*. The segregation of *Monotropa*, *Hypopitys*, and *Monotropsis* into the Monotropaceae or their inclusion in the Ericaceae has sometimes been controversial. Their inclusion in the Ericaceae has been defended (Kron & Chase 1993, Judd & Kron 1993) and as become the consensus position (APG IV), but as a monophyletic clade sister to a narrower Ericaceae, family level recognition is a credible alternative. References: Bidartondo & Bruns (2001); Keesling (2020); Keesling, Broe, & Freudenstein (2021); Stevens et al. in Kubitzki et al (2004); Wallace (1975); Wallace (2009a) in FNA8 (2009).

1 Flowers few to many per stalk, racemose; stem pubescent, at least in the inflorescence; plant yellow, orange, or red when fresh, aging or drying dark brown..... ***Hypopitys***
1 Flower solitary and terminal on the stalk; stem glabrous; plant white, pink, yellow, orange, or salmon when fresh, aging or drying black.
2 Flowers and stems orangish-yellow; nectaries upturned towards the flower opening; interior surface of flower segments densely pubescent (the margins of the segments strongly ciliate); stamen filaments strongly decreasing in diameter upwards..... ***Monotropa brittonii***
2 Flowers and stems white or pale pink; nectaries downturned away from the flower opening; interior surface of flower segments glabrous (the margins of the segments sparingly ciliate); stamen filaments nearly isodiametric from base to summit..... ***Monotropa uniflora***

Monotropa brittonii Small. SCRUB GHOST-PIPE, SOUTHERN GHOST-PIPE. **Hab:** Florida scrub, longleaf pine sandhills, other dry, sandy habitats. **Dist:** Peninsular FL, apparently extending northwards to e. NC and westward to se. LA on the Coastal Plain (J. Freudenstein, pers. comm., 2019). **Phen:** Nov. **Tax:** Molecular evidence suggests that *M. brittonii* is worthy of taxonomic recognition; additional work is underway to understand its distribution and morphology. See Keesling (2020) for discussion. **ID Notes:** Monotropa brittonii is noticeable as different from *Monotropa uniflora* in its xeric habitat and greater suffusion of reddish or salmon color in the stems, flowers, and fruits, but is most authoritatively separated by the finer scale differences in the key. **Syn:** = S, Keesling (2020), Keesling, Broe, & Freudenstein (2021); < *Monotropa uniflora* Linnaeus – FNA8, K3, K4, RAB, WH3, Luteyn et al (1996).

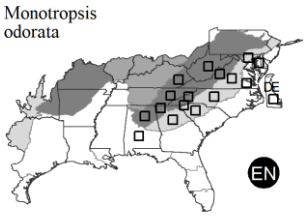
Monotropa uniflora Linnaeus. COMMON GHOST-PIPE, INDIAN PIPES. **Hab:** In a wide variety of moist to dry forests. **Dist:** NL (Labrador) and AK south to c. FL, TX, CA; e. Asia. **Phen:** Jun-Oct; Aug-Dec. **Tax:** A preliminary molecular study suggests that splitting of worldwide *Monotropa uniflora* into several geographic species or varieties may be warranted (Neyland & Hennigan 2004). We tentatively remove Mexico, Central America, and South America from the distribution of *Monotropa uniflora*, based on the morphology of these plants and preliminary findings in Keesling, Broe, & Freudenstein (2021) that Mexican accessions clade separately. Asian material needs evaluation as well. **Syn:** = S, Keesling (2020); < *Monotropa uniflora* Linnaeus – Ar, C, F, Fl5, FNA8, G, Il, K1, K3, K4, Meso4.1, Mi, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, W, WH3, WV, Luteyn et al (1996), Wallace (1975). NatureServe G5 (Secure).



Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Monotropsis Schweinitz in Elliott 1817 (PIGMY PIPES, SWEET PINESAP)

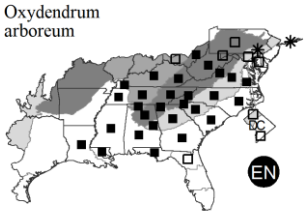
A genus of probably 2 species, mycoheterotrophic herbs, of se. North America. *Monotropsis* is heteromycotrophic, receiving its nutrition by association with a mycorrhizal fungus (which itself is associated with tree species, perhaps oaks or pines), the intertwined root mass and fungal mantle about 1-2 cm in diameter. There is a plausible case that the proper name for the genus is *Schweinitzia* Elliott ex Nuttall (Rose & Freudenstein 2014). References: Bidartondo & Bruns (2001); Chafin (2000); Chafin (2009); Klooster, Clark, & Culley (2009); Rose & Freudenstein (2014); Rose (2012); Stevens et al. in Kubitzki et al (2004); Wallace (1975); Wallace () (2009b) in FNA8 (2009); Weakley (2009a); Wolf (1922).



Monotropsis odorata Schweinitz ex Elliott. APPALACHIAN PIGMY PIPES. **Hab:** Dry to mesic upland woods under oaks and/or pines (*Pinus virginiana* or *P. echinata*), especially slopes or bluffs with abundant heaths, often including *Kalmia latifolia* and/or *Rhododendron maximum*. **Dist:** Centered in the Appalachians: DE, MD, and WV south to GA and AL. **Phen:** Feb-Apr (and sometimes Sep-Nov); May-Jun (and sometimes Oct-Nov). **Tax:** The 'fall-flowering form" (entity "*lehmaniae*", see synonymy), appears to represent the early development of *M. odorata* which will typically then overwinter in 'suspended animation' and flower in the early spring (Klooster, Clark, & Culley 2009; Rose 2012; Rose & Freudenstein 2014). **Comm:** The flowers are very fragrant, the odor variously compared to cloves, nutmeg, cinnamon, and violets. Since the diminutive plants (3-10 cm tall) are often covered by leaf litter, and the key to finding this species -- for botanists and its primary pollinator, bumblebees -- is the strong fragrance (Klooster, Clark, & Culley 2009). *Monotropsis odorata* shows fungal host specificity with *Hydnellum* P. Karst. (Thelephiorales: Bankeraceae)" (Bidartondo & Bruns (2001). **Syn:** = K3, K4, Tn, Va, Chafin (2000), Rose & Freudenstein (2014), Rose (2012), Weakley (2009a); > *Monotropsis lehmaniae* Burnham – S; < *Monotropsis odorata* Schweinitz ex Elliott – C, F, FNA8, G, K1, W, WV, Luteyn et al (1996), Wallace (1975); > *Monotropsis odorata* Schweinitz ex Elliott – S; > *Monotropsis odorata* var. *lehmaniae* (Burnham) H.E. Ahles – RAB; > *Monotropsis odorata* var. *odorata* – RAB.

Oxydendrum A.P. de Candolle 1839 (SOURWOOD)

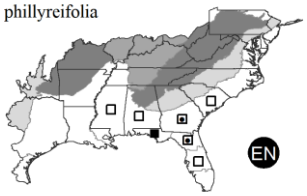
A monotypic genus, a tree, of se. North America. The genus *Oxydendrum* is "isolated ... among the Ericaceae, apparently with no close relatives" (Wood 1961). References: Judd (2009a) in FNA8 (2009); Stevens et al. in Kubitzki et al (2004).



Oxydendrum arboreum (Linnaeus) A.P. de Candolle. SOURWOOD, SORREL-TREE. **Hab:** Mesic to xeric deciduous forests, especially dry-mesic to xeric oak-hickory and oak-pine forests, and also often in sandhill/pocosin ecotones. **Dist:** Se. and sw. PA west to IL, south to n. FL and se. and c. LA. **Phen:** Jun-Jul; Sep-Oct. **Comm:** It is an especially characteristic understory tree of upland forests of the Piedmont and lower Mountains. The bark is dark grayish-brown and fairly deeply furrowed; the tree often has a characteristic lean (toward a former canopy light-gap). The finely serrate, elliptic leaves are distinctive, with the sour taste of garden sorrel (*Rumex acetosa*), sheep sorrel (*Rumex acetosella*), or wood sorrel (*Oxalis*). **Syn:** = C, F, Fl5, FNA8, G, Il, K1, K3, K4, NY, Pa, RAB, S, Tn, Va, W, WH3, WV, Luteyn et al (1996). NatureServe G5 (Secure).

Pieris D. Don 1834 (EVERGREEN FETTERBUSH)

A genus of 7 species, shrubs, of e. Asia, e. North America, and Cuba. Judd (1982a) treats *Pieris* as a genus of 7 species, 4 in e. Asia, 1 in the Southern Appalachian Mountains, 1 in the se. United States Coastal Plain, and 1 in w. Cuba. References: Judd (1979); Judd (1982a); Judd (2009b) in FNA8 (2009); Stevens et al. in Kubitzki et al (2004).



Pieris phillyreifolia (Hooker) A.P. de Candolle. VINE-WICKY, CLIMBING FETTERBUSH. **Hab:** Acidic swamp forests. **Dist:** E. SC south to c. peninsular FL west to s. AL. **Phen:** Late Feb-Apr. **Tax:** It is apparently most closely related to the other two members of subgenus *Pieris*, section *Phillyreoides*, *P. cubensis* (Grisebach) Small, endemic to w. Cuba, and *P. swinhoei* Hemsley, of se. China, neither of which shares its unusual habit. **Comm:** This southeastern species has the remarkable habit of often growing as a creeping vine under the bark of *Taxodium ascendens* or *Chamaecyparis*, the branches exserted through the cypress bark, sometimes ascending into the upper canopy with the main stem never visible except at the very base of the tree; it also sometimes grows as a low shrub. Godfrey (1969) documents the occurrence of this species in our area. See Godfrey & Wooten (1981) and Godfrey (1989) for excellent descriptions and illustrations of this curious "shrub-vine". **Syn:** = Fl5, FNA8, GW2, K1, K3, K4, WH3, Judd (1982a), Luteyn et al (1996); = *Ampelothamnus phillyreifolius* (Hooker) Small – S; = n/a – RAB. NatureServe G3 (Vulnerable).

Rhododendron Linnaeus 1753 (RHODODENDRON, AZALEA)

A genus of about 860 species, shrubs and trees, mostly north temperate (centered in Himalayan Asia). Molecular evidence appears to show that *Menziesia* should be included in *Rhododendron*, and is actually closely related within *Rhododendron* to *R. vaseyi* (Goetsch, Eckert, & Hall 2005; Kurashige et al. 2001); while the urceolate corolla is rather anomalous in *Rhododendron*, many other morphological characters do ally *Menziesia* with basal clades in *Rhododendron* s.l. References: Albach & Bauer (2021); Chamberlain (1982); Craven (2011); Cullen (1980); Davidian (1982); Duncan & Pullen (1962); Fabijan (2009a) in FNA8 (2009); Goetsch, Eckert, & Hall (2005); Horn (2019); Judd & Kron (1995); Judd & Kron (2009a) in FNA8 (2009); Kron & Creel (1999); Kron (1993); Miller (2011); Stevens et al. in Kubitzki et al (2004); Towe (2004); Zhou et al (2008).

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Considerable additional work is needed to clarify *Rhododendron* taxonomy in our region. A new species in the "*Punctatum* complex" is in the process of being described. Additional entities appear to warrant recognition in the "*Viscosum* complex" and the "*Canescens* complex"; these will be more thoroughly tackled in the next edition.

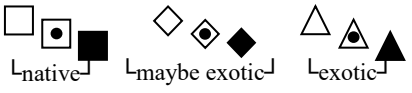
Identification Notes: This key makes as much use as possible of vegetative characters, geography, and capsule characters; capsules are generally available for longer during the year than flowers, and even when plants are in flower, last year's capsules can often be found.

Unkeyed taxa: *Rhododendron colemanii*, *Rhododendron coryi*

1 Leaves evergreen, coriaceous, entire; [rhododendrons and Labrador-tea].
  3 Lower surface of leaves not punctate with brown scales; larger leaves 10-30 cm long; [subgenus *Hymenanthes*, section *Ponticum*, subsection *Pontica*]. ..... ***Rhododendron catawbiense***
  3 Lower surface of leaves punctate with brown scales; larger leaves 6-12 cm long; [subgenus *Rhododendron*, section *Rhododendron*, subsection *Caroliniana*]. ..... ***Rhododendron minus***
1 Leaves deciduous, membranaceous, ciliate or serrulate; [azaleas, minniebush, and rhodora].
  11 Outer (abaxial) surface of the vegetative bud scales densely pubescent; flowers appearing before or with the leaves (at least some of the leaves still folded or the vegetative bud scales still present) (except *R. viscosum*).
    12 Capsule cylindroid, (3-) 4-5× as long as broad.
      13 Corolla yellow-orange to orange-red; upper corolla lobe with a contrasting blotch; [s. GA west to se. MS] ..... ***Rhododendron austrinum***
      13 Corolla white to pink; upper corolla lobe uniform in color (lacking a contrasting blotch); [collectively widespread in our area].
        14 Corolla tube narrow and somewhat abruptly expanding into the lobes, the lobes distinctly shorter than the tube; pedicels usually eglandular (occasionally glandular), (4-) 5-10 (-13) mm long; leaves inconspicuously ciliate, the cilia appressed to the leaf margin; capsule densely covered with nonglandular hairs; flowering Mar-May; [widely distributed from s. NC and n. TN southward] ..... ***Rhododendron canescens***
        14 Corolla tube broader, gradually expanding into the lobes, the lobes about as long as or longer than the tube; pedicels usually glandular, (7-) 10-16 (-26) mm long; leaves conspicuously ciliate, the cilia diverging from the leaf margin; capsule glabrous or sparsely pubescent, the hairs at least partly gland-tipped; flowering May-Jun; [Mountains and upper Piedmont from n. NC (and rarely ne. AL) northward] ..... ***Rhododendron prinophyllum***
    12 Capsule ovoid, 2-3 (-4)× as long as broad (if capsules absent, try both leads).
      16 Flowers appearing after the leaves have expanded (essentially all of the leaves unfolded, and the vegetative bud scales absent), typically May (Coastal Plain, low elevation, or south) to Aug (mountains, high elevation, or north)
        17 Shrubs to 7 m tall; floral winter bud scales 15-20, at least the inner acute and aristate; corolla tube glabrous within, > 2× as long as the lobes; [primarily Coastal Plain] ..... ***Rhododendron serrulatum***
        17 Shrubs 1-2 (-5) m tall; floral winter bud scales 8-12 (-15), rounded (-mucronate) apically; corolla tube pubescent within, < 2× as long as the lobes; [more widespread] ..... ***Rhododendron viscosum var. viscosum***
      16 Flowers appearing before or with the leaves (at least some of the leaves still folded or the vegetative bud scales still present), typically Apr-May (unless stimulated by fire or weather). ..... ***Rhododendron prinophyllum***
  11 Outer (abaxial) surface of the vegetative bud scales glabrous or sparsely pubescent; flowers appearing before, with, or after the leaves.
    19 Capsule cylindric, (3-) 4-5 × as long as broad; flowers appearing before or with the leaves (at least some of the leaves still folded or the vegetative bud scales still present).
      20 Corolla white, with a contrasting yellowish blotch on the upper lobe; [se. TN and w. GA westward] ..... ***Rhododendron alabamense***
      20 Corolla deep pink (rarely white or nearly so), lacking a contrasting blotch on the upper lobe; [widespread in our area] ..... ***Rhododendron periclymenoides***
    19 Capsule ovate, 2-3.5× as long as broad; flowers appearing before, with, or after the leaves.
      21 Corolla white to pink (sometimes with yellow blotches).
        22 Sepals 1.5-5 mm long; [primarily Appalachian: ne. PA and se. KY south to sc. NC, w. SC, c. GA, and c. AL] ..... ***Rhododendron arborescens***
        22 Sepals 0.1-1 mm long; [collectively widespread].
          24 Shrubs to 7 m tall; floral winter bud scales 15-20, at least the inner acute and aristate; corolla tube glabrous within, > 2× as long as the lobes; [primarily Coastal Plain] ..... ***Rhododendron serrulatum***
          24 Shrubs 1-2 (-5) m tall; floral winter bud scales 8-12 (-15), rounded (-mucronate) apically; corolla tube pubescent within, < 2× as long as the lobes; [more widespread] ..... ***Rhododendron viscosum var. viscosum***
      21 Corolla predominantly yellow, orange, or orange-red.
        25 Flowers appearing before or with the leaves. ..... ***Rhododendron calendulaceum***
        25 Flowers appearing after the leaves have expanded.
          27 Twigs glabrous; [south of ec. AL and wc. GA] ..... ***Rhododendron prunifolium***
          27 Twigs pubescent with multicellular hairs; [e. KY and w. VA south to ec. TN, n. GA, and ne. AL; apparently disjunct in the Piedmont of SC]
            28 Shrubs upright, not stoloniferous; corolla tube relatively wide, usually glandular-pubescent, yellow to orange or red; flower bud scales yellow-green (rarely with a brownish tinge) ..... ***Rhododendron calendulaceum***
            28 Shrubs slightly to strongly stoloniferous; corolla tube relatively narrow, usually not glandular-pubescent, deep orange to red; flower bud scales brownish or at least brown-margined ..... ***Rhododendron cumberlandense***

Rhododendron alabamense Rehder. ALABAMA AZALEA. **Hab:** Moist slopes, bluffs, streambanks. **Dist:** W. GA and Panhandle FL west through AL to e. MS. **Phen:** Mar-Apr. **Comm:** *R. alabamense* is reported for Calhoun County, SC (Radford, Ahles, & Bell 1968), but this record actually represents the more recently described *R. eastmanii*. **Syn:** = Fl5, FNA8, K1, K3, K4, Tn, WH3, Kron (1993), Luteyn et al (1996), Zhou et al (2008); = *Azalea alabamensis* (Rehder) Small – S.

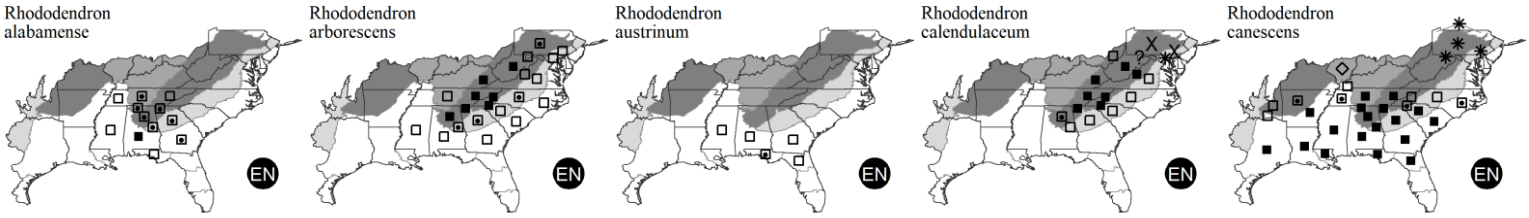
Rhododendron arborescens (Pursh) Torrey. SWEET AZALEA, SMOOTH AZALEA. **Hab:** Rocky riversides, wooded stream banks, swamps, high elevation forests, shrub balds. **Dist:** Primarily Appalachian: ne. PA and se. KY south to sc. NC, w. SC, c. GA, and c. AL. **Phen:** Late May-Jul; Jul-Oct. **Syn:** = C, F, FNA8, G, K1, K3, K4, Pa, RAB, Tn, Va, W, WV, Horn (2019), Kron (1993), Luteyn et al (1996); = *Azalea arborescens* Pursh – S. NatureServe G4G5 (Apparently Secure).

Key to Map Symbology: 
* : waif
EN : endemic
H : historic
N : no
P : planted
? : questionable
X : extirpated

Rhododendron austrinum (Small) Rehder. FLORIDA FLAME AZALEA. **Hab:** Hammocks, bluffs, floodplain forests. **Dist:** Sc. GA and ne. FL west to s. AL and se. MS (Kron 1993); also reported for e. GA (Jones & Coile 1988). **Phen:** Mar. **Tax:** See Miller (2011) for details about this species. **Syn:** = Fl5, FNA8, K1, K3, K4, WH3, Kron (1993), Luteyn et al (1996), Zhou et al (2008); = *Azalea austrina* Small – S. NatureServe G3 (Vulnerable).

Rhododendron calendulaceum (Michaux) Torrey. FLAME AZALEA. **Hab:** Deciduous forests, particularly on mountain slopes, grassy balds. **Dist:** Largely Appalachian: s. PA and s. OH to c. GA and e. TN. **Phen:** May-Jun; Jun-Sep. **Tax:** This is a tetraploid species; various theories have been advanced about the origin of this polyploid chromosome complement. Kron (1993) argues that the evidence best fits an allopolyploid derivation of *R. calendulaceum*, involving hybridization between ancestors of *R. cumberlandense* and *R. prinophyllum*. Late-flowering, high elevation "orange azaleas", sometimes referred to as the "high altitude, late phase of Flame Azalea" are poorly understood and need additional study, but appear to belong here rather than with *R. cumberlandense*. **Syn:** = C, F, FNA8, G, K1, K3, K4, NE, NY, Pa, RAB, Tn, Va, W, WV, Horn (2019), Kron (1993), Luteyn et al (1996), Zhou et al (2008); = *Azalea calendulacea* Michaux – S. NatureServe G5 (Secure).

Rhododendron canescens (Michaux) Sweet. PIEDMONT AZALEA, SOUTHERN PINXTER AZALEA, WILD AZALEA. **Hab:** Swamps, pocosins, and pine savannas. **Dist:** Se. and sc. NC, n. TN, se. KY, s. IL, and e. OK, south to n. peninsular FL and se. TX. **Phen:** Mar-early May; Sep-Oct. **Syn:** = Ar, C, F, Fl5, FNA8, G, GW2, Il, K3, K4, RAB, Tn, Tx, W, WH3, Horn (2019), Kron (1993), Luteyn et al (1996); > *Azalea candida* Small – S; > *Azalea canescens* Michaux – S; > *Rhododendron canescens* var. *candidum* (Small) Rehder – K1; > *Rhododendron canescens* var. *canescens* – K1; > *Rhododendron canescens* var. *subglabrum* Rehder – K1.



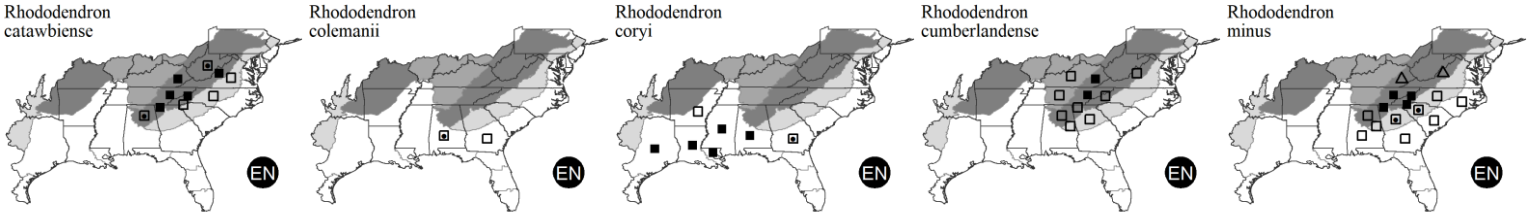
Rhododendron catawbiense Michaux. PINK LAUREL, CATAWBA RHODODENDRON, MOUNTAIN ROSEBAY. **Hab:** Rocky summits, shrub balds, acid ridges and slopes (mostly at high elevations), north-facing bluffs in the Piedmont, and sometimes in mesic situations in the Mountains. **Dist:** A Southern Appalachian endemic: VA and KY south to GA and AL, with scattered disjunct populations in the Piedmont and extreme upper Coastal Plain. **Phen:** Apr (in the Piedmont and Coastal Plain)-Jun; Jul-Oct. **Comm:** The disjunct populations in central NC are discussed by Coker (1919), who named them forma *insulare* on the basis of "the larger and broader leaves and … the longer flowers." *R. catawbiense* is apparently most closely related to *R. macrophyllum* D. Don ex G. Don of nw. North America (Milne 2004). **Syn:** = C, F, FNA8, G, K1, K3, K4, NE, RAB, S, Tn, Va, W, WV, Chamberlain (1982), Luteyn et al (1996). NatureServe G5 (Secure).

Rhododendron colemanii R.F. Miller. RED HILLS AZALEA. **Hab:** Moist hammocks, moist bluffs, along streams. **Dist:** Endemic to upper Coastal Plain areas of AL and w. GA. **Phen:** Early-mid May. **Tax:** See Zhou et al. (2008) for more detailed information. Tetraploid. {not yet keyed}. **Syn:** = K3, K4, Zhou et al (2008). NatureServe G3 (Vulnerable).

Rhododendron coryi Shinners. **Hab:** Longleaf pine savanna ecotones to bayheads. **Dist:** S. GA west to e. TX, in the Coastal Plain. **Syn:** = Tx; < *Azalea viscosa* Linnaeus – S; < *Rhododendron viscosum* (Linnaeus) Torrey – Fl5, FNA8, GW2, K1, K3, K4, WH3, Luteyn et al (1996).

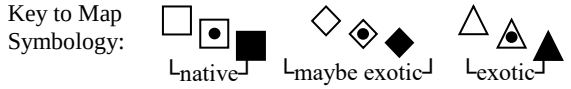
Rhododendron cumberlandense E.L. Braun. CUMBERLAND AZALEA. **Hab:** Balds and exposed or moist slopes. **Dist:** A Southern Appalachian endemic, primarily west of the Blue Ridge: e. KY and w. VA south to ec. TN, n. GA, and ne. AL; reports from the Piedmont of SC (Kron 1993) are based on *R. eastmanii*. **Phen:** Jun-Jul; Jul-Oct. **Comm:** A diploid species. **Syn:** = F, FNA8, G, K1, K3, K4, Tn, Va, W, Kron (1993), Luteyn et al (1996); = *Rhododendron bakeri* (Lemmon & McKay) Hume – C, misapplied. NatureServe G4? (Apparently Secure).

Rhododendron minus Michaux. GORGE RHODODENDRON, PUNCTATUM. **Hab:** Rocky slopes, escarpment gorges, rocky areas in the Piedmont, longleaf pine sandhill bluffs in the Coastal Plain. **Dist:** Sc. NC and nw. NC south to sc. SC, sw. GA, and s. AL. This species ranges up to granite domes along the Blue Ridge Escarpment (such as Whiteside Mountain, Macon and Jackson counties, NC). Also in extreme sw. VA and se. KY, where probably introduced. **Phen:** (Dec-) Apr (in the Piedmont and Coastal Plain)-Jun (at the higher elevations along the Blue Ridge escarpment); Sep-Oct. **Syn:** = K1, K3, S, Davidian (1982), Horn (2019); < *Rhododendron minus* Michaux – RAB, Tn, W; < *Rhododendron minus* Michaux var. *minus* – FNA8, Cullen (1980), Duncan & Pullen (1962), Luteyn et al (1996).



Rhododendron periclymenoides (Michaux) Shinners. WILD AZALEA, PINXTERFLOWER, PINXTERBLOOM AZALEA, ELECTION PINK. **Hab:** Moist to dry slopes and streambanks. **Dist:** Fairly widespread in e. United States, ranging from MA, NY, and s. OH, south to GA and AL. **Phen:** Late Mar-May; Sep-Oct. **Comm:** See Shinners (1962) for explanation of the change from the name *R. nudiflorum*. **Syn:** = C, FNA8, Il, K1, K3, K4, NE, NY, Pa, Tn, Va, W, Horn (2019), Kron (1993), Luteyn et al (1996); = *Azalea nudiflora* Linnaeus – S; = *Rhododendron nudiflorum* (Linnaeus) Torrey – F, G, GW2, RAB, WV. NatureServe G5 (Secure).

Rhododendron prinophyllum (Small) Millais. ELECTION PINK, EARLY AZALEA, ROSESHELL AZALEA. **Hab:** Upland forests (especially under *Quercus montana* and *Quercus rubra*), xeric pine and oak woodlands. **Dist:** NH, NY, and ne. OH, south to w. NC, nc. KY, and s. OH; disjunct in ne. AL and c. TN; also disjunct from s. IL and s. MO south to AR and e. OK. The only known location in NC is on Bluff Mountain, Ashe County (on a rocky plateau over amphibolite at about 1300m elevation); Kron (1993) also cites a collection from Transylvania County, but this is based on a labeling error. **Phen:** May-Jun; Aug-Oct. **Tax:** See Shinners (1962i) for explanation of the change from the name *R. roseum*, later debated back and

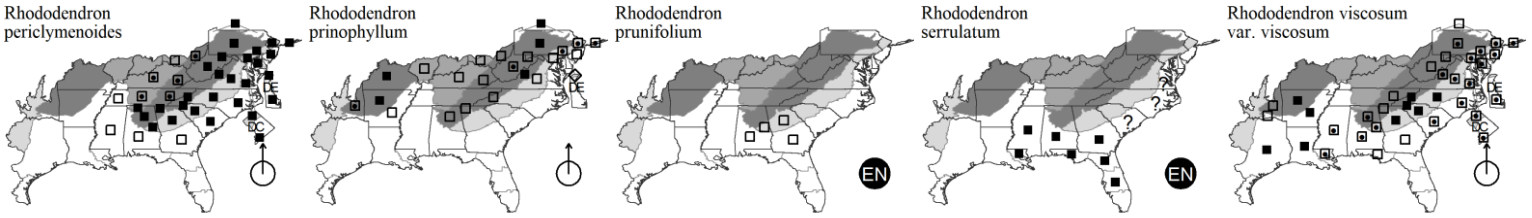


forth by others. **Syn:** = Ar, C, FNA8, Il, K1, K3, K4, NE, NY, Pa, Va, W, Kron (1993), Luteyn et al (1996); = *Azalea prinophylla* Small – S; = *Rhododendron roseum* (Loiseleur) Rehder – F, G, RAB, WV. NatureServe G5 (Secure).

Rhododendron prunifolium (Small) Millais. PLUMLEAF AZALEA. **Hab:** Mesic ravine forests and streambanks. **Dist:** Endemic to a small area along the AL-GA border, in se. AL (Kron 1993) and sw. and wc. GA (Jones & Coile 1988). **Syn:** = FNA8, K1, K3, K4, Kron (1993), Luteyn et al (1996); = *Azalea prunifolia* Small – S. NatureServe G3 (Vulnerable).

Rhododendron serrulatum (Small) Millais. SWAMP AZALEA, CLAMMY AZALEA. **Hab:** Bogs, pocosins, wet pine savannas. **Dist:** S. GA south to c. peninsular FL, west to e. LA. Its distribution northwards into the Carolinas and se. VA is uncertain. **Phen:** Apr-Jun; Jul-Oct. **Tax:** This taxon seems to warrant specific rank, based on morphology and distribution. It is sometimes treated at variety rank or lumped into *R. viscosum* (see synonymy). **Syn:** = C, F, G; = *Azalea serrulata* Small – S; = *Rhododendron viscosum* (Linnaeus) Torrey var. *serrulatum* (Small) H.E. Ahles – RAB; < *Rhododendron viscosum* (Linnaeus) Torrey – Fl5, FNA8, GW2, K1, K3, Va, W, WH3, WV, Kron (1993), Luteyn et al (1996); >< *Rhododendron viscosum* (Linnaeus) Torrey – Horn (2019).

Rhododendron viscosum (Linnaeus) Torrey *var. **viscosum***. SWAMP AZALEA, CLAMMY AZALEA. **Hab:** Moist streambanks, shrub balds, and other moist habitats. **Dist:** ME and MY, WV, e. TN, n. AR, and ne. OK, south to c. peninsular FL and e. TX. **Phen:** Jun-Jul; Jul-Oct. **Syn:** >< *Azalea viscosa* Linnaeus – S; > *Rhododendron oblongifolium* (Small) Millais – Tx; < *Rhododendron viscosum* (Linnaeus) Torrey – Ar, C, F, Fl5, FNA8, G, GW2, K1, K3, K4, NE, NY, Pa, Va, W, WH3, WV, Horn (2019), Luteyn et al (1996); < *Rhododendron viscosum* (Linnaeus) Torrey var. *viscosum* – RAB.



Vaccinium Linnaeus 1753 (BLUEBERRY)

A genus of ca. 500 species, shrubs, lianas, and small trees, semicosmopolitan (centered in e. Asia and Malesia, absent from Australia). *Vaccinium* in our area is divided into 6 strongly differentiated sections, sometimes, as by Small, treated as separate genera. The taxonomy of *Vaccinium* remains unclear at all ranks (genus, species, infrataxon); divergence of opinion is obvious in the synonymy. For instance, Small (1933) recognizes 6 genera and 25 species for our area, Ahles in RAB (1968) recognizes 1 genus and 14 species (one with 2 varieties) (not including VA), and Vander Kloet (1988) recognizes 1 genus and 9 species. The highbush blueberries of section *Cyanococcus* are particularly difficult. Vander Kloet's extremely broad concept of the highbush blueberries as consisting of a single species, *V. corymbosum*, including *V. fuscatum* (*V. atrococcum* – RAB), *V. simulatum* ("*V. constablaei*" – RAB), *V. virgatum* (*V. amoenum* – RAB), *V. elliottii*, *V. formosum* (*V. australe*), and *V. caesariense* (and many other named taxa not recognized here) has been adopted by some recent authors, at least partly for its ease of application. I agree with Godfrey (1988), though, that *V. elliottii* has "such distinctiveness as to be recognizable in the field at a glance". The other taxa are less easily recognizable, but seem to have substantial morphological and phytogeographic integrity. The fairly frequent presence of hybrid individuals and populations can make identification frustrating, but I agree with Ward (1974) that "the genus *Vaccinium* ... is difficult but not in any way an irresolvable tangle of intergrading populations. The vast bulk of individuals encountered in the field may be assigned, as with any non-apomict genus, to a relatively few, discrete, and wholly recognizable species". Many of the taxa included in *V. corymbosum* by Vander Kloet (1988) and Luteyn et al. (1996) occur together in combinations of two to four, are immediately recognizable in the field, bloom at different times, and have different flower, fruit, and leaf morphology. Failure to recognize multiple entities within the highbush blueberries results in the taxonomic homogenization of the diversity of the group and obscures important phytogeographic patterns. Our area, with 20 species (24 taxa) in 6 sections, has a greater diversity of *Vaccinium* than any other comparably sized area in North America. References: Ashe (1931); Camp (1945); Luteyn et al (1996); Rayner & Henderson (1980); Redpath et al (2022); Smith et al (2015); Stevens et al. in Kubitzki et al (2004); Uttal (1986b); Uttal (1986c); Uttal (1987); Vander Kloet & Dickenson (1999); Vander Kloet & Dickinson (2009); Vander Kloet & Hall (1981); Vander Kloet (1977); Vander Kloet (1977, 1978a, 1978b, 1980, 1982, 1983a, 1983b); Vander Kloet (1978a); Vander Kloet (1978b); Vander Kloet (1980); Vander Kloet (1982); Vander Kloet (1983a); Vander Kloet (1983b); Vander Kloet (1988); Vander Kloet (2009) in FNA8 (2009); Ward (1974).

3 Twigs of the season verrucose (the surface abundantly covered with small bumps, readily visible without magnification); [blueberries; section *Cyanococcus*]..... ***Key C***

3 Twigs of the season not verrucose.

5 Mature leaves green (or glaucous), glandular beneath, mostly elliptic to round, generally 1.5-4.5 cm long; corolla broad-urceolate to narrow-campanulate, the stamens included; berry black, lustrous, 5-9 mm long; [farkleberry; section *Batodendron*]..... ***Vaccinium arboreum***

5 Mature leaves pale and glaucous, eglandular beneath, mostly elliptic, 3-10 cm long; corolla campanulate, the stamens long-exserted; berry green, yellow, pink, or purple, usually glaucous, 7-18 mm long; [deerberries; section *Polycodium*]..... ***Key D***

Key C - blueberries, section *Cyanococcus*

1 Shrubs rhizomatous, forming clonal colonies, the upright stems < 1 m tall (and often < 0.5 m tall); ["lowbush blueberries"].

2 Leaves evergreen, 5-15 mm long (rarely to 30 mm long on fire sprouts), subcoriaceous, glossy dark-green or dull blue-green; [se. SC southward to s. FL, west to e. LA].

3 Plant glaucous and bluish-green throughout; leaf undersurface lacking scattered glandular hairs; [s. GA south to s. peninsular FL, west to e. LA]..... ***Vaccinium darrowii***

3 Plant dark green throughout; leaf undersurface with scattered glandular hairs, these sometimes very few by late in the season (best seen in the field by folding a leaf, holding the fold up to the light, and using a 10× lens); [ne. SC southward to n. FL, west to s. AL]..... ***Vaccinium myrsinites***

Key to Map Symbology: □ ⊡ ■ └native┘ ◇ ◈ ◆ └maybe exotic┘ △ ◬ ▲ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated

2 Leaves deciduous to semi-evergreen, herbaceous, generally > 20 mm in length, dull to somewhat glossy and medium green; [collectively widespread in our area].
4 Lower surfaces of the leaves with red stipitate glands (sometimes pubescent as well when young); berry usually black and lustrous; [Coastal Plain and lower Piedmont]..... ***Vaccinium tenellum***
4 Lower surfaces of the leaves eglandular, pubescent or glabrous; berry either blue and glaucous, or black and glandular-hirsute; [collectively widespread in our area].
..... ***Vaccinium pallidum***

1 Shrubs crown-forming, single-stemmed or several-stemmed from the base, the upright stems generally > 1 m tall (often 2-3 m tall, and rarely to 7 m); ["highbush blueberries"].
9 Leaves with stipitate glands on the lower surface; [Coastal Plain of SC and s. NC south to FL, west to TX] ..... ***Vaccinium virgatum***
9 Leaves lacking stipitate glands on the lower surface (variously glabrous to pubescent with eglandular hairs); [collectively widespread].
10 Leaves 0.7-3.5 cm long, 0.3-1.5 cm wide, with serrulate margins; twigs slender, numerous ..... ***Vaccinium elliottii***
10 Leaves 3-10 cm long, 1.5-4.5 cm wide, with entire, ciliate, or serrulate margins; twigs stouter, fewer.
11 Young twigs glabrous; leaf surfaces glabrous; leaf margins eciliate or ciliate.
..... ***Vaccinium formosum***
11 Young twigs puberulent, at least in lines; leaf surfaces more-or-less pubescent; leaf margins ciliate (rarely eciliate).
14 Puberulence of the young twigs merely in 2 lines; [Mountains and montane sites in the upper Piedmont].
..... ***Vaccinium simulatum***
14 Puberulence of the young twigs extending around their circumference (not merely in 2 lines); [collectively widespread in our area].
..... ***Vaccinium fuscatum***

Key D - deerberries, section *Polycodium*

2 Leaves strongly white-glaucous beneath; stamens 4-6 mm long.
3 Bracts of the inflorescence nearly as large as normal foliage leaves; [of the Coastal Plain from se. NC southward] ..... ***Vaccinium stamineum var. caesium***
3 Bracts of the inflorescence much smaller than normal foliage leaves; [of the Mountains and Piedmont]..... ***Vaccinium stamineum var. 2***
2 Leaves green beneath (often slightly paler but not at all glaucous); stamens 5-8 mm long.
5 Hypanthium and fruit pubescent..... ***Vaccinium stamineum var. sericeum***
5 Hypanthium and fruit glabrous..... ***Vaccinium stamineum var. stamineum***

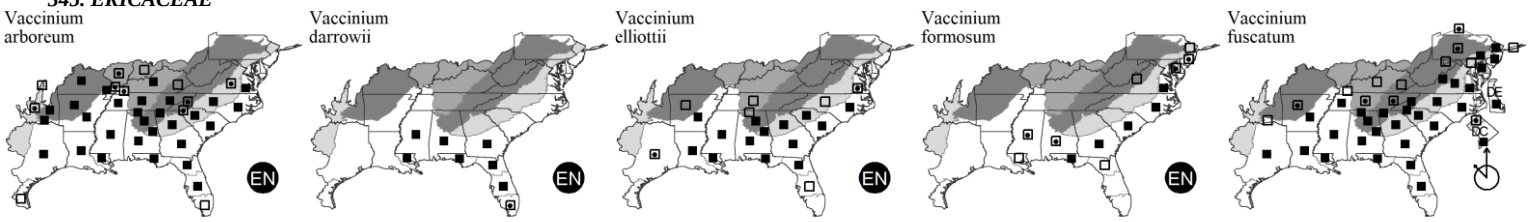
Vaccinium arboreum Marshall. FARKLEBERRY, SPARKLEBERRY. **Hab:** Rocky or sandy woodlands, bluffs, and cliffs, usually xeric and often fire-maintained, and unlike most other *Vaccinium*, often on mafic, ultramafic, or calcareous rocks. **Dist:** This species is widely distributed in se. North America, from TX and FL north to MO, IN, KY, and VA. **Phen:** Late Apr-Jun; Sep-Oct. **Tax:** V. arboreum is a diploid species (2x=24) (Redpath et al. 2022). Var. *glaucescens* (Greene) Sargent may be worthy of recognition; it differs from var. *arborescens* in its subglaucous to conspicuously blue-green (vs. dark green) leaves and the bracts at the base of the pedicels nearly equal in size and shape to the leaves (vs. bracts distinctly smaller and often also different in shape than the leaves). **ID Notes:** *Vaccinium arboreum* can be a small tree, to 35 cm DBH and 10 m tall. The leaves are coriaceous and semi-evergreen, often being retained for much or all of the winter, especially in the southern part of our area. **Syn:** = Ar, C, Fl5, FNA8, G, GrPl, K1, K3, K4, NcTx, RAB, Tn, Va, W, WH3, Camp (1945), Luteyn et al (1996), Redpath et al (2022), Uttal (1987), Vander Kloet (1988); = *Batodendron arboreum* (Marshall) Nuttall – S; > *Vaccinium arboreum* var. *arboreum* – F, Il, Tx; > *Vaccinium arboreum* var. *glaucescens* (Greene) Sargent – F, Il, Tx.

Vaccinium darrowii Camp. DARROW'S BLUEBERRY. **Hab:** Pine flatwoods. **Dist:** S. GA south to s. peninsular FL and west to e. LA. **Phen:** Mar. **Tax:** *Vaccinium darrowii* is a diploid species, 2x=24 (Redpath et al. 2022). **Syn:** = Fl5, FNA8, K1, K3, K4, Tx, Va, WH3, Camp (1945), Luteyn et al (1996), Redpath et al (2022), Vander Kloet (1988); = *Cyanococcus myrsinites* (Lamarck) Small var. *glaucum* A. Gray – S; = *Vaccinium darrowi* – GW2, orthographic variant. NatureServe G5 (Secure).

Vaccinium elliottii Chapman. MAYBERRY. **Hab:** Bottomlands, slopes, sandy river terraces, natural levees. **Dist:** Primarily a Coastal Plain species, *V. elliottii* ranges from se. VA south to n. FL, west to se. TX and AR; disjunct in Coffee County, TN (Chester, Wofford, & Kral 1997). **Phen:** Jan-Apr; May-Jun. **Tax:** Unquestionably distinct at species rank from other members of the *Vaccinium corymbosum* complex. *Vaccinium elliottii* is a diploid species, 2x=24 (Redpath et al. 2022). **Syn:** = Ar, C, F, G, GW2, K1, K3, K4, RAB, Tn, Tx, Va, Camp (1945), Redpath et al (2022), Uttal (1987); = *Cyanococcus elliottii* (Chapman) Small – S; < *Vaccinium corymbosum* Linnaeus – Fl5, FNA8, WH3, Luteyn et al (1996), Vander Kloet (1988).

Vaccinium formosum H.C. Andrews. SOUTHERN HIGHBUSH BLUEBERRY, SWAMP HIGHBUSH BLUEBERRY. **Hab:** Bogs, swamps (especially blackwater, or at least where away from strong alluvial influence), seepages, depression ponds (dolines), other moist ground. **Dist:** NJ south to n. FL and s. AL (and apparently to e. LA), primarily on the Coastal Plain. **Phen:** Late Feb-May; Jun-Aug. **Tax:** *Vaccinium formosum* is a tetraploid species, 4x=48 (Redpath et al. 2022). **Comm:** This species is the primary genetic source of the cultivated highbush blueberries. It has the largest and arguably the highest quality fruit of the native highbush blueberries. **Syn:** = K1, K3, K4, Va, Uttal (1987); = *Cyanococcus virgatus* (Aiton) Small – S, misapplied; = *Vaccinium australe* Small – G, GW2, Camp (1945); < *Vaccinium corymbosum* Linnaeus – C, Fl5, FNA8, NY, Pa, RAB, WH3, Luteyn et al (1996), Redpath et al (2022), Vander Kloet (1988).

Vaccinium fuscatum Aiton. HAIRY HIGHBUSH BLUEBERRY, BLACK HIGHBUSH BLUEBERRY. **Hab:** Bogs, pocosins, swamps, also in uplands. **Dist:** ME and NB to s. MI, south to sc. peninsular FL and e. TX. **Phen:** Feb-May; Jun-Aug. **Tax:** *Vaccinium fuscatum* is a diploid species, 2x=24 (Redpath et al. 2022). **Syn:** = Ar, GW2, Il, K1, K3, K4, NE, Tn, Va, W, Camp (1945), Redpath et al (2022), Uttal (1987); = *Vaccinium atrococcum* (Gray) Heller – F, G, RAB, Camp (1945); = *Vaccinium corymbosum* Linnaeus var. *atrococcum* A. Gray – Mi; > *Cyanococcus atrococcus* (A. Gray) Small – S; > *Cyanococcus fuscatus* (Aiton) Small – S; > *Vaccinium arkansanum* Ashe – Tx; < *Vaccinium corymbosum* Linnaeus – C, Fl5, FNA8, NY, Pa, WH3, Luteyn et al (1996), Vander Kloet (1988); ? *Vaccinium marianum* S. Watson – G.



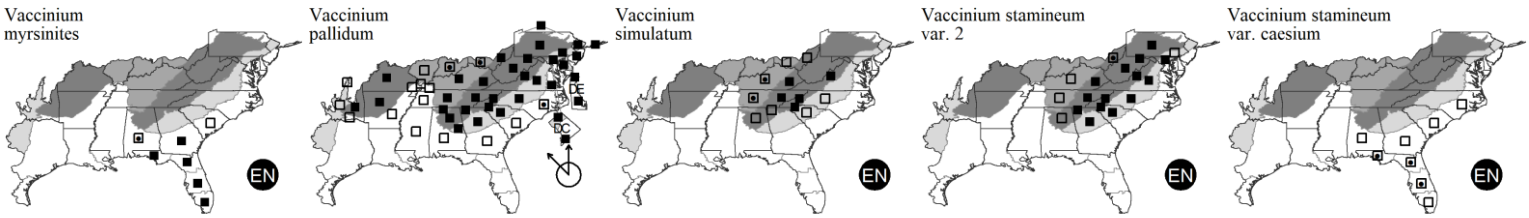
Vaccinium myrsinites Lamarck. SOUTHERN EVERGREEN BLUEBERRY. **Hab:** Pine flatwoods. **Dist:** Ne. SC (Horry County) south to s. peninsular FL, west to s. AL. **Phen:** Mar-Apr; May-Jun. **Tax:** *Vaccinium myrsinites* is a tetraploid species, 4x=48 (Redpath et al. 2022). **ID Notes:** *V. myrsinites* is readily distinguished from species other than *V. darrowii* by the following combination of characteristics: clonal shrub with upright stems usually < 50 cm tall, the young twigs verrucose, leaves evergreen, mostly 5-15 mm long and 2-10 mm wide, lower surface of young leaves with stout glandular hairs. Farther south, it can be difficult to distinguish from the closely related *V. darrowii* Camp (see key), with which it often co-occurs in their area of overlap. **Syn:** = Fl5, FNA8, GW2, K1, K3, K4, RAB, WH3, Camp (1945), Luteyn et al (1996), Redpath et al (2022), Vander Kloet (1988); = *Cyanococcus myrsinites* (Lamarck) Small var. *myrsinites* – S. NatureServe G5 (Secure).

Vaccinium pallidum Aiton. HILLSIDE BLUEBERRY, DRYLAND BLUEBERRY. **Hab:** Forested slopes, usually rather xeric. **Dist:** Widespread in e. United States, *V. pallidum* is centered in the Appalachians and Ozarks. **Phen:** Mar-Apr; Jun-Jul. **Tax:** Vander Kloet (1978, 1988) and Uttal (1987) do not favor Camp's (1945) separation of *V. pallidum* and *V. vacillans*. If the two taxa are combined (as here), *V. pallidum* has nomenclatural priority. *V. pallidum* is primarily diploid; Redpath et al. (2022) report diploid and tetraploid counts for *V. pallidum*, but the tetraploid counts likely are based on what is here treated as a separate species, *V. altomontanum*. See *V. altomontanum* for discussion of its relationship to *V. pallidum*. **Syn:** = Ar, C, GrPl, K1, K3, K4, Mi, NE, NY, Pa, Va, W, WV, Luteyn et al (1996), Uttal (1987), Vander Kloet (1978b), Vander Kloet (1988); = *Vaccinium vacillans* Kalm ex Torrey – RAB; > *Cyanococcus pallidus* (Aiton) Small – S; > *Cyanococcus vacillans* (Kalm ex Torrey) Rydberg – S; < *Vaccinium pallidum* Aiton – FNA8, Tn, Redpath et al (2022); > *Vaccinium pallidum* Aiton – F, G, Camp (1945); > *Vaccinium pallidum* var. *crinitum* (Fernald) Mohlenbrock – Il; > *Vaccinium pallidum* var. *pallidum* – Il; > *Vaccinium vacillans* Kalm ex Torrey – G, Camp (1945); > *Vaccinium vacillans* var. *crinitum* Fernald – F; > *Vaccinium vacillans* Torrey var. *vacillans* – F.

Vaccinium simulatum Small. MOUNTAIN HIGHBUSH BLUEBERRY. **Hab:** Forested slopes (northern hardwoods, spruce-fir forests), ridges, and shrub balds, at moderate and high elevations. **Dist:** A Southern and Central Appalachian endemic, *V. simulatum* ranges from e. KY and sw. VA south through w. NC and e. TN to n. GA and n. AL. **Phen:** Late Apr-early Jun; Jul-Aug. **Tax:** Redpath report diploid (2x=24) and tetraploid (2x=48) ploidy levels for what they interpret as this species. The name *V. constablaei* has been misapplied to this species, as by RAB; see *V. corymbosum* for a discussion of the correct application of *V. constablaei*. There is controversy as to whether V. constablaei and V. simulatum are actually the same taxon. *Vaccinium constablei* is a hexaploid species, 2x = 72 (Redpath et al. 2022). **Syn:** = G, K1, K3, K4, Va, Camp (1945), Uttal (1987); = *Cyanococcus simulatus* (Small) Small – S; > *Vaccinium constablaei* A. Gray – G, Redpath et al (2022), misapplied, & orthographic variant; < *Vaccinium corymbosum* Linnaeus – C, FNA8, Tn, W, Luteyn et al (1996), Vander Kloet (1988); > *Vaccinium simulatum* Small – Redpath et al (2022).

Vaccinium stamineum Linnaeus *var.* ***2***. APPALACHIAN DEERBERRY. **Hab:** Xeric to submesic woodlands and forests, including pine-oak/heath and shrub balds. **Dist:** PA south to GA, in the Appalachians and adjacent provinces. **Phen:** Apr-Jun; Aug-Oct. **Syn:** = *Polycodium candicans* Small – S, Ashe (1931); < *Vaccinium stamineum* – C, FNA8, Il, K1, K3, K4, Pa, Tn, Va, W, Luteyn et al (1996), Uttal (1987), Vander Kloet (1988); < *Vaccinium stamineum* Linnaeus var. *stamineum* – F, RAB, WV.

Vaccinium stamineum Linnaeus *var.* ***caesium*** (Greene) D.B. Ward. FLORIDA DEERBERRY, WHITELEAF DEERBERRY. **Hab:** Xeric woodlands. **Dist:** Se. NC south to c. peninsular FL, and west to s. AL. **Phen:** Mar-May; Aug-Oct. **Syn:** = Ward (1974); > *Polycodium ashei* Harbison – S; > *Polycodium floridanum* (Nuttall) Greene – S; > *Polycodium floridanum* var. *caesium* – Ashe (1931); > *Polycodium floridanum* var. *floridanum* – Ashe (1931); ? *Vaccinium caesium* Greene – F, Tx, (possibly misapplied); < *Vaccinium stamineum* – C, Fl5, FNA8, K1, K3, K4, W, WH3, Luteyn et al (1996), Uttal (1987), Vander Kloet (1988); < *Vaccinium stamineum* Linnaeus var. *stamineum* – RAB.



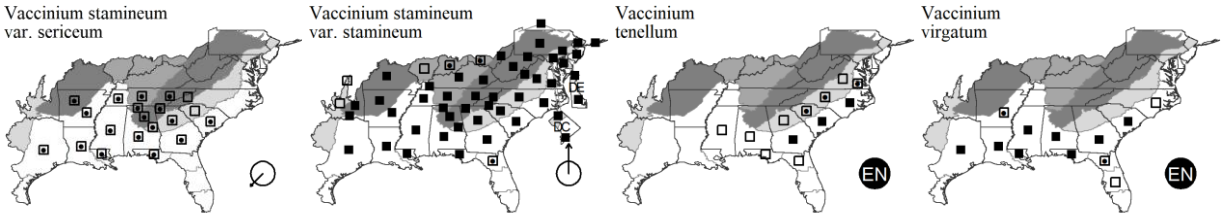
Vaccinium stamineum Linnaeus *var.* ***sericeum*** (C. Mohr) D.B. Ward. SOUTHERN DEERBERRY. **Hab:** Xeric woodlands. **Dist:** S. SC, w. NC, TN, and AR south to Panhandle FL and TX; disjunct in Mexico. **Phen:** Apr-Jun; Aug-Oct. **Syn:** = Ward (1974); = *Polycodium sericeum* (C. Mohr) C.B. Robinson – Ashe (1931); ? *Polycodium melanocarpum* (C. Mohr) Small – S, misapplied; ? *Vaccinium melanocarpum* (C. Mohr) C. Mohr ex Kearney – G, misapplied; < *Vaccinium stamineum* – Ar, C, Fl5, FNA8, K1, K3, Tn, Tx, W, WH3, Luteyn et al (1996), Uttal (1987), Vander Kloet (1988); ? *Vaccinium stamineum* var. *melanocarpum* C. Mohr – F, RAB, misapplied.

Vaccinium stamineum Linnaeus *var.* ***stamineum***. COMMON DEERBERRY. **Hab:** Xeric to submesic woodlands, forests, and rock outcrops (unlike most *Vaccinium*, often on mafic, ultramafic, or calcareous rocks). **Dist:** MA, NY, s. ON, and MO south to Panhandle FL and TX. **Phen:** Apr-Jun; Aug-Oct. **Tax:** *Vaccinium stamineum* (in the broad sense) is reported as a diploid species, 2x=24 (Redpath et al. 2022). **Syn:** = Ward (1974); >< *Polycodium candicans* Small – S; > *Polycodium neglectum* Small – S, Ashe (1931); > *Polycodium stamineum* (Linnaeus) Greene – S, Ashe (1931); > *Vaccinium neglectum* (Small) Fernald – G; < *Vaccinium stamineum* – Ar, C, Fl5, FNA8, GrPl, K1, K3, K4, NE, NY, Pa, Tn, Tx, Va, W, WH3, Luteyn et al (1996), Uttal (1987), Vander Kloet (1988); > *Vaccinium stamineum* var. *interius* (W.W. Ashe) Palmer & Steyermark – F, WV; > *Vaccinium stamineum* var. *neglectum* (Small) Deam – F, WV; < *Vaccinium stamineum* Linnaeus var. *stamineum* – RAB; > *Vaccinium stamineum* Linnaeus var. *stamineum* – F, WV.

Vaccinium tenellum Aiton. SOUTHERN DWARF BLUEBERRY, SMALL CLUSTER BLUEBERRY. **Hab:** Longleaf pine sandhills, pine flatwoods, other xeric woodlands. **Dist:** Though abundant in the Carolinas, *V. tenellum* is rather restricted, occurring as a common species from se. VA to c. GA, with a range extension (where it is scattered and rare) south and west to n. FL, s. AL, and se. MS. **Phen:** Late Mar-early May; Jun-Jul. **Tax:** *Vaccinium*

tenellum is a diploid species, 2x=24 (Redpath et al. 2022). **Syn:** = C, F, FNA8, G, K1, K3, K4, RAB, Va, Camp (1945), Luteyn et al (1996), Redpath et al (2022), Uttal (1987), Vander Kloet (1988); = *Cyanococcus tenellus* (Aiton) Small – S. NatureServe G5 (Secure).

Vaccinium virgatum Aiton. SWAMP BLUEBERRY, RABBITEYE BLUEBERRY. **Hab:** Pocosins and *Chamaecyparis* swamps, also in various drier habitats, including turkey oak sandhills. **Dist:** A Southeastern Coastal Plain species, *V. virgatum* occurs from se. NC south to FL and west to e. TX. **Phen:** Mar-Apr; May-Jun. **Tax:** *Vaccinium virgatum* is a hexaploid species, 6x=72 (Redpath et al. 2022). **ID Notes:** Uttal (1989) comments: "In a notoriously difficult genus, *Vaccinium virgatum* is a snap to identify because its oval shiny leaves are serrate and bear on their undersurface blackish glands similar to those borne by its dwarf relative *V. tenellum*. *Vaccinium virgatum* is much grosser in dimensions than *V. tenellum*. Both are rhizomatous and often grow together, but are easily distinguished. The corollas of *Vaccinium virgatum* are narrowly cylindro-urceolate, up to 12 mm long, white, or often deep pink and showy. The fruit is shiny to dull black, rarely glaucous and are usually insipid, but in certain plants they are sweet. The latter are sometimes found on a glabrescent, firm-leaved phase found in the lower Savannah River basin." **Syn:** = Ar, GW2, K1, Redpath et al (2022); = *Cyanococcus amoenus* (Aiton) Small – S; = *Vaccinium amoenum* Aiton – RAB; > *Vaccinium amoenum* Aiton – Tx, Camp (1945); > *Vaccinium ashei* Reade – Camp (1945); < *Vaccinium corymbosum* Linnaeus – K3, K4, WH3, Luteyn et al (1996), Vander Kloet (1988); > *Vaccinium virgatum* Aiton – Tx, Camp (1945).



352. RUBIACEAE A.L. de Jussieu 1789 (MADDER FAMILY) [in GENTIANALES]

A family of about 630-650 genera and 10,200-13,000 species, trees, shrubs, vines, and rarely herbs, cosmopolitan, but especially diverse in tropical and subtropical areas. Subfamily and tribe classification follows Bremer & Eriksson (2009).References: Bremer & Eriksson (2009); Paudyal et al (2018); Rogers (1987); Rogers (2005).

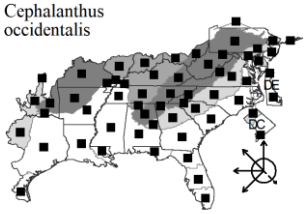
Subfamily Cinchonoideae
Tribe 1.1 Chiococceae: *Chiococca, Catesbaea, Erithalis, Exostema, Strumpfia*
Tribe 1.3 Guettardeae: *Guettarda*
Tribe 1.5 Hamelieae: *Hamelia*
Tribe 1.8 Naucleeae: *Cephalanthus*
Subfamily Ixoroideae
Tribe Condamineeae: *Pinckneya*
Tribe Ixoreae: *Ixora*
Tribe Gardenieae: *Gardenia, Casasia, Randia*
Subfamily Rubioideae
Tribe 3.8 Spermacoceae: *Pentodon, Houstonia, Oldenlandia, Richardia, Spermacoce, Borreria, Mitracarpus, Hexasepalum, Diodia, Ernodea*
Tribe 3.11 Paederieae: *Paederia*
Tribe 3.13 Rubieae: *Galium*
Tribe 3.18a Mitchelleae: *Mitchella*
Tribe 3.19 Psychotrieae: *Psychotria*
Tribe 3.20 Morindeae: *Morinda*

1 Trees, shrubs, or woody vines.
  2 Prostrate or climbing woody vine (liana), rooting at nodes; corolla lilac; [alien]; [subfamily *Rubioideae*; tribe *Paederieae*] ..... ***Paederia***
  2 Shrub or tree (sometimes somewhat scrambling, but not rooting at nodes); corolla white, green, maroon, or orange-red; [native or alien].
    3 Inflorescence spherical or globular; [collectively widespread] ..... ***Cephalanthus occidentalis***
    3 Inflorescence cymose, thyrsoid, or corymbose; [Coastal Plain, from s. SC southward]. ..... ***Gardenia jasminoides***
1 Herbs (or creeping subshrubs in *Mitchella*).
  9 Leaves whorled; [subfamily *Rubioideae*; tribe *Rubieae*] ..... ***Galium***
  9 Leaves opposite
    10 Flowers paired, the ovaries connate and developing into a single fleshy red fruit; leaves roundish; creeping subshrub; [subfamily *Rubioideae*; tribe *Mitchelleae*] ..... ***Mitchella repens***
    10 Flowers single or in inflorescences with multiple flowers, the fruits either dry or fleshy and yellowish or black; leaves various; herb; [subfamily *Rubioideae*; tribe *Spermacoceae*].
      11 Carpels with few to many seeds.
        12 Corolla 5-lobed ..... ***Pentodon pentandrus***
        12 Corolla 4-lobed.

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

13 Capsule longer than the calyx tube; flowers blue, pink, or white ..... ***Houstonia***
13 Capsule not longer than the calyx tube; flowers white ..... ***Oldenlandia***
11 Carpels 1-seeded.
14 Flowers in dense, terminal, involucrate heads; flowers 4- or-6-lobed; styles 3 ..... ***Richardia***
14 Flowers in axillary or terminal clusters, or single in axils, not involucrate; flowers 4-lobed; styles 2.
15 Flowers usually solitary in leaf axils; fruit separating into 2 parts.
16 Sepals 4 and similar in size; style entire; [of dry habitats] ..... ***Hexasepalum***
16 Sepals 2 (or 4, and then markedly dimorphic); style cleft; [of moist to wet habitats] ..... ***Diodia***
15 Flowers in terminal and axillary clusters; fruits not separating into 2 parts.
17 Carpels opening transversely ..... ***Mitracarpus hirtus***
17 Carpels opening longitudinally ..... ***Spermacoce***

Cephalanthus Linnaeus 1753 (BUTTONBUSH)



A genus of about 6 species, of tropical and temperate America, Asia, and Africa (Rogers 1987). References: Ridsdale (1976); Rogers (1987).

Cephalanthus occidentalis Linnaeus. BUTTONBUSH. **Hab:** Streambanks, riverbanks, depressional wetlands, lakes, marshes, often in standing water. **Dist:** NL, ME, ON, MI, WI, MN, NE, NM, AZ, and CA south through Mexico to Guatemala and Honduras; Cuba (where uncertainly native). **Phen:** Jun-Jul. **Syn:** = Ar, Fl5, GrPl, K1, K3, K4, Meso4.2, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, Va, W, WH3, Ridsdale (1976), Rogers (1987); = *Cephalanthus occidentalis* var. *occidentalis* – GW2, including var. pubescens; > *Cephalanthus occidentalis* Linnaeus var. *californicus* Bentham – Tx; > *Cephalanthus occidentalis* var. *occidentalis* – C, F, G, Il, Tx; > *Cephalanthus occidentalis* var. *pubescens* – C, F, G, Il, Tx.

Diodia Linnaeus 1753

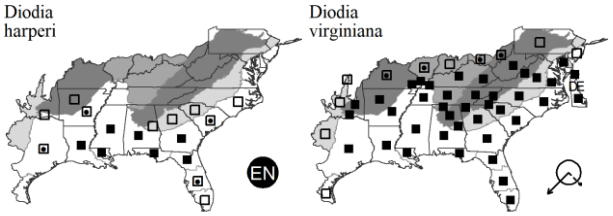
Contributed by B.A. Sorrie and A.S. Weakley

A genus of about 5 species (as narrowed in circumscription), herbs, of tropical and warm temperate America and Africa. References: Bacigalupo & Cabral (1999); Rogers (2005); Sorrie (2016).

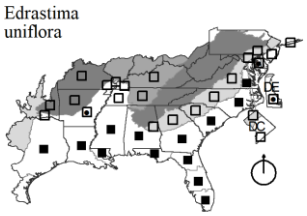
1 Sepals 4 and similar in size; style entire; [of dry habitats] ..... ***Hexasepalum***
1 Sepals 2 (or 4, and then markedly dimorphic); style cleft; [of moist to wet habitats].
2 Capsule length 3.5-5.5 mm, rotund to broadly ellipsoid; corolla tube length 4.0-7.5 mm; leaf length at midstem 14-36 mm ..... ***Diodia harperi***
2 Capsule length 6.5-9.0 mm, narrowly ellipsoid to broadly ellipsoid; corolla tube length 6.5-10.0 mm; leaf length at midstem 27-65 mm ..... ***Diodia virginiana***

Diodia harperi Small. HARPER'S BUTTONWEED. **Hab:** Pondshores, other moist sites. **Dist:** E. NC south to s. peninsular FL, west to e. TX and AR. **Phen:** May-Aug (-Oct); May-Nov. **Tax:** See Sorrie (2016) for detailed information. **Syn:** = K4, S, Sorrie (2016); < *Diodia virginiana* Linnaeus – Ar, Fl5, GW2, K3, WH3.

Diodia virginiana Linnaeus. LARGE BUTTONWEED. **Hab:** Ditches, wet fields, wet swales along highways, other moist to wet habitats. **Dist:** CT, PA, IL, and KS south to FL and TX; West Indies; Mexico and Central America. **Phen:** Jun-Dec. **ID Notes:** The leaves frequently turn bright yellow, caused by a viral infection. **Syn:** = GrPl, K4, Sorrie (2016); > *Diodia hirsuta* Pursh – S; > *Diodia tetragona* Walter – S; < *Diodia virginiana* Linnaeus – Ar, C, Fl5, G, GW2, Il, K3, Meso4.2, NcTx, RAB, Tn, Va, W, WH3, WI, WV; > *Diodia virginiana* Linnaeus – S; > *Diodia virginiana* var. *attenuata* Fernald – F, K1; > *Diodia virginiana* var. *latifolia* Torrey & A. Gray – K1; > *Diodia virginiana* var. *virginiana* – F, K1, NE.



Edrastima Rafinesque 1838 (OLDENLANDIA)



A genus of 5 species, annual herbs, of North America to South America, Africa, and Asia. References: Gibbons (2020); Rogers (1987); Terrell & Robinson (2006); Terrell (1991); Ward (2012a).

Edrastima uniflora (Linnaeus) Rafinesque. OLDENLANDIA. **Hab:** Pondshores, muddy drawdown shores, moist to wet ecotones of Coastal Plain streamheads, other moist to wet places. **Dist:** Mostly a species of the Southeastern Coastal Plain: NY (Long Island) south to s. FL and west to TX, north in the interior to MO. Alleged by some to be non-native, and of African origin (Ward 2012a). Discovered in PA Coastal Plain in 2009 (S. Grund, pers.comm., 2019). **Phen:** May-Oct. **Syn:** = K4; = *Hedyotis uniflora*

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

(Linnaeus) Lamarck – C, F, GW2, Rogers (1987); = *Oldenlandia uniflora* Linnaeus – Ar, Fl5, G, Il, K1, K3, NY, RAB, S, Tn, Va, WH3, Terrell & Robinson (2006), Terrell (1991); > *Hedyotis uniflora* (Linnaeus) Lamarck var. *fasciculata* (Bertoloni) W.H. Lewis – Tx; > *Hedyotis uniflora* var. *uniflora* – Tx; > *Oldenlandia fasciculata* (Bertoloni) Small – S; > *Oldenlandia uniflora* var. *fasciculata* (Bertoloni) D.B. Ward – Ward (2012a); > *Oldenlandia uniflora* var. *uniflora* – Ward (2012a). NatureServe G5 (Secure).

Galium Linnaeus 1753 (BEDSTRAW, CLEAVERS, WOODRUFF)

A genus of ca. 500 species, herbs, cosmopolitan. Here circumscribed to include *Asperula*, *Cruciata*, and *Sherardia*, following an analysis by Soza & Olmstead (2010) that shows the genera *Galium*, *Cruciata*, and *Sherardia* each to be paraphyletic relative to one another, if circumscribed as traditionally. Other solutions are possible, including the recognition of these genera and segregates of them, including the dispersal of *Galium* into two or more genera; this approach has recently been suggested by Ehrendorfer & Barfuss (2014). Interestingly, the number of leaves per whorl appears to be a more fundamental character than those (such as tubular corollas) used to separate genera in the past. References: Allen (2013); Braun (2017); Dempster (1978); Dempster (1981); Ehrendorfer & Barfuss (2014); Lipscomb & Nesom (2007); Moore (1975); Puff (1976); Puff (1977); Reveal et al (2007); Rogers (2005); Soza & Olmstead (2010); Stace (2010); Yang et al (2018).

Identification Notes: The whorled "leaves" are apparently evolutionarily derived from stipules, but are nonetheless here termed "leaves". The clades mentioned in the keys are those delineated in Soza & Olmstead (2010).

1 Leaves mostly in whorls of 4 (rarely a few in whorls of 5-6 in some species) at the primary nodes ..... ***Key A***
1 Leaves mostly in whorls of 6 or 8 at the primary nodes.
  2 Leaves mostly 6 per node (ranging from 5-8) at the primary nodes ..... ***Key B***
  2 Leaves mostly 8 (or more) per node at the primary nodes; [clade III] ..... ***Galium aparine***

Key A - Bedstraws with leaves mostly in whorls of 4 (rarely a few in whorls of 5-6 in some species)

1 Largest leaves < 8 mm long; flowers white, yellow, or creamy; plant an annual, 0.5-3 dm tall; [clade VII].
  3 Flowers (1-) 2-3 in small clusters in leaf axils, the pedicels 1-2 mm long; fruits and ovaries glabrous ..... ***Galium pedemontanum***
  3 Flowers solitary, sessile or subsessile in the leaf axils, the pedicels 0.3-0.8 mm long; fruits and ovaries pubescent with hooked hairs ..... ***Galium virgatum***
1 Largest leaves > 8 mm long; flowers white, creamy, greenish-purple, maroon, or purple; plant a perennial, 1-8 dm tall.
  4 Larger leaves 2.5-25 mm wide, mostly 1.5-5 (-8)× as long as wide; fruits uncinate-hispid (except smooth in *G. latifolium* and *G. arkansanum*); flowers greenish or purplish; leaves normally of very similar length and forming a symmetrical, neat whorl; [clade VII].
    5 Leaves widest below the middle, tapering to a long-acuminate apex, averaging about 3-5 (-8)× as long as wide; largest leaves 30-80 mm long, 2.5-20 mm wide.
      6 Fruits uncinate-hispid; flowers yellowish, turning maroon ..... ***Galium lanceolatum***
      6 Fruits smooth; flowers purple. ..... ***Galium latifolium***
    5 Leaves widest at about the middle, tapering to an obtuse (or broadly acute) apex, averaging about 2-3× as long as wide; larger leaves 10-50 mm long, 5-25 mm wide.
      9 Flowers (some of them) sessile or subsessile along the inflorescence branches; leaves 1.5-5 cm long, the larger usually > 2.5 cm long ..... ***Galium circaezans***
      9 Flowers all distinctly pedicelled; leaves 1-2.5 cm long
        10 Stem glabrous; plants sprawling; leaves 2-5× as long as wide ..... ***Galium orizabense ssp. laevicaule***
        10 Stem pubescent with either straight or upwardly incurved hairs; plants erect; leaves 1.5-2.5× as long as wide ..... ***Galium pilosum***
  4 Larger leaves 1-6 mm wide, mostly 4-20× as long as wide (or 2-3.5× as long as wide in *G. bermudense*); fruits smooth or pubescent (if pubescent, the hairs not hooked at the end, though they may curve through their length, except uncinate in *G. texense*), either fleshy or dry; flowers white or creamy; leaves normally of differing lengths and also often forming asymmetrical, 'sloppy' whorls (the angles between the leaves not being 90°).
    11 Fruits fleshy and blue-black; leaves firm, more-or-less evergreen, glandular-punctate beneath; [clade undetermined].
      12 Leaves elliptic, 7-18 mm long, 3-6 mm wide, 2-3.5× as long as wide ..... ***Galium bermudense***
      12 Leaves linear, 15-25 mm long, 2-4 mm wide, 5-10× as long as wide ..... ***Galium uniflorum***
    11 Fruits dry, and green, tan, or purplish; leaves herbaceous, deciduous, not glandular-punctate beneath.
      14 Stems smooth on the angles or with few, scattered hairs; stem nodes densely retrorsely bearded; corollas 4-lobed, the lobes longer than wide; leaves strictly 4 per node (very rarely 5 at a few nodes). ..... ***Galium obtusum var. obtusum***
      14 Stems retrorsely scabrous on the angles; stem nodes not conspicuously bearded; corollas 3-4-lobed, the lobes about as wide as long, or wider than long; leaves 4 per node, but most plants with at least some main stem nodes with 5 or 6 leaves. ..... ***Galium tinctorium var. floridanum***

Key B - Bedstraws with leaves mostly 6 per node (ranging from 4-8)

1 Flowers pink, purple, or blue, in terminal heads, subtended by an involucre of leaves fused at the base; stem rough-hairy or retrorse-scabrid; [alien]. ..... ***Galium sherardia***
1 Flowers white, yellow, or green, in axillary or terminal diffuse inflorescences, not subtended by an involucre; stems either smooth, retrorse-scabrid, or pubescent.
  3 Largest leaves < 10 mm long; fruits 0.7-1 mm across; annual; [alien]; [clade III].
    4 Inflorescence relatively diffuse, branches divaricate; ultimate fruits (2-) 3–6 (-7) nodes beyond primary stem axis (with largest leaves); first inflorescence internode (beyond primary stem axis) 15-50 mm long; fruit surface glabrous (without hairs) ..... ***Galium divaricatum***
    4 Inflorescence relatively strict, branches ascending; ultimate fruits 2-3 (-4) nodes beyond primary stem axis (with largest leaves); first inflorescence internode (beyond primary stem axis) 3-12 (-20) mm long; fruit surface glabrous or bristly-hispid.
      5 Fruit surface without hairs, smooth to shallowly papillate ..... ***Galium anglicum***

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

5 Fruit surface bristly-hispid with uncinate-tipped hairs, distinctly papillate ..... ***Galium parisiense***

3 Largest leaves > 10 mm long; fruits 1-2.5 mm across; perennial; [native].

6 Fruits and ovaries uncinate-hispid; leaves 15-50 mm long, 7-10 mm wide; [clade III] ..... ***Galium triflorum***

6 Fruits and ovaries glabrous or papillose; leaves 5-25 mm long, 1-6 mm wide.

..... ***Galium tinctorium var. floridanum***

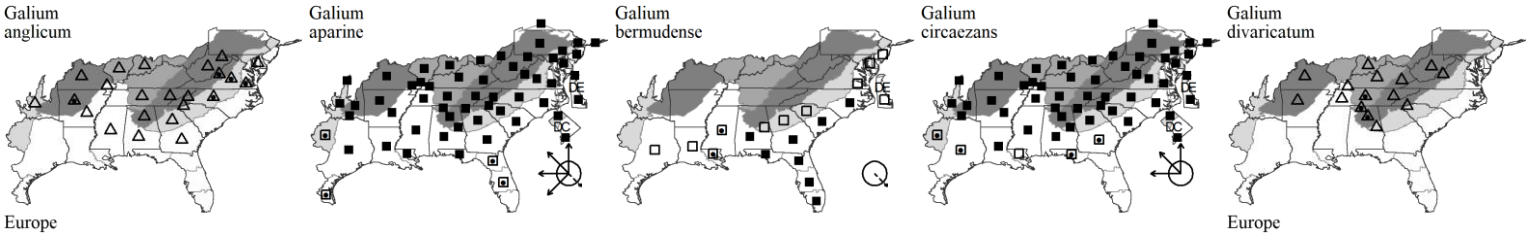
* ***Galium anglicum*** Hudson. **Hab:** Pastures, disturbed areas. **Dist:** Native of w. Europe. **Phen:** May-Jul. **Syn:** = Ar, K4, Tn, Va, Lipscomb & Nesom (2007); < *Galium divaricatum* Pourret ex Lamarck – K1; < *Galium parisiense* Linnaeus – F, G, RAB, S, W, WV, Stace (2010); < *Galium parisiense* var. *leiocarpum* Tausch – C.

Galium aparine Linnaeus. CLEAVERS, STICKY-WILLY. **Hab:** Meadows, thickets, disturbed areas, forests. **Dist:** Nearly cosmopolitan, from n. North America south through Central and South America. **Phen:** Apr-Jul. **Tax:** Apparently represented in North America (including our area) by both native and introduced genotypes. *Galium spurium* may warrant recognition as a separate taxon from *Galium aparine* (see Moore 1975), but the records have not been studied in our region. **Comm:** Schübler. **Syn:** = Stace (2010), Stace (2010); = *Galium aparine* var. *aparine* – Il; < *Galium aparine* Linnaeus – Ar, F, Fl5, G, GW2, K1, K3, K4, Mi, NcTx, NY, Pa, RAB, S, Tn, Va, W, WH3, WV, Dempster (1981); > *Galium aparine* ssp. *infestum* (Waldstein & Kitaibel) Schübler & Martens – GBI4; > *Galium aparine* var. *aparine* – C, GrPl; > *Galium aparine* var. *echinospermum* (Wallroth) Farwell – GrPl; > *Galium spurium* ssp. *spurium* – GBI4.

Galium bermudense Linnaeus. COASTAL BEDSTRAW. **Hab:** Maritime forests, longleaf pine sandhills, dry sandy forests. **Dist:** S. NJ south to FL, west to LA, primarily on the Coastal Plain; Bahamas; Bermuda. **Phen:** Jun-Aug; Aug-Sep. **Tax:** This species has long been generally known as *G. hispidulum* Michaux, but *G. bermudense* Linnaeus has priority and that name has been clearly established to apply to this species (Reveal et al. 2007). **Syn:** = S, WI, Reveal et al (2007); = *Galium hispidulum* Michaux – Bah, C, F, Fl5, G, K1, K3, K4, RAB, Va, W, WH3. NatureServe G5 (Secure).

Galium circaezans Michaux. FOREST BEDSTRAW, LICORICE BEDSTRAW. **Hab:** Mesic to dry forests. **Dist:** QC west to MN and NE, south to FL and TX. **Phen:** Apr-Jul. **Tax:** Two varieties are sometimes distinguished and need additional study (see synonymy). Var. *circaezans*, more southern, has lower leaf surface glabrous or sparsely short-hispid on the veins, and larger leaves 1.5-2.5 (-4.0) cm long and 0.7-1.4 (-1.8) cm wide. Var. *hypomalacum* Fernald, more northern, has lower leaf surface appressed-pilose, long-hirsute on the veins, and larger leaves 2-5 cm long, 1-2.5 cm wide. **Syn:** = Ar, Fl5, K3, K4, Mi, NcTx, NY, RAB, S, Tn, Va, W, WH3; > *Galium circaezans* var. *circaezans* – C, F, G, GrPl, Il, K1, NE, Pa, Tx, WV; > *Galium circaezans* var. *hypomalacum* – C, F, G, GrPl, Il, K1, NE, Pa, Tx, WV.

* ***Galium divaricatum*** Pourret ex Lamarck. LAMARCK'S BEDSTRAW, WALL BEDSTRAW. **Hab:** Disturbed areas. **Dist:** Native of s. Europe. **Phen:** May-Jul. **Syn:** = Ar, K3, K4, NE, Tn, Lipscomb & Nesom (2007); < *Galium divaricatum* Pourret ex Lamarck – K1; < *Galium parisiense* Linnaeus – F, G, S; < *Galium parisiense* var. *leiocarpum* Tausch – C.



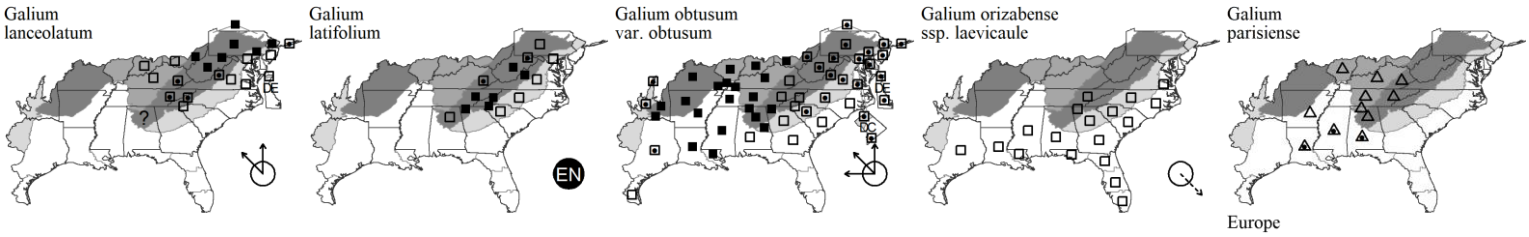
Galium lanceolatum Torrey. LANCELEAF BEDSTRAW, WILD-LICORICE. **Hab:** Mesic to dry hardwood forests. **Dist:** QC west to MN, south to w. NC and e. TN. **Phen:** Jun-Jul. **Syn:** = C, F, G, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Va, W, WV. NatureServe G5 (Secure).

Galium latifolium Michaux. PURPLE BEDSTRAW, WIDELEAF BEDSTRAW. **Hab:** Moist hardwood forests. **Dist:** C. PA and KY south to n. GA and n. AL, a Southern and Central Appalachian endemic. **Phen:** May-Aug. **Tax:** The closely related *G. arkansanum* A. Gray is the Ozarkian sibling of the Appalachian *G. latifolium*. Var. *hispidum*, named from VA, needs additional inquiry. **Syn:** = C, K1, K3, K4, Pa, RAB, S, Tn, Va, W; > *Galium latifolium* var. *hispidum* Small – F, G; > *Galium latifolium* var. *latifolium* – F, G. NatureServe G5 (Secure).

Galium obtusum Bigelow *var.* ***obtusum***. BLUNTLEAF BEDSTRAW. **Hab:** Marshes, swamps. **Dist:** NS west to SD, south to FL and TX. **Phen:** Apr-Jul. **Tax:** "Ssp. *australe* Puff", cited in Kartesz (1999) and allegedly endemic to GA, was never published and is no longer considered a useful entity by its potential author (Puff, pers. comm. 2004). **Syn:** = C, F, RAB, W; = *Galium obtusum* ssp. *obtusum* – K3, K4, NE; = *Galium tinctorium* – S, misapplied; < *Galium obtusum* – Ar, GW2, Il, Mi, NcTx, Pa, Tn, Tx, Va, WV; > *Galium obtusum* ssp. *"australe"* – K1, Puff (1976); > *Galium obtusum* ssp. *obtusum* – K1, NY, Puff (1976), Puff (1977); > *Galium obtusum* Bigelow var. *obtusum* – G, GrPl; > *Galium obtusum* var. *ramosum* Gleason – G, GrPl.

Galium orizabense Hemsley *ssp.* ***laevicaule*** (Weatherby & Blake) Dempster. BALD BEDSTRAW, SMOOTHSTEM BEDSTRAW. **Hab:** Mesic forests, maritime forests, swamp edges. **Dist:** Se. VA south to FL, west to se. TX; West Indies. **Phen:** May-Aug. **Tax:** The typic subspecies, ssp. *orizabense*, is distributed from Tamaulipas south through Mexico, Central America, to n. South America (Dempster 1981). Perhaps warranting specific status separate from *G. orizabense*. **Syn:** = K1, K3, K4, Tn, Va, Dempster (1981); = *Galium pilosum* Aiton var. *laevicaule* Weatherby & Blake – F, Tx; < *Galium orizabense* – Meso4.2; < *Galium pilosum* Aiton – Fl5, RAB, S, WH3, WI.

* ***Galium parisiense*** Linnaeus. WALL BEDSTRAW. **Hab:** Disturbed areas. **Dist:** Native of s., w., and c. Europe. **Phen:** Jun-Jul. **Syn:** = Ar, K1, K3, K4, Tn, Lipscomb & Nesom (2007); < *Galium parisiense* Linnaeus – Stace (2010).



Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more)

* : waif EN : endemic H : historic

N : no P : planted ? : questionable X : extirpated

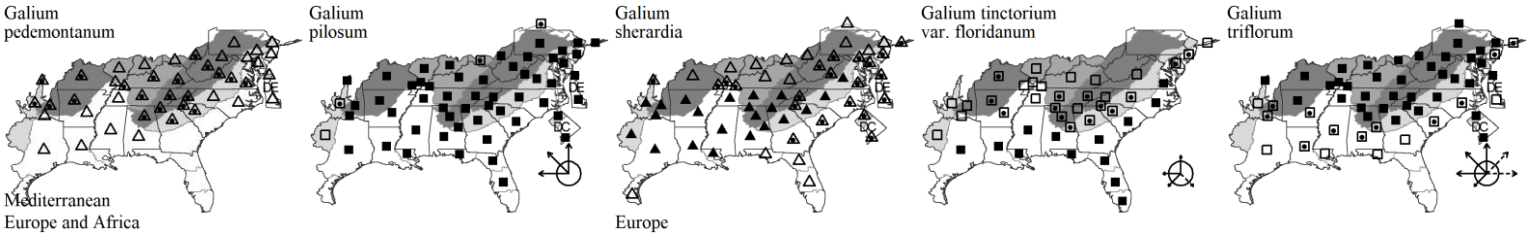
* ***Galium pedemontanum*** (Bellardi) Allioni. PIEDMONT BEDSTRAW, PIEDMONT CROSSWORT. **Hab:** Lawns, grassy roadsides, pastures. **Dist:** Native of s. Europe. The Piedmont referred to in the name is the 'original' Piedmont of southern Europe. **Phen:** Apr-Jul. **Comm:** In GA Mountains and Piedmont (T. Govus, pers. comm. 2005). Reported for DE and MD by Longbottom, Naczi, & Knapp (2016). **Syn:** = C, F, Il, NY, Pa, RAB, Tn, Va, W, WV; = *Cruciata pedemontana* (Bellardi) Ehrendorfer – Ar, K1, K3, K4, Puff (1976), Puff (1977). NatureServe GNR (Not Yet Ranked).

Galium pilosum Aiton. HAIRY BEDSTRAW. **Hab:** Forests, woodland borders, longleaf pine sandhills, prairies, coastal prairies, clearings. **Dist:** S. NH west to MI, n. IL, MO, and KS, south to c. peninsular FL and TX. **Phen:** May-Aug. **Tax:** Two varieties have often been distinguished (see synonymy). Var *pilosum* has stems and leaves pubescent with spreading, straight hairs and has a wider distribution; var. *puncticulosum* has stems and leaves with short, upwardly curved hairs, and is more restricted to the south and east. These varieties need additional study. **Syn:** = Ar, GrPl, Il, K3, K4, Mi, NcTx, Pa, RAB, S, Tn, Va, W, WV; = *Galium pilosum* var. *pilosum* – Tx; < *Galium pilosum* Aiton – Fl5, WH3; >? *Galium pilosum* ssp. *pilosum* – NY; > *Galium pilosum* var. *pilosum* – C, F, G, K1, NE; > *Galium pilosum* var. *puncticulosum* – C, F, G, K1, NE.

* ***Galium sherardia*** E.H.L. Krause. BLUE FIELD-MADDER. **Hab:** Lawns, roadsides, other disturbed areas. **Dist:** Native of Europe. **Phen:** Feb-Aug. **Tax:** Differing from *Galium* in its involucrate inflorescence and the more tubular, pink to purple flowers, and usually treated as a monotypic genus, *Sherardia*, but Soza & Olmstead (2010) show *Sherardia* to be deeply embedded within a paraphyletic *Galium*. **Syn:** = K3, K4, NY, Va, Stace (2010); = *Sherardia arvensis* Linnaeus – Ar, C, F, Fl5, G, GrPl, Il, K1, Meso4.2, Mi, NcTx, NE, Pa, RAB, S, Tn, Tx, W, WH3, WV. NatureServe GNR (Not Yet Ranked).

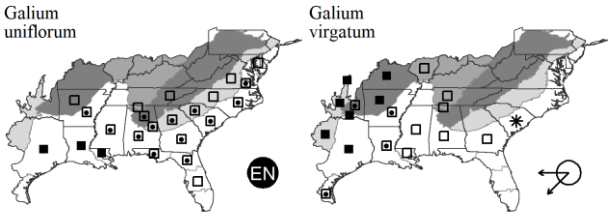
Galium tinctorium Linnaeus *var.* ***floridanum*** Wiegand. FLORIDA THREE-LOBED BEDSTRAW, STIFF MARSH BEDSTRAW. **Hab:** Swamps, marshes, and ditches. **Dist:** MA south to FL, west to e. TX, mostly on the Coastal Plain, but extending inland to w. VA, w. NC, se. KY, s. IL, and se. MO. **Phen:** Apr-Jun. **Tax:** See Puff (1976) for additional information. **Syn:** = F, NE; = *Galium obtusum* var. *floridanum* (Wiegand) Fernald – G; = *Galium tinctorium* ssp. *floridanum* – Puff (1977); < *Galium claytonii* Michaux – S; < *Galium tinctorium* – Ar, C, Fl5, Il, K1, K3, K4, Pa, RAB, Tn, Tx, Va, W, WH3.

Galium triflorum Michaux. SWEET-SCENTED BEDSTRAW. **Hab:** Mesic to dry upland forests, floodplain forests, seepage swamps, old fields, disturbed areas, usually on base-rich soils. **Dist:** Circumboreal, south in North America to FL and Mexico (Veracruz). **Phen:** May-Sep. **Syn:** = Fl5, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, Va, W, WH3; > *Galium triflorum* var. *asprelliforme* Fernald – C, F, G, WV; > *Galium triflorum* var. *triflorum* – C, F, G, WV.



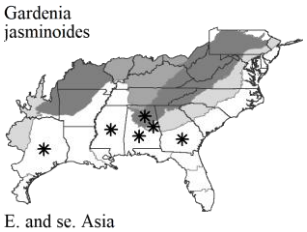
Galium uniflorum Michaux. ONE-FLOWERED BEDSTRAW. **Hab:** Moist slope forests and alluvial forests. **Dist:** Se. VA south to FL, west to AR and e. TX. **Phen:** Apr-Oct. **Syn:** = Ar, C, F, Fl5, G, K1, K3, K4, RAB, S, Tn, Tx, Va, WH3. NatureServe G4G5 (Apparently Secure).

Galium virgatum Nuttall. OZARK BEDSTRAW. **Hab:** Glades, ledgetops, rocky prairies, open blackland prairies (GA), waif around wool-combing mill (SC), other disturbed areas. **Dist:** Native from TN, c. GA (Houston County), and AL west to KS, OK, and TX. **Phen:** Mar-Jun. **Syn:** = Ar, C, F, G, Il, K1, K3, K4, NcTx, Tn, Tx; > *Galium virgatum* var. *leiocarpum* Torrey & A. Gray – GrPl, S, Tx; > *Galium virgatum* var. *virgatum* – GrPl, S, Tx. NatureServe G4G5 (Apparently Secure).



Gardenia J. Ellis 1761 (GARDENIA)

A genus of ca. 200 species, shrubs and trees, of the Old World tropics and warm temperate areas.



* ***Gardenia jasminoides*** J. Ellis. GARDENIA. **Hab:** Persistent from horticultural plantings, perhaps spreading (H. Horne, pers. comm., 2014). **Dist:** Native of China and Japan. **Syn:** = K3, K4, Meso4.2.

Hexasepalum Bartling ex A.P. de Candolle 1830

A genus of ca. 15 species, herbs, of tropical, subtropical, and warm-temperate America. Bacigalupo & Cabral (1999) suggested that *Hexasepalum* (as *Diodella*) should be recognized as distinct from *Diodia*. Kirkbride & Delprete (2015) explained the reason for the acceptance of *Hexasepalum* over *Diodella*. References: Bacigalupo & Cabral (1999); Cabaña Fader et al (2019); Kirkbride & Delprete (2015); Rogers (2005).

Hexasepalum teres (Walter) J.H. Kirkbride. POORJOE. **Hab:** Dunes, sandy roadsides, glades, hardpans, other dry habitats. **Dist:** MA, NY and WI, south to FL, TX, and CA, south through Mexico and Central America. **Phen:** Jun-Dec. **Tax:** Very variable (as reflected in the infrataxa that have been sometimes been recognized) and needing additional, careful taxonomic assessment. **Syn:** = K4, Cabaña Fader et al (2019), Kirkbride & Delprete (2015); = *Diodella teres* (Walter) Small – S, Bacigalupo & Cabral (1999); = *Diodia teres* Walter – Ar, C, Fl5, GrPl, GW2, K3, Meso4.2, Mi, NcTx, NY, Pa, RAB, Tn,

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

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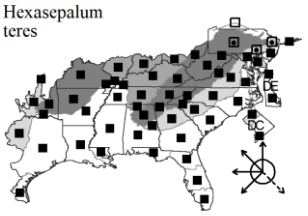
Va, W, WH3, WV; > *Diodia teres* var. *hirsutior* Fernald & Griscom – F, K1; > *Diodia teres* var. *hystricina* Fernald & Griscom – F, G, K1; > *Diodia teres* var. *oblongifolia* Fernald – F, K1; > *Diodia teres* Walter var. *setifera* Fernald & Griscom – F, Il, Tx; > *Diodia teres* var. *teres* – F, G, Il, K1, NE, Tx.



Houstonia Linnaeus 1753 (BLUET, DIAMOND-FLOWER)

The generic limits of *Houstonia*, *Hedyotis*, *Oldenlandia*, and *Stenaria* have been controversial, with much shuffling of generic configuration. It now appears that *Houstonia* should be recognized as a genus separate from *Hedyotis* and *Oldenlandia*, with *Stenaria* included in *Houstonia* (Guo et al. 2013; Wikström et al. 2013; and other references). References: Church & Taylor (2005); Church (2003); Guo et al (2013); Pease & Moore (1907); Rogers (1987); Rogers (2005); Shanks (2015); Terrell (1959); Terrell (1986); Terrell (1991); Terrell (1996); Terrell (2001); Terrell (2007); Turner (1995b); Turner (1997); Ward (2004c); Wikström et al (2013).

Identification Notes: In the key below, all leaf measurements and length/width ratios are based on mid-cauline leaves.

1 Flowers solitary, on terminal or axillary pedicels (2-) 6-50 (-70) mm long; corolla salverform; leaves 2-15 mm long; [subgenus *Houstonia*].
  2 Stems prostrate and creeping.
    ..... ***Houstonia procumbens***
  2 Stems erect or spreading.
    4 Stems 1-4 (-7) cm tall; leaves mostly oblanceolate, 0.3-3.0 mm wide; corolla 5-12 mm long, white to pale pink; seeds with a hilar ridge in an elliptical depression; [section *Mullera*] ..... ***Houstonia rosea***
    4 Stems 1-26 cm tall; leaves elliptic, ovate or spatulate, 0.3-9.0 mm wide (at least some on a plant generally > 3 mm wide); corolla 2-21 mm long, purple, pale blue, pink, or white; seeds subglobose with a ventral cavity; [section *Houstonia*].
      5 Plants perennial, with a well-developed, persistent basal rosette; corolla 5.8-16 (-21) mm long, the tube (2-) 4-11 (-12) mm long .....
      ..... ***Houstonia caerulea***
      5 Plants annual, with at most a few short-lived basal leaves; corolla 2-10 (-12) mm long, the tube 0.8-5.5 mm long.
        6 Calyx lobes slightly shorter than to slightly longer than the corolla tube; corollas white, 2.0-5.5 mm long, the tube 0.8-2.5 mm long.....
        ..... ***Houstonia micrantha***
        6 Calyx lobes 1/5 as long as to slightly longer than the corolla tube; corollas purple or violet (rarely white), 3.5-10 (-12.5) mm long, the tube 2.0-5.5 mm long ..... ***Houstonia pusilla***
1 Flowers several to many, in terminal cymes; corolla funnelform; leaves (8-) 10-60 mm long; [subgenus *Chamisme*, section *Amphiotis*].
  7 Stipules of mid-cauline leaves ciliate or fringed, and also often bristle-tipped; largest mid-cauline leaves 0.5-3 mm wide; capsule either obovoid-cylindric, longer than wide, the free calyx lobes distinctly shorter than the capsule, or (in var. floridana) globose or subglobose; [of calcareous glades and barrens or in FL of calcareous sands]
    ..... ***Houstonia nigricans var. nigricans***
  7 Capsule as long as wide or wider, depressed globose, the free calyx lobes about as long as the capsule; stipules of mid-cauline leaves not ciliate, fringed, or bristle-tipped; leaves 0.5-34 mm wide; [of various habitats, including calcareous glades and barrens]
    13 Leaves ovate or lanceolate, 1-6× as long as wide, 4-34 mm wide, widest toward the base or at the middle; calyx lobes 1-7 mm long.
      14 Calyx lobes 4-7 mm long; leaves mostly lanceolate (varying from narrowly lanceolate to broadly ovate), 17-33 mm long, 4-10 mm wide, 3.3-6× as long as wide ..... ***Houstonia lanceolata***
      14 Calyx lobes 1-4 mm long; leaves mostly ovate (varying from broadly ovate to ovate-lanceolate), 8-63 mm long, 6-34 mm wide, 1-3.2× as long as wide.
      ..... ***Houstonia purpurea***
    13 Leaves linear to narrowly elliptic, 4-20× as long as wide, 0.5-6 mm wide, widest at the middle or near the apex or nearly equally wide for most of their lengths; calyx lobes 0.5-3 mm long.
      ..... ***Houstonia tenuifolia***

Houstonia caerulea Linnaeus. QUAKER LADIES, INNOCENCE, COMMON BLUET, PISSABED. **Hab:** Forests, woodlands, openings, lawns, a wide variety of disturbed sites. **Dist:** ME, ON, and WI south to s. GA, s. AL, w. LA, and OK. **Phen:** (Late Jan-) Apr-Jul; May-Aug. **ID Notes:** The flowers of this species and *Houstonia serpyllifolia* are very similar; *H. caerulea* is a somewhat duller blue. **Syn:** = Ar, G, Il, Mi, NY, Pa, RAB, S, Tn, Va, W, WV, Terrell (1991), Terrell (1996); = *Hedyotis caerulea* (Linnaeus) Hooker – C, GW2; = *Houstonia caerulea* var. *caerulea* – F, Pease & Moore (1907); < *Hedyotis caerulea* (Linnaeus) Hooker – Rogers (1987); < *Houstonia caerulea* Linnaeus – K1, K3, K4, NE.

Houstonia lanceolata (Poiret) Britton. MIDWESTERN SUMMER BLUET, LANCELEAF BLUET, GLADE MOUNTAIN HOUSTONIA. **Hab:** Calcareous prairies and barrens, dry woodlands, banks, rock outcrops, shallow soils around mafic and calcareous rock outcrops. **Dist:** *H. lanceolata* ranges from s. ME and w. NY west to s. OH, and sw. MO, south to w. NC, n. GA, AL, MS, AR, and e. OK. The distribution and ecology of *H. lanceolata* in our area are poorly known; it apparently occupies drier and typically more circumneutral sites than *H. purpurea*. **Phen:** May-Jul; Jul-Aug. **Tax:** This taxon is clearly distinct at specific rank from *Houstonia purpurea*. **Syn:** = F, Il, S; = *Houstonia purpurea* Linnaeus var. *calycosa* Shuttleworth ex A. Gray – Ar, G, K1, K3, K4, NE, NY, Tn, WV, Terrell (1959), Terrell (1991), Terrell (1996); < *Hedyotis purpurea* (Linnaeus) Torrey & A. Gray – C, Rogers (1987); < *Houstonia purpurea* Linnaeus – Pa, RAB, W. NatureServe G5T5 (Secure).

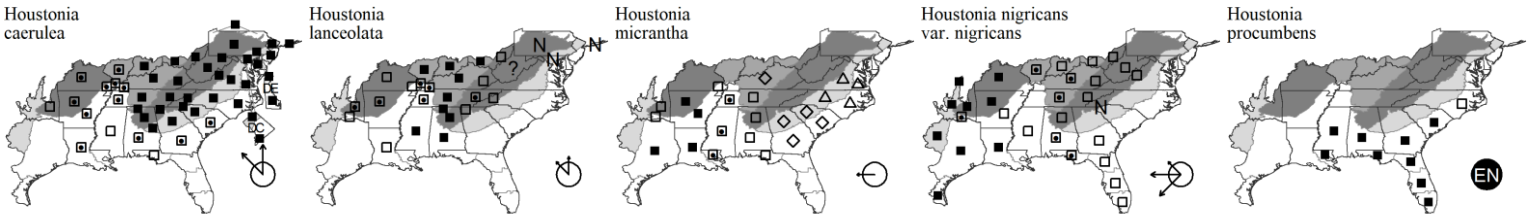
Houstonia micrantha (Shinners) Terrell. SOUTHERN BLUET. **Hab:** Dunes, sandy soils, granitic flatrocks, disturbed areas, roadsides. **Dist:** E. and c. GA west to sc. KY, sw. TN, s. MO, nw. AR, south to w. FL Panhandle, s. MS, s. LA, and e. TX. In 2017-2018, found eastwards of its known native distribution on roadsides and other disturbed areas in Wake County, NC (B. England, pers. comm., 2017, 2018). Reported for Barren County, KY (Brock 2020). **Phen:** Feb-Apr. **Syn:** = Ar, Fl5, K1, K3, K4, NcTx, Tn, WH3, Terrell (1996); = *Hedyotis australis* W.H. Lewis & D.M. Moore – Tx, Rogers (1987); = *Houstonia pusilla* Schöpf – S, misapplied.

Houstonia nigricans (Lamarck) Fernald *var.* ***nigricans***. DIAMOND-FLOWER, GLADE BLUET, PRAIRIE BLUET. **Hab:** Limestone barrens, limestone glades, limestone rocky bluffs, blackland prairies, longleaf pine sandhills, coastal dunes, coastal grasslands, scrubby pine flatwoods. **Dist:** Sw. VA (Ludwig 1999), s. MI, IA, NE, and e. CO, south to s. FL, TX, e. NM, and along the Sierra Madre Oriental to Hidalgo, Mexico. **Phen:** May-Oct. **Tax:** This species has been variously placed in *Houstonia*, *Hedyotis*, and *Stenaria*. As interpreted by Terrell (1991, 2001) and Turner (1995b), *Houstonia nigricans* is a polymorphic species, with *Houstonia nigricans* var. *nigricans* as a widespread "matrix variety", and other, much more local varieties warranting recognition. Turner (1995b) reports *Houstonia nigricans* var. *nigricans* (as *Hedyotis nigricans* var. *nigricans*) from Pickens County, SC;

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

the documentation is not known to me, and suitable habitats there are unlikely. **Syn:** = Ar, Va, Terrell (1986); = *Houstonia angustifolia* Michaux – S; < *Hedyotis nigricans* – C, GrPl, Il, NcTx, Rogers (1987); > *Hedyotis nigricans* var. *filifolia* (Chapman) Shinners – Tx, misapplied; < *Hedyotis nigricans* (Lamarck) Fosberg var. *nigricans* – K1, Tn, Terrell (1991), Turner (1995b); < *Houstonia nigricans* (Lamarck) Fernald – F, G; < *Stenaria nigricans* – Mi; < *Stenaria nigricans* (Lamarck) Terrell var. *nigricans* – Fl5, K3, WH3, Terrell (2001).

Houstonia procumbens (Walter ex J.F. Gmelin) Standley. CREEPING BLUET, FAIRY-FOOTPRINTS, ROUNDLEAF BLUET, INNOCENCE. **Hab:** Beach dunes, moist to wet sandy pinelands. **Dist:** Se. NC south to s. FL, west to se. LA. **Phen:** Oct-Apr. **Comm:** Gaddy & Rayner (1980) note that this plant is fairly common on SC barrier islands, but flowers in the winter and is easily overlooked in other seasons (when botanists are more likely to be afield). See Wilbur (1968) and Ward (2004c) for differing opinions about the merits of the taxonomic recognition of the glabrous and pubescent plants. **Syn:** = Fl5, K1, K3, RAB, S, WH3, Terrell (1991), Terrell (1996); = *Hedyotis procumbens* (Walter ex J.F. Gmelin) Fosberg – Rogers (1987); > *Houstonia procumbens* var. *hirsuta* (W.H. Lewis) D.B. Ward – Ward (2004c); > *Houstonia procumbens* var. *procumbens* – Ward (2004c). NatureServe G5 (Secure).

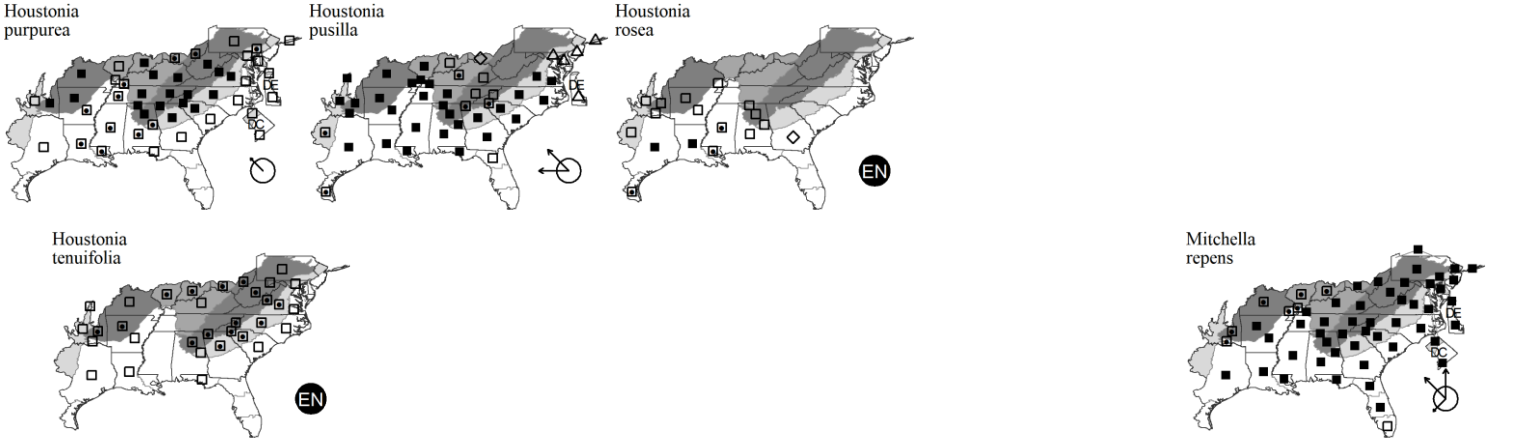


Houstonia purpurea Linnaeus. SUMMER BLUET, MOUNTAIN BLUET. **Hab:** Moist and dry woodlands and forests, thinner soils around rock outcrops, and in a variety of disturbed sites, such as paths, old roads, and roadbanks. **Dist:** DE, MD, and s. PA west to s. OH, s. IL, and sw. MO south to SC, sw. GA, Panhandle FL, MS, s. LA, e. TX, and e. OK. **Phen:** May-Jul; Jul-Aug. **ID Notes:** Plants growing in high elevation and exposed sites are sometimes somewhat dwarfed, and in that respect only, superficially resemble *H. montana*. **Syn:** = F, Mi, S; = *Houstonia purpurea* Linnaeus var. *purpurea* – Ar, G, K1, K3, K4, NY, Pa, Tn, Va, WV, Terrell (1959), Terrell (1991), Terrell (1996); < *Hedyotis purpurea* (Linnaeus) Torrey & A. Gray – C, Rogers (1987); < *Houstonia purpurea* Linnaeus – Fl5, Il, RAB, Tx, W, WH3. NatureServe G5T5 (Secure).

Houstonia pusilla Schöpf. TINY BLUET. **Hab:** Woodlands, prairies, lawns, cemeteries, and other disturbed sites. **Dist:** MD south to Panhandle FL, west to TX, and inland from IL west to NE, south to TN and TX. The natural habitats and original distribution of this species are obscure. **Phen:** Mar-Apr. **Syn:** = Ar, Fl5, G, K1, K3, K4, NcTx, NY, RAB, Tn, Va, W, WH3, Terrell (1991), Terrell (1996); = *Hedyotis crassifolia* Rafinesque – C, GrPl, GW2, Tx; = *Houstonia minima* L.C. Beck – S; = *Houstonia patens* Elliott – F; < *Hedyotis caerulea* (Linnaeus) Hooker – Rogers (1987); > *Houstonia crassifolia* Rafinesque – Il; < *Houstonia pusilla* Schöpf – S; > *Houstonia pusilla* Schöpf – Il.

Houstonia rosea (Rafinesque) Terrell. ROSE BLUET. **Hab:** Bottomlands. **Dist:** AL west to se. MO, OK, and TX. **Phen:** (Feb-) Mar-Apr. **Syn:** = Ar, K1, K3, K4, NcTx, Terrell (1996); = *Hedyotis rosea* Rafinesque – Tx. NatureServe G5 (Secure).

Houstonia tenuifolia Nuttall. DIFFUSE-BRANCHED BLUET. **Hab:** Usually in dry woodlands, often rocky (especially mafic rocks) or sandy. **Dist:** This species is centered in the Southern Appalachians and the Ozarks, extending into provinces adjacent to both areas of concentration, ranging overall from PA west to MO and OK, south to SC, GA, and TX; disjunct in Panhandle FL. **Phen:** Apr-Jul; Jul-Oct. **Syn:** = F, G, Il, RAB, S, Va, W, WV, Terrell (1959); = *Hedyotis nuttalliana* Fosberg – C; = *Houstonia longifolia* – Terrell (1996); < *Hedyotis longifolia* (Gaertner) Hooker – Rogers (1987); < *Houstonia longifolia* – Ar, K1, K3, K4, Tn, WH3.



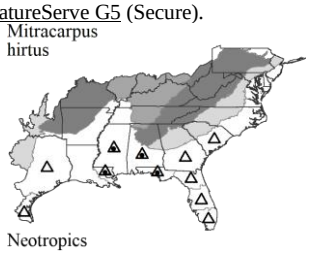
Mitchella Linnaeus 1753 (PARTRIDGE-BERRY)

A genus of 2 species, trailing "woody" vines, ours and 1 in e. Asia. *Mitchella* is sister to *Damnacanthus* of e. Asia (Huang et al. 2013). References: Huang et al (2013); Rogers (2005).

Mitchella repens Linnaeus. PARTRIDGE-BERRY, TWO-EYED-BERRY, RUNNING BOX. **Hab:** Deciduous and coniferous forests, stream-banks, heath balds, maritime forests, on rotten logs and hummocks in bottomlands and other wetter habitats. **Dist:** NS west to MN, south to c. peninsular FL and TX; disjunct in montane Mexico (CAM, CHP, GRO, HGO, NLE, OAX, PUE, QRO, SLP, TAM, VER) and Guatemala. **Phen:** May-Jul; Jun-Jul.

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Comm: Plants in maritime forests are more robust than others and often have an ascending habit, the stems sometimes 20-30 cm tall. **Syn:** = Ar, C, F, Fl5, G, GW2, Il, K1, K3, K4, Meso4.2, Mi, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV, Huang et al (2013), Rogers (2005). NatureServe G5 (Secure).



Mitracarpus Zuccarini 1827 (GIRDLE-POD)

A genus of about 30-40 species, of tropical America. References: Rogers (2005).

* ***Mitracarpus hirtus*** (Linnaeus) A.P. de Candolle. GIRDLE-POD. **Hab:** Disturbed areas, roadsides. **Dist:** Native of tropical America. Reported for GA Coastal Plain (Charlton County) (Carter, Baker, & Morris 2009) and SC Coastal Plain (Jasper County) (Bradley et al. [in prep.]). **Syn:** = Fl5, K1, K3, K4, Meso4.2, WH3, Rogers (2005); = *Mitracarpus hirtum* – Tx, orthographic variant.

Oldenlandia Linnaeus 1753 (OLDENLANDIA)

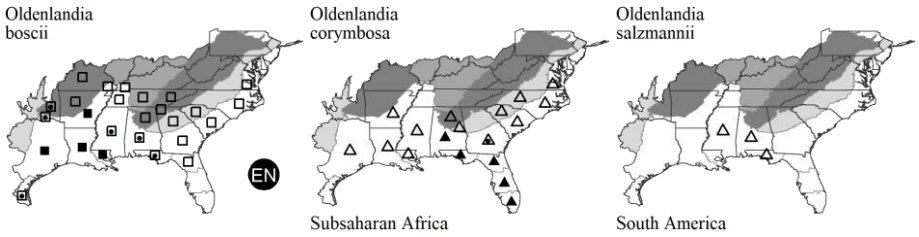
A genus of about 100 species, pantropical, but the circumscription is controversial and very uncertain. Wikström et al. (2013), Guo et al. (2013), and Kårehed et al. (2008) presage the split-up of *Oldenlandia* into monophyletic units. *O. uniflora* (and possibly *O. boscii*) will probably end up in *Edrastima* Rafinesque and *O. salzmannii* returned to the genus in which it was first described, as *Anotis salzmannii* A.P. de Candolle. References: GW1; Guo et al (2013); Kårehed et al (2008); Rogers (1987); Rogers (2005); Terrell & Robinson (2006); Terrell (1991); Wikström et al (2013).

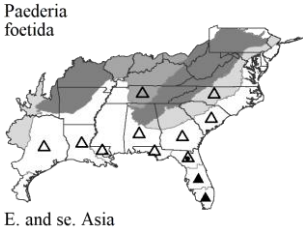
1 Creeping, mat-forming perennial, rooting at nodes; leaves 1.5-5.2 mm long; flowers solitary on slender axillary pedicels; seeds 4-14 per capsule; [genus indet., possibly *Anotis*, or perhaps more broadly in *Spermacoce*]..... ***Oldenlandia salzmannii***
1 Erect, spreading, decumbent, or prostrate annual or perennial, not rooting at nodes; leaves 3-40 mm long; flowers 1-10, in axillary clusters or pedunculate umbels; seeds > 50 per capsule.
  2 Flowers (1) 2-5 in pedunculate axillary umbels, the filiform peduncle 5-10 mm long, the filiform pedicels 3-5 mm long; [genus *Oldenlandia*]..... ***Oldenlandia corymbosa***
  2 Flowers 1-10 in sessile or subsessile axillary clusters.
    3 Stem glabrous or nearly so; leaves mostly linear or linear-oblanceolate, 1-3 mm wide, generally 5-10× as long as wide; flowers solitary or (rarely) in 2-3-flowered clusters; plant a perennial; [genus indet.]..... ***Oldenlandia boscii***
    3 Stem pilose or villous (rarely glabrous); leaves mostly ovate or broadly lanceolate, 4-10 mm wide, generally 2-3× as long as wide; flowers in compact clusters of 3-10, rarely solitary; plant an annual..... ***Edrastima uniflora***

Oldenlandia boscii (A.P. de Candolle) Chapman. BOSC'S BLUET, BOSC'S MILLE-GRAINES. **Hab:** Clay-based Carolina bays, rivershore and millpond drawdown shores, sagponds, other seasonally saturated habitats. **Dist:** A Southeastern Coastal Plain endemic: se. VA south to FL and west to TX. **Phen:** May-Oct. **ID Notes:** Reminiscent in vegetative condition of *Polypremum procumbens*. **Syn:** = Ar, Fl5, G, K1, K3, K4, NcTx, RAB, S, Tn, Va, WH3, Terrell & Robinson (2006), Terrell (1991); = *Hedyotis boscii* A.P. de Candolle – C, F, GW2, Tx, Rogers (1987). NatureServe G5 (Secure).

* ***Oldenlandia corymbosa*** Linnaeus. DIAMOND-FLOWER. **Hab:** Moist lawns, gardens. **Dist:** Native of Africa or possibly South America. Reported for NC by Nesom (2000e). **Phen:** Jul-Oct. **Tax:** In the impending splitting of *Oldenlandia* into monophyletic units, this species is likely to remain in *Oldenlandia*. **Comm:** "A tropical and subtropical weed; found new to the state in Norfolk by personnel from the Old Dominion University Herbarium in 2005... growing between cinder block pavers in parking lot" (Virginia Botanical Associates 2019). **Syn:** = Ar, Fl5, K1, K3, K4, Meso4.2, RAB, S, WH3, Terrell & Robinson (2006), Terrell (1991); = *Hedyotis corymbosa* (Linnaeus) Lamarck – Bah, GW2, Tx, Rogers (1987). NatureServe GNR (Not Yet Ranked).

* ***Oldenlandia salzmannii*** (A.P. de Candolle) Bentham & Hooker f. ex B.D. Jackson. **Hab:** Roadside ditches, marshes. **Dist:** Native of South America. Introduced in s. AL and w. Panhandle FL. **Tax:** In the impending splitting of *Oldenlandia* into monophyletic genera, this species will be removed, perhaps to *Panetos* Rafinesque. **Syn:** = K1, K3, K4, WH3, Terrell & Robinson (2006). NatureServe GNR (Not Yet Ranked).



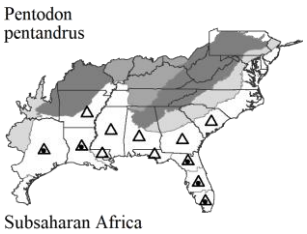


Paederia Linnaeus 1767 (SKUNK-VINE)

A genus of about 30 species, woody vines, of the Tropics. References: Chen & Taylor in FoC (2011); Diamond (1999); Rogers (2005).

* ***Paederia foetida*** Linnaeus. SKUNKVINE. **Hab:** Disturbed areas. **Dist:** Native of se. Asia. Diamond (1999) reports its naturalization in Randolph County, NC; Carter, Baker, & Morris (2009) report its naturalization in several counties in the GA Coastal Plain; reported also in s. AL (Mobile County) by Barger et al. (2019). **Syn:** = Fl5, K1, K3, K4, RAB, S, WH3, Rogers (2005). NatureServe GNR (Not Yet Ranked).

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated



Pentodon Hochstetter in Krauss 1844

A genus of 2 species, herbs, of tropical and warm temperate America and Africa. References: Guo et al (2013); Rogers (1987); Rogers (2005); Terrell (1991).

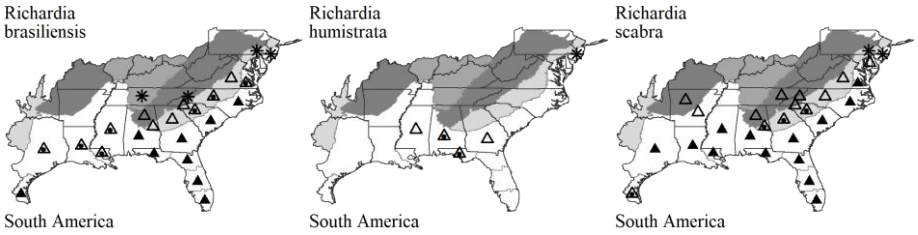
* ***Pentodon pentandrus*** Vatke. PENTODON. **Hab:** Pond edges, drawdowns, sloughs, wet meadows, moist ground. **Dist:** Apparently native of sub-Saharan Africa, now distributed in e. SC south to s. FL, west to se. TX; West Indies. **Phen:** Jul-Sep. **Syn:** = Ar, Bah, Fl5, GW2, K1, K3, K4, Meso4.2, Tx, WH3, WI, Rogers (1987), Rogers (2005), Terrell (1991); ? *Pentodon halei* (Torrey & A. Gray) A. Gray – S. NatureServe G5? (Secure).

Richardia Linnaeus 1753 (RICHARDIA)

A genus of about 15 species, of subtropical and tropical America, and introduced in the Old World. References: Krings (2002); Lewis & Oliver (1974); Rogers (2005).

1 Mericarps smooth; corolla 4-lobed; [section *Asterophyton*]..... ***Richardia humistrata***
1 Mericarps either conspicuously and densely hispidulous to strigose or papillose to tuberculate; corolla 6-lobed; [section *Richardia*].
  2 Stems hirsute, generally densely and evenly so from tip to base; adaxial leaf surface evenly strigose; mericarps conspicuously and densely hispidulous to strigose, the adaxial face broad, with a pronounced median keel; perennial from a woody rhizome (or annual)..... ***Richardia brasiliensis***
  2 Stems hirsute or villous near the tips, but progressively more sparsely so to glabrate toward the base; adaxial leaf surface glabrous to strigillose near the margins only, the median portion of the leaf blade glabrous; mericarps papillose to tuberculate, the adaxial surface closed to a narrow groove; annual.
  ..... ***Richardia scabra***

* ***Richardia brasiliensis*** Gomes. TROPICAL RICHARDIA. **Hab:** Roadsides, fields, vacant lots, urban areas, disturbed areas. **Dist:** Native of South America. **Phen:** May-Nov. **Syn:** = C, F, Fl5, K1, K3, K4, Meso4.2, RAB, S, Tx, Va, WH3, Lewis & Oliver (1974), Rogers (2005). NatureServe G5 (Secure).
* ***Richardia humistrata*** (Chamisso & Schlechtendal) J.A. Schultes & J.H. Schultes. **Hab:** Disturbed areas, pine savannas, pine flatwoods. **Dist:** Native of South America. Also collected in 1886 as a ballast waif in Camden County, NJ; first noted on the Gulf Coast only in 1941, but perhaps early introduced there on ballast as well, such as at Pensacola. **Syn:** = Fl5, K1, K3, K4, Tx, WH3, Lewis & Oliver (1974), Rogers (2005). NatureServe GNR (Not Yet Ranked).
* ***Richardia scabra*** Linnaeus. ROUGH MEXICAN-CLOVER. **Hab:** Roadsides, fields, vacant lots, urban areas, disturbed areas. **Dist:** Native of South America. Lewis & Oliver (1974) consider this species to be native from our area south through Central America into northern South America, based on the semi-contiguous distribution, but occurrences in our region seem to be in altered habitats. **Phen:** Jun -Dec. **Syn:** = C, F, Fl5, G, K1, K3, K4, Meso4.2, NcTx, RAB, S, Tx, Va, WH3, Lewis & Oliver (1974), Rogers (2005). NatureServe G5 (Secure).



Spermacoce Linnaeus 1753 (BUTTONWEED)

A genus of about 150-250 species, herbs, of tropical and warm-temperate Old and New World. Here circumscribed to include *Borreria* G.F.W. Meyer; additional changes in circumscription seem likely as genera in the Spermacoceae are recircumscribed. References: Bacigalupo (1972); Florentin, Florentin, & Salas (2020); Franck et al (2021); Rogers (2005); Ward (2011b).

1 Calyx with 4 lobes of nearly equal length.
  2 Flowers in terminal glomerules; stamens exserted; corolla white with a pink throat..... ***Spermacoce remota***
  2 Flowers in axillary glomerules; stamens included; corolla white.
    3 Corolla villous in the throat; sepals rotate in fruit, long-deltoid, < 2× as long as width at base..... ***Spermacoce glabra***
    3 Corolla not villous in throat; sepals erect in fruit, narrowly triangular, > 5× as long as width at base..... ***Spermacoce tenuior***
1 Calyx with 2 long lobes, the other 2 absent or vestigial (much shorter than the 2 long lobes).
  ..... ***Spermacoce ocymoides***

Spermacoce glabra Michaux. SMOOTH BUTTONWEED. **Hab:** Moist shores, bottomlands, riverside drawdowns, rocky riversides in the mountains, disturbed areas in the Coastal Plain. **Dist:** C. MD, s. OH, c. IN, c. IL, MO, and e. KS south to s. SC, Panhandle FL, s. AL, s. MS, LA, and e. TX. Perhaps only introduced in some parts of our area; see Wieboldt et al. (1998) for discussion. **Phen:** May-Oct. **Syn:** = Ar, C, F, Fl5, G, GrPl, GW2, Il, K1, K3, K4, NcTx, RAB, S, Tn, Tx, Va, WH3, Florentin, Florentin, & Salas (2020), Rogers (2005), Ward (2011b); > *Spermacoceodes glabra* (Michaux) Kuntze – Bacigalupo (1972). NatureServe G4G5 (Apparently Secure).

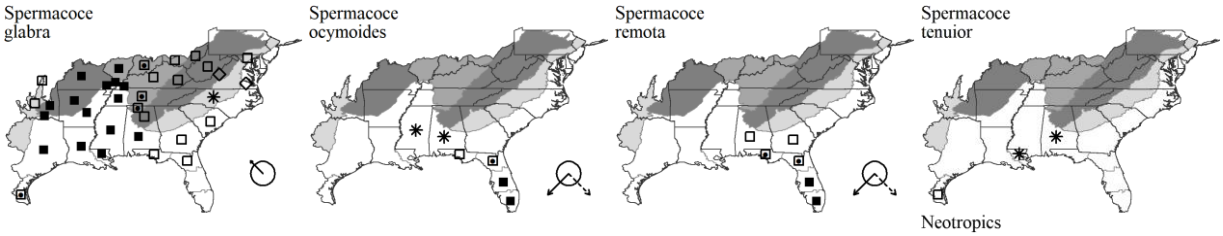
Spermacoce ocymoides Burman f. **Hab:** Wet pine flatwoods, floodplain forests. **Dist:** FL, AL, MS, south through the New World tropics. **Phen:** Jul-Sep. **Tax:** I follow Ward (2011a) in provisionally accepting *S. ocymoides* as the correct name for our plant, until a more definitive

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

rationale for its rejection in favor of *S. prostrata* is made. **Syn:** = Ward (2011b); = *Borreria ocimoides* (Burman f.) A.P. de Candolle – Bah, S; ? *Spermacoce prostrata* Aublet – Fl5, K1, K3, K4, WH3, Florentin, Florentin, & Salas (2020).

Spermacoce remota Lamarck. WOODLAND BUTTONWEED. **Hab:** Wet hammocks, bottomland forests, marshes. **Dist:** Sw. GA, s. AL, and FL; Central America, South America, and the West Indies. **Phen:** Jul-Sep. **Comm:** {add to synonymy}. **Syn:** = Fl5, K3, K4, Meso4.2, WH3; = *Borreria laevis* (Lamarck) Grisebach – Bah, GW2, S, misapplied; > *Spermacoce assurgens* Ruiz & Pavón – K1, Ward (2011b). NatureServe G3G5 (Apparently Secure).

Spermacoce tenuior Linnaeus. **Hab:** In clay soils along creeks. **Dist:** S. TX south through Mexico and Central America to South America. Reported from sw. GA and MS (Kartesz 1999, 2010) {IDs need checking; seems a bit unlikely}. **Phen:** Sep-Jan. **Syn:** = K1, K3, Meso4.2, S, Tx, Ward (2011b); < *Spermacoce riparia* Chamisso & Schlechtendal – Bacigalupo (1972). NatureServe G4 (Apparently Secure).



353. GELSEMIACEAE Struwe & V.A. Albert 1994 [1995] (JESSAMINE FAMILY) [in GENTIANALES]

A family of 3 genera and about 13 species, shrubs and vines, of tropical and warm temperate America, Africa, and Asia (Struwe 2018). There is persuasive evidence that *Gelsemium*, *Mostuea* Didrichsen, and *Pteleocarpa* Oliver, traditionally treated as part of a heterogeneous Loganiaceae, should be accorded family status as Gelsemiaceae (Backlund, Oxelman, & Bremer 2000; Struwe, Albert, & Bremer 1994; Sennblad & Bremer 1996; Struwe et al. (2015). The Gelsemiaceae form a clade most closely related to the Apocynaceae (Backlund, Oxelman, & Bremer 2000). References: Backlund, Oxelman, Bremer (2000); Rogers (1986); Sennblad & Bremer (1996); Struwe (2018) in Kadereit & Bittrich (2018); Struwe et al (2015); Struwe, Albert, & Bremer (1994).

Gelsemium A.L. de Jussieu 1789 (YELLOW JESSAMINE)

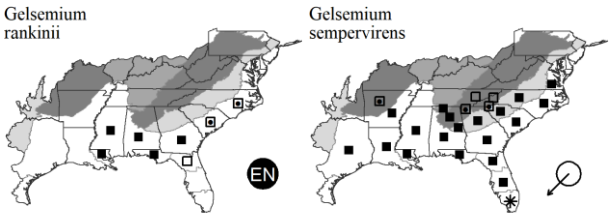
A genus of 3 species, lianas, our 2 species in se. North America (and also Central America) and 1 species in e. Asia. See Wyatt et al. (1993) and Duncan & Dejong (1964) for extensive discussions of morphology, habitat, pollination, genetics, distribution, and evolutionary relationships of our two species of *Gelsemium*. References: Duncan & DeJong (1964); GW2; Godfrey (1988); Krings in FNA () (in prep); Rogers (1986); Struwe (2018) in Kadereit & Bittrich (2018); Wyatt et al (1993).

1 Sepals acuminate apically, persistent on the fruit; capsule elliptical, 1.0-1.6 cm long, 6-8 mm broad, the tapering tip bearing a definite beak 2.4-4.2 3 mm long; seeds wingless; flowers odorless (rarely fragrant), usually golden-yellow; leaf with small patch of spreading trichomes at extreme base on the lower surface ..... ***Gelsemium rankinii***

1 Sepals obtuse to broadly acute, not persistent on the fruit; capsule oblong, 1.5-2.5 cm long, 8-12 mm broad, very abruptly narrowed to a beak 1.5-2 mm long; seeds with a prominent membranous wing sharply differentiated from the body of the seed; flowers fragrant, usually lemon-yellow; leaf glabrous on the lower surface ..... ***Gelsemium sempervirens***

Gelsemium rankinii Small. SWAMP JESSAMINE. **Hab:** Swamps of blackwater rivers. **Dist:** Se. NC (notably in the systems of the Waccamaw and Black rivers) south through SC and GA to the FL Panhandle, and west to e. LA. **Phen:** Feb-Apr; Sep-Oct. **Syn:** = Fl5, GW2, K1, K3, K4, RAB, S, WH3, Rogers (1986). NatureServe G5 (Secure).

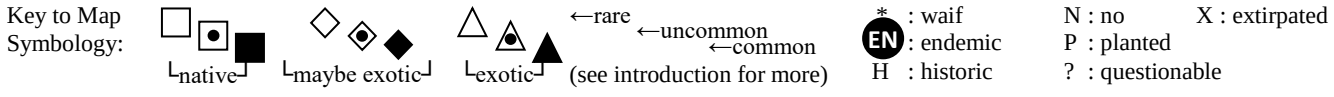
Gelsemium sempervirens (Linnaeus) J. Saint-Hilaire. CAROLINA JESSAMINE. **Hab:** In a wide range of habitats, from swamp forests to dry uplands and thickets, also commonly planted as an ornamental. **Dist:** VA, se. TN, and AR south to c. peninsular FL and e. TX; disjunct in Guatemala and Mexico (many states). **Phen:** (Jan-) Feb-early May; Sep-Nov. **Comm:** Jessamine climbs to the tops of trees. **Syn:** = F, Fl5, G, GW2, K1, K3, K4, Meso4.1, NcTx, RAB, S, Tn, Tx, Va, W, WH3, Rogers (1986). NatureServe G5 (Secure).



353. GENTIANACEAE A.L. de Jussieu 1789 (GENTIAN FAMILY) [in GENTIANALES]

A family of about 102 genera and about 1750 species, herbs, shrubs, and trees, cosmopolitan (Struwe & Pringle 2018). References: Drake (2011); Ho & Liu (1990); Struwe & Pringle (2018) in Kadereit & Bittrich (2018); Struwe et al (2002) in Struwe & Albert (2002); Wood & Weaver (1982).

1 Leaves all scale-like, 1-3 (-5) mm long, appressed to the stem.



..... ***Bartonia***

1 Leaves larger, spreading or ascending.
3 Stem leaves whorled; plants robust, 1-3 m tall; [tribe *Gentianeae*, subtribe *Swertiinae*] ..... ***Frasera***
3 Stem leaves opposite; plants generally < 1 m tall.
4 Calyx lobes 2; stem leaves obovate, widest near the rounded tip), 0.5-1.5 cm long, crowded near the tip of the stem, basal rosette never present; [of nutrient-rich, mesic forests]; [tribe *Gentianeae*, subtribe *Swertiinae*] ..... ***Obolaria***
4 Calyx lobes 4-5; stem leaves lanceolate, ovate, elliptic or narrowly elliptic (widest near the middle or toward the base, the tip acute or acuminate), mostly > 1.5 cm long, distributed fairly evenly along the stem, basal rosettes sometimes present; [of various more-or-less open habitats (except some species of *Gentiana*, which can occur in nutrient-rich, mesic forests)].
5 Corolla lobes 5-14, longer than the corolla tube, pink or white; [common natives]; [tribe *Chironieae*, subtribe *Chironiinae*].
6 Stigmas shorter than the style ..... ***Eustoma***
6 Stigmas equaling or longer than the style ..... ***Sabatia***
5 Corolla lobes 4-5, shorter than the corolla tube, blue, lavender, pink or white.
7 Corolla tube < 2 mm wide; [rare to uncommon aliens, naturalized in disturbed areas]; [tribe *Chironieae*, subtribe *Chironiinae*].
..... ***Centaurium***
7 Corolla tube > 3 mm wide.
..... ***Gentiana***

Bartonia Muhlenberg ex Willdenow 1801 (BARTONIA)

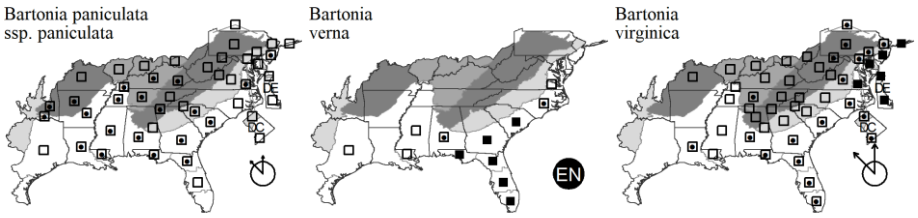
A genus of 3 species, annual herbs, of e. North America (Struwe & Pringle 2018). The genus has coralloid mycorrhizae and lacks root hairs and has been shown to be partially mycoheterotrophic (Cameron & Bolin 2010). References: Correll (1966); Drake (2011); Gillett (1959); Mathews et al (2009); Struwe & Pringle (2018) in Kadereit & Bittrich (2018).

1 Corolla lobes white, 4-10 mm long, spreading, spatulate to obovate, rounded at the apex; flowering in early spring (rarely to early summer) .....
..... ***Bartonia verna***
1 Corolla lobes green to creamy white, 2-3 (-5.2) mm long, ascending or erect, oblong to ovate or lance-ovate, acuminate or rounded-mucronate at the apex; flowering in summer or fall (Jul-Oct).
2 Mid-cauline scale leaves opposite; corolla lobes rounded at the apex, abruptly narrowed to a mucro, their margins erose (uncommonly entire); anthers 0.5-1.1 mm long; style slender with stigmas connivent; capsule dehiscing medially ..... ***Bartonia virginica***
2 Mid-cauline scale leaves alternate; corolla lobes acuminate at the apex, their margins entire; anthers 0.3-0.5 mm long; style stout with stigmas spreading; capsule dehiscing from the apex.
..... ***Bartonia paniculata ssp. paniculata***

Bartonia paniculata (Michaux) Muhlenberg *ssp.* ***paniculata***. SCREWSTEM BARTONIA. **Hab:** Swamps, bogs, pocosins, pocosin ecotones, sphagnous seepages, sinkhole ponds. **Dist:** Ssp. *paniculata* ranges from MA south to c. peninsular FL and west to e. TX, chiefly on the Coastal Plain, but with scattered occurrences inland, to c. VA, e. WV (Vanderhorst et al. 2013), w. NC, KY, and AR. **Phen:** Aug-Oct; Sep-Oct. **Comm:** Ssp. *iodandra* (B.L. Robinson) J. Gillett is more northern, ranging from NL (Newfoundland) south to MA. **Syn:** = Ar, K1, K3, K4, Va, Drake (2011), Gillett (1959), Mathews et al (2009); = *Bartonia paniculata* – G, NE, Correll (1966); = *Bartonia paniculata* var. *paniculata* – C, F; >< *Bartonia lanceolata* Small – S; < *Bartonia paniculata* – Fl5, GW2, Il, Mi, Pa, RAB, Tn, Tx, WH3; < *Bartonia paniculata* (Michaux) Muhlenberg ssp. *paniculata* – NY. NatureServe G5T5 (Secure).

Bartonia verna (Michaux) Rafinesque ex Barton. SPRING BARTONIA, WHITE BARTONIA. **Hab:** Wet pine savannas, shores of Coastal Plain depression ponds, interdune swales, other moist sands. **Dist:** VA (one site known from City of Virginia Beach) (Belden et al. 2004) and se. NC (Carteret County) south to s. FL, west to se. TX. **Phen:** (Nov-) Jan-Apr (-Jun); Apr-Jun. **Tax:** Wood & Weaver's (1982) speculation that *B. verna* is an outlier relative to the other species appears not to be true, with the deeper division being between *B. verna* / *virginica* on the one hand and the *B. paniculata* subspecies on the other (Mathews et al. 2009). **Syn:** = Fl5, GW2, K1, K3, K4, RAB, S, Va, WH3, Drake (2011), Gillett (1959), Mathews et al (2009). NatureServe G5? (Secure).

Bartonia virginica (Linnaeus) Britton, Sterns, & Poggenburg. VIRGINIA BARTONIA, YELLOW BARTONIA. **Hab:** Bogs, swamps, savannas, pocosin ecotones, pocosins, dune swales. **Dist:** NS and QC west to WI, south to n. FL and LA. **Phen:** Jul-Oct; Sep-Oct. **Syn:** = C, F, Fl5, G, GW2, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Va, WH3, Drake (2011), Gillett (1959), Mathews et al (2009). NatureServe G5 (Secure).



Centaurium Hill 1756 (CENTAURY)

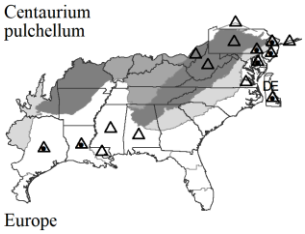
A genus of about 20 species, herbs, mainly north temperate (Struwe & Pringle 2018). References: Drake (2011); Mansion (2004); Struwe & Pringle (2018) in Kadereit & Bittrich (2018).

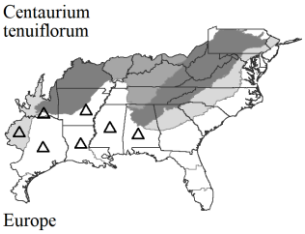
1 Flowers pedicellate, the pedicels (1-) 3-5 (-11) mm long ..... ***Centaurium pulchellum***
1 Flowers sessile or nearly so (sometimes appearing stalked but with bracteal leaves immediately below the calyx).
..... ***Centaurium tenuiflorum***

Key to Map Symbology: □ native; ◇ maybe exotic; △ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

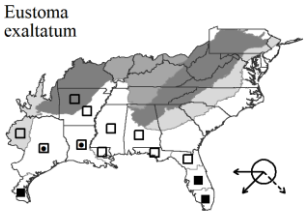
* ***Centaurium pulchellum*** (Swartz) Hayek ex Handel-Mazzetti, Stadlmann, Janchen & Faltis. LESSER CENTAURY, BRANCHED CENTAURY. **Hab:** Disturbed areas. **Dist:** Native of Europe. Reported as naturalizing in WV (Vanderhorst et al. (2019). **Phen:** Jun-Oct. **Syn:** = C, F, G, GrPl, Il, K1, K3, K4, Mi, NE, NY, Pa, S, Drake (2011), Mansion (2004); > *Centaurium floribundum* (Bentham) B.L. Robinson – NcTx; > *Centaurium pulchellum* (Swartz) Hayek ex Handel-Mazzetti, Stadlmann, Janchen & Faltis – NcTx.

* ***Centaurium tenuiflorum*** (Hoffmansegg & Link) Fritsch ex Janchen. SLENDER CENTAURY. **Hab:** Drawdown pond in blackland prairie. **Dist:** Native of Eurasia. **Phen:** Jun. **Comm:** See Keener (2013) for additional, detailed information. **Syn:** = K3, K4, Drake (2011).





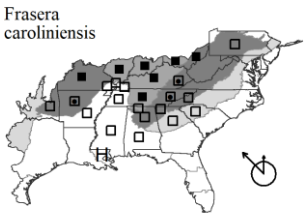
Eustoma Salisbury ex G. Don 1805 [1806] (PRAIRIE-GENTIAN)



A genus of ca. 2 species, annual or perennial herbs, of se., c., and sw. North America south to Mexico and Belize and in the West Indies (Struwe & Pringle 2018). References: Drake (2011); Shinners (1957); Struwe & Pringle (2018) in Kadereit & Bittrich (2018); Turner (2014); Wood & Weaver (1982).

Eustoma exaltatum (Linnaeus) Salisbury ex G. Don. PRAIRIE-GENTIAN. **Hab:** Alkaline prairies, saline coastal areas. **Dist:** AL and peninsular FL west to s. CA, south to Mexico and Belize; West Indies. **Phen:** Jun-Nov. **Syn:** = Ar, Bah, Fl5, GW2, Meso4.1, S, Tx, WH3, Shinners (1957), Turner (2014), Wood & Weaver (1982); = *Eustoma exaltatum* ssp. *exaltatum* – K1, K3, K4, Drake (2011). NatureServe G5T4T5 (Apparently Secure).

Frasera Walter 1788 (COLUMBO)



A genus of 15 species, annual, perennial, or monocarpic herbs, primarily of w. North America (Struwe & Pringle 2018). References: Drake (2011); Horn (1997); Struwe & Pringle (2018) in Kadereit & Bittrich (2018); Threadgill & Baskin (1978).

Frasera caroliniensis Walter. AMERICAN COLUMBO. **Hab:** Rich forests and woodlands over mafic or calcareous rocks, upper slopes of cove forests, floodplain forests. **Dist:** W. NY, nw. PA, and s. ON west to IL, MI, MO, and e. OK, south to w. SC, n. GA, and LA, primarily west of the Blue Ridge. **Phen:** Late May-Jul; Sep-Oct. **Comm:** Horn (1997) studied the ecology of this species in the Piedmont of SC. **Syn:** = Ar, C, Il, K1, K3, K4, Mi, NY, S, Tn, W, Drake (2011), Threadgill & Baskin (1978); = *Swertia caroliniensis* (Walter) Kuntze – F, G, Pa, RAB. NatureServe G5 (Secure).

Gentiana Linnaeus 1753 (GENTIAN)

A genus of about 350-400 species, annual, biennial, and perennial herbs, primarily temperate and arctic. Even following the removal of *Gentianopsis* and *Gentianella* (to separate genera and a different subtribe), *Gentiana* is a large and apparently heterogeneous group, perhaps not monophyletic. No satisfactory comprehensive treatment is available, however. All of the species treated here as *Gentiana* are in the distinctive group treated here as section *Pneumonanthe* (Favre et al. 2020). References: Drake (2011); Favre et al (2020); Halda (1996); Ho & Liu (1990); Ho & Liu (2001); Pringle & Weakley (2009); Pringle (1967a); Pringle (1977); Struwe & Pringle (2018) in Kadereit & Bittrich (2018); Yuan, Küpfer, & Doyle (1996).

Key adapted from Pringle (1967).

Identification Notes: In some species it may be somewhat difficult to interpret the corolla lobes and the corolla appendages. The filaments are alternate to the corolla lobes, and are therefore attached to the lower portion of the corolla appendages.

4 Corolla greenish-white (sometimes somewhat purplish); seeds wingless; lower leaves spatulate to obovate ..... ***Gentiana villosa***
4 Corolla blue, purplish, pale blue, or nearly white; seeds winged; lower leaves linear, lanceolate, elliptic, or ovate.
  9 Leaves ovate, widest near the base, bright green; calyx lobes longer than the calyx tube; corolla lobes spreading, usually 2-4 mm longer than the appendages..... ***Gentiana catesbyi***
  9 Leaves linear to elliptic, widest near the middle, dark green; calyx lobes shorter than or about equal to the calyx tube; corolla lobes usually incurved, rarely exceeding the appendages by > 2 mm ..... ***Gentiana saponaria***

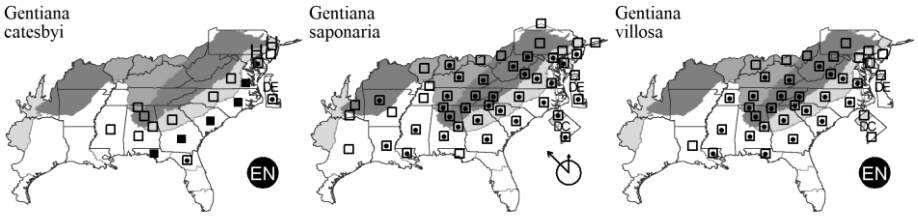
Gentiana catesbyi Walter. COASTAL PLAIN GENTIAN. **Hab:** Pocosins, moist longleaf pine savanna edges, edges of moist hardwood forests, bluff seepages. **Dist:** S. NJ south to ne. FL and e. Panhandle FL, on the Coastal Plain. **Phen:** Late Sep-Nov. **Tax:** Traditionally spelled '*catesbaei*', this is necessarily corrected to '*catesbyi*' under provisions of the Code. **Syn:** = *Gentiana catesbaei* Walter – C, Fl5, G, GW2, K1, K3, K4, Pa, RAB, Va, WH3, Halda

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

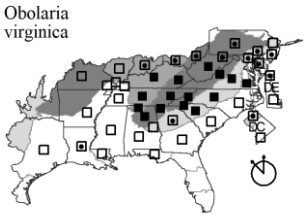
(1996), Ho & Liu (2001), Pringle (1967a); > *Dasystephana latifolia* (Chapman) Small – S; > *Dasystephana parvifolia* (Chapman) Small – S; > *Gentiana catesbaei* var. *catesbaei* – F; > *Gentiana catesbaei* var. *nummulariifolia* Fernald – F. NatureServe G5 (Secure).

Gentiana saponaria Linnaeus. SOAPWORT GENTIAN, HARVESTBELLS. **Hab:** Bogs, marshes, wet hardwood forests, other moist to wet habitats. **Dist:** NY west to n. IL, south to Panhandle FL and e. TX. **Phen:** Aug-Nov. **Tax:** A peculiar form with very narrow leaves has been found at several localities in Ashe and Watauga counties, NC and in the South Mountains, NC; it may warrant taxonomic recognition after further study. **Syn:** = C, Fl5, GW2, Il, K3, K4, Mi, NY, Pa, RAB, Tn, Tx, Va, W, WH3, Halda (1996), Ho & Liu (2001), Pringle & Weakley (2009), Pringle (1967a); = *Dasystephana saponaria* (Linnaeus) Small – S; = *Gentiana saponaria* var. *saponaria* – K1; > *Gentiana cherokeensis* (W.P. Lemmon) Fernald – F, G; > *Gentiana saponaria* Linnaeus – F, G, WV. NatureServe G5T5 (Secure).

Gentiana villosa Linnaeus. STRIPED GENTIAN. **Hab:** Upland forests, sandhill/pocosin ecotones. **Dist:** Se. PA west to n. KY and w. TN, south to Panhandle FL and e. LA. **Phen:** Late Aug-Nov. **Syn:** = C, F, Fl5, G, K1, K3, K4, Pa, RAB, Tn, Va, W, WH3, Halda (1996), Ho & Liu (2001), Pringle (1967a); = *Dasystephana villosa* (Linnaeus) Small – S. NatureServe G4 (Apparently Secure).



Obolaria Linnaeus 1753 (PENNYWORT)



A monotypic genus, a perennial herb (partly mycoheterotrophic), of e. North America. References: Gillett (1959); Struwe & Pringle (2018) in Kadereit & Bittrich (2018).

Obolaria virginica Linnaeus. PENNYWORT. **Hab:** Nutrient-rich, moist to dry forests, mesic hammocks. **Dist:** NJ west to OH, s. IN, and s. IL, south to Panhandle FL (Jefferson County) and se. LA (reported from TX). **Phen:** (Late Feb-) Mar-Jun; May-Jul. **Comm:** *Obolaria* has well-developed mycorrhizae and is substantially mycoheterotrophic (Cameron & Bolin 2010). **ID Notes:** The small purplish-green plants are inconspicuous, often nearly hidden under fallen leaves. **Syn:** = Ar, C, F, Fl5, G, Il, K1, K3, K4, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV, Gillett (1959). NatureServe G5 (Secure).

Sabatia Adanson 1763 (SABATIA, ROSE-GENTIAN, ROSE-PINK, MARSH-PINK, SEA-PINK)

Contributed by B.A. Sorrie and A.S. Weakley

A genus of about 20 species, of North America and the West Indies (Struwe & Pringle 2018). References: Bell & Lester (1980); Pringle & Witsell (2004); Struwe & Pringle (2018) in Kadereit & Bittrich (2018); Suarez-Gonzalez et al (2015); Ward (2007e); Wilbur (1955).

1 Flowers with (7-) 8-12 (-14) corolla lobes.
- 2 Pedicels < 5 mm long; calyx subtended by linear bracts that usually exceed the corolla lobes; terminal flowers in capitate clusters (less commonly single).
  - 3 Basal leaves similar in shape and size to the stem leaves; cauline leaves (25-) 35-50 (-65) mm long, (7-) 10-20 (-25) mm wide, 2-4× as long as wide; corolla lobes pale rose or white; [mountain slopes, sw. NC, nw. GA, and se. TN south to c. AL] ..... ***Sabatia capitata***
  - 3 Basal leaves much broader and shorter than the stem leaves; cauline leaves (15-) 40-80 (-100) mm long, 1-3 mm wide, 20-60× as long as wide; corolla lobes medium rose to deep rose; [bogs and savannas, Coastal Plain] ..... ***Sabatia gentianoides***
- 2 Pedicels > 10 mm long; calyx not subtended by long bracts; terminal flower single.
  - 4 Upper stem leaves about as wide as the diameter of the stem, or narrower; calyx lobes terete or semi-terete; stems 6-12 dm tall; [*Taxodium ascendens-Nyssa biflora* depressions and wet pine flatwoods in se. SC and southwards] ..... ***Sabatia decandra***
  - 4 Upper stem leaves much wider than the diameter of the stem; calyx lobes flat, linear to narrowly oblanceolate; stems 3-12 dm tall; [various habitats, primarily along the shores of blackwater rivers or ponds, or in tidal marshes] ..... ***Sabatia foliosa***

1 Flowers with 5-6 (-7) corolla lobes.
- 7 Upper branches of main stem alternate.
  - 12 Calyx lobes foliaceous, 5-8 mm wide, oblong to oblanceolate, mostly exceeding the corolla lobes ..... ***Sabatia calycina***
  - 12 Calyx lobes linear-setaceous, 0.5-2 mm wide, if equaling the corolla lobes then very narrow and not foliaceous.
    - 13 Calyx lobes (3-) 4-7 (-8) mm long; corolla lobes white ..... ***Sabatia brevifolia***
    - 13 Calyx lobes (4-) 6-17 (-23) mm long; corolla lobes pink (rarely white in individual plants).
      - 14 Plants perennial, often with several stems from a caudex; calyx lobes > 3/4× as long as the corolla lobes, and sometimes exceeding them; [saturated soils from Coastal Plain savannas to Mountain bogs] ..... ***Sabatia campanulata***
      - 14 Plants annual, solitary; calyx lobes up to 3/4× as long as the corolla lobes
        - 15 Corolla lobes (18-) 20-25 mm long; leaves succulent (usually drying rugose and green) ..... ***Sabatia grandiflora***
        - 15 Corolla lobes 10-15 mm long; leaves thin (usually drying flat and darkening) ..... ***Sabatia stellaris***
- 7 Upper branches of main stem opposite.
  - 16 Corolla lobes pink (rarely white); pedicels at least in part > 5 mm long.
    - 17 Lower half of stem winged; leaves ovate, clasping, < 2× as long as wide; [widespread in our area] ..... ***Sabatia angularis***
    - 17 Lower half of stem not winged; leaves elliptic to lanceolate, more or less tapered to the base, mostly > 3× as long as wide; [Coastal Plain or very rarely Piedmont] ..... ***Sabatia brachiata***

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

16 Corolla lobes white or creamy white; pedicels (above the uppermost bracts or branches) ca. 1-2 (-5) mm long.
18 Lower portion of stem quadrangular, narrowly winged; plants annual or biennial, with 1 (-several) stems arising from a taproot..... ***Sabatia quadrangula***
18 Lower portion of stem terete, not winged (though the upper stem is quadrangular or angled in *S. difformis*); plants perennial, with several stems arising from a short rhizome; [section *Eusabatia*, subsection *Difformes*].
19 Leaves and upper stem not glaucous; stem terete below, becoming quadrangular or quadrangular-angled above; corolla lobes (5-) 7-15 (-21) mm long; [widespread in our area]..... ***Sabatia difformis***
19 Leaves and upper stem glaucous; stem terete throughout; corolla lobes (4-) 5-7 (-8) mm long; [GA southward and westward]. ..... ***Sabatia macrophylla var. macrophylla***

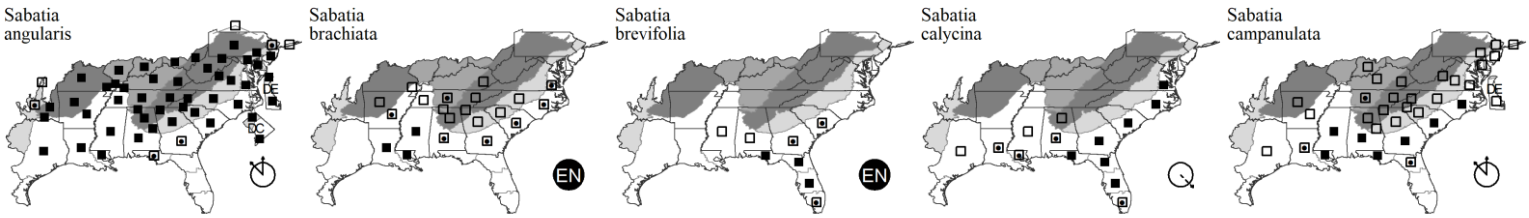
Sabatia angularis (Linnaeus) Pursh. BITTER-BLOOM, COMMON MARSH-PINK, AMERICAN CENTAURY. **Hab:** Forests, woodlands, marshes, fields, calcareous hammocks (in FL), especially in base-rich situations. **Dist:** NY west to s. MI, IL, and e. KS, south to Panhandle FL and e. TX. **Phen:** Jun-Sep; Sep-Oct. **Syn:** = C, F, Fl5, GW2, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, W, WH3, WV, Wilbur (1955); = *Sabatia angulatus* – Il, misspelling; = *Sabbatia angularis* – S. NatureServe G5 (Secure).

Sabatia brachiata Elliott. NARROWLEAF ROSE-PINK. **Hab:** Mesic pinelands, longleaf pine sandhills, pine savannas, pine flatwoods. **Dist:** Se. VA south to s. GA, west to LA, north in the interior to c. TN and se. MO. **Phen:** Late May-Aug; Aug-Sep. **Syn:** = Ar, C, F, GW2, K1, K3, K4, RAB, Tn, Va, W, Wilbur (1955); = *Sabbatia brachiata* – S. NatureServe G5? (Secure).

Sabatia brevifolia Rafinesque. SAVANNA WHITE ROSE-GENTIAN. **Hab:** Pine savannas and flatwoods. **Dist:** E. SC south to peninsular FL, west to s. AL and s. MS. **Phen:** Sep-Oct; Oct-Nov. **Syn:** = Fl5, GW2, K1, K3, K4, RAB, WH3, Wilbur (1955); = *Sabbatia elliottii* Steudel – S. NatureServe G3G4 (Vulnerable).

Sabatia calycina (Lamarck) A. Heller. COASTAL ROSE-PINK. **Hab:** Swamp forests, river banks. **Dist:** Se. VA south to s. FL, west to se. TX; e. Cuba and Hispaniola. **Phen:** Jun-Oct; Jul-Oct. **Syn:** = C, F, Fl5, GW2, K1, K3, K4, RAB, Tx, Va, WH3, Wilbur (1955); = *Sabbatia calycina* – S. NatureServe G5? (Secure).

Sabatia campanulata (Linnaeus) Torrey. SLENDER MARSH-PINK. **Hab:** Pine savannas, bogs, seeps, fens. **Dist:** MA south to ne. FL, Panhandle FL, west to LA and AR; scattered inland as in w. VA, w. NC, c. TN, and KY. **Phen:** Jun-Aug; Sep-Oct. **Syn:** = Ar, C, Fl5, GW2, K1, K3, K4, NE, NY, Pa, RAB, Tn, Va, W, WH3, Pringle & Witsell (2004), Wilbur (1955); > *Sabatia campanulata* var. *campanulata* – F; > *Sabatia campanulata* var. *gracilis* (Michaux) Fernald – F; < *Sabbatia campanulata* (Linnaeus) Torrey – S. NatureServe G5 (Secure).



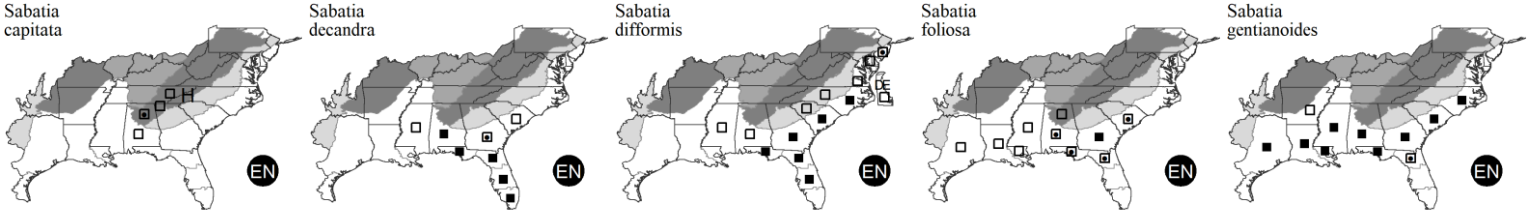
Sabatia capitata (Rafinesque) Blake. CUMBERLAND ROSE-GENTIAN. **Hab:** Sloping woodlands and meadows, over sandstone or shale. **Dist:** Sw. NC and se. TN south to nw. GA and c. AL. **Phen:** Jul-Aug; Sep-Oct. **Comm:** Apparently present in NC, at least formerly, based on a specimen collected "from Cherokee", probably Cherokee County, NC (Wilbur 1955), a remarkably poorly botanized area. **Syn:** = K1, K3, K4, Tn, Wilbur (1955); = *Lapithea capitata* (Rafinesque) Small – S. NatureServe G2 (Imperiled).

Sabatia decandra (Walter) R.M. Harper. BARTRAM'S ROSE-GENTIAN. **Hab:** Margins of *Taxodium ascendens-Nyssa* depressions, wet pine flatwoods. **Dist:** Ne. SC south to s. FL, west to s. AL and se. MS. **Phen:** Jun-Aug; Aug-Oct. **Tax:** Walter's ((1788) name *S. decandra* was rejected by Wilbur (1955) as being too uncertain as to the intended species, leading to his giving this species the new name *S. bartramii*. Ward (2007e) argued for retention of the older name and neotypified it. We agree with Ward (2007e) and reinstate *S. decandra*, particularly as a major part of Wilbur's argument is based on the non-overlap of the range of *S. decandra* and the stated area covered by Walter, yet we have gradually appreciated that a considerable number of species in Walter (1788) are not plausibly from the vicinity of his plantation. **Syn:** = Fl5, K4, WH3, Ward (2007e); = *Sabatia bartramii* Wilbur – GW2, K1, K3, Wilbur (1955); = *Sabatia dodecandra* var. *coriacea* (Elliott) H.E. Ahles – RAB; = *Sabbatia decandra* (Walter) R.M. Harper – S. NatureServe G4G5 (Apparently Secure).

Sabatia difformis (Linnaeus) Druce. LANCELEAF ROSE-GENTIAN, WHITE SABATIA. **Hab:** Pine savannas, bogs, pocosins. **Dist:** S. NJ south to c. peninsular FL, west to s. AL and s. MS. **Phen:** May-Sep; Sep-Dec. **Syn:** = C, F, Fl5, GW2, K1, K3, K4, RAB, Va, WH3, Wilbur (1955); = *Sabbatia difformis* – S. NatureServe G4G5 (Apparently Secure).

Sabatia foliosa Fernald. BLACKWATER ROSE-PINK. **Hab:** Openings along blackwater rivers, cypress ponds. **Dist:** E. SC south to ne. FL and Panhandle FL, west to se. TX. **Phen:** Jun-Aug; Aug-Oct. **Syn:** = *Sabatia dodecandra* (Linnaeus) Britton, Sterns, & Poggenburg var. *foliosa* (Fernald) Wilbur – GW2, K1, K3, K4, Tx, Wilbur (1955); < *Sabatia dodecandra* (Linnaeus) Britton, Sterns, & Poggenburg – Fl5, WH3; < *Sabatia dodecandra* var. *dodecandra* – RAB; > *Sabbatia foliosa* – S; > *Sabbatia harperi* Small – S.

Sabatia gentianoides Elliott. **Hab:** Pine savannas, bogs. **Dist:** NC south to ne. FL and Panhandle FL, west to se. TX. **Phen:** Jul-Aug; Sep-Oct. **Syn:** = Ar, Fl5, GW2, K1, K3, K4, RAB, Tx, WH3, Wilbur (1955); = *Lapithea gentianoides* (Elliott) Grisebach – S. NatureServe G4G5 (Apparently Secure).



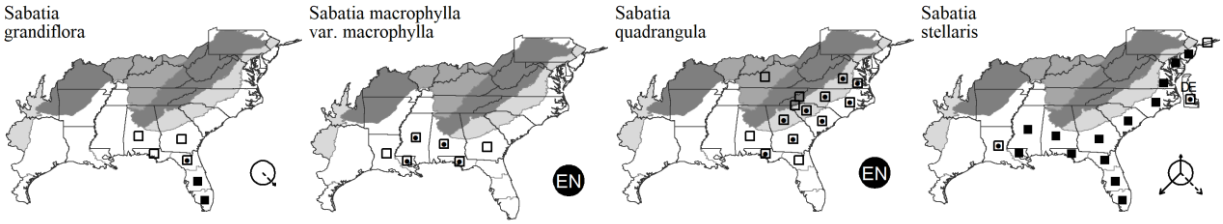
Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more)
* : waif EN : endemic H : historic
N : no P : planted ? : questionable
X : extirpated

Sabatia grandiflora (A. Gray) Small. LARGEFLOWER ROSE-GENTIAN. **Hab:** Wet flatwoods, marshes, cypress-gum depressions, limesink ponds, borrow pits. **Dist:** Ne. FL, Panhandle FL, s. AL, south to s. FL; Cuba. **Syn:** = Fl5, GW2, K1, K3, K4, WH3, Wilbur (1955); = *Sabbatia grandiflora* – S. NatureServe G3G4 (Vulnerable).

Sabatia macrophylla Hooker *var*. ***macrophylla***. LARGE-LEAF ROSE-GENTIAN. **Hab:** Wet savannas. **Dist:** Sw. GA west to e. LA. **Syn:** = K1, K3, K4, Wilbur (1955); = *Sabbatia macrophylla* Hooker – S; < *Sabatia macrophylla* – Fl5, GW2, WH3. NatureServe G4G5TNR (Not Yet Ranked).

Sabatia quadrangula Wilbur. FOUR-ANGLE SABATIA. **Hab:** Longleaf pine sandhills, moist forests, pocosin ecotones, seepages. **Dist:** E. VA south to n. peninsular FL, west to s. AL; disjunct in Eastern Highland Rim (Pulaski County, KY; Tara Littlefield, pers. comm. 2020). **Phen:** Jun-Sep; Aug-Nov. **Syn:** = C, Fl5, GW2, K1, K3, K4, RAB, Va, WH3, Wilbur (1955); = *Sabatia paniculata* Michaux – F, misapplied; = *Sabbatia paniculata* – S. NatureServe G4G5 (Apparently Secure).

Sabatia stellaris Pursh. ANNUAL SEA-PINK. **Hab:** Brackish marshes, maritime wet grasslands. **Dist:** S. MA south to s. FL, west to LA; Bahamas; Cuba; c. Mexico. **Phen:** Jul-Oct; Aug-late Nov. **Syn:** = Bah, C, F, Fl5, GW2, K1, K3, K4, NE, NY, RAB, Va, WH3, Wilbur (1955); < *Sabbatia campanulata* (Linnaeus) Torrey – S. NatureServe G5 (Secure).



354. LOGANIACEAE R. Brown ex Martius 1827 (STRYCHNINE FAMILY) [in GENTIANALES]

As here rather narrowly interpreted, Loganiaceae consists of about 16 genera and about 460 species, herbs, shrubs, and trees, of tropical, subtropical, and warm temperate areas of the Old and New Worlds (Struwe et al. 2018). Other genera in our area which have traditionally been considered components of the Loganiaceae now are clearly better placed in the small families Tetrachondraceae *(Polypremum*), Gelsemiaceae (*Gelsemium*), and Scrophulariaceae (*Buddleja*), more closely related to other families (such as Rubiaceae) than to Loganiaceae sensu stricto (Struwe, Albert, & Bremer 1994). The affinities of *Spigelia* appear to be with a small group of tropical and subtropical genera, the largest of which is *Strychnos*. Struwe, Albert, & Bremer (1994) treated this group as the family Strychnaceae, based on a cladistic analysis of data. A later, more thorough analysis suggested that Strychnaceae is best recombined with Loganiaceae (Backlund, Oxelman, & Bremer 2000). References: Rogers (1986); Struwe et al (2018) in Kadereit & Bittrich (2018).

2 Corolla funnelform, 0.1-0.2 cm long, white; [tribe Loganieae]..... ***Mitreola***
2 Corolla tubular, 3-6 cm long, red and yellow; [tribe Spigelieae] ..... ***Spigelia***

Mitreola Linnaeus 1758 (MITERWORT)

A genus of about 6 species, annual and perennial herbs, tropical, subtropical, and warm temperate (Struwe et al. 2018). References: Nelson (1980); Rogers (1986); Struwe et al (2018) in Kadereit & Bittrich (2018).

1 Leaves 2-8 cm long, petiolate or subsessile and tapering to a cuneate base..... ***Mitreola petiolata***
1 Leaves 1-4 cm long, sessile, the base rounded.
  2 Mature seed reticulate and iridescent; mature capsule smooth to slightly and finely tuberculate; larger leaves ca. 4× as long as wide..... ***Mitreola angustifolia***
  2 Mature seed smooth and shiny; mature capsule markedly papillose-warty; larger leaves 1-2× as long as wide..... ***Mitreola sessilifolia***

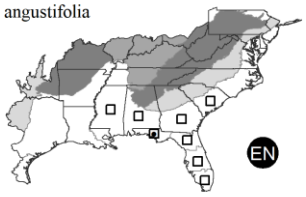
Mitreola angustifolia (Torrey & A. Gray) J.B. Nelson. NARROW-LEAVED MITERWORT. **Hab:** Clay-based Carolina bays, other Coastal Plain depressional wetlands. **Dist:** Se. SC south to s. FL, and west to s. AL and se. MS (Sorrie & Leonard 1999). **Phen:** Jun-Aug. **Syn:** = Fl5, GW2, K3, K4, WH3, Nelson (1980); = *Cynoctonum angustifolium* (Torrey & A. Gray) Small – S; < *Mitreola sessilifolia* (J.F. Gmelin) G. Don – K1, Rogers (1986).

Mitreola petiolata (J.F. Gmelin) Torrey & A. Gray. CARIBBEAN MITERWORT. **Hab:** Swamps, marshes, ditches, seepage areas on calcareous glades, other wet habitats. **Dist:** Se. VA south to s. FL and west to AR and c. TX, north in the interior to nw. GA and c. and se. TN; Mexico; the West Indies; n. South America. **Phen:** (May-) Jul-Sep; Sep-Nov. **Syn:** = Bah, Fl5, GW2, K1, K3, K4, NcTx, Tn, Va, WH3, Nelson (1980); = *Cynoctonum mitreola* (Linnaeus) Britton – C, F, G, GrPl, RAB, S, Tx. NatureServe G5 (Secure).

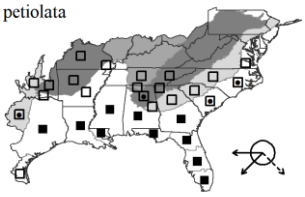
Mitreola sessilifolia (J.F. Gmelin) G. Don. SMALL-LEAVED MITERWORT. **Hab:** Wet pine savannas, pocosins, ditches, margins of limesink depressions (dolines). **Dist:** Se. VA south to s. FL, west to e. TX; Bahamas. **Phen:** Late Jun-Aug; Sep-Oct. **Syn:** = Bah, Fl5, GW2, K3, K4, Va, WH3, Nelson (1980); = *Cynoctonum sessilifolium* J.F. Gmelin – C, F, G, RAB, S, Tx; < *Mitreola sessilifolia* (J.F. Gmelin) G. Don – K1, Rogers (1986).

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

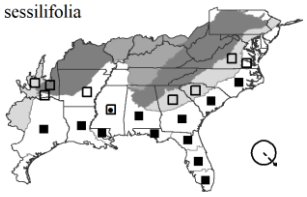
Mitreola angustifolia



Mitreola petiolata



Mitreola sessilifolia



Spigelia Linnaeus 1753 (PINKROOT)

A genus of about 60-85 species, annual and perennial herbs, of tropical and warm temperate America (Struwe et al. 2018). References: Gould & Jansen (1999); Gould (1996); Rogers (1986); Struwe et al (2018) in Kadereit & Bittrich (2018); Weakley et al (2011).

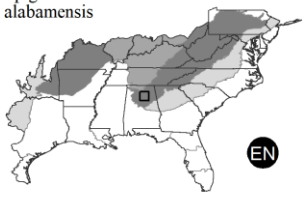
2 Corolla scarlet on the outer surface, yellow on the inner surface (rarely whitish or pink with longitudinal pink lines); leaves broadly rounded at base, 5-12 cm long, (1-) 2-6 cm wide; anthers exserted from the corolla tube; [collectively widespread] ..... ***Spigelia marilandica***
2 Corolla light pink to white on the outer and inner surfaces; leaves narrowly to broadly cuneate at base, 1.5-5 cm long, 0.5-2 cm wide; anthers included in the corolla tube; [of FL, AL, or TX].
  4 Corolla 36-50 mm long; pistil 24-27 mm long; sepals 8-11 mm long; inflorescence with 2-4 flowers; leaves usually > 2× as long as wide; [of dolomitic glades of the southern Ridge and Valley of Bibb Co. AL] ..... ***Spigelia alabamensis***
  4 Corolla 25-30 mm long; pistil 17-19 mm long; sepals 4-6 mm long; inflorescence with 3-8 flowers; leaves usually < 2× as long as wide; [of pine savannas of Coastal Plain of Panhandle FL and adjacent AL] ..... ***Spigelia gentianoides***

Spigelia alabamensis (K. Gould) K.G. Mathews & Weakley. ALABAMA PINKROOT. **Hab:** Dolostone glades. **Dist:** Endemic to Bibb County, AL (Gould 1996, Allison & Stevens 2001; Weakley et al. 2011). **Syn:** = K3, K4, Weakley et al (2011); = *Spigelia gentianoides* Chapman ex Alphonse de Candolle var. *alabamensis* K. Gould – K1, Gould (1996). NatureServe G2 (Imperiled).

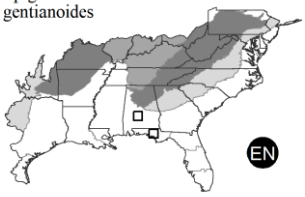
Spigelia gentianoides Chapman ex A.P. de Candolle & A.L.P.P. de Candolle. GENTIAN PINKROOT. **Hab:** Longleaf pine sandhills, pine flatwoods. **Dist:** Endemic to FL Panhandle (Calhoun, Jackson, and Washington counties) and adjacent AL (Geneva County). **Syn:** = Fl5, K3, K4, S, Rogers (1986), Weakley et al (2011); = *Spigelia gentianoides* Chapman ex Alphonse de Candolle var. *gentianoides* – K1, Gould (1996); < *Spigelia gentianoides* Chapman ex A.P. de Candolle & A.L.P.P. de Candolle – WH3. NatureServe G2 (Imperiled).

Spigelia marilandica (Linnaeus) Linnaeus. PINKROOT, WORMGRASS, INDIAN-PINK. **Hab:** Moist to dry woodlands and forests, usually on circumneutral soils. **Dist:** SC, sw. NC (Cherokee Co. and Macon Co.), and TN west to s. IN and OK, south to Panhandle FL and TX; some floras allege its occurrence north to VA, MD, NJ, and PA (its recent use as a native ornamental is spreading its distribution, at least as a garden waif, beyond its native distribution). *S. marilandica* will likely be found in sw. VA. **Phen:** May-Jun; late Jun-Jul. **Syn:** = Ar, C, F, Fl5, G, Il, K1, K3, K4, NcTx, RAB, Tn, Tx, W, WH3, Rogers (1986); = *Spigelia marylandica* – S, orthographic variant. NatureServe G4 (Apparently Secure).

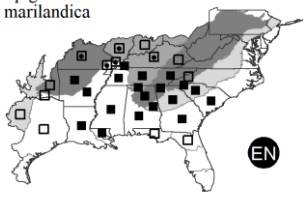
Spigelia alabamensis



Spigelia gentianoides



Spigelia marilandica



356. APOCYNACEAE A.L. de Jussieu 1789 (DOGBANE FAMILY) [in GENTIANALES]

As here circumscribed including the Asclepiadaceae, a family of about 378-480 genera and about 4800-5350 species, lianas, shrubs, perennial herbs, and trees, widespread in tropical and temperate areas (Endress et al. 2018). There appears to be overwhelming evidence favoring the combination of the Asclepiadaceae into the Apocynaceae; see, for instance, Rosatti (1989), Sennblad & Bremer (1996), and many others. References: Endress et al (2018) in Kadereit & Bittrich (2018); Endress, Liede-Schumann, & Meve (2014); Liede (1997a); Rosatti (1989); Woodson (1938).

1 Plant erect or trailing (but not twining), herbaceous or woody.
  2 Plant a woody shrub or trailing woody vine.
    3 Plant rhizomatous, suffrutescent, < 4 dm tall; leaves narrowly to broadly ovate; flowers blue, lavender, or white ..... ***Vinca***
    3 Plant erect, > 4 dm tall; leaves either lanceolate or elliptic; flowers yellow, white, pink, or red. ..... ***Nerium oleander***
  2 Plant an herb or trailing herbaceous vine.
    5 Flowers with conspicuous or less conspicuous corona; follicles not paired; seeds with coma present ..... ***Asclepias***
    5 Flowers lacking corona; follicles paired (occasionally single by abortion); seeds with coma absent (*Catharanthus, Amsonia*) or present (*Apocynum*).
      7 Leaves alternate (rarely a few on a plant subopposite) ..... ***Amsonia***
      7 Leaves opposite.
        8 Flower < 8 mm across; paired follicles pendent, 10-22 cm long; seeds with coma; mature plants normally > 7 dm tall ..... ***Apocynum***
        8 Flower > 20 mm across; paired follicles erect, 1.5-2.5 cm long; seeds lacking coma; mature plants 2-6 dm tall ..... ***Catharanthus roseus***
1 Plant twining, herbaceous or woody.

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

9 Leaves cordate at base, ovate to broadly lanceolate, < 4× as long as wide.
10 Plants in flower.
11 Petals white; gynostegial corona > ¾ as long as the corolla lobes ..... ***Cynanchum***
11 Petals purple-black, brown, yellow, yellow-green, cream, or maroon (white in *Matelea baldwyniana*); gynostegial corona < ½ as long as the corolla lobes.
12 Corolla lobes glabrous on the outer surface; dorsal anther appendages laminar; carpels smooth and angled ..... ***Gonolobus***
12 Corolla lobes glandular-puberulent or puberulent on the outer surface; dorsal anther appendages absent; carpels muricate (*Matelea*) or smooth (*Vincetoxicum*).
..... ***Matelea***
10 Plants in fruit.
14 Follicles muricate ..... ***Matelea***
14 Follicles smooth and angled.
15 Leaves cordate, broadly rounded, tapering abruptly to an acute, obtuse, or apiculate apex ..... ***Gonolobus***
15 Leaves deeply cordate, tapering steadily to an acuminate apex.
..... ***Cynanchum***
9 Leaves not cordate at base (cuneate, rounded, or truncate); leaves ovate, lanceolate, or linear, > 1.5× as long as wide.
17 Leaves linear, the margins parallel.
..... ***Pattalias paluster***
17 Leaves not linear, instead ovate or lanceolate (rarely deltoid/rhomboid shaped).
21 Corolla lobes 3-4 mm long, acute, reflexed, pale yellow; leaves subcoriaceous; [native, common] ..... ***Thyrsanthella difformis***
21 Corolla lobes 8-12 mm long, rounded, spreading, white; leaves coriaceous; [alien, commonly planted, rarely persistent or spreading] .....
..... ***Trachelospermum***

Amsonia Walter 1788 (BLUESTARS)

[by Bruce A. Sorrie and Alan. S. Weakley]. References: Doffett et al (2014); Williams (2019a); Woodson (1928); Woodson (1929); Woodson (1936b); Woodson (1938); Woodson (1943); Woodson (1943).

A genus of about 20 species, herbs, of temperate North America and Japan.

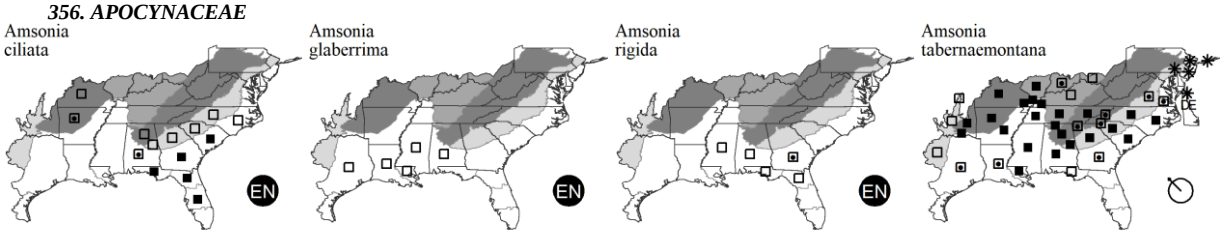
2 Corolla glabrous on the outer surface; stem pubescent (*A. ciliata*) or glabrous (*A. rigida*); [of the Coastal Plain from se. and sc. NC southward and westward to the Interior Highlands and TX].
3 Leaves elliptic, the lower and upper mostly 3-5× as long as wide, all leaves > 5 mm wide; leaves glabrous; [of seasonally flooded depression wetlands and moist pinelands].
4 Leaves 6.0-10.0 cm long (mean 7.1); corolla lobes 6.5-8.5 mm long (mean 7.3); [of se. LA to e. TX] ..... ***Amsonia glaberrima***
4 Leaves 3.5-7.5 cm long (mean 5.1); corolla lobes 7-11 mm long (mean 8.2); [of se. GA and se. AL to n. FL] ..... ***Amsonia rigida***
3 Leaves linear to lanceolate, the lower leaves 4-30× as long as wide, the upper leaves 1 mm or less wide; leaves ciliate; [of dry, sandy habitats, such as sandhills]
..... ***Amsonia ciliata***
2 Corolla pubescent on the outer surface; stem glabrous (or sometimes pubescent when young in *A. ludoviciana*); [more widespread in our area].
..... ***Amsonia tabernaemontana***

Amsonia ciliata Walter. SANDHILL BLUESTAR. **Hab:** Longleaf pine sandhills, other dry woodlands and openings. **Dist:** Se. NC south to c. peninsular FL, west to c. and s. AL; curiously disjunct in the Ozark-Ouachita highlands of sc. MO, w. AR, and se. OK; material from sc. and w. OK and TX sometimes included in *A. ciliata* is here considered a separate species, *A. texana* (A. Gray) Heller. **Phen:** Apr-May; Sep-Oct. **Tax:** Two varieties have been traditionally recognized since the monograph of Woodson (1928), var. *ciliata* (leaves strongly heteromorphic, the lower leaves lanceolate, 4-10 mm wide (mostly 4-15× as long as wide), the upper about 1 mm wide; inflorescence barely held above the foliage) and var. *tenuifolia* (leaves slightly or not at all heteromorphic, the lower leaves linear, 1-3 mm wide (mostly 15-30× as long as wide), the upper < 1 mm wide; inflorescence usually held well above the foliage). They do not seem to be clearly separable morphologically, and their distributions are very largely overlapping, suggesting that they are merely forms. **Syn:** = Fl5, RAB, WH3; < *Amsonia ciliata* Walter – K3, K4; > *Amsonia ciliata* Walter var. *ciliata* – K1, S, Woodson (1928), Woodson (1938); > *Amsonia ciliata* Walter var. *filifolia* A.W. Wood – F, G, Mo2, S, Tx; >< *Amsonia ciliata* Walter var. *filifolia* A.W. Wood – Woodson (1938); > *Amsonia ciliata* var. *tenuifolia* – Ar, K1, NcTx; >< *Amsonia ciliata* var. *tenuifolia* – Woodson (1928).

Amsonia glaberrima Woodson. GULF BLUESTAR, POND BLUESTAR. **Hab:** Seasonally flooded depression wetlands and moist pinelands. **Dist:** S. AL, s. MS, s. LA, and se. TX. **Syn:** = Tx, Woodson (1936b), Woodson (1938); < *Amsonia amsonia* (Linnaeus) Britton – S; < *Amsonia tabernaemontana* Walter var. *tabernaemontana* – K1, K3, K4, Woodson (1928).

Amsonia rigida Shuttleworth ex Small. STIFF BLUESTAR, POND BLUESTAR. **Hab:** Seasonally flooded depression wetlands and moist pinelands. **Dist:** S. GA to n. peninsular FL, west to s. MS. **Syn:** = GW2, K1, K3, K4, S, Woodson (1928), Woodson (1938); < *Amsonia tabernaemontana* Walter – Fl5, WH3.

Amsonia tabernaemontana Walter. WIDELEAF BLUE-STARS. **Hab:** Floodplain forests, moist, rich slope forests. **Dist:** Se. VA west to s. IL, MO, and KS, south to GA, LA, e. OK, and TX. **Phen:** Apr; Aug-Sep. **Syn:** = *Amsonia amsonia* (Linnaeus) Britton – S; = *Amsonia tabernaemontana* Walter var. *tabernaemontana* – Mo2, RAB, Tn, Tx, Tx, Va, W, Woodson (1928), Woodson (1938); < *Amsonia tabernaemontana* Walter – Ar, C, Fl5, GrPl, GW2, NcTx, NY, Pa, WH3; >< *Amsonia tabernaemontana* var. *salicifolia* – G; > *Amsonia tabernaemontana* Walter var. *tabernaemontana* – G, Il, K1, K3.



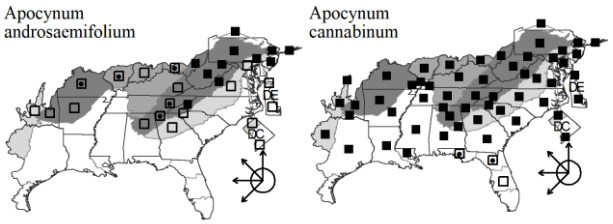
Apocynum Linnaeus 1753 (DOGBANE, INDIAN-HEMP)

A genus of about 10-12 species, perennial herbs, of temperate e. and c. Asia and North America (Endress et al. 2018). References: Endress et al (2018) in Kadereit & Bittrich (2018); Woodson (1930).

1 Corolla 5-10 mm long, pink or white with pink veins, the lobes spreading or recurved. ..... ***Apocynum androsaemifolium***
1 Corolla 3-6 mm long, white, greenish, or yellowish, the lobes erect or slightly outcurved. ..... ***Apocynum cannabinum***

Apocynum androsaemifolium Linnaeus. SPREADING DOGBANE. **Hab:** Forests, woodlands, prairies, flood-scour, roadsides, pastures. **Dist:** NL (Newfoundland) to BC south to w. NC, nw. SC (Bradley et al. [in prep.]), c. GA, TX, and AZ. **Phen:** Jun-Aug; Sep-Oct. **Syn:** = Ar, C, F, GrPl, K1, K3, K4, Mi, Mo2, NE, NY, Pa, RAB, S, Tn, Tx, Va, W; > *Apocynum androsaemifolium* var. *androsaemifolium* – G, Il, Woodson (1930); > *Apocynum androsaemifolium* var. *glabrum* Macoun – G; > *Apocynum androsaemifolium* var. *incanum* A.L.P.P. de Candolle – Il, Woodson (1930).

Apocynum cannabinum Linnaeus. HEMP DOGBANE, INDIAN-HEMP. **Hab:** Forests, woodlands, roadsides, pastures. **Dist:** QC, MB, and WA south to FL, TX, CA. **Phen:** May-Jul; Sep-Oct. **Syn:** = Ar, C, Fl5, Il, NE, NY, RAB, S, Tn, Va, W, WH3; = *Apocynum cannabinum* var. *cannabinum* – Mi; < *Apocynum cannabinum* Linnaeus – GrPl, K1, K3, K4, Mo2, NcTx, Pa; > *Apocynum cannabinum* var. *cannabinum* – F, G, Tx; > *Apocynum cannabinum* var. *glaberrimum* A.L.P.P. de Candolle – G, Tx, Woodson (1930); > *Apocynum cannabinum* var. *greeneanum* (Béguinot & Belosersky) Woodson – Woodson (1930); > *Apocynum cannabinum* var. *nemorale* (G.S. Miller) Fernald – F; > *Apocynum cannabinum* var. *pubescens* (Mitchell) Woodson – F, G, Tx, Woodson (1930).



Asclepias Linnaeus 1753 (MILKWEED)

A genus of about 100 species, herbs (mostly perennial) and shrubs, temperate and tropical, of North and Central America (Endress et al. 2018). References: Endress et al (2018) in Kadereit & Bittrich (2018); Farmer & Bell (1985); Fishbein et al (2011); Turner (2009b); Woodson (1954).

Identification Notes: The flowers of *Asclepias* have an unusual structure and associated terminology that is necessary for successful interpretation of the key. From the bottom of each flower, there is first a whorl of 5 sepals, almost always green or greenish. Next is a whorl of separate petals, in most species recurved, and variously colored (brightly, or in quite a few species green, greenish white, yellowish green, or green flushed with rose or purple). Next inmost is the corona, a pentamerous structure of 5 hoods and 5 horns (these are petaloid appendages attached to the stamens). At the center is the gynostegium, a fusion of the stigmatic disc (innermost of all) and the 5 anthers. An insect leg passes through the stigmatic slit between two adjacent anthers, and can pick up the two pollinia, attached to one another by two translater arms, fused at the corpusculum.

1 Sap clear; leaves alternate; corolla orange to yellow ..... ***Key A***
1 Sap milky (the milkiness often difficult to show in *A. verticillata*, which has numerous, whorled, linear leaves); leaves strictly or primarily opposite, subopposite, or whorled; corolla orange, red, white, cream, green, pink, or purple.
  2 Leaves linear, > 10× as long as wide ..... ***Key B***
  2 Leaves lanceolate, ovate, or elliptic, 1-5 (-10)× as long as wide.
    3 Leaves sessile, subsessile, or with petioles to 3 mm long ..... ***Key C***
    3 Leaves with petioles (3-) 4-20 mm long.
      4 Plants in flower ..... ***Key D***
      4 Plants in fruit or sterile ..... ***Key E***

Key A - milkweeds with clear sap and alternate leaves

3 Leaves widest near the base; leaf base cordate, subcordate, or truncate, with well-developed basal lobes broader than a 'waist' above; [PA, WV, KY, TN, and AL westwards] ..... ***Asclepias tuberosa var. cordata***
3 Leaves widest above the midpoint, near the midpoint, or with margins nearly parallel for > 3/4 of the leaf length; leaf base subcordate, truncate, rounded, or cuneate; [IN, s. IL, AR, and e. TX eastwards].

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated

4 Leaf base cuneate, rounded, or truncate; leaves widest above the middle or near the midpoint; [s. NH west to OH, south to Panhandle FL and e. TX widespread eastwards] ..... ***Asclepias tuberosa var. tuberosa***

4 Leaf base truncate or subcordate; leaves either widest above the midpoint, above a waist created by hastate basal lobes, or with margins nearly parallel for > 3/4 of the leaf length; [of se. Coastal Plain, se. VA south to s. FL, west to s. MS] ..... ***Asclepias tuberosa var. rolfsii***

Key B - milkweeds with milky sap, with linear leaves opposite, subopposite, or whorled

1 Leaves either mostly in whorls of 3-6 (sometimes some nodes with merely opposite leaves), or subopposite (the leaves more-or-less paired but separated by 0.5-3 mm); corolla whitish or greenish, usually suffused with rose-purple (especially at the tips of the corolla lobes).

2 Leaves mostly in whorls of 3-6 (sometimes some nodes with merely opposite leaves); leaves 1.5-7 cm long, 1-2 mm wide; seeds ca. 5 mm long, the coma ca. 2.5 cm long; milky sap often difficult to show ..... ***Asclepias verticillata***

2 Leaves subopposite (the leaves more-or-less paired but separated by 0.5-3 mm); leaves (3-) 5-18 cm long, (1-) 2-10 mm wide; seeds ca. 7-11 mm long, the coma 3-5 cm long; milky sap obvious and profuse.

3 Umbel 1, terminal; corona 5-7 mm in diameter; horns present, about as long as the hood; hoods ca. 2-4 mm long, surpassing the anther heads; [dry pinelands of the Coastal Plain] ..... ***Asclepias michauxii***

3 Umbels 1-4, terminal and from upper nodes; corona 2-3 mm in diameter; horns absent; hoods ca. 2 mm long, surpassed by the anther heads; [either wet pinelands of the Coastal Plain or dry glades or woodlands].

4 Pedicels with spreading hairs; umbels 2-10, each with up to 30-100 flowers; leaves minutely scabrous; [dry glades or woodlands, known from the Mountains of nw. GA, e. TN, w. WV westward] ..... ***Asclepias hirtella***

4 Pedicels with incurved hairs; umbels 1-6, each with 10-30 flowers; leaves glabrous or nearly so; [wet pinelands of the Coastal Plain] ..... ***Asclepias longifolia***

1 Leaves opposite; corolla white, whitish, or greenish, usually suffused with rose-purple (especially at the tips of the corolla lobes), or creamy yellow, purple, or orange-red.

6 Leaves with petioles 1-10 mm long; leaves 5-15 mm wide; plants 5-15 dm tall.

7 Petiole 4-10 mm long; corolla pink (rarely white), the lobes 3-5.5 mm long; hoods 1-2 mm long; horns longer than the hoods; [mostly of the Mountains and Piedmont] ..... ***Asclepias incarnata var. incarnata***

7 Petiole 1-3 mm long; corolla orange-red, the lobes 8-11 mm long; hoods 5-6 mm long; horns slightly shorter than the hoods; [of the Coastal Plain] ..... ***Asclepias lanceolata***

6 Leaves sessile, subsessile (with petioles 0-1 mm long); leaves 1-7 mm wide; plants 1-7 dm tall.

8 Leaves 1-2 mm wide.

9 Pedicels ca. 2 cm long, arching, the flowers often nodding; horns present (somewhat longer than the hood); hoods with 2 erect, acuminate, marginal teeth on the inner side (adjoining the anther heads); corolla ashy-gray, pale violet, or pale rose; [se. NC (historically) and e. SC south to n. peninsular FL, west to s. MS] ..... ***Asclepias cinerea***

9 Pedicels 1-1.5 cm long, ascending, the flowers facing upwards; horns absent or present; hoods lacking marginal auricles; corolla white, pale pink, or green (and often suffused with purple); [se. GA and s. AL south to s. FL] ..... ***Asclepias viridula***

8 Leaves 3-7 mm wide.

11 Umbel 1, terminal; corona 5-7 mm in diameter; horns present, about as long as the hood; hoods ca. 2-4 mm long, surpassing the anther heads; [dry pinelands] ..... ***Asclepias michauxii***

11 Umbels 1-10, terminal and from upper nodes; corona 2-3 mm in diameter; horns absent; hoods ca. 2 mm long, surpassed by the anther heads; [either of wet pinelands of the Coastal Plain or dry glades or woodlands].

12 Pedicels with spreading hairs; umbels 2-10, each with up to 30-100 flowers; leaves minutely scabrous; [dry glades or woodlands, east to nw. GA, TN, and WV] ..... ***Asclepias hirtella***

12 Pedicels with incurved hairs; umbels 1-6, each with 10-30 flowers; leaves glabrous or nearly so; [wet pinelands of the Coastal Plain] ..... ***Asclepias longifolia***

Key C - milkweeds with milky sap, with sessile, nonlinear leaves

2 Leaves cordate-clasping at base, 3-10 cm wide, 1-2× as long as wide; stem and leaves glabrous and usually also glaucous.

3 Plant erect, the stems 4-10 dm long, the leaves perpendicular to the stem thus in a plane parallel to the ground; leaf blades with margins usually strongly undulate; corolla lobes 7-11 mm long; inflorescence solitary, terminal (rarely a second from an upper node); corona 5-8 mm across; [widespread] ..... ***Asclepias amplexicaulis***

3 Plant prostrate or decumbent, the stems 2-7 dm long, the leaves perpendicular to the stem and thus perpendicular to the ground as well; leaf blades planar; corolla lobes 5-6.5 mm long; inflorescences 2-6 from upper nodes; corona 3-5 mm across; [of dry pinelands of the Coastal Plain] ..... ***Asclepias humistrata***

2 Leaves cuneate, rounded, or cordate-clasping at base, 1-6 cm wide, (1-) 1.5-6× as long as wide; stem and leaves pubescent to glabrate.

4 Corolla lobes 12-15 mm long, greenish-yellow (sometimes suffused with some purple); flowers 3-6 (-8) per umbel; hoods strongly inward-arching over the gynostegium, almost touching at their tips. ..... ***Asclepias connivens***

4 Corolla lobes 6-9 mm long, reddish-purple, pink, pale green, or greenish-yellow; flowers > 7 per umbel; hoods erect, or slightly spreading at their tips.

5 Leaves lanceolate, acuminate at the apex; corolla reddish purple to pink, the lobes 7-9 mm long; [of wetlands, Coastal Plain and very rarely inland] ..... ***Asclepias rubra***

5 Leaves orbicular to oblong, rounded at the apex; corolla pale green (sometimes suffused with some purple), the lobes 6-7 mm long; [of dry habitats, widespread]

6 xxx ..... ***Asclepias obovata***

6 xxx' ..... ***Asclepias viridiflora***

Key D - milkweeds with milky sap, with petiolate, nonlinear leaves, in flower

1 Corolla (not the corona) greenish, either pale green or yellowish green.

2 Leaves subopposite (to alternate upwards); corolla lobes 7-17 mm long. ..... ***Asclepias viridis***

Key to Map Symbology:

←rare ←uncommon ←common (see introduction for more)

* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable

X : extirpated

2 Leaves opposite; corolla lobes 6-10 mm long.
4 Corona 2-3 mm across; corolla lobes pale green, 5-7 mm long; [of various provinces, Coastal Plain and also especially inland] ..... ***Asclepias viridiflora***
4 Corona 5-9 mm across; corolla lobes yellowish green, 9-10 mm long; [strictly of the Coastal Plain, of NC and SC, and southward].
6 Hoods ca. 6 mm long, about 2× as long as the gynostegium; stem and leaves densely tomentulose ..... ***Asclepias obovata***
6 Hoods ca. 4 mm long, scarcely exceeding the gynostegium; stem and leaves softly puberulent ..... ***Asclepias tomentosa***
1 Corolla (NOT the corona) pink, purple, crimson, orange, or white.
7 Hoods about as long as the anther heads; horns 1-2× as long as the hood, exserted slightly to well beyond the hood.
8 Hood opening truncate, the hood therefore beaker-shaped; corolla lobes 8-12 mm long; [primarily of mesic forests of the Mountains] ..... ***Asclepias exaltata***
8 Hood opening very oblique, the hood therefore scoop-shaped; corolla lobes 2.5-10 mm long; [primarily of wetlands of various provinces].
9 Corolla bright orangey red, the lobes 5-10 mm long; corona orangey yellow; gynostegium orangey yellow ..... ***Asclepias curassavica***
9 Corolla white, pink, rose, or purple, the lobes 2.5-6 mm long; corona white, pink, or rose; gynostegium white or pale pink.
10 Plants 3-5 dm tall; corolla lobes usually white (rarely slightly pink); corona white; leaves glabrous beneath; [of the Coastal Plain of SC] ..... ***Asclepias perennis***
10 Plants 5-15 dm tall; corolla lobes rose to purple (rarely white); corona pink or rose; leaves pubescent to glabrate beneath; [collectively widespread].
11 Stems and leaves sparsely pubescent to glabrescent; leaves narrow, the base obtuse to truncate, the apex long-acuminate; plants usually much branched ..... ***Asclepias incarnata var. incarnata***
11 Stems and leaves moderately to densely pubescent; leaves broader, the base rounded to subcordate, the apex acute to short-acuminate; plants usually relatively strict ..... ***Asclepias incarnata var. pulchra***
7 Hoods distinctly longer than the anther heads; horns 0.5-1× as long as the hood, not conspicuously exserted beyond the hood.
12 Lower leaf surface pubescent over the surface. ..... ***Asclepias syriaca***
12 Lower leaf surface glabrous to sparsely pubescent along the midvein only.
14 Hood opening very oblique, the hood therefore scoop-shaped, and also with 2 prominent lateral teeth; corolla pink to greenish (rarely white); plants 2-5 dm tall ..... ***Asclepias quadrifolia***
14 Hood opening truncate and constricted, and lacking prominent teeth; corolla white (often pink at the "waist"); plants 3-12 dm tall ..... ***Asclepias variegata***

Key E - milkweeds with milky sap, with petiolate, nonlinear leaves, in fruit (or sterile)

1 Leaves subopposite ..... ***Asclepias viridis***
1 Leaves opposite (or apparently whorled in *A. quadrifolia*).
2 Follicle pendant; seeds without a coma; [of swamp forests of SC and southward] ..... ***Asclepias perennis***
2 Follicle erect; seeds with a coma; [collectively widespread].
3 Leaf-bearing nodes 3-4, the upper and lower opposite, the middle with a whorl of 4 leaves ..... ***Asclepias quadrifolia***
3 Leaf-bearing nodes 3-many, all opposite.
4 Follicle slightly to strongly muricate ..... ***Asclepias syriaca***
4 Follicle smooth.
5 Lower leaf surface glabrous, or pubescent on the midrib only
6 Leaves 1-3 cm wide; follicles 6-10 cm long ..... ***Asclepias curassavica***
6 Leaves 3-11 cm wide; follicles 12-14 cm long ..... ***Asclepias exaltata***
5 Lower leaf surface pubescent.
7 Leaves lanceolate, 4-10× as long as wide.
8 Leaves coriaceous, 3-10 cm long, 1.5-4.5 cm wide; [of dry upland situations] ..... ***Asclepias viridiflora***
8 Leaves herbaceous, 6-15 cm long, 2-7 cm wide; [of moist to wetland situations].
9 Stems and leaves sparsely pubescent to glabrescent; leaves narrow, the base obtuse to truncate, the apex long-acuminate; plants usually much branched ..... ***Asclepias incarnata var. incarnata***
9 Stems and leaves moderately to densely pubescent; leaves broader, the base rounded to subcordate, the apex acute to short-acuminate; plants usually relatively strict ..... ***Asclepias incarnata var. pulchra***
7 Leaves ovate to elliptic, 1.5-4× as long as wide.
10 Stem moderately to densely pubescent; plants 1.5-5 (-7) dm tall; [of xeric pinelands of the Coastal Plain of from NC to s. FL, west to OK, AR, and TX].
11 Stem and leaves densely tomentulose; leaves mucronate ..... ***Asclepias obovata***
11 Stem and leaves softly puberulent; leaves apiculate ..... ***Asclepias tomentosa***
10 Stem glabrous to pubescent in lines only; plants 2-12 dm tall; [collectively of various habitats throughout our area].
13 Leaves 4-9 cm wide, acuminate at the apex ..... ***Asclepias variegata***
13 Leaves 1-6 cm wide, mostly obtuse at the apex. ..... ***Asclepias viridiflora***

Asclepias amplexicaulis J.E. Smith. CLASPING MILKWEED, SAND MILKWEED. **Hab:** Longleaf pine sandhills, barrens, sandy prairies, other dry woodlands of various types. **Dist:** NH and NY west to MN, IA, and KS, south to c. peninsular. FL, west to e. TX. **Phen:** (Apr-) May-Jul; Jun-Aug. **ID Notes:** The flowers have a fragrance of cloves and roses. **Syn:** = Ar, C, F, Fl5, G, GrPl, Il, K1, K3, K4, Mi, Mo2, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, Woodson (1954). NatureServe G5 (Secure).

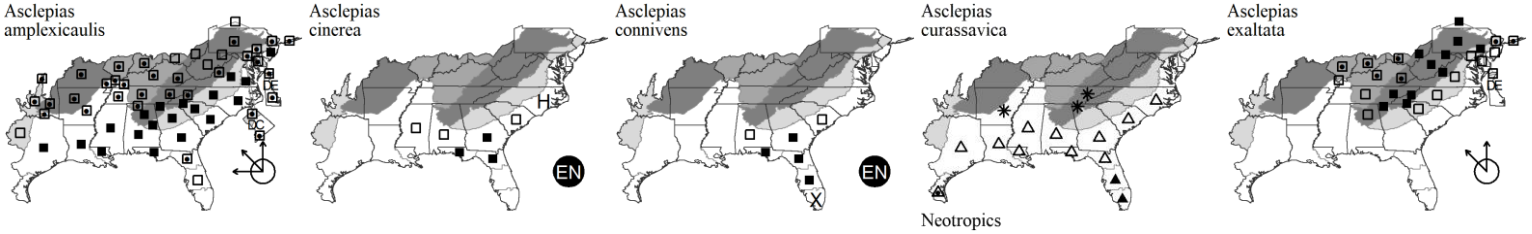
Asclepias cinerea Walter. CAROLINA MILKWEED, ASHY MILKWEED. **Hab:** Pine savannas. **Dist:** Se. NC south to n. peninsular FL, west to Panhandle FL. **Phen:** Late May-Jul; Aug-Sep. **Syn:** = Fl5, K1, K3, K4, RAB, S, WH3, Woodson (1954). NatureServe G4? (Apparently Secure).

Asclepias connivens Baldwin. LARGEFLOWER MILKWEED. **Hab:** Wet pine flatwoods, seepage bogs. **Dist:** Se. SC (McMillan et al. 2002) south to s. FL, west to w. FL Panhandle (Santa Rosa County) and s. AL. **Phen:** (May-) Jun-Aug (-Nov). **Syn:** = Fl5, GW2, K1, K3, K4, WH3, Woodson (1954); = *Anantherix connivens* (Baldwin) Feay – S. NatureServe G4? (Apparently Secure).

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

* ***Asclepias curassavica*** Linnaeus. SCARLET MILKWEED, BLOODFLOWER. **Hab:** Ditches, disturbed areas; often cultivated, naturalizing (southwards in our region) and persistent as short-lived strays (northwards). **Dist:** Native of tropical America, cultivated as an ornamental, naturalized in FL and persistent and naturalizing northwards (see, e.g., Bradley et al. [in prep.]). Kartesz (2020) reports it for e. TN; this and other northern reports far inland and off the Coastal Plain are likely of plants only shortly persistent from cultivation. **Phen:** Jan-Dec. **Syn:** = Bah, Fl5, K1, K3, K4, Meso4.1, Tx, WH3, Woodson (1954). NatureServe G5 (Secure).

Asclepias exaltata Linnaeus. TALL MILKWEED, POKE MILKWEED. **Hab:** Moist forests, slopes, and forest margins. **Dist:** ME and s. ON west to MN and IA, south to n. GA, n. AL (Schotz 2009). e. and c. TN (Chester, Wofford, & Kral 1997), KY, and IL. **Phen:** Jun-Jul; Aug-Sep. **Syn:** = C, F, G, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Va, W, Woodson (1954). NatureServe G5 (Secure).



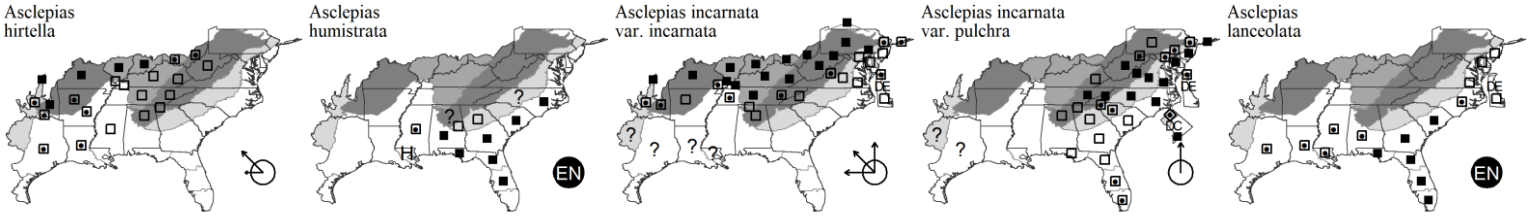
Asclepias hirtella (Pennell) Woodson. GREEN MILKWEED, BARRENS MILKWEED, PRAIRIE MILKWEED. **Hab:** Limestone glades, prairies. **Dist:** MI, WI, and MN south to w. WV (Mason County), KY, e. TN (Bradley County) (Chester, Wofford, & Kral 1997), nw. GA (Jones & Coile 1988), AR, w. LA, and e. TX. **Phen:** May-Aug. **Tax:** This species of midwestern prairies and barrens closely resembles *A. longifolia*. The two taxa have sometimes been treated as distinct only at the rank of subspecies (see synonymy) or as "very distinct varieties" (Turner 2009). **Syn:** = Ar, C, F, GrPl, Il, K1, K4, Mi, Mo2, Tn, Woodson (1954); = *Acerates hirtella* Pennell – S; = *Asclepias longifolia* Michaux ssp. *hirtella* (Pennell) J. Farmer & C.R. Bell – Farmer & Bell (1985); = *Asclepias longifolia* var. *hirtella* (Pennell) B.L. Turner – K3, Turner (2009b). NatureServe G5 (Secure).

Asclepias humistrata Walter. FLESHY MILKWEED, SANDHILL MILKWEED. **Hab:** Longleaf pine sandhills and Florida scrub. **Dist:** E. NC south to s. FL, west to e. LA. **Phen:** Apr-Jun; Jun-Jul. **ID Notes:** A striking plant, with its prostrate stems, somewhat fleshy leaves borne in a vertical plain, and cream, pink, or red main leaf veins standing out against the blue-green color of the leaf blade. **Syn:** = K1, K3, K4, RAB, S, WH3, Woodson (1954). NatureServe G4G5 (Apparently Secure).

Asclepias incarnata Linnaeus *var.* ***incarnata***. WESTERN SWAMP MILKWEED. **Hab:** Swamps, marshes, especially over calcareous substrates, such as limestone or calcareous shale. **Dist:** ME and s. QC west to MB, south to VA, s. TN (Chester, Wofford, & Kral 1997), AR, TX, and CO; disjunct in TX, NM, and UT. **Phen:** Jul-Sep; Aug-Oct. **Syn:** = C, F, G, GW2, NE, Tx, Va; = *Asclepias incarnata* – S; = *Asclepias incarnata* ssp. *incarnata* – Ar, K1, K3, K4, Mo2, NcTx, NY, Pa, RAB, Tn, W, Woodson (1954); < *Asclepias incarnata* – Fl5, GrPl, Il, Mi, WH3. NatureServe G5T5 (Secure).

Asclepias incarnata Linnaeus *var.* ***pulchra*** (Ehrhart ex Willdenow) Persoon. EASTERN SWAMP MILKWEED. **Hab:** Marshes, bogs, swamps. **Dist:** NS and ME south to e. NC, w. SC, GA, and e. TN (Chester, Wofford, & Kral 1997), and s. FL. **Phen:** Jul-Sep; Aug-Oct. **Syn:** = C, F, G, GW2, NE, Tx, Va; = *Asclepias incarnata* ssp. *pulchra* (Ehrhart ex Willdenow) Woodson – K1, K3, K4, NcTx, NY, Pa, RAB, Tn, W, Woodson (1954); = *Asclepias pulchra* Ehrhart ex Willdenow – S. NatureServe G5T5 (Secure).

Asclepias lanceolata Walter. FEW-FLOWER MILKWEED. **Hab:** Swamps, fresh to slightly brackish marshes, wet pine savannas. **Dist:** NJ south to s. FL, west to e. TX. **Phen:** Jun-Aug; Aug-Sep. **Syn:** = C, Fl5, GW2, K1, K3, K4, RAB, S, Tx, Va, WH3, Woodson (1954); > *Asclepias lanceolata* var. *lanceolata* – F, G; > *Asclepias lanceolata* var. *paupercula* (Michaux) Fernald – F, G. NatureServe G5 (Secure).



Asclepias longifolia Michaux. LONGLEAF MILKWEED, SAVANNA MILKWEED. **Hab:** Wet pine savannas. **Dist:** DE (formerly) south to s. FL, west to e. TX. **Phen:** (Apr-) May-Jun; Jun-Jul. **Comm:** *A. longifolia* and *A. hirtella* are closely related; the two taxa have sometimes been treated as distinct only at the rank of subspecies (see synonymy) or as "very distinct varieties" (Turner 2009). **Syn:** = C, F, Fl5, GW2, K1, K4, RAB, Tx, Va, WH3, Woodson (1954); = *Acerates longifolia* (Michaux) Elliott – G; = *Asclepias longifolia* ssp. *longifolia* – Farmer & Bell (1985); = *Asclepias longifolia* var. *longifolia* – K3, Turner (2009b); ? *Acerates floridana* (Lamarck) A.S. Hitchcock – S. NatureServe G4G5 (Apparently Secure).

Asclepias michauxii Decaisne. MICHAUX'S MILKWEED. **Hab:** Pine savannas. **Dist:** E. SC south to peninsular FL, west to e. LA. **Phen:** May. **Syn:** = Fl5, K1, K3, K4, RAB, S, WH3, Woodson (1954). NatureServe G4G5 (Apparently Secure).

Asclepias obovata Elliott. PINELAND MILKWEED. **Hab:** Longleaf pine sandhills, other woodlands and savannas. **Dist:** E. SC south to Panhandle FL, west to AR, e. OK, and e. TX. **Phen:** Jun-Sep. **Syn:** = Ar, Fl5, K1, K3, K4, RAB, S, Tx, WH3, Woodson (1954). NatureServe G5? (Secure).

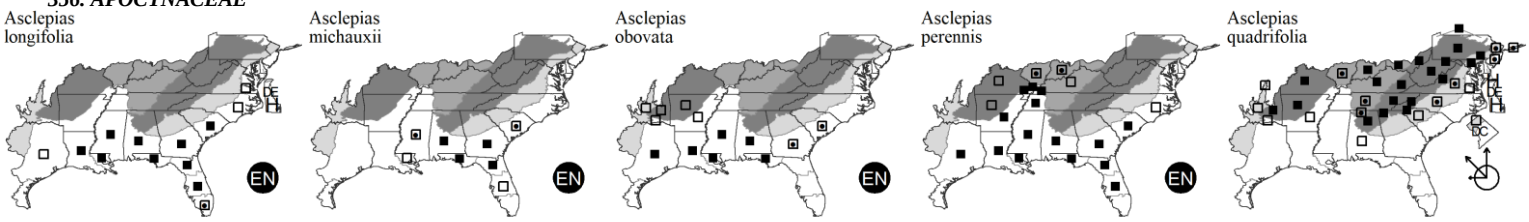
Asclepias perennis Walter. SMOOTHSEED MILKWEED, SWAMP-FOREST MILKWEED. **Hab:** Cypress-gum swamps, bottomland hardwood forests, marshes. **Dist:** Se. NC south to c. peninsular FL, west to e. TX, north in the interior to s. IN and s. IL. **Phen:** (Apr-) Jun-Aug; Aug-Sep. **Syn:** = Ar, C, F, Fl5, G, GW2, Il, K1, K3, K4, Mo2, NcTx, RAB, S, Tn, Tx, WH3, Woodson (1954). NatureServe G5 (Secure).

Asclepias quadrifolia Jacquin. FOURLEAF MILKWEED. **Hab:** Moist to dryish forests and forest margins, most common on mafic and calcareous substrates. **Dist:** NH and NY west to IN, south to NC, n. GA, n. AL, and c. TN; also from w. IL west to MO, south to AR and OK. **Phen:** May-Jun; Aug-Sep. **Syn:** = Ar, C, F, G, GrPl, Il, K1, K3, K4, Mo2, NE, NY, Pa, RAB, S, Tn, Va, W, Woodson (1954). NatureServe G5 (Secure).

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more)

* : waif EN : endemic H : historic

N : no P : planted ? : questionable X : extirpated



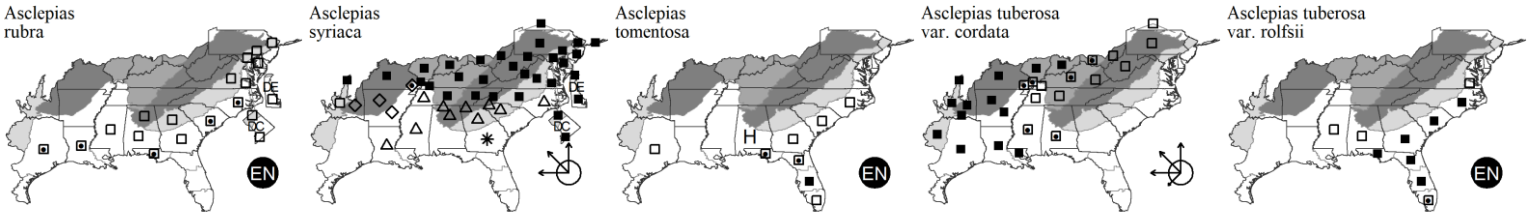
Asclepias rubra Linnaeus. PURPLE SAVANNA MILKWEED, "RED MILKWEED". **Hab:** Pocosin ecotones, wet pine savannas, seepage bogs in longleaf pine sandhills, seepage swamps. **Dist:** Se. NY (Long Island), se. PA, and NJ south to wc. GA and w. Panhandle FL, west to e. TX. **Phen:** (May-) Jun-Jul (-Aug); Jul-Sep. **Tax:** *A. laurifolia* is alleged to differ in sessile, cordate-clasping leaf bases (vs. petioled and rounded), and other characters (see Small 1933); it may warrant recognition and needs additional study. **Syn:** = C, F, Fl5, G, GW2, K1, K3, K4, NY, Pa, RAB, Tx, Va, WH3, Woodson (1954); > *Asclepias laurifolia* Michaux – S; > *Asclepias rubra* Linnaeus – S. NatureServe G4G5 (Apparently Secure).

Asclepias syriaca Linnaeus. COMMON MILKWEED. **Hab:** Prairies, floodplains, pastures, roadsides, disturbed areas. **Dist:** NB and ME west to s. MB and ND, south to SC, GA, c. TN (Chester, Wofford, & Kral 1997), AR, OK, and KS, the southern range expansion recent. **Phen:** Jun-Aug; Jul-Sep. **Comm:** This species is apparently expanding its range southward; see Wyatt et al. (1993) and Wyatt (1996) for discussion. **Syn:** = Ar, C, GrPl, K1, K3, K4, Mi, Mo2, NE, NY, Pa, RAB, S, Tn, Va, W, Woodson (1954); > *Asclepias syriaca* var. *syriaca* – F, G, Il. NatureServe G5 (Secure).

Asclepias tomentosa Elliott. SANDHILL MILKWEED. **Hab:** Longleaf pine sandhills, coastal dunes. **Dist:** Sc. NC south to s. FL, west to se. AL and Panhandle FL; disjunct in e. TX. The curious distribution is mapped and discussed by Sorrie (2016). **Phen:** Jun; Jul. **Syn:** = Fl5, K1, K3, K4, RAB, Tx, WH3, Woodson (1954); ? *Asclepias aceratoides* M.A. Curtis – S. NatureServe G4 (Apparently Secure).

Asclepias tuberosa Linnaeus *var*. ***cordata*** Beck. MIDWESTERN BUTTERFLYWEED. **Hab:** Dry forests, roadbanks. **Dist:** QC, ON, MN, SD, CO, UT, and CA south to PA, WV, KY, TN, and AL. **Phen:** (Apr-) May-Sep. **Tax:** Woodson (1954) called this *A. tuberosa* ssp. *interior*, and Shinners made a combination at varietal rank (see synonymy), but the much earlier name *A. tuberosa* var. *cordata* Beck clearly applies here. **Syn:** = *Asclepias tuberosa* ssp. *interior* Woodson – G, Il, Mo2, NcTx, NE, Tx, Woodson (1954); = *Asclepias tuberosa* Linnaeus var. *interior* (Woodson) Shinners – C, Tn; < *Asclepias tuberosa* – F, Mi, NY, Pa, S; < *Asclepias tuberosa* ssp. *interior* Woodson – Ar, GrPl, K1, K3, K4. NatureServe G5T5? (Secure).

Asclepias tuberosa Linnaeus *var*. ***rolfsii*** (Britton ex Vail) Shinners. SANDHILL BUTTERFLYWEED. **Hab:** Longleaf pine sandhills, other dry, sandy habitats. **Dist:** Se. VA south to s. FL, west to s. MS. **Phen:** Feb-Aug; May-Sep. **Comm:** The flowers are typically lighter in color than those of var. *tuberosa*, yellow or yellowish-orange rather than deep orange to reddish. The first reported occurrence in Virginia is discussed by Belden et al. (2004). **Syn:** = *Asclepias rolfsii* Britton ex Vail – S; < *Asclepias tuberosa* – Fl5, WH3; < *Asclepias tuberosa* ssp. *rolfsii* (Britton ex Vail) Woodson – K1, K3, RAB, Woodson (1954); < *Asclepias tuberosa* Linnaeus var. *rolfsii* (Britton ex Vail) Shinners – Va. NatureServe G5TNR (Not Yet Ranked).



Asclepias tuberosa Linnaeus *var*. ***tuberosa***. EASTERN BUTTERFLYWEED. **Hab:** Woodland margins, roadsides, pastures. **Dist:** S. NH west to OH, south to Panhandle FL and e. TX. **Phen:** May-Aug; Aug-Sep. **Syn:** = C, Tn, Va; = *Asclepias tuberosa* ssp. *tuberosa* – G, K1, K3, K4, NE, RAB, Woodson (1954); > *Asclepias decumbens* Linnaeus – S; < *Asclepias tuberosa* – F, Fl5, NY, Pa, W, WH3; >< *Asclepias tuberosa* – S. NatureServe G5T5? (Secure).

Asclepias variegata Linnaeus. WHITE MILKWEED, REDRING MILKWEED. **Hab:** Upland forests and woodlands. **Dist:** CT west to OH, s. IN, s. IL, se. MO, and se. OK, south to Panhandle FL, LA, and e. TX. **Phen:** (Apr-) May-Jul; Jul-Sep. **Syn:** = Ar, C, F, Fl5, G, Il, K1, K3, K4, Mo2, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, W, WH3, Woodson (1954); = *Biventraria variegata* (Linnaeus) Small – S. NatureServe G5 (Secure).

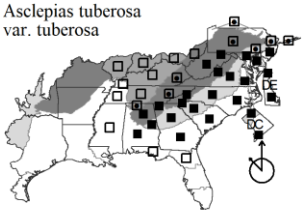
Asclepias verticillata Linnaeus. WHORLED MILKWEED. **Hab:** Barrens, thin soils of rock outcrops (especially mafic or calcareous rocks), open woodlands, longleaf pine sandhills, pine flatwoods, road and powerline rights-of-way. **Dist:** E. MA west to ND and MB, south to s. FL, TX, NM, and AZ. **Phen:** (Apr-) May-Sep; Sep-Oct. **Tax:** Southern Florida material needs study. **Syn:** = Ar, C, F, Fl5, G, GrPl, Il, K1, K3, K4, Mi, Mo2, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, Woodson (1954). NatureServe G5 (Secure).

Asclepias viridiflora Rafinesque. GLADE MILKWEED, GREEN MILKWEED. **Hab:** Open woodlands, woodland edges, barrens, glades, especially over mafic or calcareous rocks, and also in disturbed areas. **Dist:** CT west to s. ON, MB, ND, and MT, south to NC, SC, GA, Panhandle FL, AL, LA, TX, n. Mexico, NM, and AZ. **Phen:** (Apr-) May-Aug; Aug-Sep. **Syn:** = Ar, C, Fl5, GrPl, Il, K1, K3, K4, Mi, Mo2, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, W, WH3, Woodson (1954); = *Acerates viridiflora* (Rafinesque) Pursh ex Eaton – G, S; > *Asclepias viridiflora* var. *lanceolata* (Ives) Torrey – F; > *Asclepias viridiflora* var. *viridiflora* – F. NatureServe G5 (Secure).

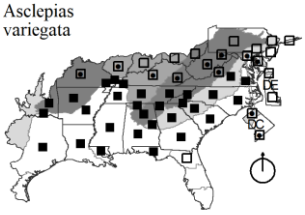
Asclepias viridis Walter. GREEN ANTELOPE-HORN, SPIDER MILKWEED. **Hab:** Prairies, dry woodlands, calcareous hammocks, pine rocklands. **Dist:** S. SC south to s. FL, west to TX; and from OH, w. WV, and KY west to NE, south to se. TN, c. TN (Chester, Wofford, & Kral 1997), nw. GA, c. AL, c. MS, AR, TX, and OK. **Phen:** (Feb-) May-Jul (-Sep). **Syn:** = Ar, Fl5, GrPl, Il, K1, K3, K4, Mo2, NcTx, Tn, Tx, WH3, Woodson (1954); = *Asclepiodora viridis* (Walter) A. Gray – S. NatureServe G4G5 (Apparently Secure).

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

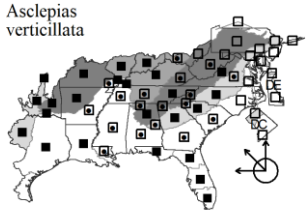
Asclepias tuberosa var. tuberosa



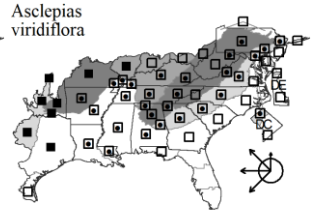
Asclepias variegata



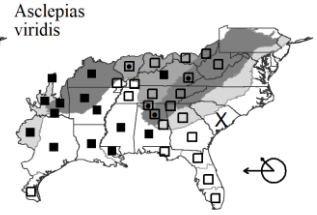
Asclepias verticillata



Asclepias viridiflora

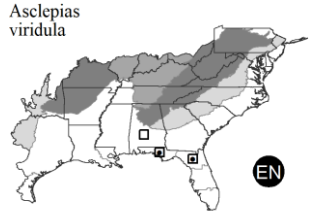


Asclepias viridis



Asclepias viridula Chapman. BOG MILKWEED, LITTLE GREEN MILKWEED, SOUTHERN MILKWEED. **Hab:** Wet longleaf pine savannas and flatwoods, seepage slopes, pitcherplant bogs. **Dist:** Ne. FL; se. AL (Houston County) south to Panhandle FL; reports for GA are apparently undocumented. **Phen:** Apr-Sep. **ID Notes:** See Chafin (2000) for additional information. **Syn:** = Fl5, GW2, K1, K3, K4, S, WH3, Woodson (1954). NatureServe G2 (Imperiled).

Asclepias viridula

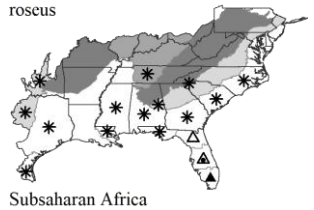


Catharanthus G. Don 1836 (ROSY-PERIWINKLE)

A genus of about 9 species, herbs, 7 endemic to Madagascar and 1 endemic to India (Endress et al. 2018). References: Endress et al (2018) in Kadereit & Bittrich (2018); Snoeijer (1996); van Bergen (1996).

* ***Catharanthus roseus*** (Linnaeus) G. Don. ROSY-PERIWINKLE, MADAGASCAR PERIWINKLE, CAYENNE JASMINE. **Hab:** Disturbed areas, northwards only persistent after cultivation or as a waif or "throw-out" after cultivation. **Dist:** Native of Madagascar, now a pantropical weed. **Phen:** May-Oct. **Comm:** *C. roseus* is the source of a powerful anti-leukemia drug. **Syn:** = Bah, Fl5, K1, K3, K4, Meso4.1, NcTx, S, WH3, van Bergen (1996); = *Vinca rosea* Linnaeus – RAB. NatureServe GNR (Not Yet Ranked).

Catharanthus roseus



Subsaharan Africa

Cynanchum Linnaeus 1753 (SWALLOW-WORT)

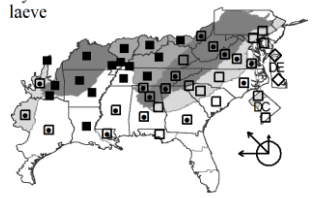
A genus of about 200-300 species, herbaceous vines and lianas, primarily of tropical and warm temperate portions of the New World and Old World (Endress et al. 2018). *Ampelamus* was retained as a genus by Liede (1997a), but later results suggest that it is not distinct from some other portions of *Cynanchum* (Liede & Täuber 2002). However, *Cynanchum* itself is strongly polyphyletic and is being broken up; further taxonomic and nomenclatural changes are likely. *C. laeve* will probably remain in *Cynanchum* s.s. (which is primarily Old World in distribution). References: Endress et al (2018) in Kadereit & Bittrich (2018); Krings (2001); Liede & Meve (1997); Liede & Täuber (2002); Liede (1997a); Liede (1997b).

1 Leaves oblong or ovate, cordate, subcordate, or rounded at the base. ..... ***Cynanchum laeve***

1 Leaves linear, cuneate at the base. ..... ***Pattalias paluster***

Cynanchum laeve (Michaux) Persoon. SANDVINE, HONEYVINE, BLUEVINE. **Hab:** Bottomlands and disturbed areas. **Dist:** Se. PA and KS south to sw. GA, Panhandle FL, and c. TX. **Phen:** Jul-Sep; Aug-Oct. **Syn:** = Fl5, GrPl, GW2, K1, K3, K4, Mo2, NcTx, NY, Pa, RAB, Tn, Tx, Tx, Va, W, WV; = *Ampelamus albidus* (Nuttall) Britton – C, F, G, Il; = *Ampelamus laevis* (Michaux) Krings – WH3, Krings (2001); = *Gonolobus laevis* Michaux – S. NatureServe G5 (Secure).

Cynanchum laeve



Gonolobus Michaux 1803 (ANGLEPOD)

A genus of about 120-140 species, herbaceous vines and lianas, primarily tropical. Liede (1997a), Lipow & Wyatt (1998), and others recognize *Gonolobus* as separate from *Matelea*. References: Drapalik (1969); Endress et al (2018) in Kadereit & Bittrich (2018); Krings & Xiang (2004); Krings & Xiang (2005); Krings (2008); Krings et al (2019); Lipow & Wyatt (1998); Reveal & Barrie (1992); Rosatti (1989).

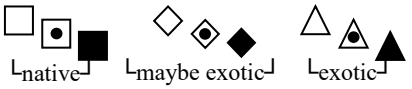
2 Upper surface of corolla lobes uniformly colored, olive green at anthesis, glabrous; laminar dorsal anther appendage yellow, apex rounded or truncate; [c. KY, e. TN, nw. AL westward] ..... ***Gonolobus suberosus var. granulatus***

2 Upper surface of corolla lobes multi-colored, generally dark maroon to brownish near the base and green to yellowish near the tips at anthesis (or uniformly yellowish-green to neon green in rare mutants), pubescent or glabrous; laminar dorsal anther appendage darkly purplish or maroonish tinted, apex bilobed to emarginate; [se. VA south to c. peninsular FL, west to s. MS and inland to nw. GA; very rarely west of the Mississippi River (in AR)] ..... ***Gonolobus suberosus var. suberosus***

Gonolobus suberosus (Linnaeus) R. Brown *var.* ***granulatus*** (Scheele) Krings & Q.Y. Xiang. WESTERN ANGLEPOD. **Hab:** Streambanks, bottomlands. **Dist:** C. KY, e. TN, nw. AL, and MS west to se. KS, c. OK, and c. TX. **Phen:** (May-) Jun-Aug. **Syn:** = K3, K4, Krings & Xiang (2005), Krings (2008); >< *Gonolobus gonocarpus* (Walter) Perry – Rosatti (1989); < *Gonolobus suberosus* (Linnaeus) R. Brown – Ar, Mo2, Tn; > *Gonolobus suberosus* (Linnaeus) R. Brown – Lipow & Wyatt (1998); >< *Matelea gonocarpa* (Walter) Shinners – GrPl, Tx, Drapalik (1969); < *Matelea gonocarpos* (Walter) Shinners – Il, K1, NcTx; >< *Vincetoxicum gonocarpos* Walter – S; >< *Vincetoxicum suberosum* (Linnaeus) Britton – S.

Gonolobus suberosus (Linnaeus) R. Brown *var.* ***suberosus***. EASTERN ANGLEPOD. **Hab:** Mesic to wet forests and thickets. **Dist:** E. MD south to s. peninsular FL, west to s. MS, inland to nw. GA and c. KY; disjunct in c. AR (Saline County). **Phen:** Jun-Aug; Sep-Nov. **Tax:** Rosatti (1989) and Drapalik (1969) expressed considerable doubt about whether two species should be recognized; their view, supporting the recognition of a single

Key to Map Symbology:

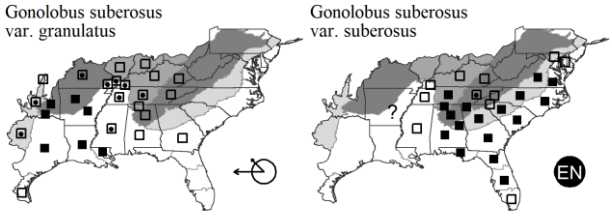


←rare ←uncommon ←common (see introduction for more)

* : waif EN : endemic H : historic

N : no P : planted ? : questionable X : extirpated

species in our area, is followed here for now. However, studies by Krings & Xiang (2004, 2005) suggested that two entities should be circumscribed at the varietal level. Drapalik (1969) considered the basionym "*suberosa*" as not applicable to *Matelea* of North America; Reveal & Barrie (1992) lectotypified the name, resulting in it applying to our material. The epithet "*suberosus*" has priority over "*gonocarpus*". **Syn:** = K3, K4, Va, Krings & Xiang (2005), Krings (2008); = *Gonolobus gonocarpus* (Walter) Perry – Rosatti (1989); = *Matelea gonocarpa* (Walter) Shinners – Drapalik (1969); > *Gonolobus gonocarpus* (Walter) Perry – F, G; < *Gonolobus suberosus* (Linnaeus) R. Brown – Fl5, Tn, WH3; > *Gonolobus suberosus* (Linnaeus) R. Brown – F, Lipow & Wyatt (1998); > *Matelea gonocarpa* (Walter) Shinners – C, RAB, W; < *Matelea gonocarpos* (Walter) Shinners – K1; > *Matelea suberosa* (Linnaeus) Shinners – C, RAB, W; < *Vincetoxicum gonocarpos* Walter – S; > *Vincetoxicum suberosum* (Linnaeus) Britton – S.



Matelea Aublet 1775 (SPINYPOD)

A genus of about 75-160 species (by current overly broad circumscription), herbs and herbaceous vines, primarily tropical and restricted to the New World. The genus as generally circumscribed since Woodson (1941) is polyphyletic and very diverse. Woodson (1941) created this broad circumscription of *Matelea* by merging dozens of previously recognized genera, stating "I should like to lay a curse on the man who revives them without at least as much study as I have devoted". *Gonolobus* and *Chthamalia* are here removed, and at least *Matelea alabamensis* will also be removed from *Matelea*. Endress et al. (2018) retain *Odontostephana*, *Edisonia*, and *Cyclodon* for our remaining species, excluding *Matelea* from the southeastern United States flora. References: Drapalik (1969); Endress et al (2018) in Kadereit & Bittrich (2018); Fishbein & McDonnell () (in prep) in FNA14; McDonnell & Fishbein (2016); Woodson (1941).

Identification Notes: *Matelea* and *Gonolobus* are difficult to distinguish without flowers or fruits. Fresh *Matelea* leaves do not have a strong odor when crushed; *Gonolobus* has a disagreeable odor of peanut butter/burnt/buttered popcorn. *Gonolobus* typically exhibits (at least some) leaves more drawn out in length with margins more or less parallel for some length before curving toward the tip (vs. in *Matelea* usually more rounded/ovate, curved throughout, and Ipomoea-like in Matelea, at least to me).

2 Inflorescence with 1-12 flowers, averaging 4-5; corolla light green, reticulated with darker green; corona disc-shaped, smooth or with obscure ridges (lacking 5 pairs of appendages); [mesic slopes of s. GA southward and westward]..... ***Matelea alabamensis***
2 Inflorescence with 2-53 flowers, averaging 9-19; corolla white, yellow, rose, or maroon (or greenish and reticulate in *M. flavidula*); corona cup-shaped, either 5-lobed (each with 4 teeth) (*M. floridana*), or 10-lobed with 5 short broad lobes alternating with 5 narrower 2-toothed lobes; [collectively widespread].
  4 Corolla lobes in a horizontal plane or reflexed; flower buds ovoid to broadly conical, < 1.5× as long as wide; corolla lobes 1.5-5× as long as wide.
    5 Corolla dark maroon (rarely maroon-yellow or yellow), not reticulate with darker veins; paired corona appendages always higher than the alternating corona lobes..... ***Matelea carolinensis***
    5 Corolla green, green-yellow, or yellow (rarely rosy or olive-maroon), reticulate with darker green veins; paired corona appendages about as high as the alternating corona lobes..... ***Matelea flavidula***
  4 Corolla lobes ascending; flower buds conical, > 2× as long as wide; corolla lobes 2.4-6.2× as long as wide.
    6 Corolla white (or fading or drying cream); corona 2.2-2.7 mm in diameter, cream or creamy-yellow; [Panhandle FL and sw. GA westward]..... ***Matelea baldwiniana***
    6 Corolla rose or maroon (rarely cream); corona 2.6-4.0 mm in diameter, rose to dark maroon (rarely green, cream, or orange); [primarily Mountains and Piedmont].
      7 Corolla lobes 2.4-3.6 (-4.0)× as long as wide, the widest part above the sinus; corolla dark maroon ..... ***Matelea decipiens***
      7 Corolla lobes (3.2-) 4.0-6.2× as long as wide, the widest part at the sinus; corolla rose to light maroon (rarely dark maroon, green, or cream)..... ***Matelea obliqua***

Matelea alabamensis (Vail) Woodson. ALABAMA MILKVINE, ALABAMA SPINYPOD. **Hab:** Open forests on river bluffs, mesic margins of sand ridges. **Dist:** Sw. and apparently se. GA, Panhandle FL, and s. AL. **Phen:** Apr-Jun. **Syn:** = Fl5, K1, K3, K4, WH3, Drapalik (1969); = *Cyclodon alabamense* (Vail) Small – S; = *Cyclodon alabamensis* (Vail) Small – Endress et al (2018) in Kadereit & Bittrich (2018). NatureServe G2 (Imperiled).

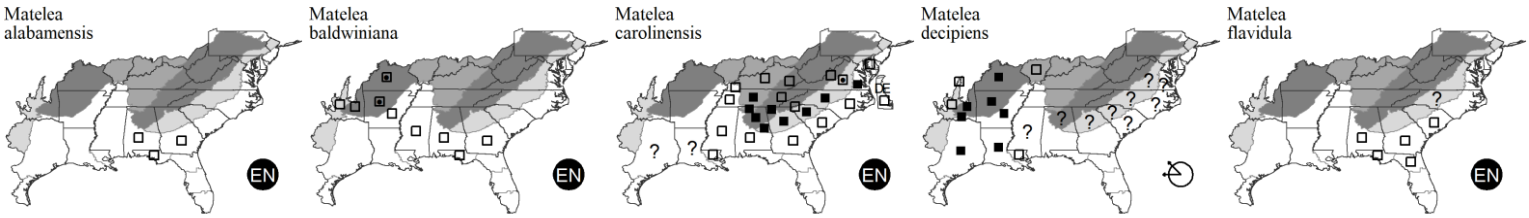
Matelea baldwiniana (Sweet) Woodson. WHITE SPINYPOD. **Hab:** Dry to mesic bluffs over calcareous rocks. **Dist:** Panhandle FL and sw. GA west to MO, AR, and OK. **Phen:** May-early Jul. **Tax:** Drapalik (1969) discussed the probability that the name *M. baldwiniana* is based on material of *M. flavidula*; this problem remains unaddressed. **Syn:** = *Matelea baldwyniana* (Sweet) Woodson – Ar, GrPl, K1, K3, K4, Mo2, WH3, Drapalik (1969), McDonnell & Fishbein (2016), orthographic variant; = *Odontostephana baldwiniana* (Sweet) Alexander – S. NatureServe G3 (Vulnerable).

Matelea carolinensis (Jacquin) Woodson. CAROLINA SPINYPOD. **Hab:** Moist to dry, nutrient-rich forests. **Dist:** DE, MD, KY, and s. MO south to GA and MS (and w. LA and e. TX?). **Phen:** Apr-Jun; Jul-Oct. **Syn:** = C, K1, K3, K4, RAB, Tn, Va, W; = *Gonolobus carolinensis* (Jacquin) R. Brown ex J.A. Schultes – F, G; = *Odontostephana carolinensis* (Jacquin) Alexander – S. NatureServe G4 (Apparently Secure).

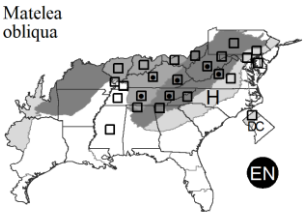
Matelea decipiens (Alexander) Woodson. DECEPTIVE SPINYPOD. **Hab:** Woodlands and thickets, generally over calcareous substrates. **Dist:** S. IL, c. MO, and se. KS south to LA and e. TX. Previous reported distribution eastwards in VA south to nc. GA and ne. MS appears to represent variability within *M. caroliniensis* (Fishbein & McDonnell in FNA, in prep.). **Phen:** Apr-Jun; Aug-Oct. **Syn:** = Ar, GrPl, Il, Mo2, NcTx, McDonnell & Fishbein (2016); = *Odontostephana decipiens* Alexander – S; >< *Gonolobus decipiens* (Alexander) Perry – F, G; >< *Matelea decipiens* (Alexander) Woodson – C, K1, K3, K4, RAB, Tx, Va. NatureServe G5 (Secure).

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Matelea flavidula (Chapman) Woodson. YELLOW SPINYPOD. **Hab:** Moist, nutrient-rich forests. **Dist:** E. SC south to Panhandle FL, apparently rare throughout its range (the single NC record seems questionable and unlikely). **Phen:** May-Jun; Aug-Oct. **Syn:** = Fl5, K1, K3, K4, RAB, WH3, Drapalik (1969); = *Odontostephana flavidula* (Chapman) Alexander – S. NatureServe G3? (Vulnerable).



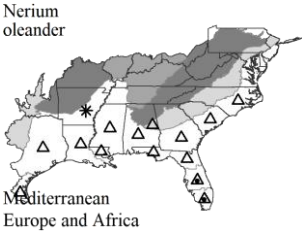
Matelea obliqua (Jacquin) Woodson. NORTHERN SPINYPOD, LIMEROCK MILKVINE. **Hab:** In forests, woodlands, or thickets over calcareous rocks. **Dist:** PA west to OH, IN, and MO, south to w. NC, nw. GA (Jones & Coile 1988), nw. AL, and ne. MS. **Phen:** Jun-Jul; Aug-Nov. **Syn:** = C, Il, K1, K3, K4, Pa, RAB, Tn, Va, W; = *Gonolobus obliquus* (Jacquin) R. Brown ex J.A. Schultes – G; = *Matelea caroliniensis* – WV, misapplied; > *Gonolobus obliquus* (Jacquin) R. Brown ex J.A. Schultes – F; > *Gonolobus shortii* A. Gray – F; > *Odontostephana obliqua* (Jacquin) Alexander – S; > *Odontostephana shortii* (A. Gray) Alexander – S. NatureServe G4? (Apparently Secure).



Nerium Linnaeus 1753 (OLEANDER)

A monotypic genus, a shrub or small tree, of Mediterranean Europe (Endress et al. 2018). References: Endress et al (2018) in Kadereit & Bittrich (2018).

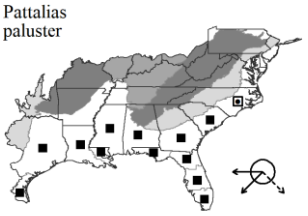
* ***Nerium oleander*** Linnaeus. OLEANDER. **Hab:** Frequently cultivated, especially on barrier islands (because of its salt resistance), sometimes persistent or weakly naturalizing. **Dist:** Native of Mediterranean Europe. **Syn:** = Bah, Fl5, K1, K3, K4, Meso4.1, S, Tx, WH3. NatureServe GNR (Not Yet Ranked).



Pattalias S. Watson 1889 (SWALLOW-WORT)

A genus of 2-3 species (as circumscribed by Fishbein & Stevens 2005), of tropical and subtropical se. United States, West Indies, and Baja California. Liede & Meve (2002) followed a broader circumscription, including *Pattalias* in *Funastrum*, but Fishbein & Stevens (2005) argued that *Seutera* (now *Pattalias* on nomenclatural grounds) is discordant as a component of *Funastrum*. References: Fishbein & Stevens (2005); Fishbein (2017); Liede & Meve (1997); Liede & Meve (2002); Liede-Schumann et al (2014).

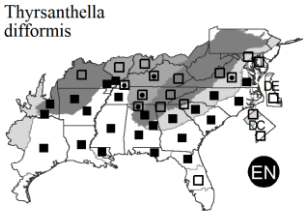
Pattalias paluster (Pursh) Fishbein. SWALLOW-WORT, MARSH CYNANCHUM. **Hab:** Coastal hammocks, edges of marshes, generally or always on barrier islands. **Dist:** E. NC (Dare County) south to s. FL, west to s. TX; Bahamas and West Indies; Mexico (Yucatán) and Belize. **Phen:** Jun-Jul; Jul-Oct. **Tax:** See Krings (2005) for a discussion of typification. See Fishbein (2017) for a discussion of the nomenclature and taxonomy of this species. **Comm:** Pursh's original description (as *Ceropegia palustris*) succinctly captures the habit and habitat of this species: "in salt marshes, winding around Scirpi and Junci: Carolina" (Pursh 1814 [1813]). **Syn:** = *Cynanchum angustifolium* Persoon – Bah, GW2, K1, Tx, Tx, WH3; = *Cynanchum palustre* (Pursh) Heller – RAB; = *Funastrum angustifolium* (Persoon) Liede & Meve – K3, Liede & Meve (2002); = *Lyonia palustris* (Pursh) Small – S; = *Pattalias palustre* (Pursh) Fishbein – Fishbein (2017), orthographic variant; = *Seutera angustifolia* (Persoon) Fishbein & W.D. Stevens – Fl5, Meso4.1, WI, Fishbein & Stevens (2005). NatureServe G5 (Secure).



Thyrsanthella (Baillon) Pichon 1948 (CLIMBING DOGBANE)

A monotypic genus, a liana, of se. North America (Endress et al. 2018). This species has been traditionally treated as the only North American taxon of *Trachelospermum*, an otherwise se. Asian genus of about 15-20 species. Such a treatment is untenable, however, as morphological and molecular evidence clearly show that our native taxon is only distantly related to Asian *Trachelospermum* (Livshultz et al. 2007); it is most closely related to the small genus *Pinochia* M.E. Endress & B.F. Hansen, of the Greater Antilles, Mexico, and Central America (Endress & Hansen 2007). References: Endress & Hansen (2007); Endress et al (2018) in Kadereit & Bittrich (2018); Livshultz et al (2007).

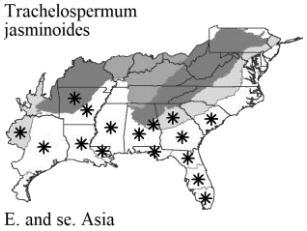
Identification Notes: Sterile *Thyrsanthella difformis* is sometimes mistaken at a glance for *Gelsemium* (both woody vines with opposite lanceolate leaves), but in the field the milky sap of *Thyrsanthella* provides an immediate identifying characteristic.



Thyrsanthella difformis (Walter) Pichon. CLIMBING DOGBANE. **Hab:** Dry-mesic to mesic upland forests and woodlands, bottomland and riparian forests, moist prairies, flatwoods, swamps, marshes, old fields, roadsides. **Dist:** DE south to n. peninsular FL, west to e. TX, north in the interior to MO and IN. **Phen:** May-Jul; Jul-Sep. **Comm:** See Krings (2003) for a discussion of nomenclature. **ID Notes:** Very variable in leaf size, with leaves up to 14 cm long and 8 cm wide, but usually much smaller and proportionally narrow than that. The leaves are often about the size and shape of Gelsemium leaves; fresh material is easily distinguished by its milky sap. **Syn:** = Fl5, K4, WH3, Livshultz et al (2007); = *Trachelospermum difforme* (Walter) A. Gray – Ar, C, F, G, GW2, Il, K1, K2, Mo2, RAB, S, Tn, Tx, Va. NatureServe G4G5 (Apparently Secure).

Trachelospermum Lemaire 1851 (CLIMBING DOGBANE)

A genus of 6-10 species, lianas, of se. Asia (Endress et al. 2018). References: Endress et al (2018) in Kadereit & Bittrich (2018); Livshultz et al (2007).



* ***Trachelospermum jasminoides*** (Lindley) Lemaire. CONFEDERATE JASMINE, STAR JASMINE. **Hab:** Disturbed areas. **Dist:** Native of se. Asia. Cultivated and sometimes persistent or spreading. Reported for e. LA and AL (Diamond 2013). **Phen:** Apr-Oct. **Syn:** = Ar, Fl5, K1, K3, K4, NcTx, WH3. NatureServe GNR (Not Yet Ranked).

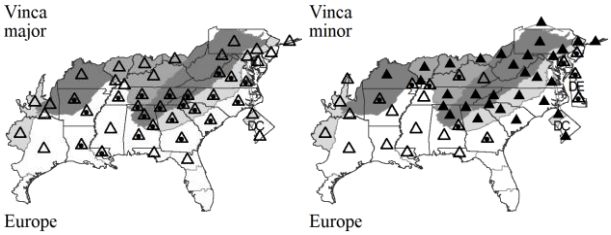
Vinca Linnaeus 1753 (VINCA, PERIWINKLE)

A genus of 5-7 species, perennial herbs, of Europe, n. Africa, and c. Asia (Endress et al. 2018). References: Endress et al (2018) in Kadereit & Bittrich (2018).

1 Leaves ovate, broadest near the base, cordate or subcordate-rounded at the base, 2-6 cm wide, thin in texture and deciduous to semi-evergreen; leaf margins ciliate; flowers 3-5 cm across, on a pedicel 3-5 cm long ..... ***Vinca major***
1 Leaves lanceolate or elliptic, broadest near the middle, rounded to cuneate at the base, 1-2 cm wide, thick in texture and evergreen; leaf margins not ciliate; flowers 2-3 cm across, on a pedicel 1-1.5 cm long ..... ***Vinca minor***

* ***Vinca major*** Linnaeus. GREATER PERIWINKLE. **Hab:** Disturbed areas, suburban woodlands, around old house sites, persistent and spreading from cultivation. **Dist:** Native of Europe. **Phen:** Late Feb-May; Jun-Jul. **Syn:** = Ar, C, F, Fl5, G, Il, K1, K3, K4, Meso4.1, Mi, Mo2, NcTx, NE, NY, RAB, S, Tn, Tx, Va, W. NatureServe GNR (Not Yet Ranked).

* ***Vinca minor*** Linnaeus. COMMON PERIWINKLE, MYRTLE. **Hab:** Disturbed areas, around old house sites and especially old cemeteries, persistent and spreading from cultivation. **Dist:** Native of Europe. **Phen:** Apr-Jun; Jun-Jul. **Syn:** = Ar, C, F, Fl5, G, GrPl, Il, K1, K3, K4, Mi, Mo2, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV. NatureServe GNR (Not Yet Ranked).



357a. BORAGINACEAE A.L. de Jussieu 1789 (BORAGE FAMILY) [in BORAGINALES]

As here more narrowly circumscribed, a family of about 85 genera and 1600-1700 species, herbs (and a few shrubs), nearly cosmopolitan (Weigend et al. in Kadereit & Bittrich 2016). References: Al-Shehbaz (1991); Constance (1963); Diane, Förther, & Hilger (2002); Ferguson (1998); Hilger & Diane (2003); Khoshsokhan-Mozaffar, Sherafati, & Kazempour-Osaloo (2018); Nazaire & Hufford (2012); Weigend et al. in Kadereit & Bittrich (2016); Wilson (1960a).

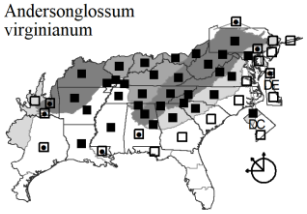
1 Leaves dissected, lobed, or toothed (sometimes the basalmost leaves simple); style fused for a portion of its length, 2-cleft toward the tip; ovary with 1 locule ..... ***Hydrophyllaceae***
1 Leaves entire, simple; style various.
  2 Styles 2, distinct to the summit of the ovary
    3 Flowers in axillary cymes; capsule subglobose; leaves 2-12 cm long ..... ***Hydroleaceae***
    3 Flowers solitary or paired in the leaf axils; capsule cylindrical; leaves 0.5-8 cm long ..... ***Namaceae***
  2 Styles absent (the stigma sessile and terminal), single, or with 2 branches.
    4 Ovary slightly 2-4-lobed, or not at all lobed; style terminal or reduced to a sessile terminal stigma ..... ***Heliotropiaceae***
    4 Ovary deeply 4-parted; style gynobasic.
      5 Mericarps with glochidiate prickles (like grappling hooks), these visible early in development.
        6 Mericarps spreading or divergent, attached to the gynobase on the upper third of the mericarp.
          7 Flowering stem leafless above the first branch; corolla blue or white; [plant a perennial native, not weedy]; [subfamily *Cynoglossoideae*; tribe *Cynoglosseae*; subtribe *Amsinckiinae*] ..... ***Andersonglossum***
          7 Flowering stem with leaves above the first inflorescence branch; corolla reddish-purple; [plant a biennial alien, weedy]; [subfamily *Cynoglossoideae*; tribe *Cynoglosseae*; subtribe *Cynoglossinae*] ..... ***Cynoglossum***
        6 Mericarps erect, attached to the gynobase near the middle of the mericarp; [subfamily *Cynoglossoideae*; tribe *Rochelieae*; subtribe *Eritrichiinae*].

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

..... ***Hackelia***

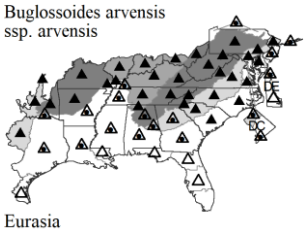
5 Mericarps smooth, rugose, or pitted, lacking glochidiate prickles.
13 Mericarps attached laterally to a pyramidal gynobase.
..... ***Mertensia***
13 Mericarps attached basally to a flat or broadly convex gynobase.
16 Mericarps laterally compressed, with an evident raised margin; [subfamily *Cynoglossoideae*; tribe *Myosotideae*] ..... ***Myosotis***
16 Mericarps neither laterally compressed nor with an evident thickened margin.
17 Mericarps with a prominent, toothed, basal rim; [subfamily *Boraginoideae*; tribe *Boragineae*; subtribe *Boragininae*] ..... ***Symphytum***
17 Mericarps lacking a prominent, toothed, basal rim; [subfamily *Boraginoideae*; tribe *Lithospermeae*].
18 Corolla whitish or bluish white; plant annual from a slender taproot; leaves without evident lateral veins; mericarps brown, dull, wrinkled and pitted; [plant a weedy alien] ..... ***Buglossoides***
18 Corolla bright yellow-orange, or greenish-white; plant perennial from a thickened, woody rhizome; mericarps white, shining, smooth or pitted; [plant a native] ..... ***Lithospermum***

Andersonglossum J.I. Cohen 2015 (AMERICAN COMFREY)



A genus of 3 species, perennial herbs, of e. North America and w. North America. These North American species previously assigned to *Cynoglossum* are in a strictly New World clade also including *Cryptantha*, *Amsinckia*, *Plagiobothrys*, and other genera, not closely related to *Cynoglossum officinale*, the type of the genus *Cynoglossum*. See Weigend et al. (2013) and Cohen (2015) for additional information. References: Al-Shehbaz (1991); Cohen (2015); Haines (2010); Hilger, Greuter, & Stier (2015); Jiménez-Mejías, Cohen, & Naczi (2017); Weigend et al (2013); Weigend et al (2016) in Kadereit & Bittrich (2016).

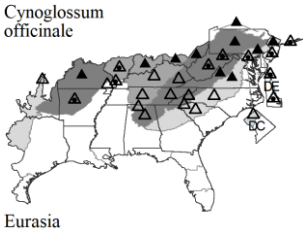
Andersonglossum virginianum (Linnaeus) J.I. Cohen. SOUTHERN HOUND'S-TONGUE, SOUTHERN WILD COMFREY. **Hab:** Moist deciduous forests. **Dist:** CT west to OK, south to FL and LA. **Phen:** Apr-Jun. **Syn:** = Fl5, NY, Cohen (2015), Jiménez-Mejías, Cohen, & Naczi (2017); = *Cynoglossum virginianum* – Ar, F, G, GrPl, Il, K3, Mo2, NcTx, Pa, Tx, Al-Shehbaz (1991); = *Cynoglossum virginianum* ssp. *virginianum* – NE, Haines (2010); = *Cynoglossum virginianum* Linnaeus var. *virginianum* – C, K1, Va; = *Cynoglossum virginicum* – S, orthographic variant; < *Andersonglossum virginianum* (Linnaeus) J.I. Cohen – K4; < *Cynoglossum virginianum* – RAB, Tn, W, WH3, WV. NatureServe G5T5 (Secure).



Buglossoides Moench 1794 (CORN-GROMWELL)

A genus of about 7-10 species, herbs or shrubs, of temperate Eurasia. References: Al-Shehbaz (1991); Weigend et al (2016) in Kadereit & Bittrich (2016).

* ***Buglossoides arvensis*** (Linnaeus) I.M. Johnston *ssp.* ***arvensis***. CORN-GROMWELL. **Hab:** Roadsides, dry disturbed areas, sandy fields. **Dist:** Native of Eurasia. Other subspecies are not known to be naturalized in our area. **Phen:** Mar-Jun. **Syn:** = NE, Va, WH3, Al-Shehbaz (1991); < *Buglossoides arvense* – Il, Pa, Tx, orthographic variant; < *Buglossoides arvensis* – Ar, Fl5, K1, K3, K4, Mi, NcTx, NY, Tn; < *Lithospermum arvense* Linnaeus – C, F, G, GrPl, RAB, S, W. NatureServe GNRTNR (Not Yet Ranked).

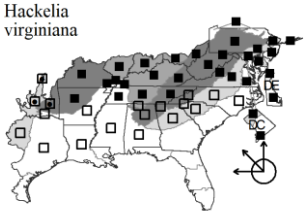


Cynoglossum Linnaeus 1753 (COMFREY)

A genus of about 75 species, herbs, of the temperate Old World (but circumscription uncertain). References: Al-Shehbaz (1991); Haines (2010); Hilger, Greuter, & Stier (2015); Weigend et al (2013); Weigend et al (2016) in Kadereit & Bittrich (2016).

1 Flowering stem with leaves above the first inflorescence branch; corolla reddish-purple; [plant a biennial alien, weedy] ..... ***Cynoglossum officinale***
1 Flowering stem leafless above the first branch; corolla blue or white; [plant a perennial native, not weedy] ..... ***Andersonglossum***

* ***Cynoglossum officinale*** Linnaeus. GARDEN COMFREY, HOUND'S-TONGUE. **Hab:** Disturbed areas, roadsides, pastures, calcareous shale barrens. **Dist:** Native of Eurasia. **Phen:** May-Jul. **Syn:** = Ar, C, F, G, GrPl, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Va, W, WV, Al-Shehbaz (1991). NatureServe GNR (Not Yet Ranked).



Hackelia Opiz 1839 (STICKSEED)

A genus of ca. 45 species, herbs (mainly perennial), of north temperate regions, Central America, and South America, especially diverse in w. North America. References: Al-Shehbaz (1991); Weigend et al (2016) in Kadereit & Bittrich (2016).

Hackelia virginiana (Linnaeus) I.M. Johnston. VIRGINIA STICKSEED. **Hab:** Rich forests and woodlands. **Dist:** S. QC west to ND, south to ne. GA (Jones & Coile 1988), LA, and TX. **Phen:** Jun-Sep. **Syn:** = Ar, C, F, G, GrPl, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, Tn, Tx, Va, W, WV, Al-Shehbaz (1991); = *Lappula virginiana* (Linnaeus) Greene – S. NatureServe G5 (Secure).

Key to Map Symbology: □ native; ◇ maybe exotic; △ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Lithospermum Linnaeus 1753 (GROMWELL, PUCCOON, STONESEED)

A genus of about 80 species, herbs (mostly perennials), nearly cosmopolitan. Studies strongly suggest that *Onosmodium* is better included in a broadened *Lithospermum* (Cohen & Davis 2009; Weigend et al. 2009), as *Onosmodium* is embedded within *Lithospermum* in a subclade also including *L. tuberosum*; morphologically, *Onosmodium* shows a subset of the characteristics in a broader and more diverse *Lithospermum*. References: Al-Shehbaz (1991); Cochrane (1976); Cohen & Davis (2009); Cusick (1985); Turner (1995a); Weakley et al (2011); Weigend et al (2009); Weigend et al (2016) in Kadereit & Bittrich (2016).

1 Corolla lobes acute to acuminate, erect (continuing the plane of the corolla tube); style exserted.
  2 Corolla lobes yellow to orange; nutlet 2.0-2.8 mm long; corolla lobes either 2.5-4× as long as wide and acuminate (*L. virginianum*) or 1.5-2× as long as wide, acute (*O. decipiens*).
    3 Stem hairs 2.5-5.0 mm long; corolla lobes 1.5-2× as long as wide, acute; tips of the anthers reaching the base of the corolla sinuses; [endemic to Ketona dolomite glades, Bibb County, c. AL]..... ***Lithospermum decipiens***
    3 Stem hairs < 2.0 mm long; corolla lobes 2.5-4× as long as wide and acuminate; tips of the anthers below the corolla sinuses; [widespread in our area]..... ***Lithospermum virginianum***
  2 Corolla lobes dull greenish-white; nutlet 2.5-3.0 mm long; corolla lobes 1.5-2× as long as wide, acute.
    4 Leaf vestiture solely of dense appressed hairs on both surfaces (the plant appearing ashy-white)..... ***Lithospermum molle***
    4 Leaf vestiture at least in part of spreading or ascending hairs.
      5 Stems glabrescent (with widely scattered appressed hairs) below the inflorescence branches..... ***Lithospermum subsetosum***
      5 Stems persistently and obviously pubescent below the inflorescence branches.
      ..... ***Lithospermum parviflorum***
1 Corolla lobes rounded, spreading; style included.
  8 Corolla white or yellowish-white, the tube 4-8 mm long.
    9 Plant with basal rosette; lower cauline leaves about equal in size to the upper cauline leaves; leaves acute to obtuse..... ***Lithospermum tuberosum***
    9 Plant lacking basal rosette; lower cauline leaves smaller than the upper cauline leaves; leaves acuminate or acute.
      ..... ***Lithospermum latifolium***
  8 Corolla yellow-orange, the tube 7-30 mm long.
    12 Plant with dense, soft, appressed pubescence, the hairs usually without pustular bases; calyx lobes 6-8 mm long at maturity; nutlets 2-3 mm long; [mostly of rocky or clayey circumneutral soils of inland physiographic provinces]..... ***Lithospermum canescens***
    12 Plant with scattered, stiff, spreading pubescence, the hairs with or without pustular bases; calyx lobes 10-15 mm long at maturity; nutlets 3.5-4.5 mm long; [variously of sandy acidic soils of the Coastal Plain or inland].
      ..... ***Lithospermum caroliniense***

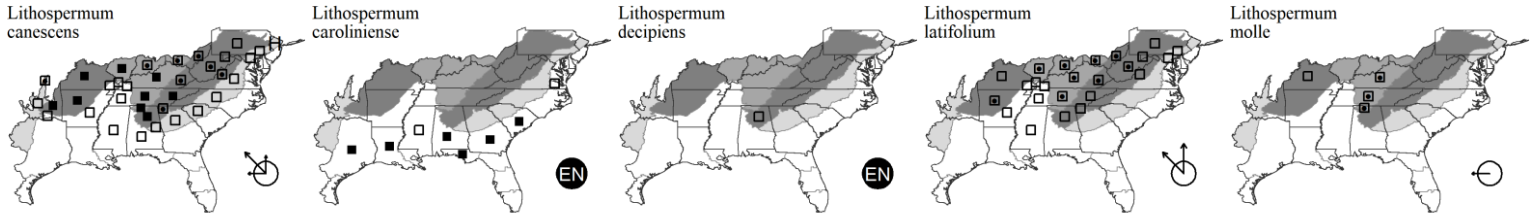
Lithospermum canescens (Michaux) Lehmann. HOARY PUCCOON, INDIAN-PAINT. **Hab:** Dry woodlands and glades over calcareous rocks (such as limestone, dolostone) or mafic rocks (such as diabase). **Dist:** ON west to SK, south to c. NC, nw. GA, AL, and TX. **Phen:** Apr-May. **Syn:** = Ar, C, F, G, GrPl, Il, K1, K3, K4, Mi, Pa, RAB, Va, W, WV, Al-Shehbaz (1991), Cusick (1985); = *Batschia canescens* Michaux – S. NatureServe G5 (Secure).

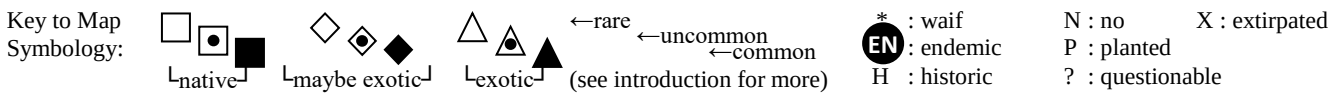
Lithospermum caroliniense (Walter ex J.F. Gmelin) MacMillan. COASTAL PLAIN PUCCOON. **Hab:** Longleaf pine sandhills, other dry sandy soils. **Dist:** A Southeastern Coastal Plain endemic: se. SC south to Panhandle FL, and west to AR and TX; disjunct in se. VA. The disjunction from SC to se. VA, skipping over large amounts of apparently suitable sandhill habitat in NC, is surprising. **Phen:** Apr-Jun. **Tax:** The sibling taxa *L. caroliniense* and *L. croceum* have been variously treated as distinct species, subspecies, or varieties, or as mere forms (see synonymy). Cusick (1985) discusses them and concludes that "the two taxa are similar, but distinctive, and their geographic distributions are almost exclusive". They appear to be as clearly separable as *L. caroliniense* is from *L. canescens*; I regard them as allopatric species. **Syn:** = Ar, F, NcTx, Tx, Va; = *Batschia caroliniensis* Walter ex J.F. Gmelin – S; = *Lithospermum carolinense* ssp. *carolinense* – Cusick (1985); = *Lithospermum caroliniense* var. *caroliniense* – C, K1, K3, K4; < *Lithospermum carolinense* – GrPl, orthographic error; < *Lithospermum caroliniense* (Walter ex J.F. Gmelin) MacMillan – Fl5, G, RAB, WH3, Al-Shehbaz (1991). NatureServe G4G5T3T5 (Apparently Secure).

Lithospermum decipiens (J.R. Allison) Weakley, Witsell, & D. Estes. DECEPTIVE MARBLESEED. **Hab:** Dolomitic Ketona glades. **Dist:** Endemic to c. AL (Bibb County) (Allison & Stevens 2001). **Phen:** Apr-early May; Jun-Aug. **Syn:** = K3, K4, Weakley et al (2011); = *Onosmodium decipiens* J.R. Allison – K2. NatureServe G2 (Imperiled).

Lithospermum latifolium Michaux. AMERICAN GROMWELL, BROADLEAF GROMWELL, BROADLEAF PUCCOON. **Hab:** Dry to moist woodlands over calcareous rocks. **Dist:** NY west to MN, south to nw. GA, s. TN and AR. **Phen:** May-Jun. **Syn:** = Ar, C, F, G, GrPl, Il, K1, K3, K4, Mi, NY, Pa, S, Tn, Va, W, WV, Al-Shehbaz (1991), Cusick (1985). NatureServe G4 (Apparently Secure).

Lithospermum molle (Michaux) Muhlenberg. TENNESSEE MARBLESEED. **Hab:** Limestone barrens. **Dist:** C. KY, c. TN (Chester, Wofford, & Kral 1997), nw. AL, and disjunct in the Ozarkian Highlands of MO. **Phen:** May-Jul. **Comm:** *O. molle* has been attributed to Durham County, NC (RAB); Baskin *et al.* (1983) determined that this report was based on a misidentification of a specimen of *O. virginianum*. **Syn:** = K3, Tn; = *Onosmodium molle* Michaux – F, G, Turner (1995a); = *Onosmodium molle* ssp. *molle* – K1, Al-Shehbaz (1991), Cochrane (1976); = *Onosmodium molle* var. *molle* – C; < *Lithospermum molle* (Michaux) Muhlenberg – K4; < *Onosmodium bejariense* A.L.P.P. de Candolle ssp. *bejariense* – K2; < *Onosmodium molle* Michaux – S. NatureServe G4G5T3 (Vulnerable).



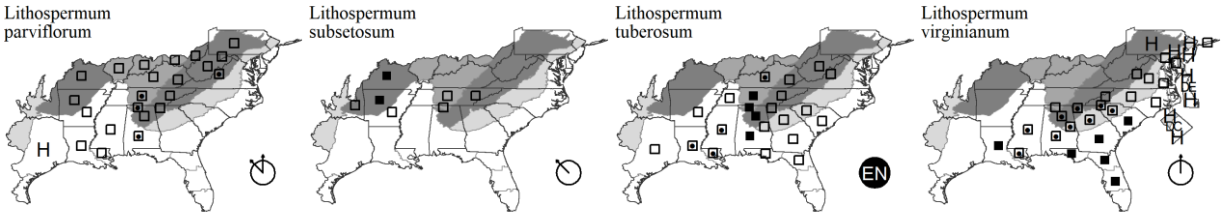


Lithospermum parviflorum Weakley, Witsell, & D. Estes. EASTERN PRAIRIE MARBLESEED, SHAGGY MARBLESEED. **Hab:** Calcareous woodlands, barrens, and glades, and nearby in disturbed areas, such as older pasture edges. **Dist:** W. NY and ON west to MN, south to sc. PA (Rhoads & Klein 1993), w. VA, e. TN (Chester, Wofford, & Kral 1997), LA, and TX. This species was attributed to NC by F and S; the documentation of these reports is not known. **Phen:** May-Jul. **Syn:** = K3, K4, NY, Tn, Va, Weakley et al (2011); = *Onosmodium bejariense* A.L.P.P. de Candolle ssp. *hispidissimum* (Mackenzie) B.L. Turner – K2, Turner (1995a); = *Onosmodium bejariense* var. *hispidissimum* – Ar; = *Onosmodium hispidissimum* Mackenzie – G, S, Tx, W, WV; = *Onosmodium molle* Michaux ssp. *hispidissimum* (Mackenzie) Boivin – K1, Al-Shehbaz (1991), Cochrane (1976); = *Onosmodium molle* Michaux var. *hispidissimum* (Mackenzie) Cronquist – C, GrPl, Pa; > *Onosmodium hispidissimum* var. *hispidissimum* – F; > *Onosmodium hispidissimum* var. *macrospermum* Mackenzie & Bush – F; < *Onosmodium molle* Michaux – Il, Mi. NatureServe G4G5T4 (Apparently Secure).

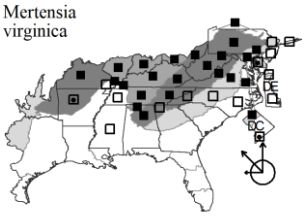
Lithospermum subsetosum (Mackenzie & Bush) Weakley, Witsell, & D. Estes. OZARK MARBLESEED. **Hab:** Calcareous glades and woodlands. **Dist:** MO south to AR and OK; disjunct in c. TN (Chester, Wofford, & Kral 1997) and ne. AL (Cumberland Plateau escarpment) (Datillo & Nestor 2011; D. Estes, pers. comm., 2011). **Phen:** May-Jul. **Syn:** = K3, K4, Tn, Weakley et al (2011); = *Onosmodium bejariense* A.L.P.P. de Candolle var. *subsetosum* (Mackenzie & Bush) B.L. Turner – Ar, Turner (1995a); = *Onosmodium molle* Michaux ssp. *subsetosum* (Mackenzie & Bush) T.S. Cochrane – K1, Al-Shehbaz (1991), Cochrane (1976); = *Onosmodium subsetosum* – F, G; < *Onosmodium molle* Michaux – S. NatureServe G4G5T4? (Apparently Secure).

Lithospermum tuberosum Rugel ex A.P. de Candolle. SOUTHERN STONESEED. **Hab:** Nutrient-rich forests, especially over calcareous rocks. **Dist:** Sw. VA, s. WV, KY, and TN, south to n. peninsular FL, FL Panhandle, and LA. **Phen:** Mar-Jun. **Syn:** = Ar, C, F, Fl5, G, K1, K3, K4, RAB, S, Tn, Tx, Va, WH3, Al-Shehbaz (1991). NatureServe G4 (Apparently Secure).

Lithospermum virginianum Linnaeus. PINELAND MARBLESEED, VIRGINIA MARBLESEED. **Hab:** Longleaf pine sandhills, shell middens in the outer Coastal Plain, woodlands and barrens over diabase and other mafic rocks in the Piedmont and low Mountains, barrens, glades, or woodlands over calcareous rocks in the Mountains (the unifying ecological factor determining its distribution may be an open, woodland condition maintained by fire). **Dist:** LA to FL, north to NY and MA, primarily on the Coastal Plain; the species has become very rare north of NC. **Phen:** Apr-Sep; late May-Oct. **Comm:** In much of its distribution, the species seems characteristically to occur in very small populations, consisting often of fewer than five plants. **Syn:** = Fl5, K3, K4, NY, Va; = *Onosmodium virginianum* (Linnaeus) A.L.P.P. de Candolle – C, F, G, K1, NE, Pa, RAB, S, W, WH3, Al-Shehbaz (1991), Cusick (1985). NatureServe G4 (Apparently Secure).



Mertensia Roth 1797 (BLUEBELL)



A genus of about 40-45 species, perennial herbs, north temperate (mainly e. Asia and North America). References: Al-Shehbaz (1991); Weigend et al (2016) in Kadereit & Bittrich (2016).

Mertensia virginica (Linnaeus) Persoon ex Link. VIRGINIA BLUEBELLS, VIRGINIA COWSLIP. **Hab:** Nutrient-rich, moist, alluvial soils of floodplain forests and thickets, also on rich slopes or bluffs over calcareous rocks. **Dist:** NY west to WI, and IA, south to n. NC, nw. GA, AL, and n. AR. **Phen:** Mar-May. **Tax:** Pringle (2004) discusses the nomenclatural reasons for retaining the name *M. virginica*. **Syn:** = Ar, C, F, G, GrPl, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Va, W, WV, Al-Shehbaz (1991). NatureServe G5 (Secure).

Myosotis Linnaeus 1753 (FORGET-ME-NOT, SCORPION-GRASS)

A genus of about 80-100 species, herbs, temperate and montane tropical. References: Al-Shehbaz (1991); Weigend et al (2016) in Kadereit & Bittrich (2016).

1 Calyx strigose, the hairs neither spreading nor uncinate; [mostly of moist to wet habitats].
..... ***Myosotis scorpioides***
1 Calyx with some loose or spreading, uncinate hairs; [of various habitats, mostly dry].
3 Corolla limb 5-8 mm wide; perennial..... ***Myosotis sylvatica***
3 Corolla limb 1-4 mm wide; annual or biennial.
4 Calyx lobes unequal, 3 lobes shorter than the other 2; corolla white; [native, of dry or moist habitats].
5 Fruiting pedicels divergent; fruiting calyx deciduous, 3-10 mm long; inflorescence internodes usually longer than 10 mm; mericarps 1.4-2.2 mm long.....
..... ***Myosotis macrosperma***
5 Fruiting pedicels more-or-less erect; fruiting calyx persistent, 3-5.5 mm long; inflorescence internodes usually shorter than 10 mm; mericarps 1.2-1.5 mm long..... ***Myosotis verna***
4 Calyx lobes equal, all 5 the same size; corolla blue (occasionally yellow or white); [alien, mostly of dry disturbed habitats].
..... ***Myosotis discolor***

* ***Myosotis discolor*** Persoon. YELLOW-AND-BLUE SCORPION-GRASS, CHANGING FORGET-ME-NOT. **Hab:** Fields, disturbed areas, roadsides. **Dist:** Native of Europe. **Phen:** May-Aug. **Syn:** = Ar, C, GW2, K1, K3, K4, Mi, NE, NY, Pa, RAB, Va, Al-Shehbaz (1991); ? *Myosotis versicolor* (Persoon) J.E. Smith – F, G. NatureServe G5 (Secure).

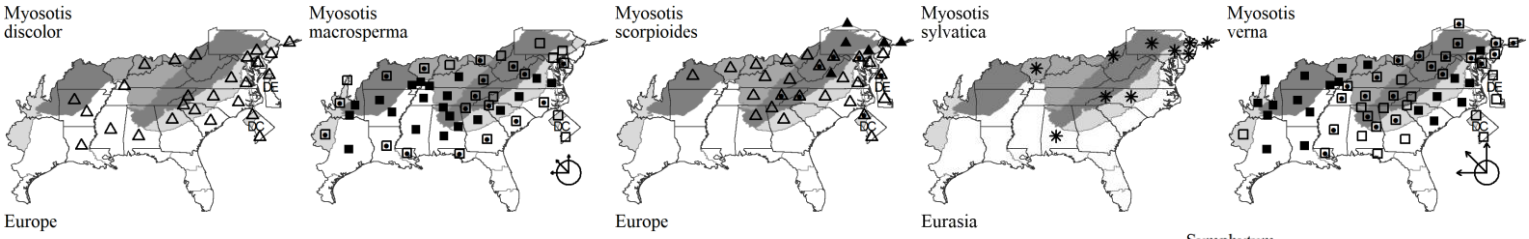
Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Myosotis macrosperma Engelmann. BIGSEED FORGET-ME-NOT. **Hab:** Bottomland forests and alluvial fields, probably associated with nutrient-rich soils. **Dist:** MD west to MO, south to FL and TX. **Phen:** Apr-May. **Syn:** = Ar, C, F, Fl5, G, GW2, Il, K1, K3, K4, NcTx, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV, Al-Shehbaz (1991); < *Myosotis verna* Nuttall – GrPl.

* ***Myosotis scorpioides*** Linnaeus. WATER SCORPION-GRASS, TRUE FORGET-ME-NOT. **Hab:** Wet meadows, streambanks. **Dist:** Native of Europe. **Phen:** May-Aug. **Syn:** = C, F, G, GrPl, GW2, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, Tn, Va, W, WV, Al-Shehbaz (1991); ? *Myosotis palustris* (Linnaeus) Hill – S. NatureServe G5 (Secure).

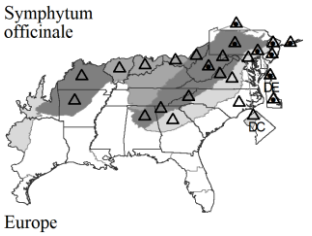
* ***Myosotis sylvatica*** Ehrhart ex Hoffmann. GARDEN FORGET-ME-NOT. **Hab:** Gardens, rarely persistent or found as a waif. **Dist:** Native of Eurasia. **Phen:** Apr-Sep. **Syn:** = C, F, G, GrPl, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, Al-Shehbaz (1991). NatureServe G5 (Secure).

Myosotis verna Nuttall. EARLY FORGET-ME-NOT, SPRING FORGET-ME-NOT. **Hab:** Dry woodlands, roadsides, disturbed areas, dry fields. **Dist:** ME west to SD, south to GA and TX; also from ID and BC south to OR. **Phen:** Mar-Jul. **Syn:** = Ar, C, F, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, W, WV, Al-Shehbaz (1991); = *Myosotis virginica* – S, misapplied; < *Myosotis verna* Nuttall – GrPl.



Symphytum Linnaeus 1753 (COMFREY)

A genus of ca. 35 species, perennial herbs, of Europe. References: Al-Shehbaz (1991); Weigend et al (2016) in Kadereit & Bittrich (2016).



* ***Symphytum officinale*** Linnaeus. COMMON COMFREY. **Hab:** Disturbed areas. **Dist:** Native of Europe. **Phen:** Jun-Aug. **Comm:** *Symphytum* is a traditional "medicinal herb", but recent evidence suggests that it can cause dangerous (even fatal) liver damage. **Syn:** = Ar, C, F, G, GrPl, Il, K1, K3, K4, Mi, NE, NY, Pa, S, Va, WV, Al-Shehbaz (1991). NatureServe GNR (Not Yet Ranked).

357b. HYDROPHYLLACEAE R. Brown 1817 (WATERLEAF FAMILY) [in BORAGINALES]

A family of about 12 genera and 250 species, herbs, of temperate (and tropical) America. References: Constance (1963); Ferguson (1998); Hofmann et al. in Kadereit & Bittrich (2016).

1 Leaves entire, simple; styles 2, distinct to the ovary.
  2 Flowers in axillary cymes; capsule subglobose; leaves 2-12 cm long ..... ***Hydrolea***
  2 Flowers solitary or paired in the leaf axils; capsule cylindrical; leaves 0.8-1.5 (-3.5) cm long ..... ***Nama***
1 Leaves dissected, lobed, pinnatifid, or toothed (sometimes the basalmost leaves simple); style fused for a portion of its length, 2-cleft toward the tip.
  3 Flowers solitary on pedicels either axillary to or opposite the leaves on the upper portion of the stem, and sometimes also terminal in a lax, (1-) 2-6-flowered cyme; [tribe *Hydrophylleae*].
  ..... ***Nemophila***
  3 Flowers all terminal in 3-many-flowered cymes.
    5 Inflorescence repeatedly branched subdichotomously; larger leaf blades > 8 cm wide; stamens well exserted from the corolla (3 mm or more beyond the corolla); plants perennial from fibrous roots; [tribe *Hydrophylleae*] ..... ***Hydrophyllum***
    5 Inflorescence with a strong central axis (some secondary branching in *P. bipinnatifida*, but not as above); larger leaf blades < 5 cm wide (except *P. bipinnatifida*); stamens slightly exserted from the corolla (< 3 mm beyond the corolla) (except well-exserted in *P. bipinnatifida*, included in *P. covillei*); plants annual (biennial in *P. bipinnatifida*) from a taproot; [tribe *Romanzoffieae*] ..... ***Phacelia***

Hydrophyllum Linnaeus 1753 (WATERLEAF)

A genus of 8-10 species, herbs, of e. and w. North America. References: Alexander (1941); Beckmann (1979); Constance (1942); Karlsson, Weakley, & Poindexter (2017) in Weakley et al (2017); Kral & Bates (1991).

1 Principal cauline leaves palmately lobed, maple-like, differing from the pinnately divided basal leaves.
  2 Sepals with small reflexed appendages exserted at each sinus of the calyx; plant biennial from a taproot; stamens exserted 1-3 mm beyond the corolla; leaf lobing relatively shallow and irregular ..... ***Hydrophyllum appendiculatum***
  2 Sepals with appendages absent or rudimentary; plant perennial from fibrous roots; stamens exserted 3-6 mm beyond the corolla; leaf lobing relatively deep and regular ..... ***Hydrophyllum canadense***
1 Principal cauline leaves pinnately divided, similar to the basal leaves.
  ..... ***Hydrophyllum macrophyllum***

Hydrophyllum appendiculatum Michaux. GREAT WATERLEAF, BIENNIAL WATERLEAF. **Hab:** Rich mesic forests. **Dist:** S. ON and MN, south to sw. PA, a. and sc. WV, e. TN, n. AL (Jackson Co.), MO, and e. KS. It was attributed to NC by Small (1933) on unknown grounds. **Phen:** Apr-Jul.

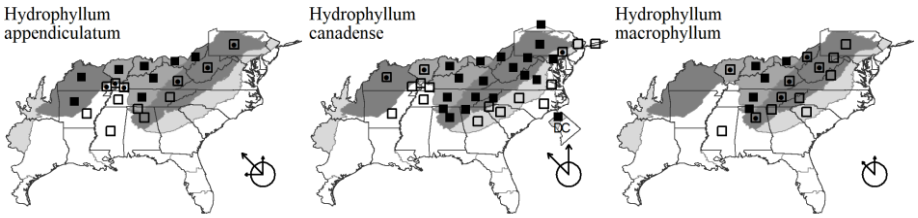
Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated

357b. HYDROPHYLLACEAE

Syn: = Ar, C, F, G, GrPl, Il, K1, K3, K4, Mi, Mi, Mo2, Pa, Tn, WV, Beckmann (1979), Constance (1942); = *Decemium appendiculatum* (Michaux) Small – S. NatureServe G5 (Secure).

Hydrophyllum canadense Linnaeus. MAPLELEAF WATERLEAF, CANADA WATERLEAF, BROADLEAF WATERLEAF. **Hab:** Cove forests, rocky streambanks, other moist and nutrient-rich forests. **Dist:** VT and s. ON west to MI and WI, south to n. GA, AL, ne. AR (?), and MO. **Phen:** May-Aug; Aug-Sep. **Syn:** = C, F, G, Il, K1, K3, K4, Mi, Mo2, NE, NY, Pa, RAB, S, Tn, Va, W, WV, Beckmann (1979), Constance (1942). NatureServe G5 (Secure).

Hydrophyllum macrophyllum Nuttall. HAIRY WATERLEAF. **Hab:** Cove forests and other moist rocky forests, especially over calcareous or mafic rocks. **Dist:** WV west to OH, and IL, south to sw. VA, w. NC, n. GA, and n. AL; disjunct in the lower Piedmont of SC (Kershaw County; L.L. Gaddy, pers. comm. 2013). **Phen:** May-Jun; Jul-Aug. **Comm:** Reports from AR are erroneous, and are based on material of *Hydrophyllum brownei* Kral & Bates (Peck 2003). The w. North American *H. occidentale* (S. Watson) A. Gray is rather closely related. **Syn:** = C, F, G, Il, K3, K4, Pa, RAB, S, Tn, Va, W, WV, Beckmann (1979), Constance (1942), Kral & Bates (1991); >< *Hydrophyllum macrophyllum* Nuttall – K1.



Nemophila Nuttall 1822 (BABY-BLUE-EYES)

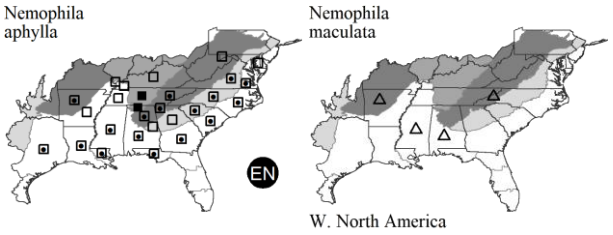
A genus of 11 species, herbs, of North America (mostly w. North America). References: Constance (1941).

Identification Notes: *Nemophila aphylla* is superficially similar to *Phacelia covillei* and *P. ranunculacea*, with which it often co-occurs. *Nemophila aphylla* has solitary flowers (and later fruits) borne on pedicels opposite the leaves, the pedicels mostly > 12 mm long; vs. *Phacelia* with flowers (and later fruits) in 2-6-flowered terminal cymes, the pedicels mostly < 12 mm long).

1 Stem leaves opposite; [aliens from w. North America].
..... ***Nemophila maculata***
1 Stem leaves alternate; [natives in our area].
..... ***Nemophila aphylla***

Nemophila aphylla (Linnaeus) Brummitt. WHITE NEMOPHILA, EASTERN BABY-BLUE-EYES, SMALL-FLOWER BABY-BLUE-EYES. **Hab:** Moist, nutrient-rich floodplain forests, often locally abundant. **Dist:** MD south to Panhandle FL and west to TX, north in the interior to e. TN, w. KY, and se. MO. **Phen:** Mar-Apr. **Syn:** = Ar, Fl5, GW2, K3, K4, Tn, Va, WH3; = *Nemophila microcalyx* (Nuttall) Fischer & C.A. Meyer – F, G, RAB, S, Tx, Constance (1941); = *Nemophila triloba* (Rafinesque) Thieret – C, Il.

* ***Nemophila maculata*** Bentham ex Lindley. FIVESPOT. **Hab:** Disturbed areas, apparently spreading from "wildflower seed mixes". **Dist:** Native of California. **Syn:** = Ar, K3, K4, Constance (1941). NatureServe G4 (Apparently Secure).



Phacelia A.L. de Jussieu 1789 (PHACELIA)

A genus of about 100-200 species, of North America and South America, concentrated in w. North America. References: Constance (1949); Gillett (1964); Gillett (1968); Hofmann et al. in Kadereit & Bittrich (2016); Levy & Malone (2001); Levy (1991a); Levy, Hou, & Taylor-Bennetts (2021); Murdy (1966); Sewell & Vincent (2006).

Identification Notes: 1. *Phacelia bipinnatifida* and *Hydrophyllum virginianum* are sometimes confused. *P. bipinnatifida* has the larger and more basal leaves distinctly bipinnatifid, the lower pinnae often stalked (vs. pinnatifid, the basal or terminal pinnae sometimes 2-lobed, all the pinnae more-or-less sessile), pubescence of the upper stem and inflorescence in part glandular (pubescence nonglandular), and seeds 4 per capsule, black (vs. 2 per capsule, light brown). 2. *Phacelia covillei* and *P. ranunculacea* are superficially similar to and sometimes confused with *Nemophila aphylla*, which see for discussion.

1 Corolla lobes fimbriate; ovules 2 to each of the 2 placentae (or 4 in *P. gilioides*); seeds 4 (or 6-8 in *P. gilioides*) per capsule.
..... ***Phacelia purshii***
1 Corolla lobes entire; seeds 4-15 per capsule.
6 Corolla 10-15 mm across, blue; plant 10-60 cm tall; seeds 2.5-4 mm long, black; ultimate segments of the leaf 15-45 mm long, 10-25 mm wide; pedicels recurved in fruit; branches of the inflorescence glandular-pubescent ..... ***Phacelia bipinnatifida***

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

6 Corolla 5-11 mm across, white to blue; plant 5-40 cm tall; seeds 1.5-2.2 mm long, brown; ultimate segments of the leaf 5-15 mm long, 5-9 mm wide; pedicels ascending to spreading in fruit; inflorescence branches variously pubescent, but not glandular.
7 Basal leaves shallowly toothed or lobed; fruiting pedicels strictly erect, usually shorter than the fruiting calyx ..... ***Phacelia strictiflora var. robbinsii***
7 Basal leaves pinnate or deeply pinnatifid; fruiting pedicels ascending or divergent, usually as long as or longer than the fruiting calyx.
9 Sepals 4-8 mm long, linear or oblanceolate; marginal bristles of sepals spreading, 1.0-1.5 mm long; plants mostly erect ..... ***Phacelia maculata***
9 Sepals 2-4 mm long, narrowly ovate; marginal bristles of sepals appressed, 0.3-1.0 mm long; plants mostly decumbent, branched from the base.
10 Sepals (in flower) 2.0-3.0 mm long; petals 3.5-5 mm long; marginal bristles of sepals 0.4-0.7 mm long; basal leaves with 4-5 pairs of lateral leaflets, the terminal leaflet about the same size and unlobed; cauline leaves with 2-4 pairs of narrow lobes; [of granitic flatrocks and domes of the Piedmont of SC and southwestward] ..... ***Phacelia dubia var. georgiana***
10 Sepals (in flower) 2.6-4.0 mm long; petals 4-6 mm long; marginal bristles of sepals 0.6-0.9 mm long; basal leaves with 1-3 pairs of lateral leaflets, the terminal leaflet larger and usually 3-lobed; cauline leaves with 1-3 pairs of rather broad lobes; [of various habitats (including granitic flatrocks and domes].
..... ***Phacelia dubia var. dubia***

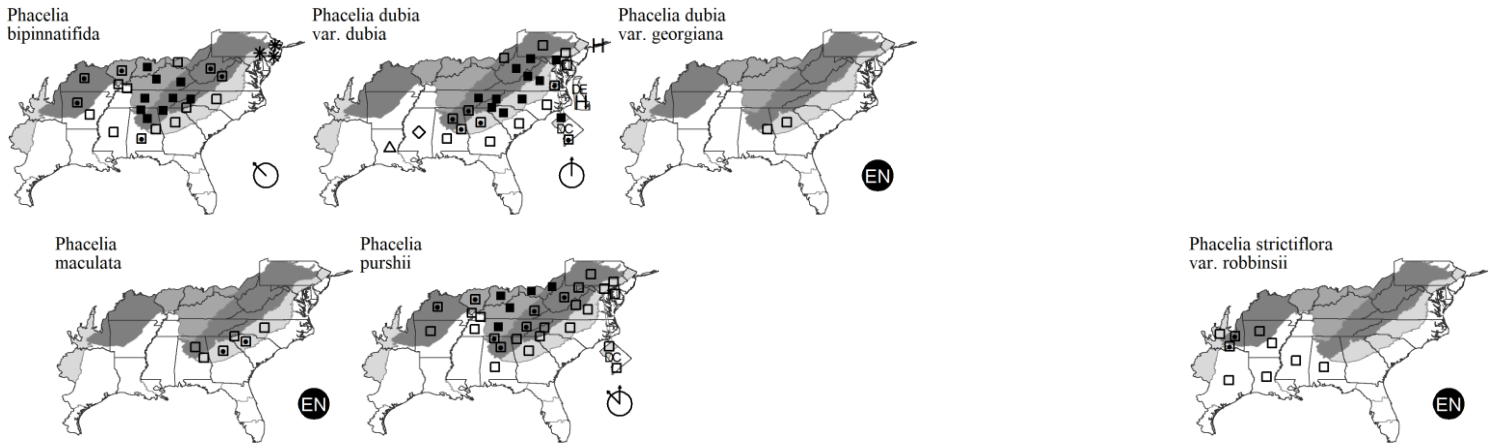
Phacelia bipinnatifida Michaux. FERNLEAF PHACELIA, FOREST PHACELIA, PURPLE PHACELIA. **Hab:** Cove forests, especially where rocky; also popular as a native plant for horticultural use, and sometimes found as a persistent or spreading from horticultural use. **Dist:** W. VA west to s. OH, n. IN, n. IL, and c. MO, south to w. NC, nw. SC, n. GA, c. AL, and n. AR. **Phen:** Mar-May; Jun. **Tax:** *P. bipinnatifida* var. *plummeri* (= *P. brevistyla*) is "based on a variation with sparser pubescence, larger and less divided leaf segments, smaller flowers, and sub-included stamens and style. These variations are not concomitant, and the distribution of forms showing a complete or partial combination of them is sporadic" (Constance 1949). The matter deserves additional study. **Syn:** = Ar, C, G, Il, K1, K3, K4, RAB, Tn, Va, W, Constance (1949); > *Phacelia bipinnatifida* Michaux – S; > *Phacelia bipinnatifida* var. *bipinnatifida* – F; > *Phacelia bipinnatifida* var. *plummeri* Wood – F; > *Phacelia brevistyla* Buckley – S.

Phacelia dubia (Linnaeus) Trelease *var*. ***dubia***. APPALACHIAN PHACELIA. **Hab:** Floodplain forests, other moist and rich forests, rocky forests, fields, roadsides, granitic flatrocks. **Dist:** Var. *dubia* ranges from NY and PA west to WV, south to nc. SC, sw. NC, and se. TN. **Phen:** Apr-May; Jun. **Tax:** The *Phacelia dubia* complex has been under detailed biosystematic study by Foster Levy and associates (Levy 1991a, 199b, 1997; Levy et al. 1996; Levy & Malone 2001; Levy & Neal 2001; Taylor & Levy 2002; del Castillo 1994, 1998). Male sterile cytotypic variants are common in some populations but formal taxonomic recognition is not warranted (Levy 1991a, 1991b; del Castillo 1994, 1998). Additionally, an incipient variety, informally termed '*imitator'*, occurs in c. SC (Levy 1991a; Levy & Malone 2001). These populations are morphologically variable, some more similar to var. *georgiana*, others more similar to var. *dubia*; see Levy (1991a) for further discussion. They may warrant taxonomic recognition, as they are allopatric from each of the 3 named varieties, and show degrees of sterility when bred with each of the three, but morphologic differences have not evolved (Levy & Malone 2001). **Syn:** = K1, K3, K4, Tn, Va, Levy & Malone (2001), Levy (1991a); < *Phacelia dubia* (Linnaeus) Trelease – C, F, NY, Pa, RAB, S, W, WV; < *Phacelia dubia* (Linnaeus) Trelease var. *dubia* – Constance (1949); > *Phacelia dubia* (Linnaeus) Trelease var. *dubia* – G; > *Phacelia dubia* var. *fallax* (Fernald) Gleason – G. NatureServe G5T5 (Secure).

Phacelia dubia (Linnaeus) Trelease *var*. ***georgiana*** McVaugh. GEORGIA PHACELIA. **Hab:** Granitic flatrocks. **Dist:** Var. *georgiana* ranges from GA west to ec. AL, in the Piedmont. **Phen:** Apr-May; Jun. **Comm:** It has sometimes been attributed to SC, and Levy found plants in SC which morphologically resemble var. *georgiana*, but he concluded that this '*imitator*' genotype was largely sterile when bred with var. *georgiana*. See var. *dubia* for additional discussion. **Syn:** = K1, K3, K4, Constance (1949), Levy & Malone (2001), Levy (1991a); < *Phacelia dubia* (Linnaeus) Trelease – RAB, S, W. NatureServe G5T3 (Vulnerable).

Phacelia maculata Alph. Wood. FLATROCK PHACELIA. **Hab:** Bottomlands, granitic flatrocks. **Dist:** Sc. NC south to GA and west to ec. AL. **Phen:** Late Mar-Apr; May. **Syn:** = K1, K3, K4, RAB, W, Constance (1949), Levy (1991a); ? *Phacelia hirsuta* Nuttall – S, misapplied.

Phacelia purshii Buckley. MIAMI-MIST. **Hab:** Moist forests on floodplains and slopes. **Dist:** S. PA west to s. ON, OH, MO, and nw. AR, south to nw. SC, nw. GA, and s. AL. **Phen:** May-Jun. **Tax:** Plants "with smaller flowers, shorter pedicels, and smaller capsules and seeds" are the basis of *P. boykinii* and *P. bicknellii* (Constance 1949). A study of the matter was initiated and specimens annotated as "*P. purshii* ssp. *boykinii*", but the research was not completed and the name was never published; further study is warranted. **Syn:** = Ar, C, F, G, Il, K1, K3, K4, Mi, NE, Pa, RAB, Tn, Va, W, WV, Constance (1949); > *Phacelia bicknellii* Small – S; > *Phacelia boykinii* (A. Gray) Small – S; > *Phacelia purshii* Buckley – S. NatureServe G5 (Secure).



Phacelia strictiflora (Engelmann & A. Gray) A. Gray *var*. ***robbinsii*** Constance. PRAIRIE SCORPION-WEED. **Hab:** Dry sandy open areas and woodlands. **Dist:** W. AR and OK south to w. LA and ne. TX; disjunct eastwards in the Black Belt of e. MS and AL. **Phen:** Mar-May. **Syn:** = Ar, K1, K3, K4, NcTx, Constance (1949); < *Phacelia strictiflora* (Engelmann & A. Gray) A. Gray – GrPl. NatureServe G5T4 (Apparently Secure).

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

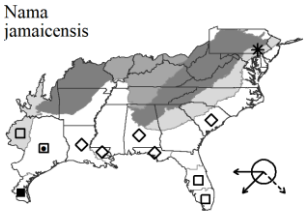
357c. NAMACEAE Molinari 2016 (FIDDLELEAF FAMILY) [in BORAGINALES]

A family of 4 genera, shrubs, trees, and herbs, mainly in the Neotropics. References: Boraginales Working Group (F. Luebert et al.) (2016); Hofmann et al. in Kadereit & Bittrich (2016).

Nama Linnaeus 1753 (NAMA, FIDDLELEAF)

A genus of about 45-50 species, annual and perennial herbs, of sw. North America, tropical America, and Hawaii. References: Boraginales Working Group (F. Luebert et al.) (2016); Hofmann et al. in Kadereit & Bittrich (2016).

Nama jamaicensis Linnaeus. JAMAICA WEED, FIDDLELEAF, FIDDLELEAF NAMA. **Hab:** Lawns, other disturbed areas, sometimes rockland hammocks, disturbed areas over limestone. **Dist:** Native of tropical America (probably including s. FL and TX). **Phen:** Apr-Jul. **Syn:** = Fl5, K4, Meso4.2, RAB, WH3; = *Marilaunidium jamaicense* (Linnaeus) Kuntze – S; = *Nama jamaicense* Linnaeus – Bah, K1, K3, NcTx, Tx, orthographic variant. NatureServe G5 (Secure).



357d. HELIOTROPIACEAE Schrader 1819 (HELIOTROPE FAMILY) [in BORAGINALES]

A family of 4 genera and about 420 species, shrubs, small trees, and herbs, nearly cosmopolitan in tropical to temperate regions. References: Al-Shehbaz (1991); Boraginales Working Group (F. Luebert et al.) (2016); Diane et al. in Kadereit & Bittrich (2016); Diane, Förther, & Hilger (2002); Feuillet (2019); Luebert (2013); Refulio-Rodriguez & Olmstead (2014); Ward & Fantz (1977).

3 Stigmatic apex pubescent; anthers apically coherent; calyx lobed 1/3-1/2 to base; embryo curved ..... ***Euploca***
3 Stigmatic apex glabrous; anthers rarely coherent apically; calyx lobed > 3/4 to base; embryo straight ..... ***Heliotropium***

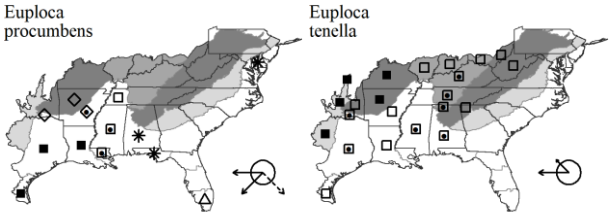
Euploca Nuttall 1837 (HELIOTROPE)

A genus of ca. 100 species, annual and perennial herbs (rarely shrubs), cosmopolitan, but mainly tropical. References: Al-Shehbaz (1991); Diane et al. in Kadereit & Bittrich (2016); Feuillet & Halse (2016); Frohlich, Thulin, & Chase (2020); Hilger & Diane (2003); Melo & Semir (2009).

3 Leaves sessile or with a poorly differentiated petiole < 2 mm long; leaf blades 4-10× as long as wide.
..... ***Euploca tenella***
3 Leaves with differentiated petioles 2-15 mm long; leaf blades 1.5-6× as long as wide.
..... ***Euploca procumbens***

Euploca procumbens (P. Miller) Diane & Hilger. FOUR-SPIKE HELIOTROPE. **Hab:** Riverbanks, exposed shores, tree farms (in s. FL), road edges (in s. FL). **Dist:** S. FL; Panhandle FL west to TX, south into Mexico, Central America, and South America. **Phen:** Apr-Nov. **Syn:** = Fl5, K4, WI; = *Heliotropium procumbens* P. Miller – Ar, Bah, GW2, Meso4.2, Tx, WH3, Al-Shehbaz (1991), Feuillet & Halse (2016); < *Heliotropium europaeum* Linnaeus – S, misapplied; > *Heliotropium procumbens* var. *procumbens* – K3.

Euploca tenella (Torrey) Feuillet & Halse. DELICATE HELIOTROPE. **Hab:** Limestone glades and barrens, other dry calcareous soils. **Dist:** WV, KY, IN, IL, IA, and KS, south to nw. GA, AL, MS, LA, and TX. **Phen:** Jul-Oct. **Syn:** = K4, Ward & Fantz (1977); = *Heliotropium tenellum* Torrey – Ar, C, F, G, GrPl, Il, K1, K3, NcTx, Tn, Tx, Al-Shehbaz (1991); = *Lithococca tenella* (Torrey) Small – S. NatureServe G5 (Secure).



Heliotropium Linnaeus 1753 (HELIOTROPE, TURNSOLE)

A genus of ca. 300 species, widespread in tropical and temperate regions. References: Al-Shehbaz (1991); Diane et al. in Kadereit & Bittrich (2016); Feuillet (2019); Feuillet (2020a); Feuillet (2020b); Frohlich, Thulin, & Chase (2020); Hilger & Diane (2003).

4 Leaves glabrous, succulent, 4-7 (-10) mm wide, the lateral veins not obvious; [of saline coastal situations, sometimes inland west of the Mississippi River in LA, AR, OK, and TX]; [section *Platygyne*] ..... ***Heliotropium curassavicum var. curassavicum***
4 Leaves pubescent, not succulent, 4-60 (-100) mm wide, the midvein and lateral veins obvious, rugose-impressed; [of a variety of mostly inland situations].
5 Leaves sessile to subsessile, 0.4-2 cm wide, strongly undulate-margined; corolla purplish with a yellow eye; [section *Heliotrophytum*] .....
..... ***Heliotropium amplexicaule***
5 Leaves with petioles 0.5-8 cm long, 1-6 (-10 cm wide, either undulate-margined or not; corolla white, blue or violet.

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

6 Petioles 2-8 cm long, winged; leaves 2-6 (-10) cm wide, the margins often undulate; corolla blue or violet (rarely white); [section *Tiaridium*] ..... ***Heliotropium indicum***

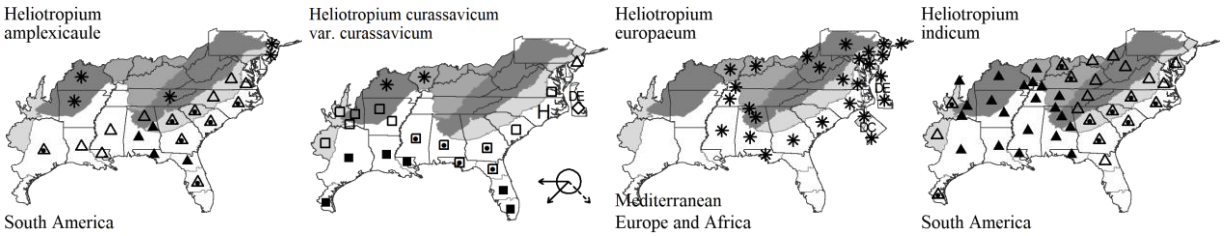
6 Petioles 0.5-1.5 cm long, not winged; leaves 1-3.5 (-5) cm wide, the margins plane; corolla white. ***Heliotropium europaeum***

* ***Heliotropium amplexicaule*** Vahl. CLASPING HELIOTROPE, VIOLET HELIOTROPE. **Hab:** Disturbed areas, roadsides, fields. **Dist:** Native of South America. **Phen:** Mar-Sep. **Syn:** = Ar, C, F, Fl5, G, K3, K4, NcTx, NE, NY, RAB, Tx, Va, WH3, Al-Shehbaz (1991), Ward & Fantz (1977); > *Cochranea anchusaefolia* (Poiret) Gürke – S. NatureServe GNR (Not Yet Ranked).

Heliotropium curassavicum Linnaeus *var.* ***curassavicum***. SEASIDE HELIOTROPE, QUAILPLANT, COLA DE MICO. **Hab:** Edges of brackish and salt marshes, estuarine shores. **Dist:** Var. *curassavicum* ranges from DE (and farther north as an introduction) south to the New World tropics. **Phen:** Apr-Sep (-Mar). **Tax:** Other varieties occur inland in the w. United States. **Comm:** Considered by some authors to be introduced and naturalized in our area. **Syn:** = C, GrPl, K1, K3, K4, NE, Tx, Va, Al-Shehbaz (1991); = *Heliotropium curassavicum* – F, G, Il, Meso4.2, Ward & Fantz (1977); < *Heliotropium curassavicum* – Ar, Bah, Fl5, GW2, NcTx, RAB, S, SFla, WH3. NatureServe G5T5 (Secure).

* ***Heliotropium europaeum*** Linnaeus. EUROPEAN HELIOTROPE. **Hab:** Roadsides, disturbed areas. **Dist:** Native of s. Europe. **Phen:** Jun-Oct. **Syn:** = C, F, G, Il, K1, K3, K4, NE, NY, Pa, RAB, S, Tx, WH3, Al-Shehbaz (1991), Ward & Fantz (1977).

* ***Heliotropium indicum*** Linnaeus. TURNSOLE, ALACRANCILLO, INDIA HELIOTROPE. **Hab:** Roadsides, woodland borders, swamps, ditches. **Dist:** Native of tropical America. **Phen:** Jun-Nov. **Syn:** = Ar, Bah, C, F, Fl5, G, GrPl, GW2, Il, K1, K3, K4, Meso4.2, NcTx, NE, RAB, Tn, Tx, WH3, WV, Al-Shehbaz (1991), Ward & Fantz (1977); = *Tiaridium indicum* (Linnaeus) Lehmann – S. NatureServe G5 (Secure).



359. CONVOLVULACEAE A.L. de Jussieu 1789 (MORNING GLORY FAMILY) [in SOLANALES]

A family of about 56 genera and 1600 species, nearly cosmopolitan, especially in tropical and subtropical areas. Tribes follow the classification of Stefanović, Austin, & Olmstead (2003). References: Austin (1979); Stefanović, Austin, & Olmstead (2003); Stefanović, Krueger, & Olmstead (2002); Wilson (1960b).

1 Plant parasitic; stems orange; [tribe *Cuscuteae*) ..... ***Cuscuta***

1 Plant photosynthetic; stems green.

2 Corolla 0.1-0.2 cm long; capsule deeply 2-lobed; leaves orbicular-reniform, 1-3 cm long and wide, not fleshy; [tribe *Dichondreae*] ..... ***Dichondra***

2 Corolla 1-10 cm long; capsule entire; leaves various, but not as above (most similar vegetatively are *Calystegia soldanella*, *Ipomoea brasiliensis*, and *Ipomoea imperati*, all beach plants with fleshy, emarginate, and usually larger leaves).

3 Styles 2, free nearly to the ovary or fused most of their length (at least the terminal 1-2 mm free); corolla either 1-2.5 cm long (*Evolvulus*, *Stylisma*) or 7-10 cm long (*Bonamia*); leaves cuneate or rounded at the base, and narrowly ovate, lanceolate, or linear; [tribe *Cresseae*].

4 Styles free, each 2-cleft, the stigmas therefore 4, linear-filiform ..... ***Evolvulus***

4 Styles free or fused at the base, the stigmas 2, globose-peltate. ..... ***Stylisma***

3 Styles 1 (sometimes with 2 stigmas, or a bilobed stigma); stigmas capitate, globose, elongate, flattened, or filiform; corolla > 2.5 cm long (except *Jacquemontia*, *Convolvulus*, and a few *Ipomoea* spp.); leaves cordate, sagittate, or truncate at the base, and (mostly) ovate in outline.

6 Calyx concealed by 2 large bracts; [tribe *Convolvuleae*] ..... ***Convolvulus***

6 Calyx not concealed by bracts.

8 Stigmas 2, linear or elongate; leaves 2-4 cm long, truncate or weakly hastate at base; corolla white or pink

9 Stigmas elongate but not linear; [tribe *Jacquemontiae*] ..... ***Jacquemontia***

9 Stigmas filiform; [tribe *Convolvuleae*] ..... ***Convolvulus***

8 Stigma 1, capitate (or sometimes 2-lobed); leaves 3-15 cm long, mostly strongly hastate or cordate at base; corolla white, pink, lavender, blue, yellow, orange, or red.

10 Anthers straight after dehiscence; fruits valvate-dehiscent; [tribe *Ipomoeeae*] ..... ***Ipomoea***

10 Anthers coiled after dehiscence (making 1-4 complete 360 degree turns); fruits longitudinally or irregularly dehiscent; [tribe *Merremieae*]. ..... ***Distimake***

Convolvulus Linnaeus 1753 (FIELD-BINDWEED)

A genus of about 170 species, perennial herbaceous vines, cosmopolitan, especially in temperate areas. References: Austin in FNA () (in prep); Austin, Diggs, & Lipscomb (1997); Brummitt (1965); Brummitt (1980); Brummitt in FNA () (in prep); Spaulding (2013c); Stefanović, Austin, & Olmstead (2003); Stefanović, Krueger, & Olmstead (2002); Turner (2009c); Wilson (1960b).

3 Calyx not concealed by 2 large bracts (the bracts small and on the pedicel at a distance below the calyx); corollas < 3 cm long.

4 Calyx 3-5 mm long; leaves sparsely pubescent; leaves entire and unlobed (except for the 2 basal lobes; corolla margins lacking sharp tips; [widespread in our area] ..... ***Convolvulus arvensis***

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated

4 Calyx 6-12 mm long; leaves sparsely to densely gray-pubescent; leaves entire, toothed, or deeply lobed (in addition to the 2 basal lobes; entire and unlobed (except for the 2 basal lobes; corolla margins lacking sharp tips; [se. KS, sw. AR, e. and s. TX westwards and southwards (and rarely a waif eastwards].
.....***Convolvulus equitans***

3 Calyx concealed by 2 large bracts; corollas > 3 cm long.

7 Stems mostly less than 1.5 m, erect at least in the lower part, but sometimes twining toward the apex, flowers mostly borne in lower leaf axils.
.....***Convolvulus catesbyanus***

7 Stems strongly twining, up to 4 m or more long; flowers borne along middle and upper stems.

11 Margins of the bracts immediately subtending the flower overlapping > ½ their length; bracts inflated at base (saccate), the apex usually obtuse; flowers 1-2 per axil.....***Convolvulus fraterniflorus***

11 Margins of the bracts immediately subtending the flower overlapping at the base only or not at all; bracts mostly flat (or often keeled, the apex usually acute; flowers 1 per axil.
.....***Convolvulus limnophilus***

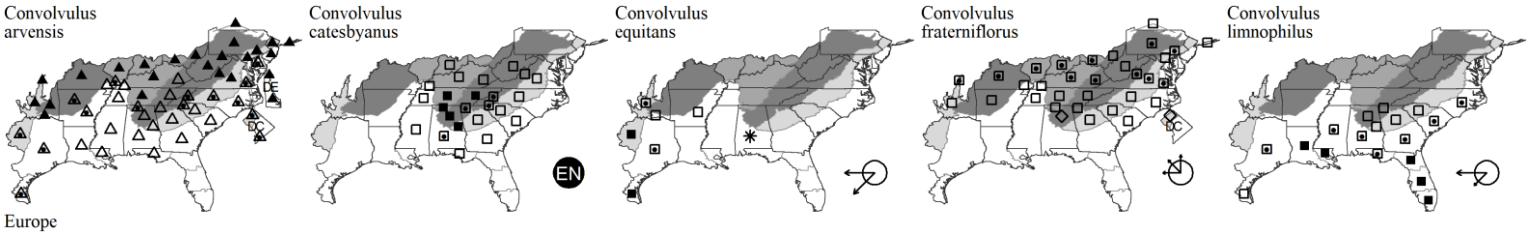
* ***Convolvulus arvensis*** Linnaeus. FIELD BINDWEED, CREEPING JENNY, POSSESSION-VINE, CORNBIND. **Hab:** Fields, roadsides, disturbed areas. **Dist:** Native of Europe. **Phen:** Late Apr-Nov. **Syn:** = Ar, C, F, Fl6, G, GrPl, Il, K1, K3, Mi, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, W, WH3, WV, Spaulding (2013c); = *Strophocaulos arvensis* (Linnaeus) Small – S. NatureServe GNR (Not Yet Ranked).

Convolvulus catesbyanus (Pursh) Elliott. CATESBY'S BINDWEED. **Hab:** Longleaf pine savannas, marsh edges, openings in dry to dry-mesic montane forests. **Tax:** The epithet spelling requires correction from the spelling of Pursh. **Syn:** = *Calystegia catesbeiana* – Fl6, orthographic variant; = *Calystegia catesbeiana* Pursh ssp. *catesbeiana* – K3, K4, Spaulding (2013c), Zhang, Zhang, & Endress (2003), orthographic variant; < *Calystegia catesbeiana* – K1, Tn, Va, WH3, orthographic variant; < *Calystegia sericata* (House) Bell – RAB, W; < *Calystegia spithamaea* – C; < *Convolvulus sericatus* House – S, Wilson (1960b); < *Convolvulus spithamaeus* Linnaeus var. *pubescens* (Gray) Fernald – F.

Convolvulus equitans Bentham. TEXAS BINDWEED, GRAY BINDWEED, SILVER BINDWEED. **Hab:** Prairies, especially in rocky or sandy soils, eastwards in disturbed areas. **Dist:** Native of sw. United States and nw. Mexico. Sw. AR, KS, CO, UT, and NV south to e. TX, s. TX, NM, AZ, and Mexico. Recorded for s. AL by C. Mohr in 1883; probably a ballast waif and not established. **Phen:** (Feb-) Apr-Nov. **Syn:** = Ar, GrPl, K3, K4, Tx, Spaulding (2013c), Turner (2009c). NatureServe G5 (Secure).

Convolvulus fraterniflorus (Mackenzie & Bush) Mackenzie & Bush. **Hab:** Thickets, roadsides, fields, streambanks, disturbed areas. **Dist:** MA and VT west to MI, IA, and KS, south to SC, GA, AL, AR, and OK. **Phen:** Apr-Sep. **Tax:** Brummitt treated this (in *Calystegia*) as a North American subspecies of *Calystegia silvatica* (see synonymy), with three other subspecies in the Old World: ssp. *silvatica* and ssp. *disjuncta* Brummitt European and ssp. *orientalis* Brummitt e. Asian. This taxon is on a separate evolutionary trajectory and warrants specific rank. **Syn:** = *Calystegia sepium* (Linnaeus) R. Brown var. *fraterniflora* (Mackenzie & Bush) Shinners – Tx; = *Calystegia silvatica* Grisebach ssp. *fraterniflora* (Mackenzie & Bush) Brummitt – K1, K3, K4, Mi, NcTx, NE, NY, Tn, Va, Austin, Diggs, & Lipscomb (1997), Spaulding (2013c); = *Calystegia silvatica* ssp. *fraterniflorus* – Il, orthographic variant; = *Calystegia silvatica* var. *fraterniflora* (Mackenzie & Bush) Brummitt – Pa; = *Calystegia sylvatica* ssp. *fraterniflora* – GrPl, orthographic variant; = *Convolvulus sepium* Linnaeus var. *fraterniflorus* Mackenzie & Bush – F, G, WV, Wilson (1960b); < *Calystegia sepium* – C.

Convolvulus limnophilus Greene. COASTAL PLAIN BINDWEED. **Hab:** Woodland edges. **Dist:** NC south to s. FL, west to e. TX. **Syn:** = *Calystegia sepium* (Linnaeus) R. Brown ssp. *limnophila* (Greene) Brummitt – K1, K3, K4, NcTx, WH3, Austin, Diggs, & Lipscomb (1997), Spaulding (2013c); < *Calystegia sepium* – C, GW2, RAB, Va, W; < *Calystegia sepium* ssp. *binghamiae* (Greene) Brummitt – Fl6; < *Convolvulus sepium* Linnaeus var. *sepium* – F, G, Wilson (1960b).



Cuscuta Linnaeus 1753 (DODDER)

A genus of about 100 species, parasitic, achlorophyllose herbs, nearly cosmopolitan. Variously treated as a monogeneric family, or as a component of the Convolvulaceae; Neyland (2001) and Stefanović, Krueger, & Olmstead (2002) provide molecular evidence for the treatment of *Cuscuta* as a derived member of Convolvulaceae. Hadač & Chrtek (1970) suggest that *Cuscuta* should be separated into 4 genera based on chromosome number, morphology, and distribution; if followed, all our native species would be in *Grammica*, with *Cuscuta s.s.* and *Monogynella* represented by a few introduced species. References: Costea, Nesom, & Stefanović (2006a); Costea, Nesom, & Stefanović (2006b); Costea, Nesom, & Stefanović (2006c); Floden & Brant (2018); Gandhi, Thomas, & Hatch (1987); Musselman (1986); Neyland (2001); Spaulding (2013a); Stefanović, Krueger, & Olmstead (2002); Yuncker (1921); Yuncker (1965).

Identification Notes: Corolla measurements are from the base to the sinuses of the corolla. The infrastaminal scales are transparent structures at the base of the stamens.

1 Styles united for most of their length; capsule circumscissile; [subgenus {or genus} *Monogynella*].
.....***Cuscuta japonica***

1 Styles separate and distinct from the base; capsule not circumscissile (except the rare aliens *C. epilinum* and *C. epithymum*).

5 Each flower subtended by 1-10 imbricate bracts; sepals distinct nearly to the base.
.....***Cuscuta compacta***

5 Flowers not bracteate (rarely a single bract may be present towards the base of the pedicel); sepals various.

8 Perianth surface granular (papillate); fresh flowers fleshy; corolla lobes acute, tips typically curved inward.

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

9 Corolla tubular; calyx > ½ as long as the corolla; flowers 4 (-5)-merous; infrastaminal scales reduced, merely bifid or shallowly toothed..... ***Cuscuta coryli***
9 Corolla campanulate; calyx ca. ½ as long as the corolla; flowers 5-merous; infrastaminal scales profusely fringed ..... ***Cuscuta indecora***
8 Perianth surface not granular; fresh flowers not especially fleshy; corolla lobes various.
10 Stylopodium (a thickened ridge at the base of the style) present; flowers 5-merous. ..... ***Cuscuta gronovii***
10 Stylopodium absent; flowers 3-4-merous or 5-merous.
12 Flowers subsessile, therefore in globular inflorescences. ..... ***Cuscuta obtusiflora var. glandulosa***
12 Flowers on pedicels slightly shorter than to longer than the flowers, therefore in loose inflorescences.
15 Flowers mostly longer than wide ..... ***Cuscuta suaveolens***
15 Flowers mostly as wide as long.
16 Flowers 1.5-3.0 mm long, at least some exceeding 2.5 mm long; calyx lobes not overlapping at the base in older flowers, and therefore the flowers not pronouncedly 5-angled..... ***Cuscuta campestris***
16 Flowers 0.9-2.5 mm long; calyx lobes strongly overlapping and forming definite angles at the sinuses, thus the flower strongly 4-5-angled.
17 Flowers 4-merous; flowers 0.9-1.4 mm long; stems very slender; [on granite and sandstone outcrops]..... ***Cuscuta harperi***
17 Flowers 5-merous; flowers 1.5-2.5 mm long; stems not especially slender; [widespread]..... ***Cuscuta pentagona***

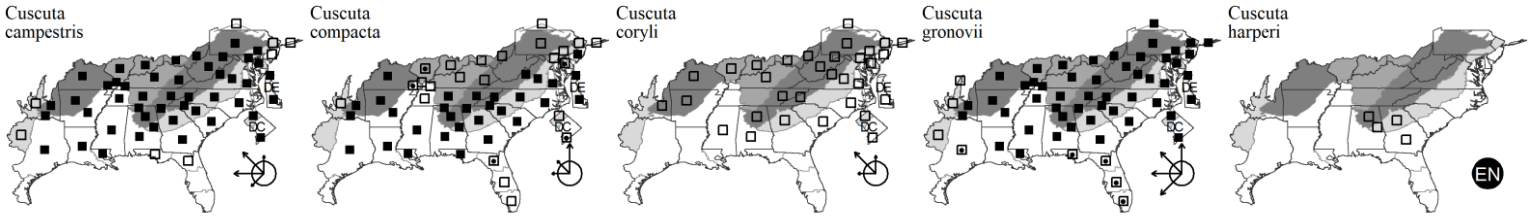
Cuscuta campestris Yuncker. FIELD DODDER, PRAIRIE DODDER. **Hab:** Roadsides, fields, open disturbed areas, especially (but not only) on herbaceous Fabaceae. **Dist:** Nearly cosmopolitan because of its common association with cultivated legumes, its original distribution unclear. **Phen:** Late May-Nov. **Syn:** = Ar, Bah, F, GW2, Il, K3, K4, Mi, NY, Pa, RAB, Tn, Tx, Va, W, Costea, Nesom, & Stefanović (2006a), Costea, Nesom, & Stefanović (2006b), Costea, Nesom, & Stefanović (2006c), Musselman (1986), Spaulding (2013a), Yuncker (1965); < *Cuscuta pentagona* Engelmann – C, G; < *Cuscuta pentagona* var. *pentagona* – K1, Gandhi, Thomas, & Hatch (1987).

Cuscuta compacta A.L. de Jussieu ex Choisy. COMPACT DODDER. **Hab:** Bottomland forests, stream banks, marshes, swamps, pine savannas, calcareous seeps and streambanks, wet fields, other wet habitats, on herbaceous and especially on woody hosts. **Dist:** VT, QC, and NE south to s. FL and TX. **Phen:** Late Jul-Nov. **Syn:** = Ar, C, F, Fl6, G, GrPl, GW2, Il, NcTx, NY, Pa, RAB, S, Tn, Va, WH3, Gandhi, Thomas, & Hatch (1987), Spaulding (2013a); > *Cuscuta compacta* var. *compacta* – K3, K4, NE, W, Musselman (1986), Yuncker (1965); > *Cuscuta compacta* var. *efimbriata* Yuncker – K3, K4, Musselman (1986), Yuncker (1965).

Cuscuta coryli Engelmann. HAZEL DODDER. **Hab:** Open woodlands and woodland borders, on a wide variety of woody and herbaceous hosts. **Dist:** MA, NY, and SK south to SC, AL, TX, and AZ. **Phen:** Jul-Nov. **Syn:** = C, F, G, GrPl, GW2, Il, K1, K3, K4, Mi, NcTx, NE, NY, S, Tn, Tx, Va, WV, Costea, Nesom, & Stefanović (2006a), Costea, Nesom, & Stefanović (2006b), Costea, Nesom, & Stefanović (2006c), Gandhi, Thomas, & Hatch (1987), Spaulding (2013a), Yuncker (1965); = *Cuscuta corylii* – Pa, RAB, W, orthographic variant. NatureServe G5? (Secure).

Cuscuta gronovii Willdenow ex Roemer & J.A. Schultes. SWAMP DODDER, COMMON DODDER. **Hab:** Stream banks, bottomland forests, bogs, marshes, swamps, wet fields, wet disturbed areas, on a very wide variety of herbaceous and woody plants. **Dist:** QC west to BC, south to s. FL and AZ. **Phen:** Late Jul-Nov. **Syn:** = Ar, C, F, Fl6, G, GrPl, GW2, K1, Mi, NcTx, Pa, RAB, S, Va, W, WH3, WV, Musselman (1986), Spaulding (2013a); > *Cuscuta gronovii* var. *calyptrata* – K3, K4, Tx; > *Cuscuta gronovii* var. *gronovii* – Il, K1, K3, K4, NE, NY, Tn, Costea, Nesom, & Stefanović (2006a), Costea, Nesom, & Stefanović (2006b), Costea, Nesom, & Stefanović (2006c), Gandhi, Thomas, & Hatch (1987), Yuncker (1965); > *Cuscuta gronovii* var. *latiflora* Engelmann – K1, NE, NY, Tn, Tx, Costea, Nesom, & Stefanović (2006a), Costea, Nesom, & Stefanović (2006b), Costea, Nesom, & Stefanović (2006c), Yuncker (1965); > *Cuscuta gronovii* var. *latifolia* – Il, misspelling.

Cuscuta harperi Small. HARPER'S DODDER. **Hab:** Outcrops of granite (Piedmont), sandstone (Cumberland Plateau, Ridge and Valley), and Altamaha grit (Coastal Plain), typically on plants such as *Liatris microcephala*, *Bigelowia nuttallii*, *Hypericum gentianoides*, *Helianthus longifolius*, and *Croton willdenowii*. **Dist:** C. and wc. GA west to nw. AL. **Phen:** Jul-Nov. **Syn:** = K1, K3, K4, S, Costea, Nesom, & Stefanović (2006a), Spaulding (2013a), Yuncker (1965). NatureServe G2G3 (Imperiled).



Cuscuta indecora Choisy. BIGSEED ALFALFA DODDER, PRETTY DODDER. **Hab:** Salt marshes (on *Iva frutescens*), pine savannahs, bogs, roadsides, disturbed areas. **Dist:** NJ, MN, and ID, south to s. FL, TX, CA, Mexico, Central America, and South America. See Nelson (1993) for the first SC record. Silberhorn (1998) described an occurrence of this species in VA. **Phen:** Jul-Oct. **Syn:** = C, Fl6, GrPl, GW2, Mi, S, Va, WH3, WV, Gandhi, Thomas, & Hatch (1987), Musselman (1986), Spaulding (2013a); > *Cuscuta indecora* var. *attenuata* – K3, K4; > *Cuscuta indecora* var. *indecora* – Ar, F, Il, K1, K3, K4, NcTx, NE, Tn, Tx, Costea, Nesom, & Stefanović (2006a), Yuncker (1965); > *Cuscuta indecora* var. *longisepala* – Ar, K3, K4, NcTx, Tx; > *Cuscuta indecora* var. *neuropetala* (Engelmann) A.S. Hitchcock – F, Il, K1, Yuncker (1965).

* ***Cuscuta japonica*** Choisy. JAPANESE DODDER. **Hab:** Disturbed areas, especially on Fabaceae (especially *Pueraria*) and woody plants. **Dist:** Native of e. Asia. **Phen:** Jun-Oct. **Comm:** See Barger et al. (2019) for discussion of the record in Coosa, Tallapoosa, and Tuscaloosa counties, AL. **Syn:** = Fl6, K1, WH3, Spaulding (2013a), Yuncker (1965); > *Cuscuta japonica* var. *formosana* (Hayata) Yuncker – K3, K4. NatureServe GNR (Not Yet Ranked).

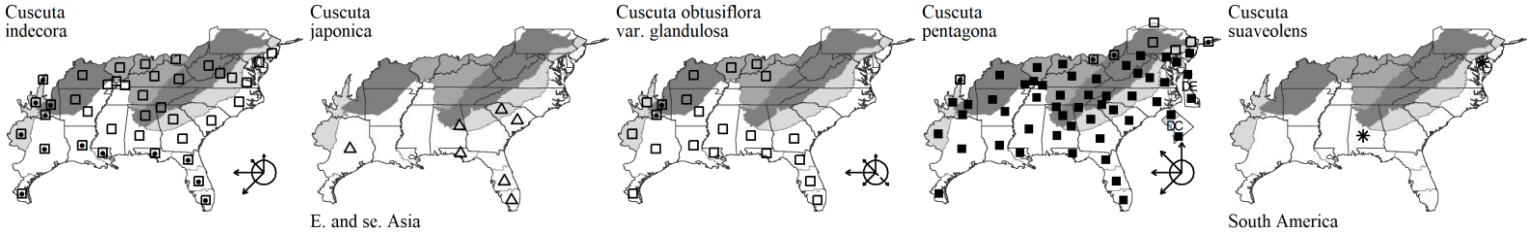
Cuscuta obtusiflora Kunth *var*. ***glandulosa*** Engelmann. GLANDULAR DODDER. **Hab:** In calcareous glades, swampy thickets, and other habitats. **Dist:** GA and OK south to FL, TX, Mexico; West Indies. **Comm:** See Anderson (2007) for FL Panhandle record and Floden & Brant (2018) for the MO records. **Syn:** = Ar, Fl6, G, GW2, K1, K3, K4, NcTx, NY, Tx, WH3, Costea, Nesom, & Stefanović (2006b), Gandhi, Thomas, & Hatch (1987), Spaulding (2013a); = *Cuscuta glandulosa* Small – S. NatureServe G5T4T5 (Apparently Secure).

Cuscuta pentagona Engelmann. **Hab:** Roadsides, fields, open disturbed areas, on a wide variety of (mostly herbaceous) hosts, especially Fabaceae. **Dist:** Throughout the United States and s. Canada. **Phen:** May-Nov. **Syn:** = C, Fl6, G, GW2, Il, Mi, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, Costea, Nesom, & Stefanović (2006a), Musselman (1986), Spaulding (2013a), Yuncker (1965); > *Cuscuta campestris* Yuncker – F, WV; > *Cuscuta pentagona*

Key to Map Symbology: □ native; ◇ maybe exotic; △ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Engelmann – F, WV; > *Cuscuta pentagona* var. *pentagona* – K3, K4, NcTx; >< *Cuscuta pentagona* var. *pentagona* – K1, Gandhi, Thomas, & Hatch (1987); > *Cuscuta pentagona* var. *pubescens* – K3, K4, NcTx.

* ***Cuscuta suaveolens*** Seringe. FRINGED DODDER, LUCERNE DODDER, ALFALFA DODDER. **Hab:** Fields, especially on herbaceous Fabaceae. **Dist:** Native of South America. Reported from scattered sites in eastern North America, allegedly including AL, MD, and OH. **Phen:** Jul-Oct. **Syn:** = C, G, GrPl, K1, K3, K4, Tx, Spaulding (2013a), Yuncker (1965). NatureServe GNR (Not Yet Ranked).



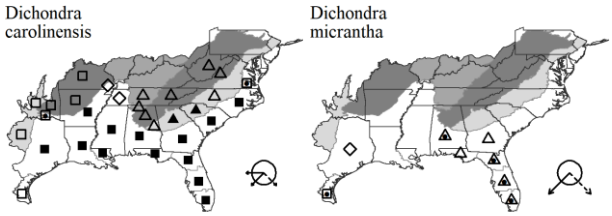
Dichondra J.R. Forster & G. Forster 1775 (PONYFOOT, DICHONDRA)

A genus of about 9 species, of tropical, subtropical and warm temperate areas. References: Austin, Demissew, & Young (1998); Tharp & Johnston (1961); Wilson (1960b).

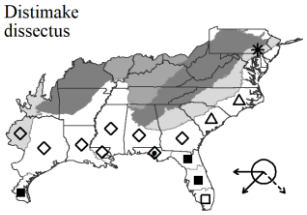
1 Calyx lobes > 2× as long as wide, exceeding the fruit; pedicels straight or nearly so ..... ***Dichondra carolinensis***
1 Calyx lobes < 2× as long as wide, shorter than the fruit; pedicel strongly recurved just below the calyx ..... ***Dichondra micrantha***

Dichondra carolinensis Michaux. CAROLINA PONYFOOT. **Hab:** Lawns, roadsides, moist pinelands, mesic hammocks, floodplain forests. **Dist:** Se. VA south to s. FL, west to AR and TX; also in Bermuda and reported for the Bahamas; sometimes adventive beyond that range. **Phen:** Mar-Jun(-Sep). **Comm:** This plant is rarely seen in a "natural" habitat, but is very common and weedy in lawns and other mowed grassy areas in the Southeastern Coastal Plain. **Syn:** = Ar, Bah, C, Fl6, GW2, Il, K1, K3, K4, NcTx, RAB, S, Tn, Tx, Va, WH3, Austin, Demissew, & Young (1998), Tharp & Johnston (1961); = *Dichondra repens* J.R. Forster var. *carolinensis* (Michaux) Choisy – F, G, Wilson (1960b). NatureServe G5 (Secure).

Dichondra micrantha Urban. KIDNEYWEED, SMALL-FLOWERED PONYFOOT. **Hab:** Damp open areas, lawns, disturbed areas. **Dist:** Probably native of Neotropics (north to s. TX), the original range uncertain. Reported for Camden County, GA (Carter, Baker, & Morris 2009). **Phen:** Mar-May. **Syn:** = Bah, Fl6, K1, K3, K4, Tx, WH3, Austin, Demissew, & Young (1998), Tharp & Johnston (1961). NatureServe G5 (Secure).



Distimake Rafinesque 1836 [1838] (WOODROSE)



A genus of about 35 species, herbaceous vines, of New World and Old World tropics and subtropics. See Simões & Staples (2017) for discussion of generic circumscription. References: Austin (2007); Simões & Staples (2017); Wilson (1960b).

Distimake dissectus (Jacquin) A.R. Simões & Staples. NOYAU VINE, ALAMO VINE, CORREHUELA DE LOS DOCE. **Hab:** Disturbed areas. **Dist:** Native of the neotropics, the original distribution unclear, but probably native in peninsular FL (Austin 2007) and s. TX. **Phen:** May-Sep. **Comm:** See Austin (2007) for a detailed discussion about many aspects of this species. **Syn:** = K4, Simões & Staples (2017); = *Merremia dissecta* (Jacquin) Hallier f. – Bah, K1, K3, Meso4.2, NcTx, WH3, Wilson (1960b), Zhang, Zhang, & Endress (2003); = *Operculina dissecta* (Jacquin) House – S; >< *Ipomoea sinuata* Ortega – Tx. NatureServe G5 (Secure).

Evolvulus Linnaeus 1762 (DWARF MORNING-GLORY)

Contributed by Keith A. Bradley and Alan S. Weakley

A genus of about 100 species, of tropical, subtropical, and warm temperate America. References: Austin in FNA () (in prep); Harms (2014); van Ooststroom (1934); Ward (1968); Wilson (1960b).

Identification Notes: the inflorescence is technically a pedunculate dichasium, with 2 bracteoles at the summit of the peduncle (which is sometimes reduced or absent), each with a lateral branch in its axil, these branches (pedicels) each bearing a flower. The "peduncle + pedicel" (in the key) combination may elongate in fruit and in species keyed as shorter "stalked" may be longer than the subtending leaf in fruiting specimens.

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more)

* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable

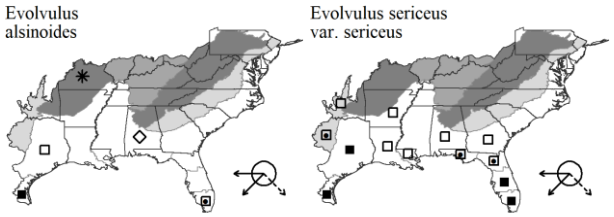
X : extirpated

2 Flowering peduncle well-developed, longer than the subtending leaf; [collectively almost restricted to s. FL; also s. AL, coastal TX, and as a waif in MD]. ..... ***Evolvulus alsinoides***

2 Flowering peduncle absent or < 0.5 mm long, much shorter than the subtending leaf; [collectively somewhat widespread in the Coastal Plain; also c. TN]. ..... ***Evolvulus sericeus var. sericeus***

Evolvulus alsinoides (Linnaeus) Linnaeus. SLENDER DWARF MORNING-GLORY. **Hab:** Coastal hammocks, coastal rock barrens, disturbed areas in shelly coastal areas. **Dist:** S. FL, s. AL (Dauphin Island), TX, NM, and AZ south into the Neotropics; West Indies; also widely and early introduced throughout the Paleotropics (Austin 2008). **Phen:** Jun-Jul (-Feb). **Comm:** The species is sometimes divided into numerous varieties (as by Ooststroom 1934), but these have generally been regarded as too confluent for recognition (see synonymy). If recognized, s. FL material is var. *grisebachianus*, with a West Indian distribution. **Syn:** = Fl6, Meso4.2, S, WH3, Harms (2014); > *Evolvulus alsinoides* var. *adscendens* (House) van Ooststroom – van Ooststroom (1934); > *Evolvulus alsinoides* var. *alsinoides* – WI; > *Evolvulus alsinoides* var. *angustifolia* – Tx; > *Evolvulus alsinoides* var. *angustifolius* Torrey – K3, K4; > *Evolvulus alsinoides* var. *grisebachianus* Meisner – Bah, WI, van Ooststroom (1934), Ward (1968), Wilson (1960b); > *Evolvulus alsinoides* (Linnaeus) Linnaeus var. *hirticaulis* Torrey – Tx.

Evolvulus sericeus Swartz *var. **sericeus***. SILKY DWARF MORNING-GLORY, SILVER DWARF MORNING-GLORY. **Hab:** Wet flatwoods, seepages, bogs, Altamaha Grit outcrops, westwards and southwards in dry sandy or limestone habitats. **Dist:** Coastal Plain of ec. GA (Appling, Jeff Davis, and Coffee counties) (Bridges & Orzell 1989; Patrick, Allison, & Krakow 1995) south to s. FL; AR and LA west to AZ, south into Mexico and the Neotropics; West Indies. **Syn:** = Ward (1968); < *Evolvulus sericeus* Swartz – Ar, Bah, Fl6, K3, K4, Meso4.2, NcTx, S, Tx, WH3, WI, Harms (2014), Wilson (1960b), Zhang, Zhang, & Endress (2003); < *Evolvulus sericeus* Swartz var. *discolor* (Bentham) A. Gray – van Ooststroom (1934); < *Evolvulus sericeus* Swartz var. *sericeus* – K1.



Ipomoea Linnaeus 1753 (MORNING-GLORY)

A genus of about 650 species, herbs, vines, and shrubs, of tropical, subtropical, and warm temperate areas. References: Austin & Bianchini (1998); Austin & Huáman (1996); Austin (1976); Austin (1979); Austin (1984); Austin (1986); Campitelli & Stinchcombe (2014); Eserman et al (2020); Miryeganeh et al (2014); Muñoz-Rodríguez et al (2022); Wood et al (2020b).

Unkeyed taxa: *Ipomoea leucantha*

2 Corolla salverform, the long narrow tube cylindrical (with sides more-or-less parallel) for most of its length, the limb abruptly flaring at the summit of the tube.
- 3 Corolla 3-14 cm long, lavender to white; flowers open from evening until early morning.
  - 4 Leaves tomentose beneath; corolla mostly white on the outer surface, lavender to purple on the inner surface, thus bicolored in-and-out; [of outer Coastal Plain dunes, hammocks, and shell middens from se. NC southward]..... ***Ipomoea macrorhiza***
  - 4 Leaves glabrous beneath; corolla either white on both surfaces or lavender on both surfaces, not bicolored in-and-out; [weedy, widespread, of disturbed habitats]. ..... ***Ipomoea muricata***
- 3 Corolla 2-4 cm long, scarlet, orange or yellow; flowers open from early morning to late morning or late afternoon.
  - 6 Leaf blade pinnately divided into 11-31 (or more) linear segments (with parallel sides) ..... ***Ipomoea quamoclit***
  - 6 Leaf blade entire, or angled, or lobed into 3-7 lanceolate or ovate segments (broadening towards their bases).
    - 8 Inner sepals 4-6 mm long; pedicels becoming reflexed in fruit; leaves usually unlobed (though sometimes with a few coarse dentate teeth) ..... ***Ipomoea coccinea***
    - 8 Inner sepals 2-3 (-4) mm long; pedicels remining erect in fruit; leaves usually 3-lobed about halfway from margin to base ..... ***Ipomoea hederifolia***

2 Corolla funnelform to campanulate, the short to long tube expanding in diameter upwards from below the middle, the limb gradually to abruptly flaring at the summit of the tube.
- 9 Pedicels and peduncles with spreading, ascending, or reflexed trichomes; gynoecium 3-parted; [*Pharbitis* clade]
  - 10 Sepals soft-pilose on the outer surface with slender trichomes..... ***Ipomoea indica var. acuminata***
  - 10 Sepals hispid-pilose on the outer surface, with swollen-based trichomes.
    - 11 Sepals with slightly narrowed green tips shorter than to slightly longer than the body of the sepal; corolla pink (rarely white or blue); sepals oblong-lanceolate, obtuse or acute; leaves entire or 3–5-lobed ..... ***Ipomoea purpurea***
    - 11 Sepals with very narrow elongate green tips much longer than the body of the sepal; corolla blue with a white tube (drying pink): sepals ovate with an elongate apex, notably accrescent in fruit; leaves usually 3-lobed.
      - 12 Sepals < 2 cm long at anthesis, abruptly narrowed upwards, the long subacute tips strongly spreading or recurved outwards; corolla < 3.5 cm long; peduncles very short. ..... ***Ipomoea hederacea***
      - 12 Sepals ca. 3 cm long at anthesis, gradually narrowed upwards, the long acute tips suberect, straight, scarcely spreading; corolla 4–4.5 cm long; peduncles long or short..... ***Ipomoea nil***
- 9 Pedicels and peduncles glabrous or with short, appressed trichomes; gynoecium 2-parted.
  - 13 Stems trailing, rooting at the nodes; leaf apex emarginate, truncate, or obtuse; [of beaches from se. NC southward].
    - 14 Corolla lavender; larger leaves not lobed (though notched at the apex on at least the larger, better-developed leaves) ..... ***Ipomoea brasiliensis***
    - 14 Corolla white with a yellowish or purple eye; larger leaves 3-7-lobed ..... ***Ipomoea imperati***
  - 13 Stems erect or twining, not rooting at the nodes (except sometimes in *I. batatas*); leaf apex acute to acuminate; [collectively of various habitats, not beaches, widespread].

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

15 Leaves palmately dissected with 5 (-7) lobes, the sinuses to within 2 mm of the petiole summit or the midvein.
16 Leaves pinnately dissected (the pair of lobes about the basal pair diverging from the midvein several mm above the basal pair); axillary buds developing stipule-like leaves ..... ***Ipomoea cairica***
16 Leaves palmately dissected; axillary buds not developing leaves ..... ***Ipomoea heptaphylla***
15 Leaves entire or pinnately lobed.
17 Leaf base sagittate ..... ***Ipomoea sagittata***
17 Leaf base cuneate to cordate.
18 Corolla 1.5-2.5 cm long, white or lavender
19 Corolla white; anthers purple; sepals lanceolate; capsule 10-15 mm in diamter; seeds 5-6 mm long ..... ***Ipomoea lacunosa***
19 Corolla lavender; anthers white; sepals oblong; capsules 5-6 mm in diameter; seeds 2.8-3.0 mm long ..... ***Ipomoea triloba***
18 Corolla 3-8 cm long, at least partly pink to lavender (sometimes entirely white in *I. batatas*).
20 Sepals ovate to oblong-elliptic; corolla usually white on the limb, the throat purple; anthers 5-7 mm long ..... ***Ipomoea pandurata***
20 Sepals oblong-ovate to oblong-lanceolate; corolla usually pink to lavender on the limb, the throat lavender to purple; anthers 1.5-3.2 mm long.
21 Sepals unequal in length, oblong-ovate, with acute to caudate apices; leaves mostly 10-15 cm wide ..... ***Ipomoea batatas***
21 Sepals more-or-less equal in length, oblong-lanceolate, with acuminate apices; leaves 2-5 cm wide ..... ***Ipomoea cordatotriloba var. cordatotriloba***

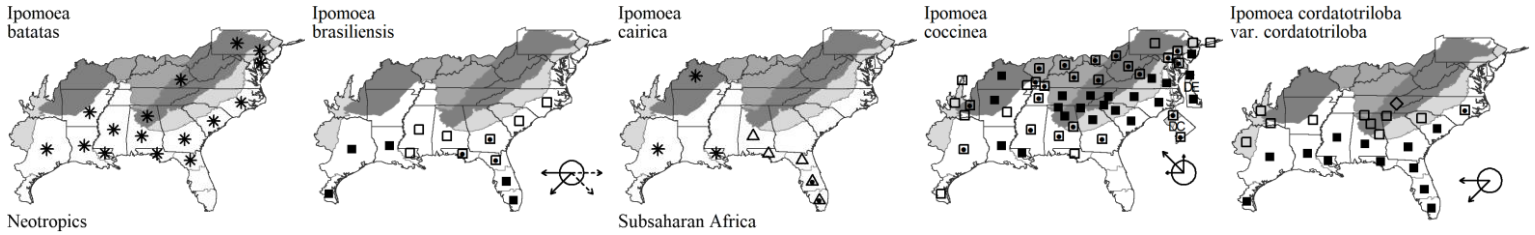
* ***Ipomoea batatas*** (Linnaeus) Lamarck. SWEET POTATO. **Hab:** Persistent in fields after cultivation, disturbed areas. **Dist:** Native of tropical America. **Tax:** Muñoz-Rodríguez et al. (2022) discuss the origin of *Ipomoea batatas* as a hexaploid allopolyploid derivative derived from the ancestors of autotetraploid *Ipomoea aequatoriensis* T. Wells & P. Muñoz (currently an Andean endemic) and diploid *Ipomoea trifida* (a widespread circum-Caribbean species). **Syn:** = Bah, Fl6, K1, K3, K4, Meso4.2, NcTx, NY, RAB, S, Tx, WH3, WI, Austin & Huáman (1996), Austin (1984). NatureServe G5 (Secure).

Ipomoea brasiliensis (Linnaeus) Sweet. RAILROAD VINE, GOAT'S-FOOT, BAY HOPS, BAY WINDERS. **Hab:** Ocean beaches, dunes. **Dist:** E. NC (Carteret County), SC (Beaufort, Horry, Charleston, Colleton, and Georgetown counties), south to s. FL, west to TX, and widespread on tropical and subtropical shores of the New World (se. United States, West Indies, Pacific and Atlantic coasts of Central America and South America), and Old World (Atlantic and Indian Ocean coasts of Africa). **Phen:** Jan-Dec. **Tax:** Our taxon, often treated as a variety or subspecies (see synonymy) of the Old World *I. pes-caprae*, is strongly genetically differentiated from *I. pes-caprae* (despite occurring widely in both the New World and the Old World and in proximity to *I. pes-caprae*); "the two subspecies are clearly differentiated genetically and the genetic differences between them were considerably high…, this suggests that the two subspecies may have cryptic ocean barriers that prevent migration by sea dispersal between the distribution ranges, and/or they have experienced historical differentiation that caused local adaptation to different environmental factors in each region" (Miryeganeh et al. 2014). The evidence supports species rank, which is used here. **Comm:** The records in the Carolinas may reflect the periodic arrival of sea-borne seeds. **Syn:** = *Ipomoea pes-caprae* ssp. *brasiliensis* (Linnaeus) van Ooststroom – Fl6, K1, K4, WH3, Wood et al (2020a); = *Ipomoea pes-caprae* var. *emarginata* Hallier f. – Tx; < *Ipomoea pes-caprae* (Linnaeus) R. Brown – Bah, GW2, Meso4.2, Pa, S, WI. NatureServe G5T5 (Secure).

* ***Ipomoea cairica*** (Linnaeus) Sweet. MILE-A-MINUTE VINE. **Hab:** Disturbed areas. **Dist:** Native of Africa. **Phen:** Jul. **Syn:** = Fl6, K3, K4, Meso4.2, S, Tx, WH3, WI. NatureServe GNR (Not Yet Ranked).

Ipomoea coccinea Linnaeus. SCARLET CREEPER, RED MORNING-GLORY. **Hab:** Fields, roadsides, thickets, streambanks. **Dist:** Native of the se. United States, though the details of the pre-Columbian distribution are uncertain. Wood et al. (2020b) stated "Endemic to southeastern USA, where it grows on waste ground, roadsides, stream sides and in ditches, apparently with a preference for seasonally moist habitats." **Phen:** Aug-Dec. **Syn:** = Ar, C, F, GrPl, GW2, Il, K1, K3, K4, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, W, WV, Austin & Huáman (1996), Austin (1984); = *Quamoclit coccinea* (Linnaeus) Moench – G, S; < *Ipomoea hederifolia* Linnaeus – WI.

Ipomoea cordatotriloba Dennstedt *var. **cordatotriloba***. COASTAL MORNING-GLORY, TIE-VINE. **Hab:** Dunes, sandy areas on barrier islands, other sandy habitats. **Dist:** Se. NC south to s. FL, west to e. TX and AR; Mexico. Attribution of this species to South America are based on Ipomoea australis (Wood et al. 2020). **Phen:** Sep-Oct. **Tax:** The correct nomenclature was discussed by Manitz (1983). **Syn:** = Ar, K1, K3, K4, NcTx; = *Ipomoea trichocarpa* var. *trichocarpa* – Austin (1976); ? *Ipomoea cordatotriloba* Dennstedt – Austin & Huáman (1996); < *Ipomoea cordatotriloba* Dennstedt – Fl6, WH3, WI, Wood et al (2020a); ? *Ipomoea trichocarpa* Elliott – Austin (1984); < *Ipomoea trichocarpa* Elliott – GW2, RAB; > *Ipomoea trichocarpa* Elliott – S; > *Ipomoea trifida* – S, misapplied.



* ***Ipomoea hederacea*** Jacquin. IVYLEAF MORNING-GLORY. **Hab:** Fields, disturbed areas. **Dist:** ME, MN, ND, NM, AZ, and CA south to s. FL, s. TX, and Mexico; Cuba. Native to the southeastern United States (the core of its distribution), but the more precise limits of its native distribution are obscure (populations in New England, Ontario, and the n. Midwestern US may be only adventive). Its current distribution is centered in southeastern North America and it was encountered there by "early botanists" Michaux and Pursh in the first decades of the 1800s, but its current genetic structure suggests that it may have been introduced (Campitelli & Stinchcombe 2014), but if so, from where? Austin (in Davidse et al. 2012) considered its area of nativity to to be the southeastern United States. Austin (1986) also described it as "a temperate plant that grows poorly, if at all, in tropical climes" (in contrast to *Ipomoea nil*). **Phen:** Jul-Dec (-Jun). **Syn:** = Ar, Bah, C, Fl6, GrPl, GW2, Il, K1, K3, K4, Meso4.2, Mi, NcTx, NE, NY, Pa, Tn, Tx, Va, W, WH3, WV, Austin & Huáman (1996), Austin (1984), Wood et al (2020a); > *Ipomoea hederacea* var. *hederacea* – F, G, RAB; > *Ipomoea hederacea* var. *integriuscula* A. Gray – F, G, RAB; > *Pharbitis barbigera* (Sweet) G. Don – S; > *Pharbitis hederacea* (Linnaeus) Choisy – S.

Ipomoea hederifolia Linnaeus. SCARLET CREEPER. **Hab:** Moist thickets (especially near-coastal), disturbed areas. **Dist:** GA and AL, south to s. FL; West Indies; Mexico, Central America, and South America. Some of the more inland occurrences likely represent an adventive extension from

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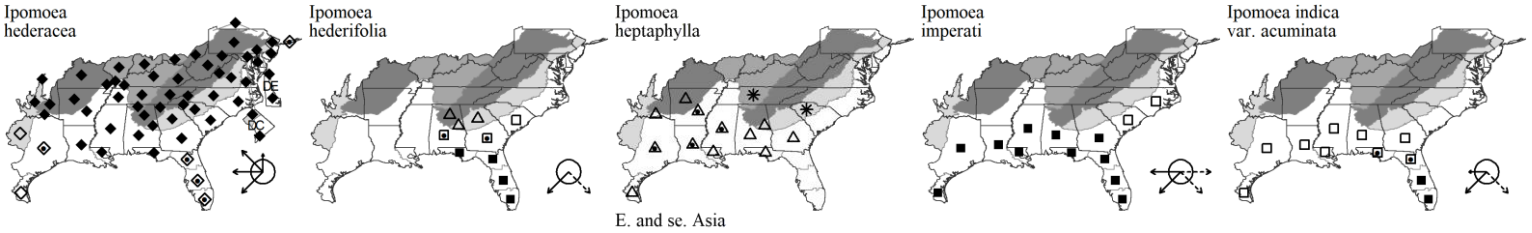
horticultural use. **Phen:** Jul-Nov. **Syn:** = Bah, Fl6, GW2, K1, K3, K4, Meso4.2, NE, WH3, Austin & Huáman (1996), Austin (1984); < *Ipomoea hederifolia* Linnaeus – WI.

* ***Ipomoea heptaphylla*** Sweet. WRIGHT'S MORNING-GLORY. **Hab:** Disturbed areas. **Dist:** Native of India. Reported as likely naturalized in central TN, "spreading northward from the Gulf Coastal Plain" (Kral 1981). It also is known from GA (Kartesz 1999). **Phen:** Jun-Oct. **Syn:** = S, Wood et al (2020a); = *Ipomoea wrightii* A. Gray – Ar, Fl6, K1, K3, K4, Meso4.2, NcTx, Tx, WH3. NatureServe GNR (Not Yet Ranked).

Ipomoea imperati (Vahl) Grisebach. BEACH MORNING-GLORY. **Hab:** Beaches, dune blowouts, fore-dunes. **Dist:** Se. NC south to s. FL, west to TX; south through Mexico, Central America to South America; West Indies; Old World tropics. **Phen:** Aug-Oct. **Syn:** = Fl6, K1, K3, K4, Meso4.2, WH3, Austin & Huáman (1996); = *Ipomoea stolonifera* (Cirillo) J.F. Gmelin – Bah, GW2, RAB, S, Tx, Austin (1984).

Ipomoea indica (Burman) Merrill *var.* ***acuminata*** (Vahl) Fosberg. OCEAN-BLUE MORNING-GLORY. **Hab:** Hammocks, coastal areas, disturbed areas. **Dist:** FL west to TX; West Indies, Mexico; Central and South America. **Phen:** Jan-Dec. **Tax:** Wood et al. (2020) stated "Molecular studies suggest it is not monophyletic so more than one species may eventually be recognised." **ID Notes:** "This species might be confused with *Ipomoea purpurea* and *I. magnifolia* but it is usually easily distinguished by the leaves grey-pubescent or tomentose beneath and the clustered flowers with very persistent bracteoles. However, it is extremely variable so leaves are sometimes glabrous, lobed or entire, bracteoles may be reduced and flowers are occasionally solitary varying in colour from blue to deep violet with prominent darker midpetaline bands." (Wood et al. 2020). **Syn:** = K3, K4, WI; = *Ipomoea acuminata* (Vahl) Roemer & J.A. Schultes – Tx; < *Ipomoea indica* – Bah, Fl6, Meso4.2, WH3, Austin (1986); >< *Pharbitis cathartica* (Poiret) Choisy – S. NatureServe GNR (Not Yet Ranked).



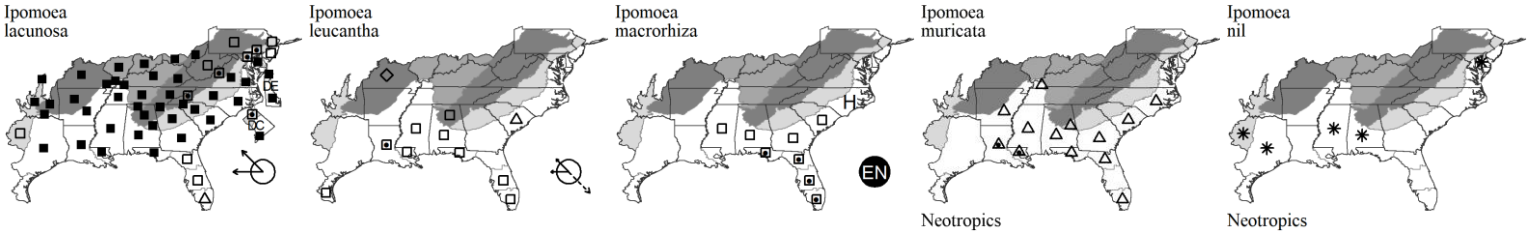
Ipomoea lacunosa Linnaeus. SMALL WHITE MORNING-GLORY, WHITESTAR. **Hab:** Riverbanks, marshes, swamps, fields, roadsides, disturbed areas. **Dist:** NJ west to OH, IL, and KS, south to FL and e. TX. **Phen:** Jul-Dec. **Syn:** = Ar, C, F, Fl6, G, GrPl, GW2, Il, K1, K3, K4, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV, Austin & Huáman (1996), Austin (1984). NatureServe G5? (Secure).

Ipomoea leucantha Jacquin. **Hab:** Disturbed areas, roadsides. **Tax:** This species had been thought to originate from a cross between *I. cordatotriloba* and *I. lacunosa*. However, Duncan & Rausher (2013) found that *I. leucantha* was not interfertile with *I. lacunosa*. It is widespread and fecund (Felger et al. 2012) necessitating its recognition as a species (Duncan & Rausher 2013). Another genetically similar entity was given the provisional name *Ipomoea austinii* (non *I. austinii* Infante-Bet.), but was not formally described (Duncan & Rausher 2013)." (Atlas of Florida Plants 2018). **ID Notes:** This species seems best identified by its glabrous sepals (Felger et al. 2012), in comparison to the similar species *I. cordatotriloba*, *I. lacunosa*, and *I. triloba*. **Syn:** = Fl6, WH3; = *Ipomoea* ×*leucantha* Jacquin (pro sp.) – K3, K4, Meso4.2.

Ipomoea macrorhiza Michaux. INDIAN-MIDDEN MORNING-GLORY, MANROOT, PINK MOONVINE. **Hab:** Hammocks, shell middens, dunes, dry sands, disturbed maritime areas. **Dist:** Se. NC south to s. FL, west to s. AL. **Phen:** Jun-Jul. **Comm:** Sometimes, as by WH3 and K2, considered an alien, native of South America, but this is nonsense (D. Austin, pers. comm., 2011; Wood et al. 2020). **Syn:** = Fl6, K1, K3, K4, RAB, S, WH3, Austin & Huáman (1996), Austin (1984). NatureServe G3G5 (Apparently Secure).

* ***Ipomoea muricata*** (Linnaeus) Jacquin. LILACBELL, PURPLE MOONFLOWER. **Hab:** Fields, disturbed areas; native (apparently) of Mexico. **Dist:** Austin & Jansson (1988) discussed the species' spread in se. United States, apparently as a contaminant in soybean seeds. **Phen:** Jun-Nov. **Tax:** Staples et al. (2005) reinstated the name *I. muricata*. **Syn:** = Fl6, K3, K4, Meso4.2, Tx, WH3; = *Ipomoea turbinata* Lagasca y Segura – K1, Austin & Huáman (1996), Austin (1984).

* ***Ipomoea nil*** (Linnaeus) Roth. **Hab:** Disturbed areas. **Dist:** Occurs in scattered states, such as MD and MS, as a rare introduction from tropical America (Kartesz 1999). **Phen:** Jul-Nov. **Syn:** = Bah, K1, K3, K4, Meso4.2, Tx, WI, Austin & Huáman (1996), Austin (1984), Austin (1986); = *Pharbitis nil* (Linnaeus) Choisy – S.



Ipomoea pandurata (Linnaeus) G.F.W. Meyer. WILD SWEET POTATO, MANROOT, MAN-OF-THE-EARTH, BIGROOT MORNING-GLORY. **Hab:** Longleaf pine sandhills, dry forests and woodlands, prairies, disturbed areas. **Dist:** CT, NY, and s. ON west to OH, s. MI, and KS, south to c. peninsular FL and e. TX. **Phen:** May-Sep; Jul-Oct. **Syn:** = Ar, C, F, Fl6, G, GrPl, GW2, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV, Austin & Huáman (1996), Austin (1984); > *Ipomoea pandurata* var. *pandurata* – G; > *Ipomoea pandurata* var. *rubescens* Choisy – G. NatureServe G5 (Secure).

* ***Ipomoea purpurea*** (Linnaeus) Roth. COMMON MORNING-GLORY. **Hab:** Fields, disturbed areas. **Dist:** Native of tropical America. **Phen:** Jun-Sep. **Syn:** = Ar, C, F, Fl6, G, GrPl, GW2, Il, K1, K3, K4, Meso4.2, Mi, NcTx, NE, NY, Pa, RAB, Tn, Va, W, WH3, WI, WV, Austin & Huáman (1996), Austin (1984), Austin (1986); = *Pharbitis purpurea* (Linnaeus) Voigt – S; > *Ipomoea purpurea* var. *purpurea* – Tx. NatureServe GNR (Not Yet Ranked).

* ***Ipomoea quamoclit*** Linnaeus. CYPRESS-VINE. **Hab:** Fields, hedgerows, disturbed areas. **Dist:** Native of tropical America. **Phen:** Sep-Dec. **Tax:** The 'Cardinal Climber' is cultivated and will key here. It is *Ipomoea* ×*sloteri* (House) van Ooststroom, an allotetraploid derivative of *Ipomoea coccinea* × *quamoclit*. It has 11-19 lobes, the lobes narrowly triangular in shape rather than parallel-sided. **Syn:** = Ar, Bah, C, F, Fl6, GrPl, GW2, Il, K1,

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* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable

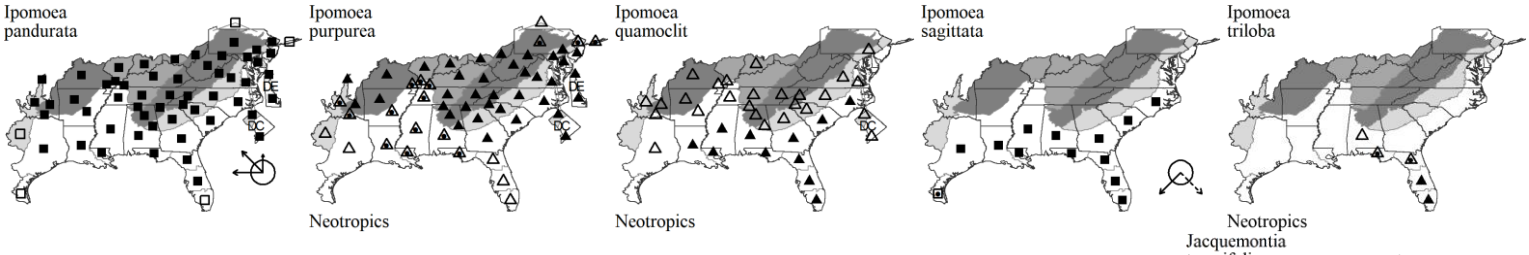
X : extirpated

359. CONVOLVULACEAE

K3, K4, Meso4.2, NcTx, NE, Pa, RAB, Tn, Tx, WH3, WI, Austin & Huáman (1996), Austin (1984); = *Quamoclit quamoclit* (Linnaeus) Britton – S; = *Quamoclit vulgaris* Choisy – G. NatureServe GNR (Not Yet Ranked).

Ipomoea sagittata Poiret. SALTMARSH MORNING-GLORY. **Hab:** Edges of brackish marshes, moist thickets on barrier islands, hammocks. **Dist:** E. NC south to s. FL, west to TX; eastern Mexico and Central America; West Indies. **Phen:** Apr-Oct. **Syn:** = Bah, Fl6, GW2, K1, K3, K4, RAB, S, Tx, WH3, WI, Austin & Huáman (1996), Austin (1984). NatureServe G5? (Secure).

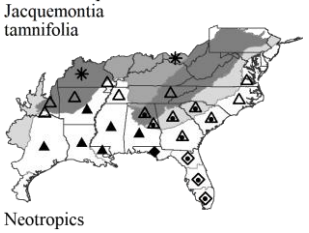
* ***Ipomoea triloba*** Linnaeus. LITTLE-BELL. **Hab:** Hammocks, sand dunes, disturbed areas. **Dist:** Apparently native of tropical America. N. FL south to s. FL; West Indies; New World and Old World tropics. **Phen:** Feb-Dec. **Syn:** = Bah, Fl4, K3, K4, Meso4.2, S, WH3, WI. NatureServe GNR (Not Yet Ranked).



Jacquemontia Choisy 1834 (JACQUEMONTIA)

A genus of about 90 species, tropical, subtropical, and warm temperate areas, especially America. References: Wilson (1960b).

{add key}



* ***Jacquemontia tamnifolia*** (Linnaeus) Grisebach. COMMON JACQUEMONTIA. **Hab:** Fields, roadsides, other disturbed areas. **Dist:** Se. VA south to FL, west to AR and TX; also widespread in West Indies, Central America, and South America, its original range difficult to determine. **Phen:** Aug-Sep. **Comm:** It is probably adventive in much of our area. Fox, Godfrey, & Blomquist (1952) report the first collections of the species in NC, in 1938 and 1950, from obviously disturbed situations. **Syn:** = Ar, Bah, C, F, Fl6, G, GW2, Il, K1, K3, K4, Meso4.2, NcTx, RAB, Tn, Tx, WH3, WI, Wilson (1960b); = *Thyella tamnifolia* (Linnaeus) Rafinesque – S. NatureServe GNR (Not Yet Ranked).

Stylisma Rafinesque 1825 (DAWNFLOWER)

A genus of about 7 species (and about 8 taxa), vining to trailing herbs, endemic to se. North America. References: Myint (1966); Shinners (1962d); Wilson (1960b).

2 Corolla pink or purple; filaments glabrous, or nearly so; leaves densely and conspicuously silvery-sericeous; [of seasonally wet habitats] ..... ***Stylisma aquatica***

2 Corolla white; filaments villous, at least near the base; leaves puberulent or pubescent, but not conspicuously silky-sericeous; [of dry habitats].

3 Larger leaves (7-) 12-30 mm wide; peduncles with (1-) 3-7 (-12) flowers; stems with a tendency to twine, at least near growing tip. ..... ***Stylisma humistrata***

3 Larger leaves 2-10 mm wide; peduncles with 1 (-5) flowers; stems without a tendency to twine.

5 Bracteoles (2-) 10-20 mm long; stylar branches usually fused more than 5/6 of the total length (occasionally fused less than ½ of length), the free portion of the stylar branches usually less than 3 mm long; sepals villous, 4-6 (-7) mm long, ovate-elliptic with obtuse to acute apices; leaves 1-3 mm wide. ..... ***Stylisma pickeringii var. pickeringii***

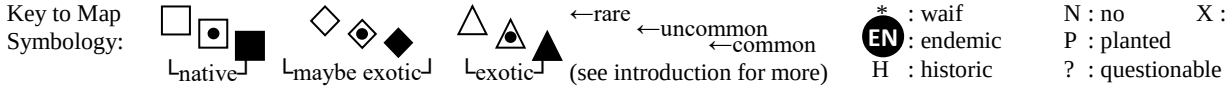
5 Bracteoles 1-3 (-5) mm long; stylar branches free nearly to base, the free portion more than 5 mm long; sepals villous or glabrous, 6-9 mm long, ovate-lanceolate with acuminate apices; leaves 2-10 mm wide. ..... ***Stylisma patens***

Stylisma aquatica (Walter) Rafinesque. WATER DAWNFLOWER. **Hab:** Clay-based Carolina bays, wet pine savannas, margins of pineland ponds. **Dist:** Se. and sc. NC south to c. FL and Panhandle FL, west to se. AR and e. TX. **Phen:** (May-) Jun-Jul. **ID Notes:** *Stylisma aquatica*, as the epithet implies, occurs in wetter (or at least moister) habitats than our other species. The bright pink flowers and densely silvery-hairy leaves are distinctive. **Syn:** = Fl6, GW2, K1, K3, K4, S, Tx, WH3, Myint (1966); = *Bonamia aquatica* (Walter) A. Gray – RAB, Shinners (1962d); = *Bonamia michauxii* (Fernald & Schubert) K.A. Wilson – Wilson (1960b); = *Breweria michauxii* Fernald & Schubert – F. NatureServe G4 (Apparently Secure).

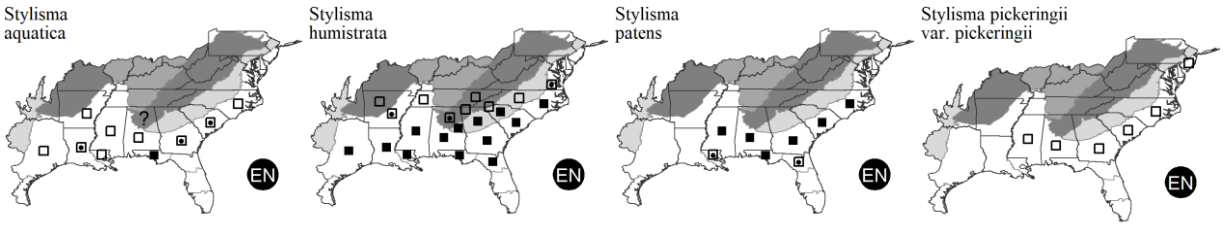
Stylisma humistrata (Walter) Chapman. SOUTHERN DAWNFLOWER. **Hab:** Sandhills, dry hammocks, and other dry woodlands, especially on dryish stream terraces. **Dist:** Se. VA south to Panhandle FL, west to AR and e. TX, north in the interior to n. AL and w. TN. **Phen:** Jun-Aug. **Syn:** = Ar, C, Fl6, K1, K3, K4, S, Tn, Tx, Va, WH3, Myint (1966); = *Bonamia humistrata* (Walter) A. Gray – RAB, Shinners (1962d), Wilson (1960b); = *Breweria humistrata* (Walter) A. Gray – F, G. NatureServe G4G5 (Apparently Secure).

Stylisma patens (Desrousseaux) Myint. COMMON DAWNFLOWER. **Hab:** Longleaf pine sandhills and other relatively dry sandy areas. **Dist:** E. NC south to n. FL, and west to s. MS; reports from west of the Mississippi River are misidentifications. **Phen:** Jun-Aug. **ID Notes:** Overall, the most common and widespread taxon of the genus in our area, regularly encountered in its habitat. **Syn:** = *Bonamia aquatica* (Walter) A. Gray – Wilson (1960b), misapplied; = *Bonamia patens* (Desrousseaux) Shinners var. *patens* – RAB, Shinners (1962d); = *Stylisma patens* (Desrousseaux) Myint ssp. *patens* – K1, K3, K4, Myint (1966); = *Stylisma patens* (Desrousseaux) Myint var. *patens* – Fl6; = *Stylisma trichosanthes* (Michaux) House – S, misapplied; < *Stylisma patens* (Desrousseaux) Myint – WH3. NatureServe G5T3T5 (Apparently Secure).

Stylisma pickeringii (Torrey ex M.A. Curtis) A. Gray *var. **pickeringii***. PICKERING'S DAWNFLOWER. **Hab:** Longleaf pine sandhills, usually in the driest, most barren, deep-sand areas, occasionally colonizing dry, disturbed areas in sandhills, such as sandy roadbanks, known from the Fall-line



Sandhills, aeolian rims of Carolina bays, and sandhills on relict riverine dunes along Coastal Plain rivers. **Dist:** Var. *pickeringii* ranges from s. NC south through SC, GA, AL, and e. MS, with a disjunct area in the Pine Barrens of s. NJ, sometimes treated as a separate variety "*caesariensis*" (see synonymy). **Phen:** Jun-Aug (-Sep); Jul-Sep. **Comm:** Fernald and Schubert (1949) named four varieties in this widely but disjunctly distributed species; Myint (1966) reduced this to two varieties, one eastern and one western. **ID Notes:** This rare species is easily recognizable by its growth form, with numerous stems arching from a central point, then trailing radially away, forming a mound 1-2 meters in diameter. The narrowly linear leaves are borne vertically. **Syn:** = C, K1, K3, K4, Myint (1966); < *Bonamia pickeringii* (Torrey ex M.A. Curtis) A. Gray – RAB, Shinners (1962d), Wilson (1960b); < *Breweria pickeringii* – G; > *Breweria pickeringii* var. *caesariensis* Fernald & Schubert – F; > *Breweria pickeringii* (Torrey ex M.A. Curtis) A. Gray var. *pickeringii* – F; < *Stylisma pickeringii* (Torrey ex M.A. Curtis) A. Gray – S. NatureServe G4T3 (Vulnerable).

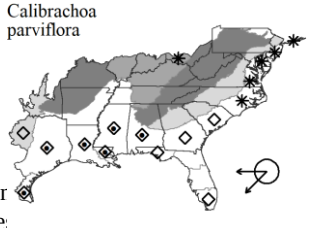


360. SOLANACEAE A.L. de Jussieu 1789 (NIGHTSHADE FAMILY) [in SOLANALES]

A family of about 94-96 genera and 2400-3000 species, herbs, shrubs, trees, and lianas, nearly cosmopolitan but especially diverse in South America. References: Barboza et al. in Kadereit & Bittrich (2016); Hunziker (2001).

1 Leaves all basal, from creeping rhizomes; corolla white; [subfamily *Solanoideae*].
..... ***Jaborosa integrifolia***
1 Leaves all or mainly cauline.
3 Plant distinctly woody, an upright shrub or scrambling vine.
4 Flowers white or yellow, the tube > 6× as long as its diameter; fruit either a white berry, or a capsule.
..... ***Nicotiana glauca***
4 Flowers lavender or blue, the tube < 3× as long as its diameter; fruit a red, orange, or yellow berry; [subfamily *Solanoideae*].
6 Leaves 0.5-7 cm long, 0.2-3.5 cm wide; [tribe *Lycieae*] ..... ***Lycium***
6 Leaves 10-30 cm long, 4-14 cm wide; [tribe *Solaneae*] ..... ***Solanum***
3 Plant herbaceous (some taxa keyed here can be robust and tough-stemmed, but are herbaceous, lacking overwintering buds on aerial stems).
7 Corolla salverform or narrowly funnel-shaped, with a well-developed tubular portion, this > 1 cm long (except in *Calibrachoa*) and either flared or essentially isodiametric and > 4× as long as its midpoint diameter, the limb expanding more or less abruptly from the tubular portion; fruit a capsule opening by longitudinal valves or by apical pores.
8 Corolla 7-25 cm long, white, pale blue or pale pink; capsule spiny, 3-5 cm long, subtended by a collar formed by the reflexed corolla base; [subfamily *Solanoideae*; tribe *Datureae*] ..... ***Datura***
8 Corolla 0.6-7 cm long, white, blue, pink, or other colors; capsule smooth, not collared.
9 Flowers solitary, axillary; [subfamily *Petunioideae*].
10 Leaves linear to narrowly spatulate ..... ***Calibrachoa parviflora***
10 Leaves oblong, ovate or elliptic ..... ***Petunia ×atkinsiana***
9 Flowers in (2-) 3-many flowered racemes or panicles.
..... ***Nicotiana***
7 Corolla either urceolate, campanulate, or rotate, lacking a narrow tubular portion that is both > 1 cm long and > 4× as long as its midpoint diameter; fruit a berry (or circumscissile capsule in *Hyoscyamus*); [subfamily *Solanoideae*].
14 Calyx not accrescent, subtending the mature berry.
15 Berries 1.0-2.5 cm long; corolla urceolate (at least slightly constricted at the 'neck', just below the lobes of the corolla).
..... ***Salpichroa origanifolia***
15 Berries 0.3-25 cm long.
17 Locules air-filled; berries usually elongate and irregularly shaped (sometimes ovoidal or spherical; [peppers, chilis]; [tribe *Capsiceae*] .....
..... ***Capsicum***
17 Locules fleshy; berries spherical or ellipsoidal; [nightshades, tomato, potato, eggplant]; [tribe *Solaneae*] ..... ***Solanum***
14 Calyx accrescent, wholly or partly surrounding the mature berry.
18 Mature calyx spiny; [tribe *Solaneae*] ..... ***Solanum***
18 Mature calyx glabrous or with hairs.
19 Calyx divided nearly to the auricled base; corolla blue; [tribe *Nicandreae*] ..... ***Nicandra physalodes***
19 Calyx fused nearly to its summit; corolla white or yellow; [tribe *Physalinae*].
21 Flowers 2 or more per leaf axil; berries with spherical seed-like bodies intermixed with the flattened, reniform seeds; [of the Gulf Coastal Plain].
..... ***Calliphysalis carpenteri***
21 Flowers 1 per leaf axil; berries with flattened, reniform seeds only; [collectively widespread] ..... ***Physalis***

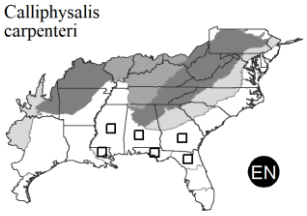
Calibrachoa La Llave & Lexarza 1825 (SEASIDE PETUNIA)



A genus of 26-30 species, annual or perennial herbs and shrubs, of tropical America. References: Barboza et al. in Kadereit & Bittrich (2016); Hunziker (2001); Jenkins in FNA () (in prep).

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : plar ? : que

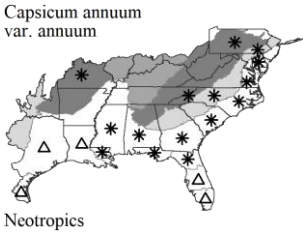
* ***Calibrachoa parviflora*** (A.L. de Jussieu) D'Arcy. WILD PETUNIA, SEASIDE PETUNIA. **Hab:** Upper edges of salt marshes, drawdown shores, waste areas, garbage dumps. **Dist:** Presumably native of tropical America, though perhaps native in parts of our area (especially along the Gulf Coast and south to s. TX). Tatnall (1946) documents its occurrence in Virginia:. "upper edge of salt marsh, Wachapreague", Accomack County (Fernald & Long 4169, 26 Jul 1934). **Phen:** Apr-Sep. **Syn:** = Fl6, K1, K3, K4, NcTx, NY, WH3; = *Petunia parviflora* A.L. de Jussieu – C, F, G, Il, RAB, S, Tx, Hunziker (2001). NatureServe G5 (Secure).



Calliphysalis M. Whitson 2012

A monotypic genus, a perennial herb, endemic to se. United States Coastal Plain. References: Barboza et al. in Kadereit & Bittrich (2016); Sullivan (2004); Ward (2008a); Whitson (2010); Whitson (2012).

Calliphysalis carpenteri (Riddell) M. Whitson. CARPENTER'S GROUND-CHERRY. **Hab:** Longleaf pine sandhills, dry hammocks, dry sandy soils. **Dist:** N. peninsular FL, sw. GA, and Panhandle FL west to e. LA. **Phen:** (Late Apr-) Jun-Aug (-Sep). **Syn:** = Fl6, K3, K4, Whitson (2012), Zhang, Zhang, & Endress (2003); = *Physalis carpenteri* Riddell – K1, S, WH3, Sullivan (2004), Ward (2008a). NatureServe G3 (Vulnerable).



Capsicum Linnaeus 1753 (RED PEPPER, CHILE)

A genus of 25-35 species, herbs, shrubs, and rarely small trees, of tropical America. References: Andrews (1995); Barboza et al. in Kadereit & Bittrich (2016); Barchenger & Bosland (2019); Bosland & Votova (2000); D'Arcy & Eshbaugh (1974); De (2003); Eshbaugh in FNA () (in prep); Heiser & Pickersgill (1975).

* ***Capsicum annuum*** Linnaeus *var*. ***annuum***. BELL PEPPER, CHILE, PIMIENTO, PAPRIKA, ANCHO, JALAPEÑO, CAYENNE, PEPPERONCINI, SERRANO, AND MANY OTHERS. **Hab:** Naturalized or persistent from gardens; commonly cultivated, rare as a naturalized species. **Dist:** Native of Mexico (but early spread through Central America by native Americans, and since nearly worldwide in distribution at least in cultivation). A very influential food crop introduced from the New World to the Old World, now important in various (especially tropical or subtropical) cuisines, including Hunan, Szechuan, Indian, Thai, various African, Mexican, and others. **Phen:** Jun-Dec (-May). **Comm:** The great majority of our cultivated forms of peppers and chilis are of this species. **Syn:** = K1, K3, K4, Andrews (1995), Bosland & Votova (2000), D'Arcy & Eshbaugh (1974), De (2003); = *Capsicum annuum* Linnaeus – S; < *Capsicum annuum* Linnaeus – NY, RAB. NatureServe G5TNR (Not Yet Ranked).

Datura Linnaeus 1753 (JIMSONWEED, THORN-APPLE)

A genus of 10-11 species, annual herbs, of sw. United States and Mexico. Several species of *Datura* are known to have been in our area at the time of first settlement by Europeans. They may have been weeds in native American fields, or grown for their hallucinogenic properties; the common name 'Jimsonweed' is a corruption of 'Jamestown Weed'. References: Avery, Satina, & Rietsema (1959); Barboza et al. in Kadereit & Bittrich (2016); Bye in FNA [(in prep).

1 Corollas 4-11 cm long, the limb with 5 shallow sinuses alternating with acuminate lobes; fruits erect; [section *Datura*].
  2 Leaf blades elliptic to narrowly ovate, margins pinnately lobed ..... ***Datura quercifolia***
  2 Leaf blades broadly ovate, margins sinuate-dentate. ..... ***Datura stramonium***
1 Corollas usually greater than 10 cm long, limb with 5 lobules alternating with acuminate lobes; fruits pendent; [section *Dutra*].
  5 Corolla limbs with 5 acuminate lobes +/- equal to 5 lobules; calyces villous-pubescent (especially along veins); abaxial leaf surface villous-pubescent (especially along veins), trichomes spreading ..... ***Datura innoxia***
  5 Corolla limbs with 5 acuminate lobes longer than the 5 lobules; calyces canescent-puberulent (especially along veins); abaxial leaf surface canescent-puberulent (especially along veins), trichomes short-appressed or curved ..... ***Datura wrightii***

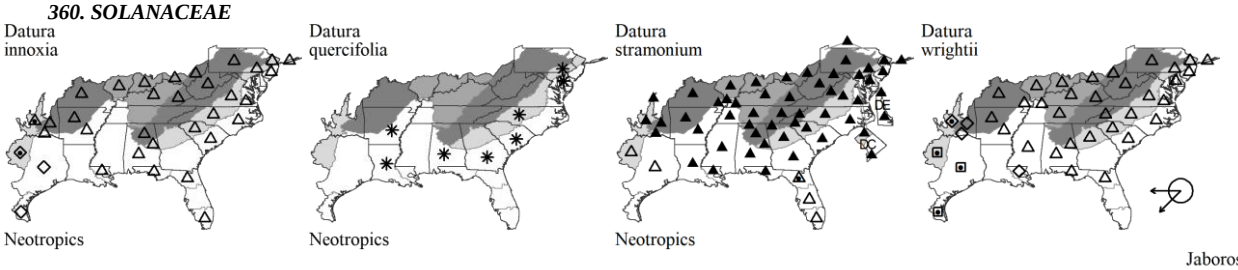
* ***Datura innoxia*** P. Miller. INDIAN-APPLE. **Hab:** Disturbed areas. **Dist:** Native of Mexico. **Phen:** Jul-Oct. **Tax:** This species may not be distinct from *D. wrightii*. {It is currently not known with confidence which records in our area apply to which taxon}. **Syn:** = F, NY, S, WV, "inoxia" a correctable orthographic error; = *Datura inoxia* P. Miller – Bah, Fl6, Il, K1, Mi, NE, Tx, WH3, Avery, Satina, & Rietsema (1959), orthographic variant; > *Datura meteloides* Dunal – G, misapplied; < *Datura wrightii* Regel – K3.

* ***Datura quercifolia*** Kunth. OAKLEAF THORN-APPLE. **Hab:** Sandy and clayey open areas. **Dist:** Native of sw. US and Mexico. Reported for sw. GA by Jones & Coile (1988). **Syn:** = Ar, GrPl, K1, K3, K4, Tx.

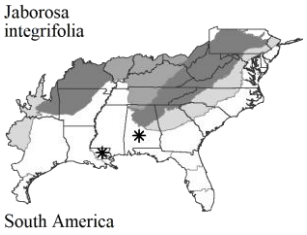
* ***Datura stramonium*** Linnaeus. JIMSONWEED, THORNAPPLE. **Hab:** Fields, pastures, disturbed areas, especially common in severely over-grazed pastures; presumably introduced from farther south and west (Mexico or Central America) prior to 1492. **Phen:** Jul-Sep; Aug-Oct. **Comm:** The plant is dangerously poisonous. **Syn:** = Ar, Bah, C, Fl6, GrPl, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV; > *Datura stramonium* var. *stramonium* – F, Il; > *Datura stramonium* var. *tatula* (Linnaeus) Torrey – F, Il.

Datura wrightii Regel. INDIAN-APPLE. **Hab:** Disturbed areas. **Dist:** Native of Mexico. **Phen:** Jul-Sep; Sep-Oct. **Syn:** = Fl6, Il, K1, NcTx, NE, Tx; ? *Datura innoxia* P. Miller – WV, misapplied; ? *Datura metel* Linnaeus – G, misapplied; ? *Datura meteloides* Dunal – RAB, S, Avery, Satina, & Rietsema (1959), misapplied; < *Datura wrightii* Regel – K3.

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

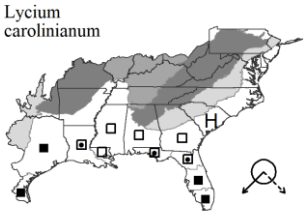


Jaborosa A.L. de Jussieu 1789 (JABOROSA)



A genus of ca. 23 species, perennial herbs, of South America. References: Barboza et al. in Kadereit & Bittrich (2016); Vincent in FNA () (in prep).

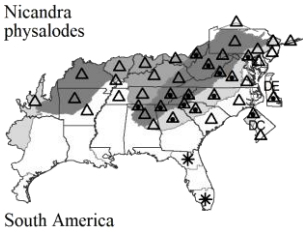
* ***Jaborosa integrifolia*** Lamarck. JABOROSA. **Hab:** Disturbed areas, and on ballast. **Dist:** Native of South America. The Mobile County, AL record is from ballast, reported by Mohr (1901), and is likely merely a historical waif, but a more recent collection from a field in Plaquemines Parish, LA (on the western edge of our area) confirms at least sporadic establishment of this species. **Phen:** Apr-Sep. **Syn:** = K4. NatureServe GNR (Not Yet Ranked).



Lycium Linnaeus 1753 (MATRIMONY-VINE, WOLFBERRY, GOJI BERRY)

A genus of 90-100 species, shrubs, of warm temperate and tropical areas of the Old World and New Word (especially America). References: Barboza et al. in Kadereit & Bittrich (2016); Hitchcock (1932); Levin & Miller in FNA () (in prep).

Lycium carolinianum Walter. CHRISTMAS-BERRY, CAROLINA MATRIMONY-VINE. **Hab:** Shell middens, shell mounds, shelly sand dunes, brackish marshes, maritime sand spits. **Dist:** Se. SC (where not recently seen; its occurrence is based on being named by Walter (1788) and Elliott's (1816) statement "found by Mr. Wm. Bartram, in the saline rushy marshes of Carolina") and e. GA south to FL, west to e. TX; also in the West Indies. **Phen:** Sep-Oct. **Syn:** = Fl6, GW2, RAB, S, WH3; > *Lycium carolinianum* var. *carolinianum* – K1, K3, K4, Hitchcock (1932); > *Lycium carolinianum* var. *quadrifidum* (Dunal) C.L. Hitchcock – K1, K3, K4, Tx, Hitchcock (1932).



Nicandra Adanson 1763 (APPLE-OF-PERU)

A genus of 3 species, annual herbs, native of Peru. References: Barboza et al. in Kadereit & Bittrich (2016); Hunziker (2001); Whitson in FNA () (in prep).

* ***Nicandra physalodes*** (Linnaeus) Gaertner. APPLE-OF-PERU, SHOO-FLY-PLANT. **Hab:** Disturbed places, such as cultivated fields and roadsides. **Dist:** Native of Peru. **Phen:** Jul-Sep; Aug-Oct. **Syn:** = Ar, C, F, Fl6, G, GrPl, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, Tn, Va, W, WH3, WV; = *Physalodes physalodes* (Linnaeus) Britton – S. NatureServe GNR (Not Yet Ranked).

Nicotiana Linnaeus 1753 (TOBACCO)

A genus of about 65-80 species, herbs, shrubs, and small trees, of America, Australia, and s. Pacific areas. Fernald (1950) describes the genus as "rank, acrid-narcotic American herbs". Sectional classification follows Knapp, Chase, & Clarkson (2004). References: Barboza et al. in Kadereit & Bittrich (2016); Goodspeed (1954); Knapp in FNA () (in prep); Knapp, Chase, & Clarkson (2004).

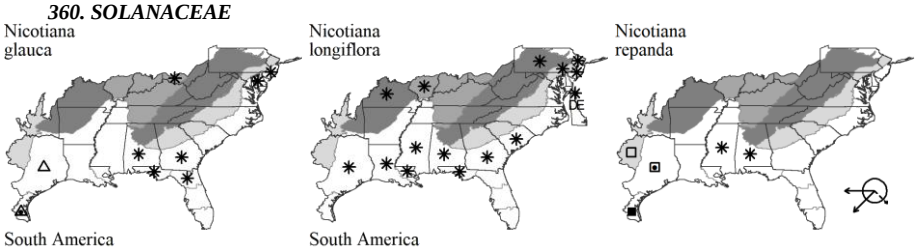
1 Plant a shrub or small tree, 3-10 m tall; stems and leaf blades glabrous and glaucous; [section *Paniculatae*] ..... ***Nicotiana glauca***
1 Plant an herb, 0.5-3 m tall; stems and leaf blades densely viscid-puberulent (or sparsely so to merely tuberculate in *N. longiflora*).
  6 Corolla throat constricted; filaments unequal, stamens didynamous (2 different lengths); cauline leaf blades lanceolate or linear, leaves sessile, auriculate; [section *Alatae*] ..... ***Nicotiana longiflora***
  6 Corolla throat gaping; filaments equal, fused to corolla along their entire length, anthers appearing sessile; cauline leaf blades pandurate and clasping; [section *Repandae*] ..... ***Nicotiana repanda***

* ***Nicotiana glauca*** Graham. TREE TOBACCO. **Hab:** Cultivated in gardens, rarely persistent or spreading. **Dist:** Native of South America (Argentina and Bolivia). Apparently present at Fort Pulaski National Monument, Chatham County, GA (Jones & Coile 1988; W. Duncan pers.comm. 2004). **Phen:** Jul. **Syn:** = Fl6, K1, K3, K4, S, Tx, WH3, Goodspeed (1954), Zhang, Zhang, & Endress (2003). NatureServe GNR (Not Yet Ranked).

* ***Nicotiana longiflora*** Cavanilles. LONG-FLOWER TOBACCO. **Hab:** Disturbed areas. Cultivated and may be found as a waif or persistent. **Dist:** Native of South America. **Phen:** Apr-Sep. **Syn:** = Fl6, Il, K1, K3, K4, NE, S, Tx, WH3, Goodspeed (1954), Knapp in FNA () (in prep). NatureServe GNR (Not Yet Ranked).

Nicotiana repanda Willdenow ex Lehmann. FIDDLELEAF TOBACCO. **Hab:** Disturbed areas, moist areas along streams. **Dist:** Native to TX, Mexico, and West Indies. **Phen:** Feb-Sep. **Syn:** = K3, K4, NcTx, Tx, Knapp in FNA () (in prep). NatureServe G4G5 (Apparently Secure).

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

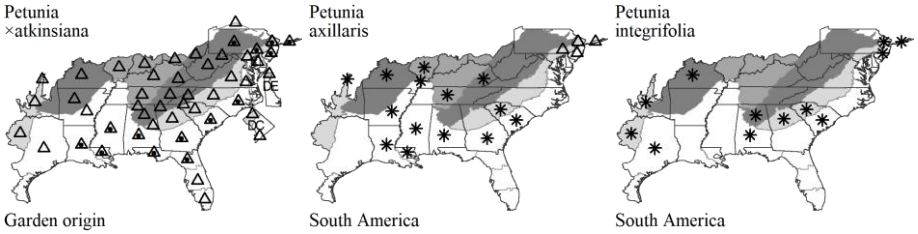


Petunia A.L. de Jussieu 1803 (PETUNIA)

A genus of 14-20 species, annual herbs, of South America. References: Barboza et al. in Kadereit & Bittrich (2016); Fox & Sullivan in FNA () (in prep); Reck-Kortmann et al (2014).

1 Corolla salverform, white or ivory..... ***Petunia axillaris***
1 Corolla funnelform, white, pale pink, or purple (drying deep violet).
2 Corolla white to pale pink, without bulge..... ***Petunia ×atkinsiana***
2 Corolla purple, with slight bulge..... ***Petunia integrifolia***

* ***Petunia ×atkinsiana*** D. Don ex W.H. Baxter in J.C. Loudon. GARDEN PETUNIA. **Hab:** Disturbed areas, garden edges, common in cultivation, rare as a waif or persistent. **Dist:** Native of Argentina. Individual plants may closely resemble either parent, but this taxon in our area is probably best and most conveniently considered as a variable hybrid taxon. **Phen:** May-Nov. **Syn:** = Fl6, K4, Mi, RAB; = *Petunia ×hybrida* Vilmorin – Pa, WH3; = *Petunia axillaris × integrifolia* – NY; > *Petunia integrifolia* (Hooker) Schinz & Thellung – Ar, C, G, K1, K3.
* ***Petunia axillaris*** (Lamarck) Britton, Sterns, & Poggenburg. WHITE-FLOWERED PETUNIA. **Syn:** = C, F, G, Il, K1, K3, K4, NcTx, NE, S.
* ***Petunia integrifolia*** (Hooker) Schinz & Thellung. VIOLET-FLOWERED PETUNIA. **Syn:** = C, G, K1, K3, K4, Mo1, NE; > *Petunia violacea* Juss. – F, Il, S, misapplied.



Physalis Linnaeus 1753 (GROUND-CHERRY)

Contributed by Milo Pyne

A genus of about 90 species, herbs (rarely shrubs), of the Americas. Many of the species of *Physalis* in our area occur primarily in disturbed habitats; their pre-Columbian ranges are unclear and they may have been introduced to e. North America by native Americans. Of the species treated here, only a few are definitely introduced. References: Barboza et al. in Kadereit & Bittrich (2016); Martínez (1998); Mione et al (1994); Pyne (2018); Pyne et al (2019); Pyne, Orzell, & Bridges (2019); Sullivan (1985); Sullivan (2004); Sullivan (2013); Sullivan in FNA () (in prep); Turner & Martínez (2011); Ward (2008a); Waterfall (1958); Waterfall (1967); Whitson & Manos (2005); Whitson (2011).

Unkeyed waifs: *Physalis peruviana*
1 Flowers 2 or more per leaf axil; berries with spherical seed-like bodies intermixed with the flattened, reniform seeds; [of the Gulf Coastal Plain]..... ***Calliphysalis***
1 Flowers 1 per leaf axil; berries with flattened, reniform seeds only; [collectively widespread].
3 Plants pubescent with 2-3 branched or dendroid-stelliform hairs (in some species with simple hairs as well), these in some taxa abundantly covering the leaves, or if leaves glabrous, the stellate hairs visible on the tips and margins of the sepals; plants perennial, from deeply buried rhizomes; [section *Stellatae*]
5 Leaves linear, 10-20× as long as wide, glabrous (except for leaf margins and calyx); plants erect; [of s. FL and FL Panhandle westward to s. LA]..... ***Physalis angustifolia***
5 Leaves ovate, elliptic, obovate or spatulate (varying in width but not narrowly linear-lanceolate), 2-10× as long as wide, stellate pubescent, especially on the young growth, flowering calyces, and pedicels (or glabrous); [of se. VA south to s. FL, west to s. MS].
7 Undersurfaces of mid-stem and upper leaves densely white tomentose, the vestiture mostly obscuring the surface of the blades..... ***Physalis mollis***
7 Undersurfaces of mid-stem and upper leaves mostly moderately to sparsely pubescent, the vestiture not usually obscuring the surface of the blades.
8 Anthers < 1× as long as the mature filaments; [s. MS east to s. FL and north to e. VA]..... ***Physalis walteri***
8 Anthers > 1.5× as long as the mature filaments; [native west of the Mississippi River (AR, LA, OK, TX, etc.), and rarely introduced eastwards, as in SC, TN, and AL]..... ***Physalis cinerascens var. cinerascens***
3 Plants glabrous, or pubescent with simple hairs only (stellate or branched hairs absent or very rare); plants annual or perennial.
12 Leaves glabrous or essentially so.
13 Perennials from rhizomes, frequently with remnant of last year's stem attached to crown; corolla with 5 dark maculations in the throat.

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

14 Hairs on the pedicels and young stems retrorse or retrorse-spreading; fruiting calyx 5-angled, indented at base ..... ***Physalis virginiana***
14 Hairs on the pedicels and young stems antrorse; fruiting calyx subterete, with 10 ribs, not indented at base ..... ***Physalis longifolia var. subglabrata***
13 Annuals from taproots; corolla with or without 5 dark maculations in the throat.
17 Upper part of the stem with long, spreading hairs; corolla with 5 dark maculations in the throat; [section *Epeteiorhiza*].
18 Leaf margins strongly dentate with 7-10 (or more) teeth per side; fruiting pedicels 12 mm or more long; mature fruiting calyx 2.5-4 cm (or more) long, the lobes long-acuminate to attenuate; corolla pubescent internally ..... ***Physalis cordata***
18 Leaf margins entire, or dentate with 1-8 teeth per side; fruiting pedicels < 10 mm long; mature fruiting calyx 2.5 cm or less long, the lobes triangular-acuminate; corolla glabrous internally ..... ***Physalis pubescens***
17 Upper part of the stem glabrous or glabrate (when young, sometimes with minute, deflexed hairs in lines); corolla with or without 5 dark maculations in the throat.
20 Corollas white to cream, widely flaring and very flat, with greenish-tinged, densely hairy region in 5 spots towards the base of the inner surface; anthers 2.5-3.0 mm long; fruiting pedicels 2.5-6.0 cm long ..... ***Physalis acutifolia***
20 Corollas yellow, bell-, or saucer-shaped, sometimes suffused with purple within, but lacking densely hairy spots; anthers 1.5-2.5 mm long; fruiting pedicels 1.5-4.0 cm long ..... ***Physalis angulata***
12 Leaves variously pubescent, the hairs copious and villous to sparse and appressed.
21 Flowering calyces < 6 mm long; annuals from taproots; [section *Epeteiorhiza*].
23 Stems, young growth, and major veins of the leaves covered with villous pubescence intermixed with sessile glands; leaves gray-green, prominently and coarsely dentate to the base, with well-defined reticulate venation, especially visible on the lower surface, frequently drying orange or with orange spots; anthers yellow, perhaps with a bluish tinge; body of mature calyx about as long as broad, abruptly acuminate at apex; berry tawny orange when mature ..... ***Physalis grisea***
23 Stems, young growth, and major veins of leaves with fine, non-villous pubescence; leaves green, obscurely dentate, often in the upper half only, or entire, without well-defined reticulate venation, drying green or brownish; anthers blue or violet; body of mature calyx longer than broad, long-acuminate at the apex; berry green when mature ..... ***Physalis pubescens***
21 Flowering calyces > 6 mm long; perennials from rhizomes.
25 Plants glabrous or villous, hairs antrorse and to 1 mm, sometimes also with hairs 1-2 mm long, often with slender, shallow rhizomes ..... ***Physalis arenicola***
25 Plants densely villous and/or viscid, hairs divergent and 1-2 mm, often also with shorter hairs; upper leaf surfaces punctate to densely viscid-pubescent; rhizomes stout and deeply buried (but these sometimes not collected).
26 Pubescence viscid, generally composed of glandular trichomes mixed with fine, short hairs and long, multicellular ones; leaf blades broadly ovate to suborbicular, the base rounded, truncate, or cordate (occasionally widely cuneate). ..... ***Physalis heterophylla***
26 Pubescence seldom if at all glandular-viscid, composed of simple trichomes of varying lengths, from dense, spreading, and long-villous to sparse, strigose and appressed; leaf blades narrowly ovate to broadly lanceolate, the base cuneate (rarely truncate).
28 Pedicels and flowering calyces pubescent with minute, appressed, antrorse hairs; hairs on the calyx primarily confined to 10 narrow longitudinal strips consisting of simple, appressed hairs < 0.5 mm long. ..... ***Physalis longifolia var. subglabrata***
28 Plants moderately to densely pubescent with divergent hairs 1-1.5 mm long, and antrorse or retrorse hairs to 0.5 mm long; pedicels and flowering calyces densely pubescent with divergent and appressed hairs mixed (or only with appressed retrorse hairs); hairs on the calyx scattered more or less evenly over the surface, not confined to 10 longitudinal strips ..... ***Physalis virginiana***

Physalis acutifolia (Miers) Sandwith. **Hab:** Disturbed areas. **Dist:** Native of sw. United States south into Mexico. Collected once in NC (in 1936), from a nursery in Mecklenburg County, NC, in MS (Sullivan 2004), and in nw. GA (the basis of the report of *P. missouriensis* in Jones & Coile 1988). It may not be established. **ID Notes:** *Physalis acutifolia* is most similar to *P. angulata*, but differs in its white to cream-colored corollas, with yellow basal spots, and the presence of 5 hairy pads, alternating with the stamens near the base of the corolla limb. **Syn:** = K1, K3, K4, Tx, Sullivan (2004). NatureServe G5? (Secure).

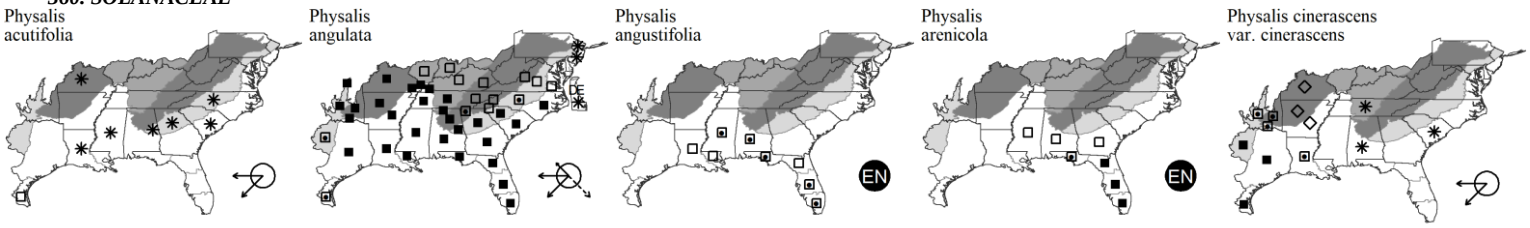
Physalis angulata Linnaeus. SMOOTH GROUND-CHERRY. **Hab:** Longleaf pine sandhills, disturbed areas, open woodlands, agricultural fields. **Dist:** Widely distributed in tropical America, north to se. VA and MO, and scattered as an adventive farther north. **Phen:** Aug-Oct. **Syn:** = Ar, Bah, C, Fl6, K1, K3, K4, NcTx, NE, RAB, S, Va, WH3, Sullivan (2004); > *Physalis angulata* Linnaeus – F, G, Il; > *Physalis angulata* var. *angulata* – GrPl, Tn, Tx; > *Physalis angulata* var. *pendula* – GrPl, Tn, Tx; > *Physalis pendula* Rydberg – F, G, Il.

Physalis angustifolia Nuttall. COASTAL GROUND-CHERRY. **Hab:** Maritime dunes and coastal sands, longleaf pine sandhills. **Dist:** Gulf Coast shorelines from S. FL west to s. LA. Reports of *P. viscosa* from the Southeast are based on either *P. angustifolia* or *P. walteri*. **Phen:** Jan-Dec. **Syn:** = Fl6, K1, K3, K4, WH3, Sullivan (1985), Sullivan (2004), Turner & Martínez (2011), Ward (2008a). NatureServe G3G4 (Vulnerable).

Physalis arenicola Kearney. SANDHILL GROUND-CHERRY. **Hab:** Longleaf pine sandhills, pine flatwoods. **Dist:** GA, AL, and s. MS south to s. FL. Reported from nc. GA by Jones & Coile (1988) and for "cypress-heads and scrub thickets" by GANHP. **Phen:** Jan-Dec. **Syn:** = Fl6, K1, K3, K4, WH3, Sullivan (2004); > *Physalis arenicola* var. *arenicola* – Ward (2008a); > *Physalis arenicola* var. *ciliosa* (Rydberg) Waterfall – Ward (2008a). NatureServe G3? (Vulnerable).

Physalis cinerascens (Dunal) A.S. Hitchcock *var. **cinerascens***. SMALLFLOWER GROUND-CHERRY. **Hab:** Dry areas. **Dist:** AR, KS, and NM south to w. LA, TX, and Mexico; native distribution limits are uncertain. **ID Notes:** *Physalis cinerascens* var. *cinerascens* resembles *P. walteri* in having stellate pubescence, but differs in having leaves ovate to suborbicular, with margins sinuate, dentate, or entire (vs. leaves obovate, with margins entire), anthers at least 1.5× as long as the filaments (vs. anthers equal to or shorter than the filaments), and fruiting pedicels mostly at least 1.5× as long as the calyces (vs. fruiting pedicels equal to or shorter than the fruiting calyces). **Syn:** = Ar, K1, K3, K4, Sullivan (1985), Sullivan (2004), Turner & Martínez (2011); = *Physalis cinerascens* – NcTx; = *Physalis viscosa* Linnaeus ssp. *mollis* (Nuttall) Waterfall var. *cinerascens* (Dunal) Waterfall – GrPl; = *Physalis viscosa* Linnaeus var. *cinerascens* (Dunal) Waterfall – Tx; < *Physalis cinerascens* – Tn. NatureServe G4G5T3T5 (Apparently Secure).

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



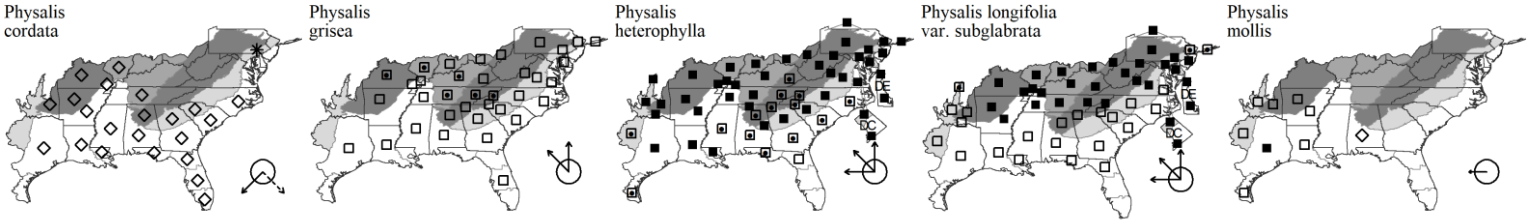
* ***Physalis cordata*** P. Miller. TOOTHLEAF GROUND-CHERRY. **Hab:** Disturbed areas. **Dist:** Native distribution is uncertain; this species is scattered in the Southeastern United States, south to s. FL, and is more widespread in Mexico, Central America, and West Indies. **Phen:** Jul-Oct. **Syn:** = Ar, Bah, Fl6, K1, K3, K4, Tn, Tx, WH3, Martínez (1998), Sullivan (2004), Ward (2008a); = *Physalis barbadensis* var. *glabra* (Michaux) Fernald – F; = *Physalis pubescens* var. *glabra* (Michaux) Waterfall – GrPl, RAB. NatureServe G5 (Secure).

Physalis grisea (Waterfall) M. Martínez. GRAY GROUND-CHERRY, STRAWBERRY-TOMATO, DWARF CAPE-GOOSEBERRY. **Hab:** Wooded slopes, disturbed areas. **Dist:** The species is mainly distributed in ne. United States, south (mainly) to NC, TN, and MO, and scattered farther south. **Phen:** May-Nov; Aug-Oct. **Tax:** Martínez (1993) discusses the nomenclature of this species, showing that *P. pruinosa* Linnaeus is properly applied to a Mexican and Central American species. **Comm:** The fruits are edible, sweet, and tasty. **Syn:** = Il, K1, K3, K4, Mi, NE, NY, Tn, Va, Martínez (1998), Sullivan (2004), Ward (2008a); = *Physalis pubescens* var. *grisea* Waterfall – C, GrPl, RAB; < *Physalis pruinosa* Linnaeus – F, G, S, W, misapplied. NatureServe G5? (Secure).

Physalis heterophylla Nees. CLAMMY GROUND-CHERRY. **Hab:** Disturbed areas, prairies, stream valleys, dry rocky woodlands, hammocks. **Dist:** Widespread in e. and c. United States and adjacent Canada, south to ne. FL and Panhandle FL. **Phen:** May-Sep; Jul-Sep. **Syn:** = Ar, C, Fl6, GrPl, GrPl, K3, K4, Mi, NcTx, NY, Pa, RAB, S, Tn, Va, W, WH3, Sullivan (2004); > *Physalis ambigua* (A. Gray) Britton – S; > *Physalis heterophylla* Nees – S; > *Physalis heterophylla* var. *ambigua* (A. Gray) Rydberg – F, G, Il; > *Physalis heterophylla* var. *clavipes* Fernald – F; > *Physalis heterophylla* var. *heterophylla* – F, G, Il, K1, NE, Tx; > *Physalis heterophylla* var. *nyctaginea* (Dunal) Rydberg – F, Il; > *Physalis heterophylla* Nees var. *villosa* Waterfall – Tx; > *Physalis nyctaginea* Dunal – S.

Physalis longifolia Nuttall *var*. ***subglabrata*** (Mackenzie & Bush) Cronquist. LONGLEAF GROUND-CHERRY. **Hab:** Open woodlands, gardens and disturbed areas. **Dist:** The species is widespread in e. and c. United States; var. *subglabrata* is more eastern, south to Panhandle FL, var. *longifolia* more western. **Phen:** Jun-Aug; Aug-Oct. **Syn:** = Ar, C, G, GrPl, K1, K3, K4, NcTx, NE, NY, Tn, Va, W, Sullivan (2004); = *Physalis subglabrata* Mackenzie & Bush – F, Pa, S, WV; = *Physalis virginiana* P. Miller var. *subglabrata* (Mackenzie & Bush) Waterfall – RAB; < *Physalis longifolia* – Fl6, Mi, WH3; > *Physalis longifolia* – Il; > *Physalis subglabrata* Mackenzie & Bush – Il; > *Physalis virginiana* var. *virginiana* – Tx.

Physalis mollis Nuttall. **Hab:** Prairies, roadsides, disturbed areas. **Dist:** Reported for Sumter County, AL. **Syn:** = Turner & Martínez (2011); = *Physalis mollis* Nuttall var. *mollis* – K2, Sullivan (1985); = *Physalis viscosa* Linnaeus var. *mollis* (Nuttall) Waterfall – Tx; < *Physalis mollis* Nuttall – Ar, NcTx; < *Physalis viscosa* Linnaeus – K3, K4.



* ***Physalis peruviana*** Linnaeus. CAPE GOOSEBERRY, PO'HA. **Hab:** Cultivated, rarely escaped or persistent. **Dist:** Native of South America. It is now cultivated for its edible fruit in various tropical and temperate areas, and is known to rarely persist in e. North America. **Syn:** = K1, K3, K4. NatureServe GNR (Not Yet Ranked).

Physalis pubescens Linnaeus. DOWNY GROUND-CHERRY, HUSK-TOMATO. **Hab:** Disturbed areas. **Dist:** Widespread in the American tropics, north to PA and IA. **Phen:** Jul-Sep; Aug-Oct. **Tax:** Varieties are sometimes recognized. Var. *integrifolia* has leaves entire or with few teeth, usually 1-4 teeth per side; leaf blade thin in texture, flaccid and translucent; fruiting calyces 1.2-2.5 cm long, 1-1.5 cm wide, the lobes ovate to deltoid, the apex acute, 3-3.5 mm long. Var. *pubescens* has leaves mostly toothed nearly to the base with 5-8 teeth per side; leaf blade thick in texture, not translucent; fruiting calyces 2-3.5 cm long, 1.2-3 cm wide, the lobes triangular to narrowly lanceolate, the apex narrowly acute to acuminate, (3.5-) 4.5-6.5 mm long. **Syn:** = Bah, Fl6, K4, Va, W, WH3, Martínez (1998), Sullivan (2004); = *Physalis pubescens* var. *pubescens* – RAB; > *Physalis barbadensis* Jacquin – G, S, S; > *Physalis barbadensis* Jacquin var. *barbadensis* – F; > *Physalis integrifolia* (Dunal) D.B. Ward – Ward (2008a); > *Physalis pubescens* Linnaeus – F, G, S, S; > *Physalis pubescens* var. *integrifolia* – C, GrPl, K1, NcTx, NE, Pa, Tn, Tx; > *Physalis pubescens* var. *pubescens* – C, GrPl, K1, NcTx, Pa, Tn, Tx; > *Physalis turbinata* Medikus – G, NcTx, S, Tx.

Physalis virginiana P. Miller. VIRGINIA GROUND-CHERRY. **Hab:** Woodlands, glades, barrens, and disturbed areas. **Dist:** This complex species is widespread in e. and c. North America. **Phen:** Apr-Oct; Jun-Nov. **Tax:** Varieties are sometimes recognized; if so, only var. *virginiana* is represented in the eastern part of our area. **Syn:** = C, F, Fl6, G, GrPl, Il, Mi, NcTx, Pa, Tn, W, WH3, Sullivan (2004), Ward (2008a); > *Physalis intermedia* Rydberg – S; > *Physalis monticola* C. Mohr – S; > *Physalis virginiana* P. Miller – S; > *Physalis virginiana* P. Miller var. *virginiana* – K1, K3, K4, NE, NY, RAB, Tx, Va. NatureServe G5T5 (Secure).

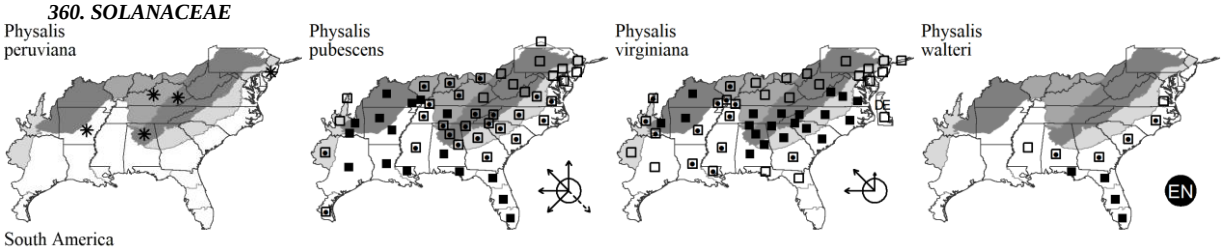
Physalis walteri Nuttall. DUNE GROUND-CHERRY, TOMATILLA DE SUELO, WALTER'S GROUND-CHERRY, DUNE GROUND-CHERRY. **Hab:** Dunes of sea-beaches, openings in maritime forests, longleaf pine sandhills (southward), and rarely inland as a waif in disturbed areas. **Dist:** Se. VA south to s. FL and west to s. MS. **Phen:** May-Sep. **Tax:** See Sullivan (1985) for further information on this species and its relatives. It is largely replaced on the Gulf Coast by the related *P. angustifolia*, with which it locally intergrades in peninsular FL. *P. viscosa* Linnaeus (in the narrow sense) is South American. **Syn:** = C, Fl6, K1, K3, Va, WH3, Sullivan (1985), Sullivan (2004), Turner & Martínez (2011); = *Physalis walteri* var. *walteri* – Ward (2008a); < *Physalis maritima* M.A. Curtis – F; < *Physalis viscosa* Linnaeus – G, S; < *Physalis viscosa* Linnaeus ssp. *maritima* (M.A. Curtis) Waterfall – RAB.

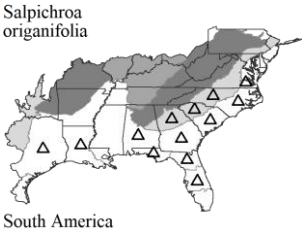
Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more)

* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable

X : extirpated





Salpichroa Miers 1845

A genus of 16-17 species, lianas and shrubs, native of South America. References: Barboza et al. in Kadereit & Bittrich (2016); Hunziker (2001); Jenkins in FNA () (in prep).

* ***Salpichroa origanifolia*** (Lamarck) Baillon. LILY-OF-THE-VALLEY VINE, PAMPAS LILY-OF-THE-VALLEY, COCK'S-EGGS. **Hab:** Gardens, roadsides, disturbed areas. **Dist:** Native of n. South America. **Phen:** May-Nov. **Syn:** = Fl6, K1, K3, K4, RAB, Tx, Va, WH3, Hunziker (2001); = *Perizoma rhomboidea* (Gillies & Hooker) Small – S. NatureServe GNR (Not Yet Ranked).

Solanum Linnaeus 1753 (NIGHTSHADE, TOMATO, POTATO, HORSE-NETTLE)

Contributed by Milo Pyne and Alan S. Weakley

A genus of 1400-1700 species, trees, shrubs, vines, and herbs, of tropical and temperate regions of the Old and New World. References: Barboza et al. in Kadereit & Bittrich (2016); Bohs & Olmstead (1997); Harper & Diamond (2021); Knapp et al (2019); Olmstead & Palmer (1997); Schilling (1981); Wahlert, Chiarini, & Bohs (2015).

1 Stems, and often leaves, prickly and/or spiny.
- 3 Shrubs, small trees, or scrambling, vine-like shrubs to 5 m tall or long; stems with strongly recurved prickles. ..... ***Solanum torvum***
- 3 Herbs to 2 (-3) m tall; stems with straight prickles; stems with prickles, but these not strongly recurved.
  - 6 Berry enveloped at least until near maturity by prickly calyx; leaves regularly and strongly pinnately parted or very deeply divided (sinus depth greater than 1/2 distance from leaf margin to midvein).
    - 7 Corolla yellow; inflorescence stellate-pubescent only; calyx tightly enveloping the fruit; seeds coarsely undulate-rugose ..... ***Solanum rostratum***
    - 7 Corolla violet to (rarely) white, anthers all similar; inflorescence glandular-villous and stellate-pubescent; calyx loosely or tightly enveloping the fruit; seeds minutely reticulate-pitted. ..... ***Solanum sisymbriifolium***
  - 6 Berry not enveloped by prickly calyx; the leaves not pinnately parted or divided (except in *S. sisymbriifolium*), or only weakly so (sinus depth < ½ the distance from leaf margin to midvein).
    - 9 Berry (1.5-) 2-5 cm long; lower leaf surface pubescent with simple hairs, these viscid (gland-tipped) or not.
      - 10 Ripe berry orange-red to reddish, leaves deeply lobed (sinus depth up to 1/2 distance from leaf margin to midvein); plants with eglandular, villous pubescence; seeds winged ..... ***Solanum capsicoides***
      - 10 Ripe berry yellow, immature berry green with white mottles, leaves shallowly lobed (sinus depth typically < 1/3 distance from leaf margin to midvein); plants glandular-viscid; seeds not winged ..... ***Solanum viarum***
    - 9 Berry < 2 cm in diameter; lower leaf-surface stellate-pubescent.
      - 11 Leaves linear-lanceolate, 1-3 cm wide, trichome clusters 0.5 mm broad, with 12 or more rays ..... ***Solanum elaeagnifolium***
      - 11 Leaves ovate to elliptic, 2-8 cm wide, often lobed or cleft, trichome clusters 1 mm broad, with 5-10 rays.
        - 12 Leaves pinnately parted or divided, the segments often pinnately lobed; calyx enveloping fruit when ripe, berry red; plant annual ..... ***Solanum sisymbriifolium***
        - 12 Leaves irregularly lobed or cleft, the lobes or segments entire; calyx not enveloping fruit when ripe; berry yellowish orange, never red; plant perennial.
          - 14 Leaves entire, margins at most sinuate; plants up to 2 dm in stature; prickles few, absent, and/or confined to midveins; corollas white; inflorescence with up to ca. 4 flowers; [rare plants of c. AL and wc. GA] ..... ***Solanum pumilum***
          - 14 Leaves not entire, lobed, cleft, pinnately parted, or divided; plants 3-10 dm in stature; prickles more abundant and generally distributed; corollas purple, rarely white; inflorescence with up to ca. 15 flowers; [plants more widely distributed, weedy or ruderal].
            - 15 Stems sparsely to moderately armed with prickles up to 12 mm long; inflorescences 2- to several-branched; corollas 2.0-4.4 cm in diameter; [mainly AL, FL, and GA, rarely MS] ..... ***Solanum perplexum***
            - 15 Stems unarmed or sparsely armed with prickles up to 6 mm long; inflorescences unbranched or once branched; corollas 2.2-3.0 cm in diameter; [collectively widespread]. ..... ***Solanum carolinense var. carolinense***

1 Stems and leaves not prickly or spiny.
- 17 Leaves compound (at least well-developed leaves), pinnatifid, or basally auriculate-lobed.
  - 18 Woody or suffrutescent climbing or twining vine; leaves regularly pinnatifid (to bipinnatifid) or basally auriculate-lobed. ..... ***Solanum dulcamara***
  - 18 Herb, not twining; leaves pinnately compound or pinnatifid.
    - 21 Stem pubescence glandular; anthers opening by longitudinal slits; seeds hairy; [tomato] ..... ***Solanum lycopersicum***
    - 21 Stem pubescence eglandular; anthers opening by terminal pores; seeds glabrous; [potato] ..... ***Solanum tuberosum***
- 17 Leaves not compound or auriculate-lobed.
  - 22 Shrubs and small trees; [mainly FL and s. TX southwards, rarely northwards].

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

.....***Solanum pseudocapsicum***

22 Herbs; [collectively widespread].

31 Corolla 10-16 mm long, lavender; fruits 10-15 mm in diameter, yellow when ripe (blackening with age); trichomes of stems and leaves stellate, with 9-13 branches.....***Solanum elaeagnifolium***

31 Corolla 5-8 mm long, white to cream; fruits 5-10 mm in diameter, black, purple, green, orange, red, or dark yellow when ripe; trichomes of stems and leaves simple (when present).

32 Foliage with glandular trichomes; fresh plants sticky to the touch.

.....***Solanum nigrum***

32 Foliage lacking glandular trichomes, sometimes with a few scattered trichomes with glandular tips, but not markedly glandular (fresh plants not sticky to the touch).

38 Anthers less than or equal to 2 mm long.

39 Mature berries dropping without the pedicel; calyx lobes strongly reflexed in fruit; stone cells 0-2 (-4).....***Solanum americanum***

39 Mature berries dropping with the pedicel; calyx lobes appressed to spreading in fruit; stone cells more than 4, usually 8 per berry.....***Solanum emulans***

38 Anthers more than 2 mm long

41 Stone cells present in mature berries, always more than 2; corolla (10-) 15-20 mm in diameter

.....***Solanum nigrescens***

41 Stone cells in mature berries absent (occasionally 2); corolla < 15 mm in diameter.

45 Inflorescences with the flowers spaced along the rachis; anthers 1.8–2.5 mm long; fruiting pedicels spreading; berry surface slightly shiny; seeds 1.8-2 mm long.....***Solanum nigrum***

45 Inflorescences with the flowers clustered at the tips (sub-umbelliform), only a few spaced along the rachis; anthers > 2 mm long; fruiting pedicels deflexed, usually strongly so; berry surface matte or glaucous; seeds 1-1.5 mm long.

.....***Solanum pseudogracile***

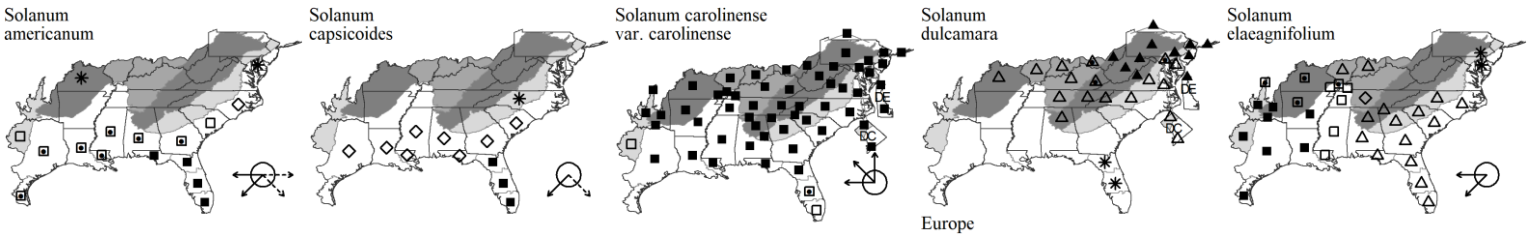
Solanum americanum P. Miller. AMERICAN BLACK NIGHTSHADE. **Hab:** Hammocks, marsh edges, shell middens, disturbed areas. **Dist:** E. GA (and SC?) south to s. FL, west to e. TX; western North America, Central America, South America; Old World tropics and subtropics; the original area of nativity obscure. **Phen:** May-Nov (-Apr). **Syn:** = Fl6, K1, K3, WH3, Knapp et al (2019); < *Solanum americanum* P. Miller – F, RAB; >< *Solanum americanum* P. Miller – Tx; > *Solanum americanum* var. *americanum* – Bah; > *Solanum americanum* P. Miller var. *nodiflorum* (Jacquin) Edmonds – Bah; < *Solanum nigrum* Linnaeus – C, G, S; > *Solanum nodiflorum* Jacquin – Tx.

Solanum capsicoides Allioni. SODA APPLE, COCKROACHBERRY. **Hab:** Disturbed areas, open woodlands. **Dist:** Native of tropical America. The nativity of this species in the Southeast is uncertain. **Phen:** Jan-Dec. **Syn:** = K1, K3, K4, WH3; = *Solanum aculeatissimum* – RAB, S, Tx, misapplied; = *Solanum ciliatum* Lamarck – Bah. NatureServe G4? (Apparently Secure).

Solanum carolinense Linnaeus *var*. ***carolinense***. CAROLINA HORSE-NETTLE, BALL-NETTLE. **Hab:** Fields, gardens, disturbed areas. **Dist:** ME and MN, south to s. FL and TX; naturalized well beyond this area, and the original native distribution unclear. **Phen:** May-Oct. **Syn:** = Fl6, K1, K3, K4, NE, NY, Va, WH3, Wahlert, Chiarini, & Bohs (2015); = *Solanum carolinense* – S; < *Solanum carolinense* – Ar, C, F, G, GrPl, Il, Mi, NcTx, Pa, RAB, Tx, W, WV. NatureServe G5T5 (Secure).

* ***Solanum dulcamara*** Linnaeus. BITTERSWEET, CLIMBING NIGHTSHADE. **Hab:** Disturbed areas. **Dist:** Native of Europe. **Phen:** May-Nov. **Syn:** = C, Fl6, GrPl, K4, Mi, NY, Pa, RAB, Tn, Va, W, WH3, WV; > *Solanum dulcamara* var. *dulcamara* – F, Il, K1, K3, NE; > *Solanum dulcamara* var. *villosissimum* Desvaux – NE.

Solanum elaeagnifolium Cavanilles. SILVERLEAF NIGHTSHADE, WHITE HORSE-NETTLE. **Hab:** Glades, prairies, thickets, fencerows, pastures, disturbed areas. **Dist:** W. MO west to CA, south to w. LA and Mexico; the native distribution highly conjectural. **Phen:** Jun-Oct. **Syn:** = Ar, Bah, C, F, Fl6, G, GrPl, Il, K1, K3, K4, Tn, Tx, WH3; = *Solanum eleagnifolium* – RAB, S, orthographic error. NatureServe G4G5 (Apparently Secure).



Solanum emulans Rafinesque. EASTERN BLACK NIGHTSHADE. **Hab:** Forests, roadsides, gardens, river banks, shores, disturbed areas. **Dist:** NL west to SK, south to s. FL and e. TX; reports from s. TX and Mexico are apparently based on other taxa. **Phen:** May-Dec. **Syn:** = K4, Knapp et al (2019); = *Solanum ptychanthum* Dunal – Ar, GrPl, Il, K1, K3, Mi, NcTx, NE, NY, Tn, Va, W, Schilling (1981); < *Solanum americanum* P. Miller – F, Pa, RAB, WH3, WV, misapplied; < *Solanum nigrum* Linnaeus – C, G, Pa, S.

* ***Solanum lycopersicum*** Linnaeus. TOMATO. **Hab:** Persistent and weakly naturalized around gardens, especially where compost or sewage sludge is spread, commonly cultivated, rare as a naturalized species. **Dist:** Native of Andean South America. **Phen:** May-Nov. May-Nov. **Tax:** There appears to be little reason to separate *Lycopersicon* from *Solanum*. **Comm:** *S. lycopersicum* is one of the most important and influential of edible species native of the New World introduced to the Old World, along with two other Solanaceae, the potato (*Solanum tuberosum*) and the chili (*Capsicum annuum*). **Syn:** = Ar, Fl6, K3, K4, Mi, NcTx, NY, Va, WH3; = *Lycopersicon esculentum* – C, F, G, Il, RAB; = *Lycopersicon lycopersicon* (Linnaeus) Karsten – S; > *Lycopersicon esculentum* var. *esculentum* – Bah; > *Lycopersicon esculentum* P. Miller var. *leptophyllum* (Dunal) D'Arcy – Bah; > *Solanum lycopersicon* var. *lycopersicon* – NE; > *Solanum lycopersicum* Linnaeus var. *cerasiforme* (Dunal) Spooner, J. Anderson, & R.K. Jansen – K1; > *Solanum lycopersicum* var. *lycopersicum* – K1.

Solanum nigrescens M. Martens & Galeotti. BLACK NIGHTSHADE. **Hab:** Disturbed areas. **Dist:** FL, AL, MS, LA, and TX south through Mexico and Central America to n. South America; West Indies. **Syn:** = Knapp et al (2019); ? *Solanum nigrescens* M. Martens & Galeotti – K3, K4. NatureServe G4?Q (Apparently Secure).

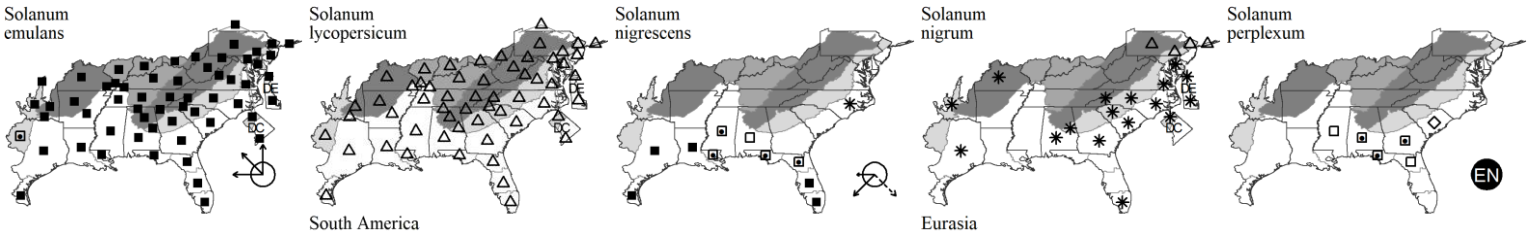
* ***Solanum nigrum*** Linnaeus. EUROPEAN BLACK NIGHTSHADE. **Hab:** Disturbed areas. **Dist:** Native of Eurasia. **Phen:** May-Nov. **Syn:** = K4, Knapp et al (2019); = *Solanum nigrum* Linnaeus ssp. *nigrum* – K1, NY, Schilling (1981); < *Solanum nigrum* Linnaeus – C, F, G, K3, NE, Pa, RAB, S.

Key to Map Symbology: □⊡■ └native┘ ◇◈◆ └maybe exotic┘ △◬▲ └exotic┘ ←rare ←uncommon ←common (see introduction for more)

* : waif EN : endemic H : historic

N : no P : planted ? : questionable X : extirpated

Solanum perplexum Small. OCHLOCKONEE GROUND-CHERRY. **Hab:** Forest edges, fields, pastures, disturbed areas. **Dist:** Sw. GA, AL, nc. Peninsular FL; disjunct in w. MS. **Phen:** May-Aug; Sep-Nov. **Syn:** = S, Wahlert, Chiarini, & Bohs (2015); < *Solanum dimidiatum* Rafinesque – K1, K3, K4, WH3.



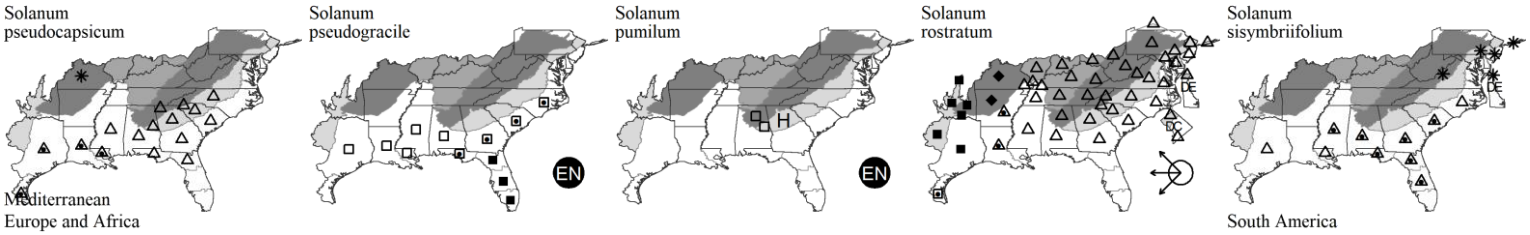
* ***Solanum pseudocapsicum*** Linnaeus. JERUSALEM-CHERRY. **Hab:** Disturbed areas, sandbars, bottomland hardwood forests. **Dist:** Native of Mediterranean Europe. See Harper & Diamond (2021) for discussion of occurrences and habitats in Alabama. **Phen:** Jul-Oct. **Syn:** = Fl6, K3, K4, NE, NY, WH3; = *Solanum pseudo-capsicum* – F, orthographic variant; ? *Solanum capsicastrum* – K1; > *Solanum capsicastrum* – Tx; > *Solanum pseudocapsicum* Linnaeus – Tx.

Solanum pseudogracile Heiser. DUNE NIGHTSHADE. **Hab:** Ocean dunes, usually with *Uniola paniculata*, maritime forests. **Dist:** E. NC south to s. FL, west to s. MS (or w. LA?). **Phen:** May-Oct (-Apr). **Tax:** Closely related to *S. chenopodioides* and sometimes combined with it (see synonymy). **Syn:** = K1, K3, K4, Knapp et al (2019), Schilling (1981); = *Solanum gracile* – RAB, S, misapplied; < *Solanum chenopodiodes* Lamarck – Fl6, WH3.

Solanum pumilum Dunal. DWARF HORSE-NETTLE. **Hab:** Dolomitic glades, amphibolite glades. **Dist:** Known from dolomitic Ketona glades in Bibb County, c. AL (Allison & Stevens 2001) and (?) historically in GA (GAHP). **Phen:** Apr-May. **Syn:** = K3, K4, Wahlert, Chiarini, & Bohs (2015); = *Solanum carolinense* Linnaeus var. *hirsutum* (Nuttall) A. Gray – K1. NatureServe G5T1 (Critically Imperiled).

Solanum rostratum Dunal. BUFFALO-BUR, KANSAS-THISTLE, BUFFALO-BUR NIGHTSHADE. **Hab:** Disturbed areas, especially overgrazed pastures and feedlots. **Dist:** The native distribution obscure, at least in c. and w. United States. **Phen:** May-Oct. **Syn:** = C, F, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, W; = *Androcera rostrata* (Dunal) Rydberg – S.

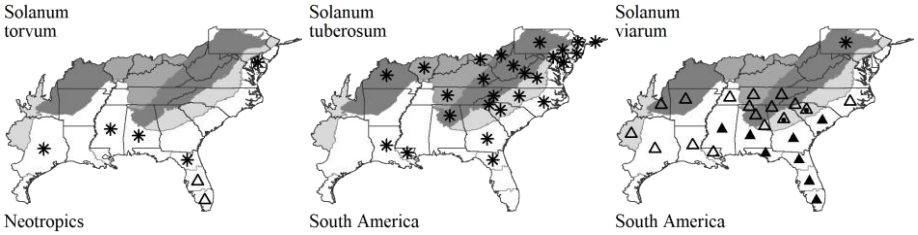
* ***Solanum sisymbriifolium*** Lamarck. STICKY NIGHTSHADE. **Hab:** Disturbed areas. **Dist:** Native of South America. **Phen:** May-Sep; Sep-Oct. **Comm:** "It is planted widely as a trap plant where potatoes are grown to attract the pale potato cyst nematode" (Virginia Botanical Associates 2019). **Syn:** = C, F, Fl6, G, K1, K3, K4, NE, NY, RAB, S, Tx. NatureServe GNR (Not Yet Ranked).



* ***Solanum torvum*** Swartz. TURKEY-BERRY. **Hab:** Disturbed areas. **Dist:** Native of West Indies. Introduced in AL. **Phen:** Jan-Dec. **Syn:** = Bah, Fl6, K1, K3, K4, WH3. NatureServe GNR (Not Yet Ranked).

* ***Solanum tuberosum*** Linnaeus. POTATO, IRISH POTATO, WHITE POTATO. **Hab:** Commonly cultivated, rarely escaped or spontaneous from thrown-out tubers. **Dist:** Native of Andean South America. **Phen:** Jun-Aug. **Syn:** = C, F, Fl6, G, Il, K1, K3, K4, Mi, NE, NY, RAB, WH3. NatureServe GNR (Not Yet Ranked).

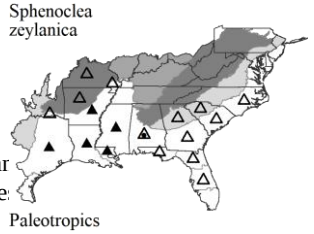
* ***Solanum viarum*** Dunal. TROPICAL SODA APPLE. **Hab:** Pastures. **Dist:** Native of South America (s. Brazil, Paraguay, and n. Argentina). This species has only recently appeared in our area, but has been publicized as a severe, extremely aggressive, and rapidly spreading weed (Wunderlin et al. 1993; Mullahey et al. 1993; Mullahey 1996). **Phen:** Apr-Sep. **Syn:** = Fl6, K1, K3, K4, WH3. NatureServe GNR (Not Yet Ranked).

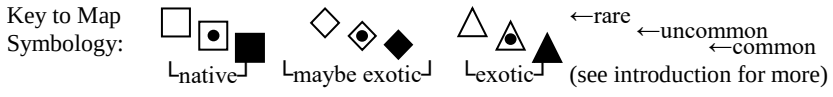


360. SPHENOCLEACEAE Baskerville 1839 (CHICKENSPIKE FAMILY) [in SOLANALES]

A monotypic family of 1 genus and 1 species, an annual herb, of tropical regions, native of the Old World. References: Lammers in Kadereit & Bittrich (2016); Rosatti (1986).

Sphenoclea Gaertner 1788 (CHICKENSPIKE)





360. SPHENOCLEACEAE
A genus of 1 species, an annual herb, native of the Old World. References: Lammers in Kadereit & Bittrich (2016).

* ***Sphenoclea zeylanica*** Gaertner. CHICKENSPIKE, GOOSEWEED. **Hab:** Rice plantations, reservoirs, other disturbed wetlands. **Dist:** Native of Old World tropics. **Phen:** Jul-Nov. **Syn:** = Ar, Fl6, K1, K3, K4, NcTx, S, Tx, WH3, Rosatti (1986); = *Sphenoclea zeylandica* – GW2, RAB, orthographic error (presumably from a mistaken notion that the epithet refers to New Zealand rather than Ceylon). NatureServe G4G5 (Apparently Secure).

361. HYDROLEACEAE R. Brown 1821 (HYDROLEA FAMILY) [in SOLANALES]

A family of one genus and 11-12 species, herbs and shrubs of water bodies and wetlands, primarily tropical. The Hydroleaceae is not closely related to Hydrophyllaceae; recent molecular data confirm the view prevailing through most of the 19th century that *Hydrolea* should be placed in its own family. References: APG (2016); Bittrich & Amaral in Kadereit & Bittrich (2016); Ferguson (1998); Hilger & Diane (2003).

Hydrolea Linnaeus 1762

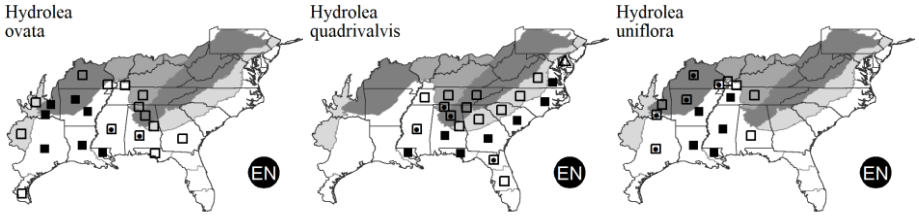
A genus of about 11 species, aquatic and wetland herbs, of tropical and subtropical regions.

1 Flowers in axillary cymes; leaves 3-14 cm long, 1.5-4 cm wide; axillary spines present in the axils of some leaves; corolla 7-8 mm long.
  2 Calyx and stem sparsely pubescent with spreading hairs 2-3 mm long ..... ***Hydrolea quadrivalvis***
  2 Calyx and stem glabrous, or minutely puberulent or with sessile glands ..... ***Hydrolea uniflora***
1 Flowers in terminal cymes or corymbs; leaves 2-6 cm long, 0.6-2.5 cm wide; axillary spines present or absent; corolla 10-15 mm long.
  ..... ***Hydrolea ovata***

Hydrolea ovata Nuttall ex Choisy. OVATE FIDDLELEAF. **Hab:** Swamps, ponds, ditches. **Dist:** C. GA and Panhandle FL west to TX, north in the interior to sc. TN and MO. **Phen:** Jun-Sep. **Syn:** = Ar, C, F, Fl6, G, GW2, K1, K3, K4, NcTx, Tn, Tx, WH3; = *Nama ovatum* (Nuttall ex Choisy) Britton – S. NatureServe G5 (Secure).

Hydrolea quadrivalvis Walter. WATERPOD. **Hab:** Swamp forests, backwater sloughs, especially in cypress-gum forests, marshes, ditches. **Dist:** Se. VA south to c. peninsular FL, west to LA. **Phen:** Jun-Sep. **Syn:** = C, F, Fl6, G, GW2, K1, K3, K4, RAB, Tn, Va, WH3; = *Nama quadrivalve* (Walter) Kuntze – S. NatureServe G5 (Secure).

Hydrolea uniflora Rafinesque. **Hab:** Swamp forests, sloughs, marshes. **Dist:** Mainly in the Mississippi River Alluvial Plain, west to e. TX and east to AL, TN, and KY. **Phen:** Jun-Sep. **Syn:** = Ar, C, F, G, GW2, Il, K1, K3, K4, Tn, Tx; = *Nama affine* (A. Gray) Kuntze – S. NatureServe G5 (Secure).



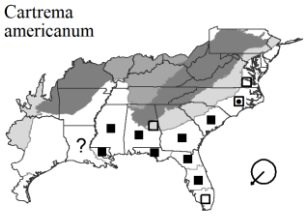
366. OLEACEAE Hoffmannsegg & Link 1809 (OLIVE FAMILY) [in LAMIALES]

A family of about 25 genera and 600-615 species, trees and shrubs, nearly cosmopolitan, but centered in Asia. References: Green in Kadereit (2004); Hardin (1974); Li et al (2020).

1 Leaves compound.
  2 Leaves pinnately compound with > 5 leaflets; petals absent; fruit a samara; small to large tree; [tribe *Oleeae*, subtribe *Fraxininae*] ..... ***Fraxinus***
  2 Leaves trifoliolate; petals 6-10, yellow, conspicuous; fruit a deeply 2-lobed dryish berry; [tribe *Jasmineae*] ..... ***Jasminum***
1 Leaves simple.
  3 Flowers bright yellow, showy; fruit a many-seeded capsule; [tribe *Forsythieae*] ..... ***Forsythia***
  3 Flowers white, lilac, or purplish; fruit a drupe or 4-seeded capsule.
    5 Corolla absent; calyx minute or lacking; flowers in axillary fascicles; [tribe *Oleeae*, subtribe *Oleinae*] ..... ***Forestiera***
    5 Corolla present (often conspicuous and showy); calyx present; flowers in lateral or terminal panicles or in terminal subumbellate clusters.
      6 Corolla lobes 5-12; flowers in terminal subumbellate clusters; [tribe *Jasmineae*] ..... ***Jasminum***
      6 Corolla lobes 4; flowers in axillary or terminal panicles or axillary fascicles.
        7 Corolla lobes elongate, much longer than the corolla tube; [tribe *Oleeae*, subtribe *Oleinae*] ..... ***Chionanthus***
        7 Corolla lobes short, no longer than the corolla tube.
          8 Inflorescence a many-flowered terminal panicle; leaves generally ovate, elliptic or lanceolate (widest below or at the middle); [tribe *Oleeae*, subtribe *Ligustrinae*] ..... ***Ligustrum***
          8 Inflorescence a few-flowered axillary panicle or fascicle; leaves generally oblanceolate or obovate (widest above the middle); [tribe *Oleeae*, subtribe *Oleinae*].
          ..... ***Cartrema***

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Cartrema Rafinesque 1838 (WILD OLIVE, DEVILWOOD)

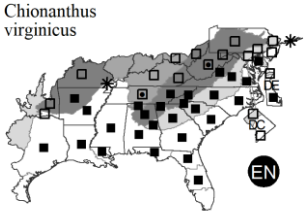


A genus of 2 species, trees, of e. North America. Several Asian species that have sometimes been included in *Cartrema* are not closely related to *Cartrema* and are better placed in *Chengiodendron* (Li et al. 2020). References: Guo et al (2011); Hardin (1974); Li et al (2020); Nesom (2012d); Nesom in FNA () (in prep); Weakley et al (2011).

Cartrema americanum (Linnaeus) Nesom. WILD OLIVE, DEVILWOOD. **Hab:** Maritime forests and (in FL, GA, SC, and extreme s. NC) hammocks and other dry, sandy forests well inland, and reported southwards for wet habitats as well. **Dist:** Se. VA south to c. peninsular FL, west to e. LA (Florida parishes); also in Mexico (CHP). **Phen:** Apr-May; Aug-Oct. **Comm:** The very hard, tough, and "unsplittable" wood is the inspiration for the common name "Devilwood". *C. americanum* is a conspicuous element of maritime forests in most of our coastal area, readily recognizable by the flattened twigs characteristic of the family, and the opposite (or typically, actually subopposite), glossy, oblanceolate to obovate, evergreen leaves. **Syn:** = Fl6, Zhang, Zhang, & Endress (2003); = *Amarolea americana* (Linnaeus) Small – S; = *Cartrema americana* – K4, Nesom (2012d), Weakley et al (2011), orthographic variant; = *Osmanthus americana* – GW2, orthographic variant; = *Osmanthus americanus* (Linnaeus) Bentham & Hooker f. – F, G, Meso4.1, RAB, Va, WH3; = *Osmanthus americanus* var. *americanus* – C, K1, K2, Hardin (1974).

Chionanthus Linnaeus 1753 (FRINGE-TREE, OLD MAN'S BEARD)

A genus of controversial circumscription, of only 2 species, limited to se. North America. The genus has often in the past been circumscribed much more broadly, to include 55-60 additional and primarily tropical species. Hong-Wa & Besnard (2013) excluded the African and Madagascarian species and suggested a much narrower circumscription of *Chionanthus*; Li et al. (2020) deepened the understanding that tropical *Chionanthus* are not closely related to our two species in eastern North America. While the disposition of the tropical clades has not been resolved, it is clear that they are not part of *Chionanthus* (whose type species is *C. virginicus*). References: Hardin (1974); Hong-Wa & Besnard (2013); Li et al (2020); Nesom (in prep).



Chionanthus virginicus Linnaeus. FRINGE-TREE, OLD MAN'S BEARD. **Hab:** Dry, mesic, or wet forests and woodlands, granitic flatrocks and domes, glades and barrens over various rocks (including granite, greenstone, etc.), swamp forests in the Coastal Plain, tidal swamps, rarely pocosins. **Dist:** NJ, s. PA, s. OH, and MO south to c. peninsular FL and e. TX. **Phen:** (Late Feb-) Apr-May; Jul-Sep. **Tax:** *C. virginicus* in our area shows a diversity of morphology and correlated habitat that suggests the possible presence of two taxa. Swamp- and pocosin-inhabiting populations in the outer Coastal Plain have leaves 4-8× as long as wide and seem very different than Piedmont dry woodland populations with leaves 1-2× as long as wide; further and more careful study is needed. **Comm:** *C. virginicus* is a traditional southern yard plant, often used as a 'specimen plant', very showy in spring, particularly when grown to its full size. **Syn:** = Ar, C, F, Fl6, G, GW2, Il, K1, K3, K4, NE, NY, Pa, RAB, Tn, Va, W, WH3, Hardin (1974); = *Chionanthus virginica* – S, orthographic variant; > *Chionanthus virginica* var. *maritima* Pursh – Tx; > *Chionanthus virginica* var. *virginica* – Tx. NatureServe G5 (Secure).

Forestiera Poiret 1812 (FORESTIERA)

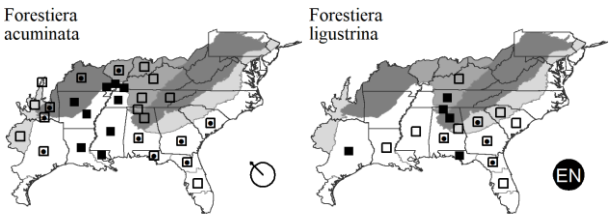
A genus of about 15-20 species, shrubs, of sw. and se. North America, Central America, and the West Indies. References: Anderson (1985); Brooks (1977); Godfrey (1988); Green in Kadereit (2004); Hardin (1974); Johnston (1957); Nesom (2009e).

2 Leaves (6-) 7-8 (-9) cm long, long-acuminate or acuminate (rarely acute) at the apex, the tip sharply pointed; [of swamp forests, sloughs, and ponds]..... ***Forestiera acuminata***

2 Leaves 1.5-7 (-8) cm long, obtuse at the apex, or if short-acuminate the ultimate tip blunt; [of uplands, over calcareous rocks or shell]. ***Forestiera ligustrina***

Forestiera acuminata (Michaux) Poiret. SWAMP FORESTIERA, SWAMP-PRIVET. **Hab:** Swamp forests, especially over calcareous substrates. **Dist:** SC south to n. FL, west to TX, north in the interior to KY, e. and c. TN, IN, IL, MO, and KS. **Phen:** Feb-May; Apr-Jun. **Syn:** = Ar, C, F, Fl6, G, GrPl, GW2, Il, K1, K3, K4, NcTx, RAB, S, Tn, Tx, WH3, Anderson (1985), Brooks (1977), Godfrey (1988), Hardin (1974), Johnston (1957). NatureServe G5 (Secure).

Forestiera ligustrina (Michaux) Poiret. GLADE FORESTIERA, SOUTHERN-PRIVET. **Hab:** Upland forests, woodlands, and glades, mostly on calcareous rocks or shell middens. **Dist:** E. SC south to n. peninsular FL, west to sc. KY, c. TN, AL, and MS; disjunct in w. LA and e. TX. **Syn:** = Fl6, K1, K3, K4, S, Tn, Tx, WH3, Brooks (1977), Godfrey (1988), Hardin (1974), Johnston (1957). NatureServe G4G5 (Apparently Secure).



Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more)

* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable
X : extirpated

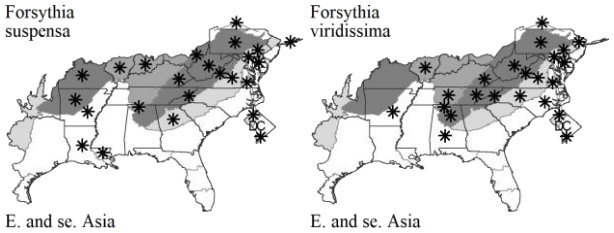
Forsythia Vahl 1804 (FORSYTHIA, GOLDEN-BELLS)

A genus of about 7-9 species, shrubs, of e. Asia and se. Europe. References: Green in Kadereit (2004); Hardin (1974).

1 Mature branches hollow or irregularly pith-filled between the nodes; leaves oblong-ovate, toothed or 3-parted; branches arching when well-developed ..... ***Forsythia suspensa***
1 Mature branches cross-septate (chambered) between the nodes; leaves oblong-lanceolate, toothed; branches upright ..... ***Forsythia viridissima***

* ***Forsythia suspensa*** (Thunberg) Vahl. WEEPING FORSYTHIA. **Hab:** Waste places, vacant lots, suburban woodlands, commonly planted and persistent, rarely escaped. **Dist:** Native of China. **Phen:** Feb-early May. **Syn:** = C, G, Il, K1, K3, K4, Mi, Mo1, NE, NY, Pa, Va, Hardin (1974). NatureServe GNR (Not Yet Ranked).

* ***Forsythia viridissima*** Lindley. GREENSTEM FORSYTHIA. **Hab:** Waste places, vacant lots, suburban woodlands, commonly planted and persistent, rarely escaped. **Dist:** Native of China. **Phen:** Feb-early May. **Syn:** = C, G, Il, K1, K3, K4, Mi, NE, NY, Pa, Tn, Va, W, Hardin (1974). NatureServe GNR (Not Yet Ranked).



Fraxinus Linnaeus 1753 (ASH)

A genus of about 43-65 species, trees, mostly north temperate (Asia, North America, Europe). References: Campbell (2017); Green in Kadereit (2004); Hardin & Beckmann (1982); Miller (1955); Nesom (2010g); Nesom (2010i); Wallander (2008); Ward (2011a); Whittemore et al (2018).

1 Leaves minutely honeycombed-reticulate beneath (best seen at magnification of 40-100×), more-or-less strongly whitened (and otherwise variously glabrous or pubescent); [*Fraxinus americana* complex].
  3 Petiole bases and leaf scars V- to U- or crescent-shaped with a deeply concave or notched upper margin; samaras (19-) 25-32 (-38) mm long, samara wings 3-5 (-6) mm wide, samara bodies (5-) 6-11 mm long, 1.5-2.5 mm wide; twigs, petioles, petiolules, and rachises glabrous ..... ***Fraxinus americana***
  3 Petiole bases and leaf scars oblong-obovate to widely obovate with a nearly truncate or very shallowly bowl- shaped upper margin; samaras (32-) 33-54 mm long, samara wings (4.5-) 5-8 mm wide, samara bodies (7-) 10-15 mm long, 2-4 mm wide; twigs, petioles, petiolules, and rachises glabrous or hirtellous to hirtellous-puberulent to tomentulose.
    4 Twigs, petioles, petiolules, and rachises sparsely to densely hirtellous to hirtellous-puberulent or tomentulose; samaras 33-54 mm long, samara wings 6-8 mm wide, samara bodies (7-) 11-15 mm long, 2-4 mm wide ..... ***Fraxinus biltmoreana***
    4 Twigs, petioles, petiolules, and rachises glabrous; samaras (32-) 36-44 mm long, samara wings (4.5-) 5-7 mm wide, samara bodies (9-) 10-13 mm long, 2-3.5 mm wide ..... ***Fraxinus smallii***
1 Leaves not minutely-honeycombed-reticulate beneath (sometimes with papillae and small scales visible at 40×, but these not forming a developed netlike pattern), pale green (and otherwise variously glabrous or pubescent).
  5 Youngest twigs 4-angled to narrowly 4-winged; petiole bases raised on a distinct pedestal; lateral leaflets sessile to subsessile; [of dry to mesic sites]. ..... ***Fraxinus quadrangulata***
  5 Youngest twigs terete; petiole bases flush with stem; lateral leaflets sessile to subsessile or petiolulate; [of mesic to wetland sites].
    8 Samara wings arising abruptly from the upper (distal) 1/5-1/4 (-1/2) of the samara body; samara wings 4-7 mm wide ..... ***Fraxinus pennsylvanica***
    8 Samara wings arising from the base or lower (proximal) 1/4 of the samara body; samara wings (5.5-) 6-20 (-22) mm wide.
      9 Trees, 15--30(--40) m tall; leaflet blades (7-) 9-15 (-25) cm long × (2.5-) 3.5-7 (-11) cm wide, the bases often rounded, sometimes obtuse to acute or acuminate; samaras (35-) 40-70 (-75) mm long, the wings gradually expanded from near the base of the body to the proximal 1/2, (5.5-) 6-10 (-12) mm wide ..... ***Fraxinus profunda***
      9 Shrubs, trees, or shrublike trees, 2.5-12 (-15) m tall; leaflet blades 4-12 (-15) cm long × (1-) 2-5 (-6) cm wide, the bases acute to truncate or rounded; samaras (25-) 30-50 (-54) mm long, the wings arising **either** from the base of the body to the proximal 1/4 **or** from the middle/proximal 3/4 of the body, 6-20 (-22) mm wide. ..... ***Fraxinus caroliniana***

Fraxinus americana Linnaeus. WHITE ASH, AMERICAN ASH. **Hab:** Mesic slopes, rich cove forests. **Dist:** NS west to MN, south to n. peninsular FL and TX. **Phen:** Apr-May; Aug-Oct. **Comm:** A valuable timber tree. **Syn:** = Mi, NY, S, Tn, Campbell (2017), Miller (1955), Nesom (2010i); < *Fraxinus americana* Linnaeus – Ar, C, Fl6, GrPl, Il, K1, K3, K4, NcTx, NE, Tx, Va, W, WH3, Ward (2010a); < *Fraxinus americana* Linnaeus var. *americana* – F, G, Pa, RAB, WV; > *Fraxinus americana* var. *microcarpa* A. Gray – F. NatureServe G4 (Apparently Secure).

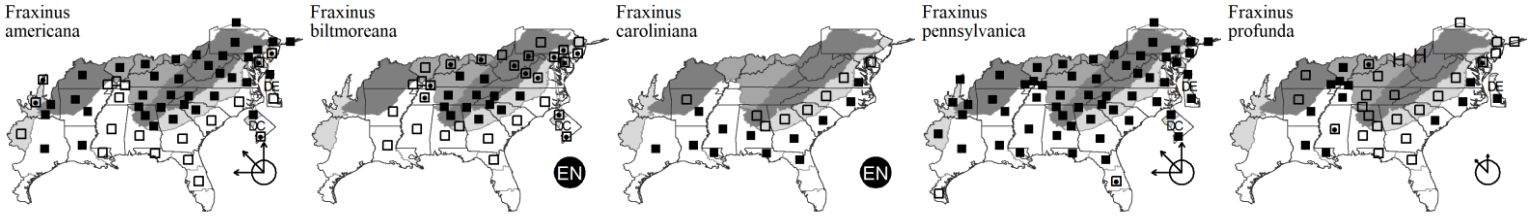
Fraxinus biltmoreana Beadle. BILTMORE ASH, BILTMORE WHITE ASH. **Hab:** Mesic slopes, rich cove forests, dry calcareous or mafic glades and woodlands (with *Juniperus virginiana* var. *virginiana* and *Carya glabra*), calcareous hammocks. **Dist:** NJ, OH, and IL south to n. peninsular FL, c. AL, c. MS, and LA. **Phen:** Apr-May; Aug-Oct. **Tax:** This controversial taxon has been recently clarified by Nesom (2010), though much additional information is needed to fully establish its distribution, ecology, and evolutionary origins. It is hexaploid (and possibly also tetraploid) (Whittemore et al. 2018). Whittemore et al. (2018) were disinclined to accept *F. biltmoreana* and *F. smallii* as taxa because of the lack of correlation of ploidy with morphological characters; additional study is needed. **Syn:** = Il, S, Tn, Miller (1955); = *Fraxinus americana* Linnaeus var. *biltmoreana* (Beadle) J. Wright ex Fernald – F, G, Pa, RAB, WV; = *Fraxinus biltmoreana* var. *biltmoreana* – Campbell (2017); < *Fraxinus americana* Linnaeus – Ar, C, Fl6, K1, K3, K4, NE, Va, W, WH3; < *Fraxinus biltmoreana* Beadle – Whittemore et al (2018).

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated

Fraxinus caroliniana P. Miller. WATER ASH, POP ASH, CAROLINA ASH. **Hab:** Deeply to shallowly flooded swamps, both alluvial and tidal. **Dist:** Se. MD south to n. FL, west to TX, primarily on the Coastal Plain. **Phen:** May; Jul-Oct. **Tax:** J.J.N. Campbell (pers. comm., 2020) suggests recognizing a varietal entity in the Apalachicola region of Panhandle FL, with smaller leaves and leaflets, proportionally broader samaras, and mature at shrub size. **Comm:** A small tree, sometimes very abundant (and nearly the only subcanopy species) as the understory in *Taxodium-Nyssa* swamps. Reported for se. MD by Longbottom, Naczi, & Knapp (2016). **Syn:** = Ar, C, G, K1, RAB, Tx, Va, Hardin & Beckmann (1982), Hardin (1974), Miller (1955), Nesom (2010i); = *Fraxinus caroliniana* var. *caroliniana* – Ward (2010a); < *Fraxinus caroliniana* P. Miller – GW2, K3, K4, S, WH3; > *Fraxinus caroliniana* var. *caroliniana* – F; > *Fraxinus caroliniana* var. *cubensis* (Grisebach) Lingelsheim – F, misapplied; > *Fraxinus caroliniana* var. *oblanceolata* (M.A. Curtis) Fernald & Schubert – F.

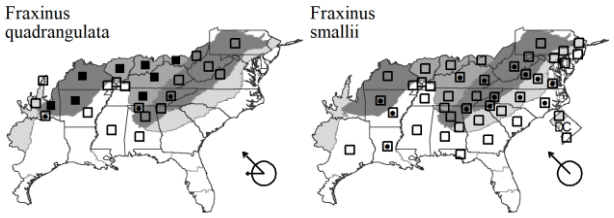
Fraxinus pennsylvanica Marshall. GREEN ASH, RED ASH. **Hab:** Bottomlands and swamps, especially along brownwater rivers and streams, rarely on mesic upland disturbed sites. **Dist:** NS west to AB, south to FL, TX, and CO. **Phen:** Apr-May; Aug-Oct. **Tax:** Variation in this species (see synonymy) needs further study. Campbell (2017) has provided a detailed analysis of variation in *F. pennsylvanica*, choosing to recognize four varieties. **Syn:** = Ar, C, GrPl, GW2, K1, K3, Mi, NE, NY, Pa, Tn, Va, W, Hardin & Beckmann (1982), Hardin (1974), Ward (2010a); > *Fraxinus darlingtonii* Britton – S; > *Fraxinus lanceolata* Borkhausen – Il; < *Fraxinus pennsylvanica* Marshall – Fl6, WH3; > *Fraxinus pennsylvanica* Marshall – Il, S; ? *Fraxinus pennsylvanica* ssp. *pennsylvanica* – Miller (1955); > *Fraxinus pennsylvanica* var. *austinii* Fernald – F, Campbell (2017); > *Fraxinus pennsylvanica* var. *campestris* (Britton) F.C. Gates – Campbell (2017); > *Fraxinus pennsylvanica* var. *pennsylvanica* – F, G, RAB, WV, Campbell (2017); > *Fraxinus pennsylvanica* var. *subintegerrima* (Vahl) Fernald – F, G, RAB, WV, Campbell (2017); > *Fraxinus pensylvanica* var. *integerrima* – Tx, orthographic variant.

Fraxinus profunda (Bush) Bush. PUMPKIN ASH. **Hab:** Swamps, especially along blackwater rivers and streams and in freshwater tidal wetlands (as along the James, Pamunkey, Mattaponi, and Rappahannock rivers in e. VA), also in brownwater bottomlands; common (rare in Piedmont and Mountains). **Dist:** S. NJ south to n. FL, west to LA, mostly on the Coastal Plain, north in the interior to w. NC, sc. TN, e. AR, se. MO, s. IL, IN, OH, sc. MI, ne. PA, and w. NY. **Phen:** Apr-May; Aug-Oct. **Tax:** This species has a peculiar distribution; see McCormac, Bissell, & Stine (1995) and Nesom (2010) for additional discussion. The nomenclature has been controversial, but is now resolved. There is also some question as to its evolutionary history and appropriate taxonomic recognition; it may be an allopolyploid derivative of *F. pennsylvanica*, perhaps from multiple origins. Whittemore et al. (2018) determined it to be an octoploid. **Syn:** = Ar, C, GW2, Il, K1, K3, K4, Mi, NY, Pa, Tn, Va, W, Ward (2010a); = *Fraxinus tomentosa* Michaux f. – F, G, RAB, Miller (1955); > *Fraxinus michauxii* Britton – S; < *Fraxinus pennsylvanica* Marshall – Fl6, WH3; > *Fraxinus profunda* (Bush) Bush – S.



Fraxinus quadrangulata Michaux. BLUE ASH. **Hab:** Mesic to dry calcareous woodlands and forests. **Dist:** S. ON west to s. MI and e. KS, south to sw. VA, e. TN, nw. GA, n. AL, and OK. **Phen:** Mar-May; Jul-Oct. **Syn:** = Ar, C, F, G, GrPl, Il, K1, K3, K4, Mi, S, Tn, Va, WV, Miller (1955). NatureServe G4 (Apparently Secure).

Fraxinus smallii Britton. SMALL'S WHITE ASH. **Hab:** Bottomland forests, alluvial woods, river bluffs, upland hardwood forests, oak-pine forests. **Dist:** PA, MI, IA, and KS south to Panhandle FL and e. TX. **Phen:** (Feb-) Apr-May. **Tax:** Recent studies by Whittemore et al. (2018) did not find a correlation between ploidy and the morphological characters used by Nesom (2010i) to separate *F. biltmoreana* and *F. smallii*. Whittemore et al. (2018) suggest that *F. smallii* should be remerged with *F. biltmoreana*, while Campbell (2017) proposed that it be reduced to varietal rank under *F. biltmoreana* (Campbell 2017). Additional study is needed. **Syn:** = Mi, S, Tn, Miller (1955); = *Fraxinus biltmoreana* var. *subcoriacea* J.J.N. Campbell – Campbell (2017); < *Fraxinus americana* Linnaeus – Ar, C, Fl6, GrPl, Il, K1, K3, K4, NcTx, Tx, Va, W, WH3, Ward (2010a); < *Fraxinus americana* Linnaeus var. *americana* – F, G, Pa, RAB, WV; < *Fraxinus biltmoreana* Beadle – Whittemore et al (2018); < *Fraxinus pennsylvanica* Marshall – WH3.



Jasminum Linnaeus 1753 (WINTER JASMINE)

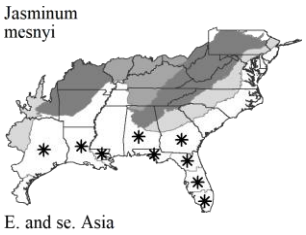
A genus of about 200 species, shrubs and woody vines, of tropical (and rarely temperate) Eurasia. References: Green in Kadereit (2004); Serviss et al (2018b).

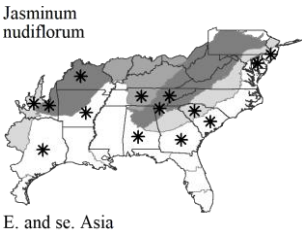
3 Leaflets 2.5-7 cm long; flowers 3.5-5 cm across ..... ***Jasminum mesnyi***
3 Leaflets 1-3 cm long; flowers ca. 2.5 cm across ..... ***Jasminum nudiflorum***

* ***Jasminum mesnyi*** Hance. JAPANESE JASMINE, PRIMROSE JASMINE. **Hab:** Cultivated and sometimes persistent or spreading (at least vegetatively, by layering) from plantings. **Dist:** Native of w. China. Reported for GA (Kartesz 1999), Panhandle FL (Kunzer et al. 2009), and AL Coastal Plain (Diamond 2013). **Syn:** = Fl6, K1, K3, K4, Meso4.1, WH3. NatureServe GNR (Not Yet Ranked).

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

* ***Jasminum nudiflorum*** Lindley. WINTER JASMINE. **Hab:** Cultivated and rarely persistent or spreading, at least vegetatively by layering (Diamond 2013). **Dist:** Native of China. Reported for GA (Kartesz 1999), AL Coastal Plain (Diamond 2013), and AR (Hot Springs County) (Serviss et al. 2018). **Phen:** Jan-Mar. **Syn:** = K1, K3, K4. NatureServe GNR (Not Yet Ranked).





Ligustrum Linnaeus 1753 (PRIVET)

Contributed by Guy L. Nesom and Alan S. Weakley

A genus of about 40 species, shrubs and trees, of the Old World. *Ligustrum* appears to be a monophyletic group phylogenetically embedded within *Syringa* (Li, Alexander, & Zhang 2002; Li et al. 2012); Li et al. (2012) recommend treating *Ligustrum* as series *Ligustrae* of *Syringa*, but species combinations have not been made. References: Green in Kadereit (2004); Hardin (1974); Li et al (2012); Li, Alexander, & Zhang (2002); Nesom (2009a).

1 Leaves (3-) 4-13 (-15) cm long.
  2 Leaves mostly (3-) 4-8 (-9) cm long, with the primary lateral leaf veins in 3-5 pairs; leaf apex acute to abruptly acuminate; abaxial midvein covered by epidermis; flowers short-pedicellate on pedicels 0.5-2 mm; corolla tube hardly exserted from calyx, ca. equal lobe length ..... ***Ligustrum japonicum***
  2 Leaves (4.5-) 6-13 (-15) cm, with the primary lateral veins in (5-) 6-8 pairs; leaf apex usually long-acuminate; abaxial midvein not covered by epidermis; flowers subsessile on pedicels 0-0.5 mm; corolla tube distinctly exserted from calyx, ca. 2× longer than lobes ..... ***Ligustrum lucidum***
1 Leaves 1.5–6 (-6.5) cm long.
  3 Branchlets glabrous and usually glossy ..... ***Ligustrum ovalifolium***
  3 Branchlets minutely hirtellous, hirsute-hirtellous, or hirsutulous, dull.
    5 Leaf blades narrowly oblong-elliptic to oblanceolate-elliptic, oblanceolate or narrowly obovate, usually broadest slightly above the middle; inflorescence usually narrowly cylindric, flowers sessile to subsessile in verticil-like clusters ..... ***Ligustrum quihoui***
    5 Leaf blades variously shaped; inflorescence broadly cylindric to pyramidal, flowers sessile to pedicellate in broadly cylindric to pyramidal panicles of cymes.
      6 Corolla tube 1.5-3× longer than the lobes. ..... ***Ligustrum obtusifolium var. suave***
      6 Corolla tube < 1.2× as long as the lobes.
        8 Leaves ovate-elliptic to oblong-ovate, elliptic-lanceolate, or suborbicular, primary lateral veins (3-) 4-5 pairs, apex obtuse to rounded or retuse, abaxial midvein usually sparsely hirsutulous to puberulent; inflorescence diffuse and open panicles terminal and on essentially leafless, lateral branches interspersed with leafy ones; branchlets hirtellous to loosely substrigose with straight hairs of uneven length; corolla tube slightly shorter than lobes, often barely exserted from the calyx tube; pedicels glabrous ..... ***Ligustrum sinense***
        8 Leaves elliptic-lanceolate to elliptic-ovate, primary lateral veins 4-6 pairs, apex obtuse to acute, abaxial midvein usually glabrous or with a few scattered hairs; inflorescence mostly a compact, terminal panicle; branchlets evenly and minutely hirtellous to hirsutulous with relatively even-length hairs; corolla tube equal the lobes or slightly shorter, distinctly exserted from the calyx tube; pedicels hirtellous ..... ***Ligustrum vulgare***

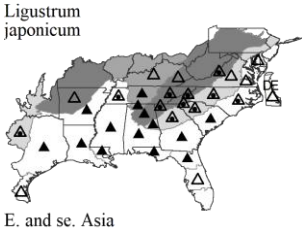
* ***Ligustrum japonicum*** Thunberg. JAPANESE PRIVET. **Hab:** Disturbed places. **Dist:** Native of Japan and Korea. **Phen:** Apr-Jun. **Syn:** = Ar, Fl6, K1, K3, K4, NcTx, RAB, Va, WH3, Hardin (1974), Nesom (2009a). NatureServe GNR (Not Yet Ranked).

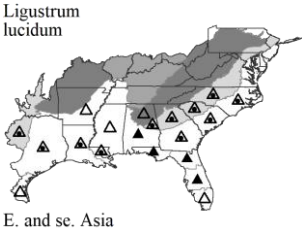
* ***Ligustrum lucidum*** W.T. Aiton. GLOSSY PRIVET, BROADLEAF PRIVET. **Hab:** Disturbed places. **Dist:** Native of China, Japan, and Korea. **Phen:** Jun-Sep. **Comm:** This species is superficially similar to *L. japonicum*; the lateral leaf veins are translucent in this species. **Syn:** = Ar, Fl6, K1, K3, K4, Meso4.1, NcTx, S, WH3, Hardin (1974), Nesom (2009a). NatureServe G5 (Secure).

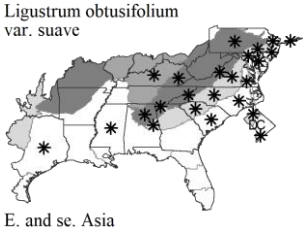
* ***Ligustrum obtusifolium*** Siebold & Zuccarini *var. **suave*** (Kitagawa) H. Hara. AMUR PRIVET. **Hab:** Disturbed places. **Dist:** Native of Japan. **Syn:** = K4, NE, NY, Va, Nesom (2009a); = *Ligustrum amurense* Carrière – C, F, G, K1, Pa, RAB, Hardin (1974); = *Ligustrum obtusifolium* ssp. *suave* (Kitagawa) Kitagawa – K3. NatureServe GNR (Not Yet Ranked).

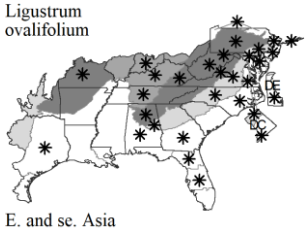
* ***Ligustrum ovalifolium*** Hasskarl. CALIFORNIA PRIVET. **Hab:** Disturbed places. **Dist:** Native of Japan. **Phen:** Apr-Jul. **Syn:** = C, F, Fl6, G, K1, K3, K4, Meso4.1, Mi, Mo1, NE, NY, Pa, RAB, S, Va, WH3, Hardin (1974), Nesom (2009a). NatureServe GNR (Not Yet Ranked).

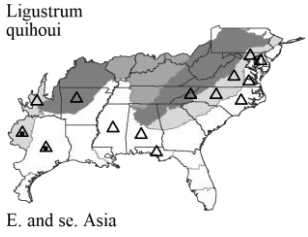
* ***Ligustrum quihoui*** Carrière. WAXY-LEAF PRIVET. **Hab:** Glade margins, suburban woodlands, disturbed places. **Dist:** Native of China. Though seemingly established only rarely in parts of our area, this species has the potential to become another noxious "shrub weed" across the region. Reported for AL by Diamond & Keener (2012). **Phen:** May-Jul. **Syn:** = Ar, Fl6, K1, K3, K4, NcTx, Tx, WH3, Hardin (1974), Nesom (2009a); = n/a – RAB. NatureServe GNR (Not Yet Ranked).

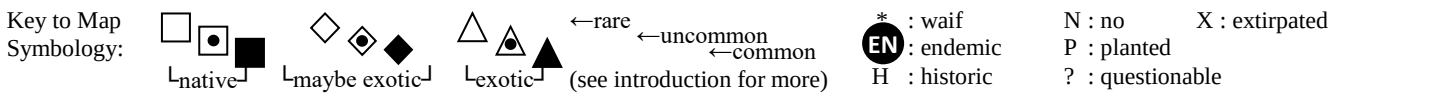






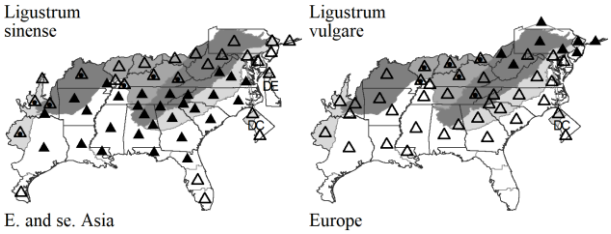






* ***Ligustrum sinense*** Loureiro. CHINESE PRIVET, "PRIVY HEDGE". **Hab:** Moist forests, especially alluvial bottomlands, and also in a wide range of other forests, woodlands, glade edges, etc. **Dist:** Native of China. **Phen:** (Late Apr-) May-Jun. **Comm:** This species is one of the most noxious of all weeds in much of our area, choking out native vegetation. The rapidity with which it has engulfed southern wetlands (and increasingly uplands as well) is hinted at by Small's (1933) mention of it only as "an escape in southern Louisiana". **Syn:** = Ar, C, Fl6, G, GW2, K1, K3, K4, Meso4.1, NcTx, NE, RAB, S, Tn, Tx, Va, W, WH3, Hardin (1974), Nesom (2009a). NatureServe GNR (Not Yet Ranked).

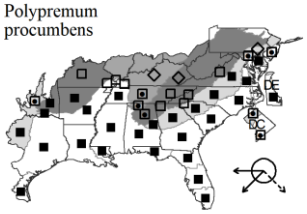
* ***Ligustrum vulgare*** Linnaeus. COMMON PRIVET. **Hab:** Disturbed places. **Dist:** Native of Europe and n. Africa. **Phen:** May-Jul. **Syn:** = Ar, C, F, G, Il, K1, K3, K4, Mi, NE, NY, Pa, S, Va, WV, Hardin (1974), Nesom (2009a). NatureServe GNR (Not Yet Ranked).



367. TETRACHONDRACEAE Skottsberg ex Wettstein 1924 (TETRACHONDRA FAMILY) [in LAMIALES]

A family of 2 genera, *Polypremum* and *Tetrachondra* (Oxelman et al. 1999), and 3 species, perennial herbs, of s. North America south to South America, and New Zealand. The assignment of *Polypremum* to family has been controversial, with placement formerly in Loganiaceae or Buddlejaceae. A recent molecular analysis strongly suggests that its closest relationship is with *Tetrachondra* (Oxelman et al. 1999), and the treatment followed here reflects the current general consensus. Some prefer to treat it in the monospecific Polypremaceae (Reveal 2011). References: Oxelman, Backlund, & Bremer (1999); Rabeler & Freeman (2019c) in FNA17 (2019); Wagstaff in Kadereit (2004).

Polypremum Linnaeus 1753 (POLYPREMUM)



The genus is monotypic, an herb, or warm temperate, subtropical and tropical America. References: Rabeler (2019) in FNA17 (2019); Rogers (1986); Wagstaff in Kadereit (2004).

Identification Notes: Plants tend to turn a distinctive orangish color in midsummer to later in the year.

Polypremum procumbens Linnaeus. POLYPREMUM, RUSTWEED, JUNIPERLEAF. **Hab:** Dunes, longleaf pine sandhills, pine flatwoods, pond margins, fields, pastures, roadsides, riverside sand bars, disturbed areas. **Dist:** Se. NY, NJ, and MO south to FL and TX, south into Central America and South America; West Indies. **Phen:** Late May-Nov; Aug-Dec. **Syn:** = Ar, Bah, C, F, Fl6, FNA17, G, GW2, Il, K1, K3, K4, Meso4.1, NcTx, RAB, S, Tn, Tx, Va, W, WH3, Rogers (1986). NatureServe G5 (Secure).

370. PLANTAGINACEAE A.L. de Jussieu 1789 (PLANTAIN FAMILY) [in LAMIALES]

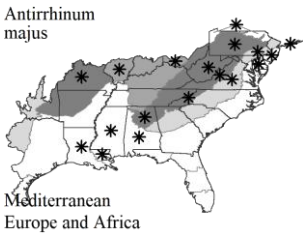
As radically recircumscribed, a family of about 100-120 genera and 1800-1900 species, herbs and shrubs, nearly cosmopolitan. References: Albach, Meudt, & Oxelman (2005); Fischer in Kadereit (2004); Freeman, Rabeler, & Elisens (2019c) in FNA17 (2019); Olmstead et al (2001); Schwarzbach in Kadereit (2004).

1 Leaves alternate, at least those on the upper stem; calyx 5-merous; stamens 4.
  3 Corolla with a broad pouch at the base (saccate or gibbose).
    ..... ***Antirrhinum***
  3 Corolla with a slender spur at the base.
    5 Flowers in terminal racemes ..... ***Linaria***
    5 Flowers solitary in leaf axils.
      6 Stems erect; leaves linear ..... ***Chaenorhinum***
      6 Stems prostrate; leaves orbicular, ovate, or triangular.
        7 Leaves orbicular in outline, palmately lobed and veined; stems rooting at nodes ..... ***Cymbalaria***
        7 Leaves ovate or triangular, pinnately veined; stems not rooting ..... ***Kickxia***
1 Leaves either strictly basal, or opposite or whorled throughout; calyx 0-, 4-, or 5-merous; stamens 1, 2, or 4.
  8 Leaves strongly basally disposed, usually all the leaves basal; petals 4, scarious and translucent in texture; inflorescence a spike; [tribe *Plantagineae*] .....
    ..... ***Plantago***
  8 Leaves cauline, either opposite or whorled; petal 0, or 4, or 5; inflorescence various.
    9 Leaves whorled.
      ..... ***Veronicastrum***
    9 Leaves opposite.
      11 Petals 0; sepals 0, stamens 1; leaves both < 2 cm long and entire; [tribe *Callitricheae*] ..... ***Callitriche***
      11 Petals 4 or 5; sepals 4 or 5; stamens 2 or 4; leaves > 2 cm long, or serrate, or both.
        12 Calyx and corolla 4-merous.
          13 Leaves punctate; stamens 4; [tribe *Gratioleae*] ..... ***Scoparia***
          13 Leaves not punctate; stamens 2; [tribe *Veroniceae*] ..... ***Veronica***
        12 Calyx and corolla 5-merous.

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

14 Plants erect, moderately robust, usually > 4 dm tall, larger leaves > 5 cm long; inflorescences terminal (the bracts subtending flowers strongly reduced in size in comparison to main leaves of the stem); [tribe *Cheloneae*].
15 Inflorescence compact, the inflorescence axis generally hidden by the closely packed and overlapping flowers; each flower subtended by large overlapping bracts ..... ***Chelone***
15 Inflorescence more diffuse, the inflorescence axis readily visible between the flowers; flowers lacking extra subtending bracts ..... ***Penstemon***
14 Plants creeping, decumbent or erect, small, usually < 4 dm tall (except *Mecardonia*, to 5 dm tall), larger leaves < 5 cm long; inflorescences axillary (all or most of the flowers axillary to more-or-less normally sized leaves).
16 Stamens 2; [section *Gratioleae*].
17 Capsule flattened, compressed in ×-section; capsule wider than long, notched; leaves dimorphic, with narrow submersed leaves on the lower stems, and broad floating leaves just subtending the aerial inflorescences; [of vernal pools on granite outcrops in Piedmont SC, GA, and AL]. ..... ***Gratiola amphiantha***
17 Capsule turgid, roundish in ×-section; capsule longer than wide; leaves monomorphic; [collectively of many habitats and widespread].
18 Flowers and fruits on definite pedicels; annual or perennial; leaves not papillose ..... ***Gratiola***
18 Flowers and fruits sessile or subsessile, the pedicels < 1 mm long; perennial; leaves papillose on the surfaces and margins ..... ***Sophronanthe***
16 Stamens 4.
19 Sepals evidently connate into a tube about as long as the lobes; [section *Cheloneae*] ..... ***Collinsia***
19 Sepals distinct or very nearly so.
20 Leaves deeply pinnatifid; [tribe *Stemodieae*] ..... ***Leucospora***
20 Leaves entire or toothed; [tribe *Gratioleae*].
21 Corolla nearly radially symmetrical; corolla lobes about as long as the corolla tube; leaves palmately veined, with parallel veins diverging from the base, margins entire to crenulate; of aquatic to moist habitats, often somewhat succulent ..... ***Bacopa***
21 Corolla distinctly bilabiate; corolla lobes shorter than the corolla tube; leaves pinnately veined, with a single main-vein and lateral veins diverging along it, margins serrate; of moist habitats, not succulent ..... ***Mecardonia***

Antirrhinum Linnaeus 1753 (SNAPDRAGON)



A genus of about 20 species, herbs, of Mediterranean Europe. References: Barringer & Harriman (2019a) in FNA17 (2019); Pennell (1935); Sutton (1988).

* ***Antirrhinum majus*** Linnaeus. COMMON SNAPDRAGON. **Hab:** Cultivated, rarely persistent or naturalized. **Dist:** Native of Mediterranean Europe. **Phen:** May-Nov. **Syn:** = C, FNA17, G, GrPl, Il, K1, K3, K4, Mi, NE, NY, Pa, WV, Pennell (1935), Sutton (1988). NatureServe GNR (Not Yet Ranked).

Bacopa Aublet 1775 (WATER-HYSSOP)

A genus of about 50 species, herbs (mostly aquatic or at least wetland), of tropical, subtropical, and warm temperate regions of the Old and New Worlds. References: Ahedor (2019a) in FNA17 (2019); Fernald (1942a); Pennell (1935); Schuyler (1989).

1 Fresh plants strongly aromatic when bruised; corolla blue, 9-13 mm long; stem and leaves pubescent ..... ***Bacopa caroliniana***
1 Fresh plants not aromatic when bruised; corolla predominantly white (in some species slightly pink or marked with yellow), 2-10 mm long; stem and leaves pubescent or glabrous.
2 Leaves glabrous; leaf margins crenate to serrate or entire; flowers radially symmetrical. ..... ***Bacopa monnieri***
2 Leaves pubescent, leaf margins entire; flowers bilaterally symmetrical.
4 Corolla 4-10 mm long, white with a yellow throat; capsule ca. 5 mm long ..... ***Bacopa rotundifolia***
4 Corolla 2-5 mm long, white or pink, without a yellow throat; capsule 2-3 mm long. ..... ***Bacopa innominata***

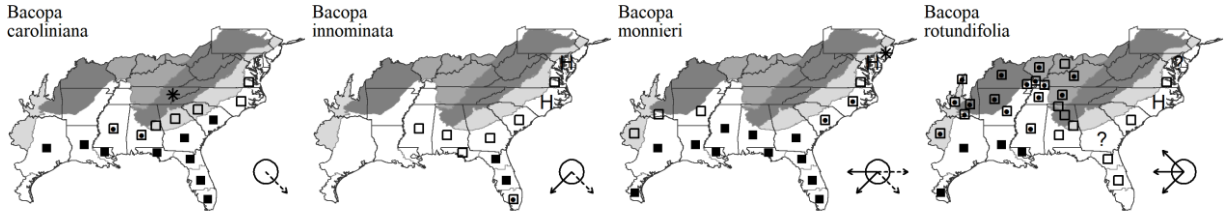
Bacopa caroliniana (Walter) B.L. Robinson. BLUE WATER-HYSSOP, SWEET WATER-HYSSOP, CAROLINA WATER-HYSSOP, LEMON BACOPA. **Hab:** Wet shores, tidal muds, marshes, disturbed wetland sites. **Dist:** Se. VA south to s. FL, west to e. TX; disjunct in KY. **Phen:** May-Oct. **ID Notes:** The strongly fragrant stems and leaves are unique. **Syn:** = C, F, Fl6, FNA17, G, GW2, K1, K3, K4, RAB, Tn, Tx, Va, W, WH3; = *Hydrotrida caroliniana* (Walter) Small – S, Pennell (1935). NatureServe G4G5 (Apparently Secure).

Bacopa innominata (M. Gómez) Alain. TROPICAL WATER-HYSSOP. **Hab:** Freshwater tidal muds, marshes, shallow water. **Dist:** MD south to s. FL, and in the West Indies and Central America. **Phen:** Jun-Sep. **Tax:** *B. stragula* Fernald has been considered a rare endemic of tidal areas in VA and MD, differing from *B. innominata* in its glabrous stems (vs. pubescent), smaller flowers (the corolla < 3 mm long vs. > 3 mm long), and shorter, glabrous pedicels 3-6 mm long (vs. pubescent and to 8 mm long). Schuyler (1989) concluded that *B. stragula* is an intertidal form of *B. innominata*, the morphologic differences induced by the flooding regime. Additional work, perhaps involving growth under experimental conditions or chemical or molecular studies, is needed to corroborate Schuyler's conclusion. See Schuyler (1989), F, and Fernald (1942) for further discussion. **Syn:** = C, Fl6, FNA17, GW2, K1, K3, K4, Va, WH3, Schuyler (1989); > *Bacopa cyclophylla* Fernald – RAB; > *Bacopa stragula* Fernald – F, G; ? *Herpestis rotundifolia* Gaertner f. – S, Pennell (1935); ? *Macuillamia obovata* Rafinesque – Pennell (1935). NatureServe G3G5 (Apparently Secure).

Bacopa monnieri (Linnaeus) Pennell. BRAHMI, INDIAN-PENNYWORT, HERB-OF-GRACE, MONNIER'S WATER-HYSSOP. **Hab:** Freshwater tidal marshes, muddy shores, streams and pools. **Dist:** E. MD and e. VA south to s. FL, west to c. TX, and in the West Indies and the New World subtropics and tropics; also Old World tropics and subtropics. **Phen:** Apr-Sep. **Syn:** = Ar, Bah, C, F, Fl6, FNA17, G, GW2, K1, K3, K4, NcTx, RAB, Tx, Va, WH3; = *Bramia monnieri* (Linnaeus) Drake – S, Pennell (1935). NatureServe G5? (Secure).

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Bacopa rotundifolia (Michaux) Wettstein. MIDWESTERN WATER-HYSSOP. **Hab:** Tidal muds, shallow water of large natural lake, river sandbars, other shallow water and shore situations. **Dist:** IN and IA west to ND and MT, south to AL and AZ; disjunct in e. MD, e. VA, ne. NC, and e. SC (Bradley et al. [in prep.]), where apparently native, though Cronquist (1991) considered introduced. Known in NC only from Lake Mattamuskeet, Hyde County, where not seen since 1929. **Phen:** May-Sep (-Nov). **Comm:** *B. simulans* Fernald has been considered a rare endemic of tidal areas in VA and MD. It is alleged to differ from *B. rotundifolia* in its glabrous to glabrescent stems (vs. pubescent), more succulent condition, smaller leaves (the larger 1-2 cm long and 0.6-1.5 cm wide vs. 2-3.5 cm long and 1.5-2.7 cm wide), smaller flowers (corolla 3-4 mm long vs. 6-10 mm long). Schuyler (1989) concluded that *B. simulans* is an intertidal form of *B. rotundifolia*, the morphologic differences the result of differences in inundation. Additional work, perhaps involving growth under experimental conditions or chemical or molecular studies, is needed to corroborate Schuyler's conclusion. See Schuyler (1989), F, and Fernald (1942) for further discussion. **Syn:** = Ar, C, FNA17, GrPl, GW2, Il, K1, K3, K4, Mo1, NcTx, Tn, Tx, Schuyler (1989); = *Macuillamia rotundifolia* (Michaux) Rafinesque – S, Pennell (1935); > *Bacopa rotundifolia* (Michaux) Wettstein – F, G; > *Bacopa simulans* Fernald – F, G.



Callitriche Linnaeus 1753 (WATER-STARWORT)

A genus of 20-50 species, annual and perennial herbs of aquatic, wetland, and upland habitats, nearly cosmopolitan. This genus should be included in a greatly expanded Plantaginaceae. References: APG (2016); Crow & Hellquist (2000a); Erbar & Leins in Kadereit (2004); Fassett (1951); Lansdown (2009); Lansdown (2019) in FNA17 (2019); Prančl et al (2020).

2 Flowers and young fruits with 2 inflated bracteoles at the base; leaves dimorphic (with floating rosettes of spatulate leaves and submersed linear leaves) or monomorphic.
  3 Fruit margin distinctly winged, the wing nearly 0.1 mm wide, extending the entire distance from the summit to the base of the fruit; fruit globose ..... ***Callitriche stagnalis***
  3 Fruit margin either not winged or with a wing < 0.05 mm wide, narrowing toward the base of the fruit before ending above the base; fruit ellipsoidal, obovoid, or nearly heart-shaped. ..... ***Callitriche heterophylla var. heterophylla***
2 Flowers and young fruits lacking bracts at their base; leaves monomorphic, obovate-spatulate, rounded at the tip.
  5 Mericarps bent at an angle and thickened on one side at the base; [of SC southward] ..... ***Callitriche peploides***
  5 Mericarps not bent at an angle nor thickened at the base; [collectively widespread].
    6 Fruit on pedicels 0.5-7 mm long; margin of fruit curled over on itself, appearing thickened; fruit developing underground ..... ***Callitriche pedunculosa***
    6 Fruit on pedicels 0.1-0.6 mm long; margin of fruit narrow, thin; fruit developing aboveground ..... ***Callitriche terrestris***

Callitriche heterophylla Pursh *var.* ***heterophylla***. COMMON WATER-STARWORT. **Hab:** Pools, slow-moving streams, ditches. **Dist:** Greenland west to AK, south to c. peninsular FL, TX, CA, and Mexico. **Phen:** Mar-Nov. **Tax:** The other variety, var. *bolanderi* (Hegelmann) Fassett, with larger fruits, co-occurs with var. *heterophylla* in nw. North America and is of uncertain taxonomic status, having been treated as species, subspecies, variety, and lumped. **Syn:** = NE, Va, Lansdown (2009); = *Callitriche heterophylla* ssp. *heterophylla* – K1, K3, K4, NY; > *Callitriche anceps* Fernald – F, Fassett (1951); < *Callitriche heterophylla* – Ar, C, Fl6, FNA17, G, GrPl, GW2, Il, Mi, NcTx, Pa, RAB, S, Tn, Tx, W, WH3, Crow & Hellquist (2000a); > *Callitriche heterophylla* – F; > *Callitriche heterophylla* Pursh var. *heterophylla* – Fassett (1951). NatureServe G5T5 (Secure).

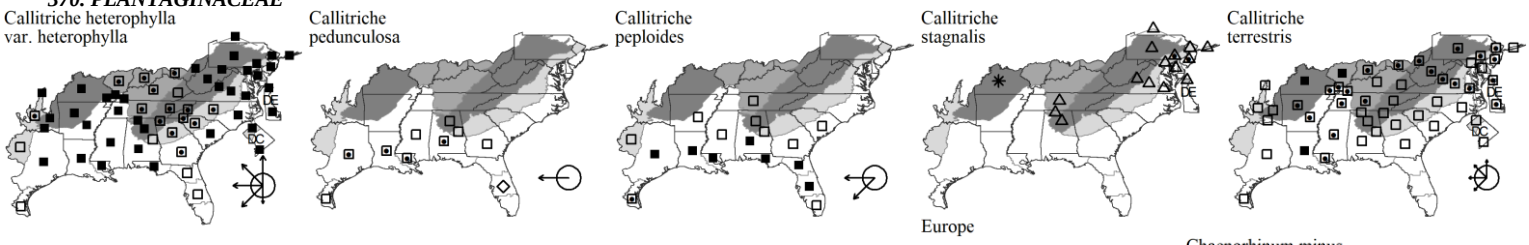
Callitriche pedunculosa Nuttall. NUTTALL'S WATER-STARWORT. **Hab:** Low fields, pond shores. **Dist:** NC, c. TN, and OK south to c. peninsular FL, AL, and TX. **Phen:** Late Mar-Apr. **Syn:** = Fl6, FNA17, K1, K3, K4, WH3; = *Callitriche nuttallii* Torrey – Ar, GW2, NcTx, Tn, Tx, Crow & Hellquist (2000a), Fassett (1951), Lansdown (2009). NatureServe G5 (Secure).

Callitriche peploides Nuttall. **Hab:** Low fields, ditches. **Dist:** SC south to s. FL, west to TX; disjunct inland in AR (the report for Polk Co., TN erroneous); e. Mexico south to Costa Rica. **Phen:** (Jan-) Feb-Apr (-Jun). **Syn:** = Ar, Fl6, FNA17, GW2, K1, K3, K4, NcTx, RAB, S, Tx, WH3, Lansdown (2009); > *Callitriche peploides* var. *peploides* – Fassett (1951). NatureServe G4G5 (Apparently Secure).

* ***Callitriche stagnalis*** Scopoli. POND WATER-STARWORT. **Hab:** Ponds, stagnant water, wet soil. **Dist:** Native of Europe, or possibly also native in some areas. See Philbrick, Aakjar, & Stuckey (1998) for additional discussion of the spread of this species in North America. **Phen:** May-Oct. **Syn:** = C, F, FNA17, G, K1, K3, K4, NE, NY, Pa, Tn, Crow & Hellquist (2000a), Fassett (1951), Lansdown (2009). NatureServe GNR (Not Yet Ranked).

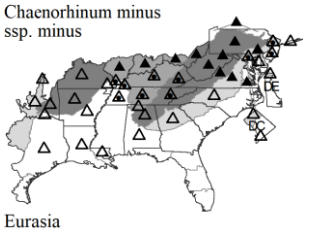
Callitriche terrestris Rafinesque. TERRESTRIAL WATER-STARWORT. **Hab:** Clay-pan areas, streambanks, ditches, low fields, wet paths. **Dist:** MA to KS, south to GA, TX, and Mexico. **Phen:** Apr-Jun. **Syn:** = Ar, C, FNA17, GrPl, GW2, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, S, Tn, Tx, Va, W, Crow & Hellquist (2000a), Lansdown (2009); = *Callitriche deflexa* A. Braun – RAB, Fassett (1951); = *Callitriche terrestris* ssp. *terrestris*; > *Callitriche deflexa* var. *austinii* (Engelmann) Hegelmann – F, G.

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



Chaenorhinum (A.P. de Candolle) Reichenbach 1828 (DWARF SNAPDRAGON, LESSER TOADFLAX)

A genus of about 30 species, herbs, of Mediterranean Europe. Circumscription of the genus follows Yousefi, Zarre, & Heubl (2016). References: Pennell (1935); Rabeler & Freeman (2019b) in FNA17 (2019); Sutton (1988); Yousefi, Zarre, & Heubl (2016).



* ***Chaenorhinum minus*** (Linnaeus) Lange *ssp. **minus***. DWARF SNAPDRAGON, SMALL TOADFLAX, LESSER TOADFLAX. **Hab:** Road shoulders, railroad embankments, other disturbed areas. **Dist:** Native of Eurasia. **Phen:** May-Nov. **Syn:** = FNA17, NY; = *Chaenorrhinum minus* ssp. *minus* – Sutton (1988); < *Chaenorhinum minus* – Ar, K3, K4, Mi, NE; < *Chaenorrhinum minus* – C, F, G, GrPl, Il, NcTx, Pa, Tn, Va, W, Pennell (1935). NatureServe GNRTNR (Not Yet Ranked).

Chelone Linnaeus 1753 (TURTLEHEAD)

A genus of about 4 species, perennial herbs, of e. North America. References: Nelson (2019) in FNA17 (2019); Nelson, Elisens, & Benesh (1998); Pennell (1935).

Identification Notes: The four fertile stamens are inserted on either side of the corolla near its base and are flattened and conspicuously pilose. The single staminodium (the color of which is used in the key) is much shorter (often only a few mm long), and is inserted uppermost on the corolla near its base.

2 Petioles (2-) 10-40 mm long; leaf blade rounded or truncate at the base; leaf blades averaging ca. 2× as long as wide, 4-8 cm wide; staminodes with white to light pink tips; corolla purple; inflorescence bracts 2-7 mm long ..... ***Chelone lyonii***

2 Petioles 1-15 mm long; leaf blade cuneate at the base; staminodium white or green; leaf blades averaging 3× (or more) as long as wide, 1-6 cm wide; corolla purple or white; inflorescence bracts 4-23 mm long.

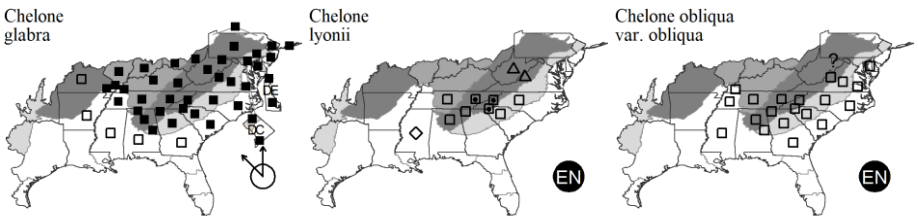
3 Corolla white (or tinged with purple, pink, or green near the mouth); staminodes with green tips; palate white-bearded (rarely greenish-yellow-bearded) ..... ***Chelone glabra***

3 Corolla pink or purple throughout; staminodes with white tips (rarely with green or purple tips); palate yellow-bearded (rarely white-bearded). ..... ***Chelone obliqua var. obliqua***

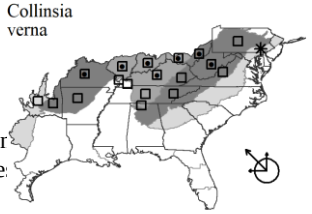
Chelone glabra Linnaeus. WHITE TURTLEHEAD. **Hab:** Streambanks, seeps, swamp forests. **Dist:** NL (Newfoundland) and MN south to GA and AL. **Phen:** Jul-Oct; Sep-Nov. **Comm:** The named varieties (or subspecies) are intergrading and the characters used to distinguish them do not correlate well. The species is diploid (Nelson, Elisens, & Benish 1998). **Syn:** = C, FNA17, GW2, K1, K3, K4, Mi, NE, NY, Pa, RAB, Tn, Va, W; > *Chelone chlorantha* Pennell & Wherry – S; > *Chelone glabra* ssp. *chlorantha* (Pennell & Wherry) Pennell – Pennell (1935); > *Chelone glabra* ssp. *dilatata* (Fernald & Wiegand) Pennell – Pennell (1935); > *Chelone glabra* ssp. *elatior* (Rafinesque) Pennell – Pennell (1935); > *Chelone glabra* ssp. *elongata* (Pennell & Wherry) Pennell – Pennell (1935); > *Chelone glabra* ssp. *ochroleuca* (Pennell & Wherry) Pennell – Pennell (1935); > *Chelone glabra* ssp. *typica* – Pennell (1935); > *Chelone glabra* var. *dilatata* Fernald & Wiegand – F; > *Chelone glabra* var. *elatior* Rafinesque – F, G, S; > *Chelone glabra* var. *elongata* – F, G, S; > *Chelone glabra* var. *glabra* – F, G, Il, S; > *Chelone glabra* var. *linifolia* Coleman – Il; > *Chelone glabra* var. *ochroleuca* Pennell & Wherry – F, G, S; > *Chelone montana* var. *elatior* (Rafinesque) Small – S; > *Chelone montana* (Rafinesque) Pennell & Wherry var. *montana* – S.

Chelone lyonii Pursh. APPALACHIAN TURTLEHEAD. **Hab:** Cove forests, spruce-fir forests, balds, streambanks. **Dist:** W. NC and e. TN south to nw. SC, nw. GA (Zomlefer et al. 2018), and ne. AL. **Phen:** Jul-Sep; Oct. **Comm:** The species is diploid (Nelson, Elisens, & Benish 1998); scattered localities away from the Southern Appalachians are the result of horticultural use. **Syn:** = C, FNA17, GW2, K1, K3, K4, NE, RAB, Tn, W; = *Chelone lyoni* – F, G, S, Pennell (1935), orthographic variant. NatureServe G4 (Apparently Secure).

Chelone obliqua Linnaeus *var. **obliqua***. PURPLE TURTLEHEAD. **Hab:** Streambanks, swamp forests, ecotones of freshwater tidal marshes. **Dist:** MD and KY south to GA and MS. **Phen:** Jul-Oct; Sep-Nov. **Comm:** Var. *obliqua* is hexaploid (Nelson, Elisens, & Benish 1998). **Syn:** = FNA17, K1, K3, NE; = *Chelone obliqua* ssp. *obliqua* – Pennell (1935); < *Chelone obliqua* – C, F, G, GW2, RAB, S, Tn, Va, W. NatureServe G4T3T4Q (Vulnerable).



Collinsia Nuttall 1817 (BLUE-EYED MARY)

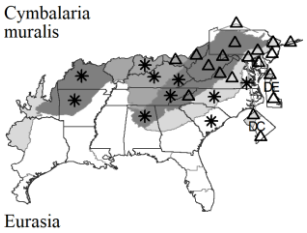


A genus of about 20 species, herbs, of North America (especially diverse in w. North America). References: Park (2019) in FNA17 (2019); Pennell (1935).

Collinsia verna Nuttall. EASTERN BLUE-EYED-MARY. **Hab:** Nutrient-rich, moist bottomlands and forested slopes. **Dist:** NY west to s. WI, south to w. VA, WV, nc. TN (Chester, Wofford, & Kral 1997), KY, and AR. **Phen:** Apr-Jun. **Syn:** = Ar, C, F, FNA17, G, GrPl, Il, K1, K3, K4, Mi, NY, Pa, S, Tn, Va, W, WV, Pennell (1935). NatureServe G5 (Secure).

Cymbalaria Hill 1756 (KENILWORTH-IVY)

A genus of about 9-10 species, herbs, of Mediterranean Europe and w. and c. Asia. References: Carnicero et al (2017); Elisens (2019a) in FNA17 (2019); Pennell (1935); Sutton (1988).



* ***Cymbalaria muralis*** G. Gaertner, B. Meyer, & Scherbius. KENILWORTH-IVY, IVY-LEAF TOADFLAX. **Hab:** Naturalized on walls and rock outcrops near plantings, roadsides, disturbed areas. **Dist:** Native of Eurasia. **Phen:** Mar-Oct. **Tax:** The other two subspecies, both villous throughout (vs. glabrous or with a few scattered hairs in ssp. *muralis*) are Mediterranean and are not known to be naturalized in North America. The results of Carnicero et al. (2017) suggest that the subspecies should be recognized as full species, so *C. muralis* is here treated in a strict sense. **Comm:** Reported for NC (Henderson County) by Pittillo & Brown (1988) as "derived from potted plants that have become established beneath the overhang of a porch for over a decade," and reported again more recently as spreading from plantings in Alleghany County, NC (Poindexter 2006) and Buncombe County, NC (C.A. McCormick, pers.comm., 2009). Reported by Pennell (1935) as being "in herbaria" from DC, KY, MD, SC, TN, WV, and other states beyond our area. **Syn:** = *Cymbalaria muralis* P.G. Gaertner, B. Meyer, & Scherbius ssp. *muralis* – FNA17, Va, Carnicero et al (2017), Sutton (1988); = n/a – RAB; < *Cymbalaria muralis* G. Gaertner, B. Meyer, & Scherbius – Ar, C, F, G, GrPl, Il, K1, K3, K4, Mi, NE, NY, Pa, Tn, WV, Pennell (1935).

Gratiola Linnaeus 1753 (HEDGE-HYSSOP)

A genus of about 20 species, herbs, of temperate regions (and tropical mountains) of the Old and New Worlds. Circumscription of the genus includes *Amphianthus* (following Estes & Small 2007, 2008). References: Estes & Small (2007); Estes & Small (2008); Freeman (2019b) in FNA17 (2019); Pennell (1935).

Identification Notes: *Gratiola amphiantha* somewhat resembles *Callitriche*, but has floating leaves in single pairs rather than in a whorl.

1 Capsule flattened, wider than long, notched; leaves dimorphic, with narrow submersed leaves on the lower stems, and broad floating leaves just subtending the aerial inflorescences; [of vernal pools on granite outcrops in Piedmont SC, GA, and AL] ..... ***Gratiola amphiantha***
1 Capsule turgid, longer than wide; leaves monomorphic; [collectively of many habitats and widespread].
2 Flowers and fruits sessile or subsessile, the pedicels < 1 mm long; perennial.
3 Leaves linear-subulate; corolla 2-3× as long as the calyx ..... ***Sophronanthe hispida***
3 Leaves ovate; corolla 1-1.5 × as long as the calyx ..... ***Sophronanthe pilosa***
2 Flowers and fruits on definite pedicels; annual or perennial.
4 Leaves clasping or subclasping-rounded at the base; perennial; [section *Gratiola*].
5 Calyx subtended by 0 (-1) bractlet; corolla lobes white; corolla tube greenish yellow, conspicuously veined ..... ***Gratiola ramosa***
5 Calyx subtended by 2 bractlets; corolla lobes white or yellow-orange; corolla tube greenish yellow and conspicuously veined, or orange and not conspicuously veined.
7 Leaves oblong-ovate to ovate (or linear-lanceolate in submersed forms), finely dentate; corolla veined with purple lines; sepals lanceolate to oblong-lanceolate ..... ***Gratiola viscidula***
7 Leaves triangular to lanceolate, margins entire, or with a few teeth toward the tip; corolla veined with brown lines; sepals linear-lanceolate ..... ***Gratiola brevifolia***
4 Leaves cuneate at the base; annual; [section *Nibora*].
10 Pedicels stout, erect, 1-5 (-12) mm long ..... ***Gratiola virginiana***
10 Pedicels slender, spreading, 10-45 mm long.
11 Corolla 13-25 mm long; leaves oval or oblanceolate ..... ***Gratiola floridana***
11 Corolla 5-14 mm long; leaves elliptic, rhombic-lanceolate, or lanceolate
13 Leaves narrowly elliptic or rhombic to oblanceolate, not conspicuously falcate, (2.7-) 5-11 (-18) mm wide, (2.5-) 3.5-5 (-6)× as long as wide; leaf margins with (1-) 3-5 (-7) teeth per side; primary veins 3-5 (-7); mid-stem moderately to densely glandular pubescent (rarely glabrate); seeds (0.18-) 0.22-0.26 (-0.29) mm thick; [widespread] ..... ***Gratiola neglecta***
13 Leaves linear, linear-lanceolate, to elliptic-lanceolate, often falcate, (1-) 2.5-4 (-4.5) mm wide, (5.5-) 6-9.5 (-11)× as long as wide; leaf margins with 0-2 (-3) teeth per side; primary veins 1 (-3); mid-stem glabrous; seeds (0.19-) 0.26-0.32 (-0.37) mm thick; [limestone cedar glades of n. AL and c. TN] ..... ***Gratiola quartermaniae***

Gratiola amphiantha D. Estes & R.L. Small. POOL-SPRITE, SNORKELWORT. **Hab:** Vernal pools on granitic flatrocks. **Dist:** Endemic to granitic flatrocks of ec. AL, nc. GA (17 counties), and sc. SC. **Phen:** Apr. **Comm:** Hilton & Boyd (1996) and Patrick, Allison, & Krakow (1995) discuss the ecology and population ecology of this remarkable plant in detail. **Syn:** = FNA17, K3, K4, Estes & Small (2008); = *Amphianthus pusillus* Torrey – GW2, K1, RAB, S, Pennell (1935). NatureServe G2 (Imperiled); USESA T.

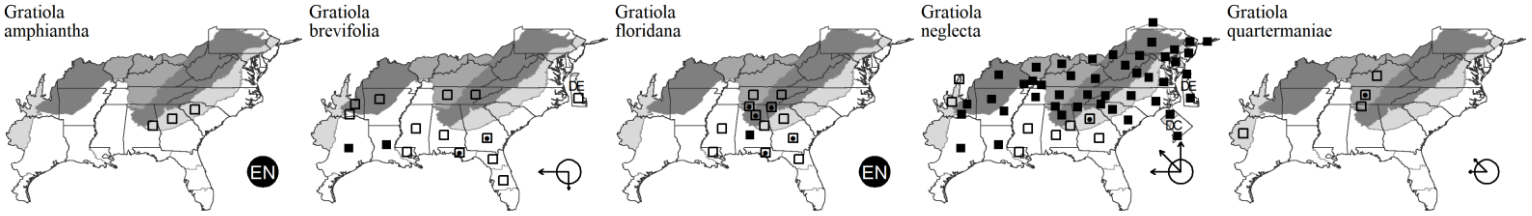
Gratiola brevifolia Rafinesque. STICKY HEDGE-HYSSOP. **Hab:** Floodplain forests, cypress swamps, other wet places. **Dist:** E. GA, south and west to c. peninsular FL, e. Panhandle FL, and se. AL; c. AR and se. OK; se. LA and e. TX; c. TN; s. DE (Knapp & Estes 2006). **Phen:** Apr-Jun (-Sep). **Comm:** Previous reports from SC are based on misidentifications (Knapp & Estes 2006). **Syn:** < *Gratiola brevifolia* Rafinesque – Ar, Fl6, FNA17, GW2, K1, K3, K4, S, Tn, Tx, WH3, Pennell (1935).

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Gratiola floridana Nuttall. FLORIDA HEDGE-HYSSOP. **Hab:** Stream banks, spring runs, blackwater swamps. **Dist:** Ne. GA, se. TN (in counties adjacent to NC) (Chester, Wofford, & Kral 1997), and e. KY, south to e. GA (in counties adjacent to SC) (Jones & Coile 1988), ne. FL, Panhandle FL, AL, and MS. **Phen:** Mar-May. **Syn:** = Fl6, FNA17, GW2, K1, K3, K4, S, Tn, WH3, Pennell (1935). NatureServe G4 (Apparently Secure).

Gratiola neglecta Torrey. MUD-HYSSOP, CLAMMY HEDGE-HYSSOP. **Hab:** Ditches, wet areas, bottomlands, wet cropped fields, brackish marshes. **Dist:** QC and ME west to BC, south to c. GA, e. TX, AZ, and CA. **Phen:** Mar-Oct. **Syn:** = FNA17, GrPl, Il, K3, K4, Mi, NE, NY, Tn, Va, Estes & Small (2007); < *Gratiola neglecta* Torrey – C, G, GW2, K1, NcTx, Pa, RAB, S, Tx, W, WV, Pennell (1935); < *Gratiola neglecta* var. *neglecta* – F.

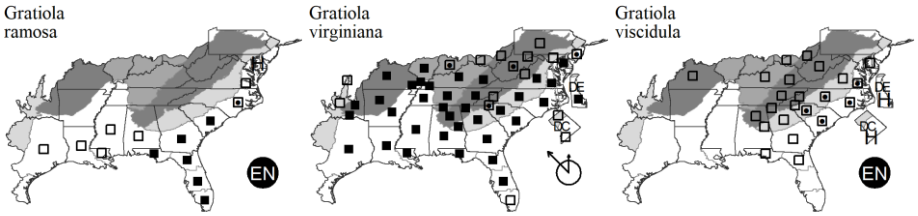
Gratiola quartermaniae D. Estes. LIMESTONE HEDGE-HYSSOP, QUARTERMAN'S HEDGE-HYSSOP. **Hab:** Pools in limestone glades, wet ditches. **Dist:** C. TN south to n. AL; nc. and c. TX (prairies and Edwards Plateau); s. ON; ne. IL. **Phen:** Apr-early Jun. **Syn:** = FNA17, Il, K3, K4, Tn, Estes & Small (2007); < *Gratiola neglecta* Torrey – C, G, GW2, K1, S, Tx, W, Pennell (1935); < *Gratiola neglecta* var. *neglecta* – F.



Gratiola ramosa Walter. BRANCHED HEDGE-HYSSOP. **Hab:** Wet pine savannas, pineland ponds and Carolina bays, marshes, pond margins; ditches. **Dist:** Se. NC south to s. FL, west to sw. LA; disjunct in se. VA (Greensville County) and (at least historically) in e. MD. **Phen:** May-Jun. **Syn:** = C, F, Fl6, FNA17, G, GW2, K1, K3, K4, RAB, S, Va, WH3, Pennell (1935). NatureServe G4G5 (Apparently Secure).

Gratiola virginiana Linnaeus. VIRGINIA HEDGE-HYSSOP, ROUND-FRUIT HEDGE-HYSSOP. **Hab:** Sluggish streams, bogs, wet areas. **Dist:** NJ west to OH and IA and KS, south to c. peninsular FL and e. TX. **Phen:** Mar-Oct. **Tax:** Var. *aestuariorum* Pennell, of s. NJ south to e. VA, is alleged to differ in being shorter, with more rounded leaves, short pedicels (< 2 mm long), a shorter calyx and corolla, and a smaller capsule; it is likely merely a stunted aquatic form, but needs additional study – see Fernald (1950) and Pennell (1935) for additional details. **Syn:** = Ar, C, Fl6, FNA17, G, GrPl, GW2, Il, Mi, NcTx, NY, RAB, S, Tn, Va, W, WH3, WV; > *Gratiola virginiana* var. *aestuariorum* Pennell – F, K1, K3, K4, Pennell (1935); > *Gratiola virginiana* var. *virginiana* – F, K1, K3, K4, NE, Pennell (1935).

Gratiola viscidula Pennell. VISCID HEDGE-HYSSOP, SHORT'S HEDGE-HYSSOP. **Hab:** Bogs, marshes, beaver ponds, wet areas, ditches, margins of Coastal Plain ponds. **Dist:** DE, MD and e. VA, south to c. SC and ne. GA; disjunct in s. OH, WV, e. TN, MO, and ne. FL. **Phen:** May-Nov. **Tax:** Spooner (1984) studied infraspecific taxa recognized in *G. viscidula* and determined that they did not warrant recognition. **Syn:** = C, F, Fl6, FNA17, GW2, K1, K3, K4, RAB, S, Tn, Va, W, WH3; > *Gratiola viscidula* var. *"shortii"* – G; > *Gratiola viscidula* var. *"viscidula"* – G; > *Gratiola viscidula* ssp. *shortii* Pennell – Pennell (1935); > *Gratiola viscidula* ssp. *typica* Pennell – Pennell (1935). NatureServe G4G5 (Apparently Secure).



Kickxia Dumortier 1827 (FLUELLEN, CANCERWORT)

A genus of about 9 species (following the removal of *Nanorrhinum* Betsche), annual herbs, of Mediterranean Europe west to c. Asia. Generic circumscription follows Yousefi, Zarre, & Heubl (2016). References: Elisens (2019b) in FNA17 (2019); Ghebrehiwet (2000); Pennell (1935); Sutton (1988); Yousefi, Zarre, & Heubl (2016).

1 Leaves triangular-ovate or hastate, truncate at the base; pedicels glabrous through much of their length or villous; [more widespread alien] ..... ***Kickxia elatine***

1 Leaves round-ovate, rounded to cordate at the base; pedicels villous throughout their length; [ballast and other waif] ..... ***Kickxia spuria***

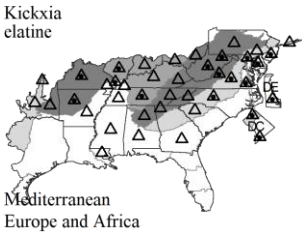
* ***Kickxia elatine*** (Linnaeus) Dumortier. SHARP-LEAVED FLUELLEN, MALE FLUELLEN. **Hab:** Gravel bars, road shoulders, railroad embankments, other disturbed areas. **Dist:** Native of Mediterranean Europe, n. Africa, and w. Asia. **Phen:** May-Nov. **Tax:** Two infraspecific taxa are sometimes recognized (as by Sutton 1988), especially in the European literature. Ssp. *crinita* (Mabille) W. Greuter is considered to differ from the typic subspecies in having stems densely villous (vs. sparsely villous), the stems robust, usually 1.5-3.5 mm thick, often much-branched (vs. slender, to 1.5 mm thick, sparingly if at all branched, and pedicels 5-12 (-20) mm long, 0.25-0.35 mm in diameter, often villous their entire lengths (vs. pedicels mostly (8-) 15-25 (-30) mm long, 0.1-0.2 mm in diameter, glabrous except for immediately below the calyx). It is unclear the degree to which these characters are well-correlated and describe useful taxa, and whether distinctions made in its native range apply well in North America. **Syn:** = Ar, C, F, FNA17, G, GrPl, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Va, Ghebrehiwet (2000), Pennell (1935); > *Kickxia elatine* ssp. *crinita* – Sutton (1988); > *Kickxia elatine* ssp. *elatine* – Sutton (1988). NatureServe GNR (Not Yet Ranked).

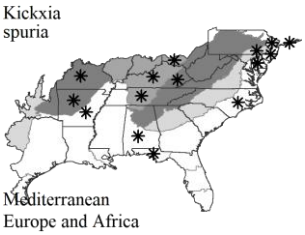
* ***Kickxia spuria*** (Linnaeus) Dumortier. ROUND-LEAVED FLUELLEN, FEMALE FLUELLEN. **Hab:** Ballast near old ports (Wilmington, NC; Pensacola, FL; Mobile, AL; etc.), streambanks, other disturbed sites, perhaps only a waif. **Dist:** Native of Mediterranean Europe, n. Africa, and w. Asia. **Phen:** May-Sep. **Syn:** = Ar, C, F, Fl6, FNA17, G, GrPl, K1, K3, K4, NE, NY, Pa, RAB, S, WH3, Ghebrehiwet (2000), Pennell (1935); > *Kickxia spuria* ssp. *spuria* – Sutton (1988). NatureServe GNR (Not Yet Ranked).

Key to Map Symbology: □⊡■ └native┘ ◇◈◆ └maybe exotic┘ △◬▲ └exotic┘ ←rare ←uncommon ←common (see introduction for more)

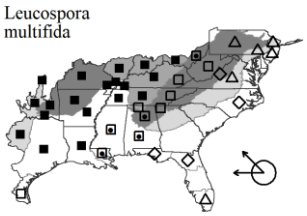
* : waif EN : endemic H : historic

N : no P : planted ? : questionable X : extirpated





Leucospora Nuttall 1834 (LEUCOSPORA)



A genus of 2 species, herbs, of e. North America and Coahuila, Mexico. *Leucospora* may not be distinct from *Stemodia*. References: Freeman (2019c) in FNA17 (2019); Pennell (1935); Turner & Cowan (1993).

Leucospora multifida (Michaux) Nuttall. LEUCOSPORA, NARROWLEAF PALESEED. **Hab:** Moist to wet, sandy margins of artificial ponds, drawdown areas on riverbanks, streambanks, drawdown depressional wetlands, other seasonally ponded disturbed areas, probably introduced in some of our area from c. United States. **Dist:** S. ON west to IA and KS, south to nw. GA, AL, LA, and e. TX; scattered occurrences farther east (as in e. NC, FL, KY, TN, VA, and se. PA) may be recent introductions. **Phen:** May-Oct. **Syn:** = Ar, C, Fl6, FNA17, G, GrPl, GW2, Il, K1, K3, K4, Mi, NcTx, NY, Pa, S, Tn, Tx, Va, Pennell (1935); = *Conobea multifida* (Michaux) Bentham – F, WH3; = *Stemodia multifida* (Michaux) Sprengel – Turner & Cowan (1993). NatureServe G5 (Secure).

Linaria P. Miller 1754 (YELLOW-TOADFLAX)

A genus of about 160 species, of temperate regions of Eurasia and less commonly North and South America. Following the analyses of Fernández-Mazuecos, Blanco-Pastor, & Vargas (2013), Ogutcen & Varnosi (2016), and Yousefi, Heubl, & Zarre (2017) it seems best to include *Nuttallanthus* in *Linaria* as section *Lectoplectron*. References: Fernández-Mazuecos, Blanco-Pastor, & Vargas (2013); Freeman (2019j) in FNA17 (2019); Ogutcen & Varnosi (2016); Pennell (1935); Sáez Goñalons (2019) in FNA17 (2019); Sutton (1988); Yousefi, Heubl, & Zarre (2017).

1 Styles bifid, with 2 distinct stigmatic surfaces; corolla primarily reddish-purple or magenta (the palate red, yellow, or whitish); capsule 3-7 mm long; plants annuals, with no stolons or rhizomes; seeds wingless; [section *Versicolores*].
.....***Linaria maroccana***
1 Styles simple, with a single stigmatic surface; corolla blue, pale bluish-violet, bright yellow, light yellow, or white; capsule 2-12 mm long; plants annuals, biennials, or perennials; seeds winged or wingless.
3 Corollas yellow; plants perennials; [aliens].
.....***Linaria vulgaris***
3 Corollas blue, violet, pale bluish-white, or white; plants annuals, biennials, or perennials; [natives (often weedy) and aliens].
7 Infructescence axis zigzag; fruiting pedicels densely glandular pubescent, 5-13 mm long, 2× or more as long as the calyx; corolla spur almost obsolete, reduced to a bulge 0.1-0.4 mm long.....***Linaria floridana***
7 Infructescence axis straight or nearly so; fruiting pedicels glabrous or with a few scattered glandular hairs, 2-6 (-9) mm long, < 1× as long as the calyx; corolla spur 2-11 mm long.
8 Corolla 8-11 (-14) mm long (measured from the tip of the spur to the tip of the middle lobe of the lower lip), the lower lip 2-4.5 (-6) mm long; seeds longitudinally ridged, the intervening faces smooth or with sparse low tubercles.....***Linaria canadensis***
8 Corolla (11-) 14-22 mm long (measured from the tip of the spur to the tip of the middle lobe of the lower lip), the lower lip 5-11 mm long; seeds densely tuberculate, not longitudinally ridged .....***Linaria texana***

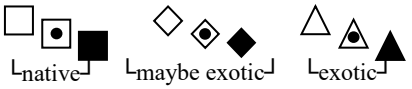
Linaria canadensis (Linnaeus) Dumont de Courset. COMMON TOADFLAX. **Hab:** In a wide variety of natural and disturbed habitats, especially common and weedy in disturbed sites such as roadsides and fields, also common and apparently native in thin soil of rock outcrops. **Dist:** NS west to ND, south to s. FL and TX; also adventive on the west coast, from WA to CA. **Phen:** Mar-Aug; Apr-Nov. **Tax:** Sutton (1988) comments that there is substantial variation in this species not taxonomically explained. **Syn:** = Fl6, K4, Pa, Tx, WH3, WV, Pennell (1935), Yousefi, Heubl, & Zarre (2017); = *canadensis var.* – C, F, G, GrPl, S; = *Nuttallanthus canadensis* (Linnaeus) D.A. Sutton – Ar, FNA17, Il, K1, K3, Mi, NcTx, NE, NY, Tn, Va, Sutton (1988); < *Linaria canadensis* (Linnaeus) Dumont de Courset – RAB, W. NatureServe G5 (Secure).

Linaria floridana Chapman. FLORIDA TOADFLAX. **Hab:** Sandhills, scrub, dunes, other dry, sandy places. **Dist:** E. GA south to s. FL and west to s. MS. **Syn:** = Fl6, K4, S, WH3, Pennell (1935), Yousefi, Heubl, & Zarre (2017); = *Nuttallanthus floridanus* (Chapman) D.A. Sutton – FNA17, K1, K3, Sutton (1988). NatureServe G3G5 (Apparently Secure).

* ***Linaria maroccana*** Hooker f. MOROCCAN TOADFLAX. **Hab:** Disturbed areas. **Dist:** Native of n. Africa. This species is being included in "wildflower mixes", and should be expected to be encountered as a waif at other locations through our region. Introduced in VA (perhaps just a waif) and WV. Reported as adventive in Alleghany County, NC (Poindexter, Weakley, & Denslow 2011). **Phen:** Jul-Sep. **Syn:** = K1, K3, K4, NE, NY, Sutton (1988). NatureServe GNR (Not Yet Ranked).

Linaria texana Scheele. TEXAS TOADFLAX. **Hab:** Granite flatrocks, grassy pinelands, dry sandy soils, disturbed soils of roadsides and fields. **Dist:** Native of sc. United States, the eastern extent of the original range unclear. **Phen:** (Feb-) Mar-Aug; Apr-Nov. **Syn:** = Fl6, K4, Tx, WH3, Pennell (1935), Yousefi, Heubl, & Zarre (2017); = *Linaria canadensis* var. *texana* (Scheele) Pennell – C, F, G, GrPl, S; = *Nuttallanthus texanus* (Scheele) D.A. Sutton – Ar, FNA17, Il, K1, K3, NcTx, Tn, Va, Sutton (1988); < *Linaria canadensis* (Linnaeus) Dumont de Courset – RAB, W. NatureServe G4G5 (Apparently Secure).

* ***Linaria vulgaris*** P. Miller. BUTTER-AND-EGGS, YELLOW TOADFLAX, WILD-SNAPDRAGON. **Hab:** Fields, pastures, roadsides, disturbed areas. **Dist:** Native of Europe. Reported for Coastal Plain of GA (Taylor County) by Carter, Baker, & Morris (2009). **Phen:** (Mar-) May-Nov. **Syn:** = Ar, C,

Key to Map Symbology: 

* : waif
EN : endemic
H : historic
N : no
P : planted
? : questionable
X : extirpated

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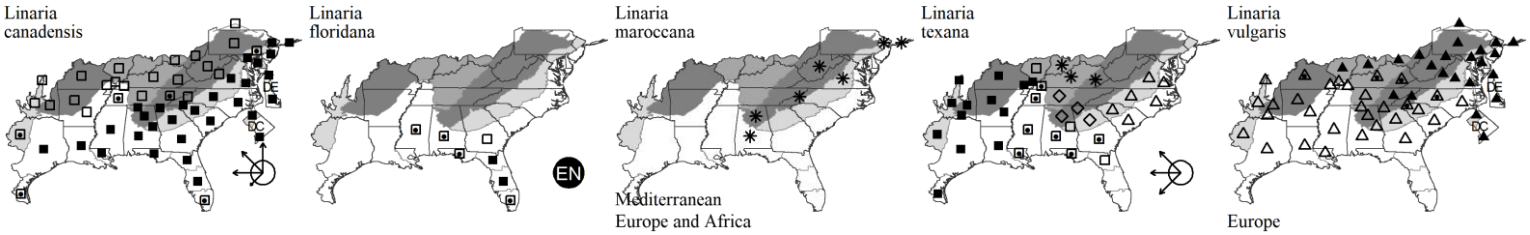
F, FNA17, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, W, WV, Pennell (1935), Sutton (1988); = *Linaria linaria* (Linnaeus) Karsten – S. NatureServe GNR (Not Yet Ranked).



Mecardonia Ruiz & Pavón 1794 (MECARDONIA, AXIL-FLOWER)

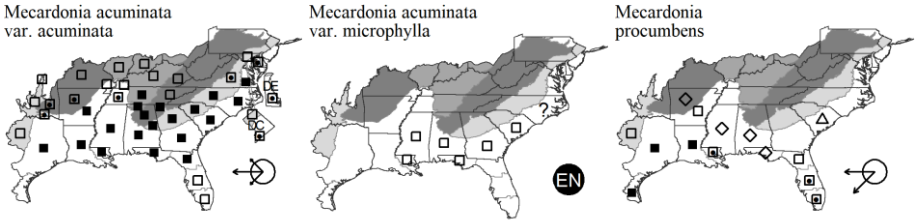
A genus of about 10 species, of tropical, subtropical, and warm temperate regions of America. References: Ahedor (2019b) in FNA17 (2019); Pennell (1935).

1 Corolla yellow, with reddish veins; outer sepals broadly lanceolate to ovate, overlapping the shorter, much narrower inner sepals..... ***Mecardonia procumbens***
1 Corolla white, with purple veins; sepals lanceolate nearly equal in length.
2 Pedicels (in fruit) 10-18 mm long; sepals > 2 mm wide ..... ***Mecardonia acuminata var. microphylla***
2 Pedicels (in fruit) 16-35 mm long; sepals < 2 mm wide.
..... ***Mecardonia acuminata var. acuminata***

Mecardonia acuminata (Walter) Small *var*. ***acuminata***. MECARDONIA, COMMON AXIL-FLOWER. **Hab:** Marshes, ditches, wet pine savannas, bottomland forests, wet disturbed areas. **Dist:** DE and MD south to n. peninsular FL, west to e. TX, north in the interior to KY, TN, and MO. **Phen:** Jul-Sep; Aug-Oct. **ID Notes:** The long, ascending pedicels are distinctive for the species. The plant blackens on drying. **Syn:** = FNA17, K1, K3, K4, S, Va; = *Mecardonia acuminata* ssp. *acuminata* – Fl6, WH3; = *Pagesia acuminata* (Walter) Pennell ssp. *typica* – Pennell (1935); < *Bacopa acuminata* (Walter) B.L. Robinson – F; < *Mecardonia acuminata* – Ar, C, G, GrPl, GW2, Il, NcTx, RAB, Tn, Tx. NatureServe G5T5 (Secure).

Mecardonia acuminata (Walter) Small *var*. ***microphylla*** (Rafinesque) Pennell. POND AXIL-FLOWER. **Hab:** Margins of Coastal Plain ponds, wet pine savannas. **Dist:** Sc. GA south to Panhandle FL and west to e. LA; also reported for SC and NC (Ahedor in FNA17). **Phen:** Jul-Oct. **Syn:** = FNA17, K1, K3, K4, S; = *Mecardonia acuminata* ssp. *microphyla* – Fl6, WH3, (misspelling); = *Pagesia acuminata* (Walter) Pennell ssp. *microphylla* (Rafinesque) Pennell – Pennell (1935); < *Mecardonia acuminata* – GW2. NatureServe G5TNR (Not Yet Ranked).

Mecardonia procumbens (Miller) Small. BABY JUMP-UP. **Hab:** Ponds, streams, ditches, moist shores. **Dist:** FL, AL, MS, AR, TX, NM, and AZ south. Reported for MS (Philley 2020). **Phen:** (Mar-) Jun-Sep (-Feb). **ID Notes:** Often mistaken for a yellow-flowered *Gratiola*. **Syn:** = Fl6, K1, K3, K4, NcTx, WH3; = *Pagesia procumbens* (Miller) Pennell – Pennell (1935); > *Mecardonia procumbens* (Miller) Small – S; > *Mecardonia tenuis* Small – S; ? *Mecardonia vandelliodes* (Kunth) Pennell – GW2, misspelled; ? *Mecardonia vandellioides* (Kunth) Pennell – Tx.



Penstemon Schmidel 1763 (BEARDTONGUE, PENSTEMON)

Contributed by Alan S. Weakley and Dwayne Estes

A genus of about 280 species, perennial herbs and shrubs, of w. North America, e. North America, and (a single species) ne. Asia. References: Bennett (1963); Clements, Baskin, & Baskin (1998); Estes (2012); Freeman (2019d) in FNA17 (2019); Pennell (1935).

5 Inflorescence with many nodes; anther cells dehiscing by short proximal slits; [s. GA south to s. FL] ..... ***Penstemon multiflorus***
5 Inflorescence with <10 nodes; anther cells dehiscing their entire length; [collectively widespread].
7 Mid and upper stem (but below the inflorescence) glabrous or with short eglandular hairs distributed in patches or lines; lower lobes of the corolla essentially equaling the upper lobes; corolla throat not strongly 2-ridged within, the tube conspicuously dilated into the throat; [*Penstemon digitalis* complex].
8 Corolla 20-35 mm long.
9 Corollas purplish to lavender; sepals linear-lanceolate, straight and attenuate, 5-9 mm long at anthesis; anthers glabrous to papillose .....
..... ***Penstemon calycosus***
9 Corollas white with purple lines; sepals ovate to ovate-lanceolate, acuminate, 4.5-6.5 mm long at anthesis; anthers with several to many hairs .....
..... ***Penstemon digitalis***
8 Corollas 15-23 mm long.
..... ***Penstemon laevigatus***

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

7 Mid and upper stem (but below the inflorescence) pubescent throughout, consisting of short eglandular hairs and sometimes also with an overstory of longer glandular hairs; lower lobes of the corolla projecting beyond the upper lobes; corolla throat strongly 2-ridged on its floor, the tube also slightly to moderately dilated into the throat.
12 Stem vestiture (mid and upper stem, but below the inflorescence) of short eglandular hairs only (or rarely also with a few glandular hairs in *P. smallii*).
13 Leaves 4-28 mm wide, 4-5× as long as wide ..... ***Penstemon laxiflorus***
13 Leaves 15-60 mm wide, 2.5-4× as long as wide; [*Penstemon smallii* complex].
14 Corollas 28-35 mm long, lavender, violet, or purple; staminodes 15-18 mm long, densely bearded in the upper 13-15 mm; largest leaf blades mostly 30-60 mm wide ..... ***Penstemon smallii***
14 Corollas 10-16 mm long, pale lavender, pink, violet, or almost white; staminodes 7-9 mm long, densely bearded in the upper 4-5 mm; largest leaf blades mostly 10-40 mm wide.
..... ***Penstemon kralii***
12 Stem vestiture (mid and upper stem, but below the inflorescence) of a mixture of long glandular hairs and short eglandular hairs.
16 Corolla throats closed or nearly so (the lower lip arching upwards and pressing against the upper lip); corollas unlined or very obscurely lined (except strongly lined in *P. australis*).
17 Corollas lined; inflorescence branches erect-ascending, nearly paralleling the inflorescence axes ..... ***Penstemon australis***
17 Corollas unlined; inflorescence branches spreading-ascending, obviously diverging from the vertical inflorescence axis; [*Penstemon hirsutus* complex].
..... ***Penstemon tenuiflorus***
16 Corolla throats open, not as described above (except sometimes nearly closed in *P. australis*); corollas lined, at least internally; [*Penstemon canescens* complex].
20 Corollas 14-23 mm long.
..... ***Penstemon pallidus***
20 Corollas 20-32 mm long.
22 Inflorescence branches erect-ascending, nearly paralleling the inflorescence axes; sepals 4-5.2 mm long; corollas 20-25 mm long; corolla:calyx length ratio 4-5 ..... ***Penstemon australis***
22 Inflorescence branches spreading-ascending, obviously diverging from the vertical inflorescence axis; sepals 3.2-4.5 mm long; corollas 20-30 mm long; corolla:calyx length ratio 7-9 ..... ***Penstemon canescens***

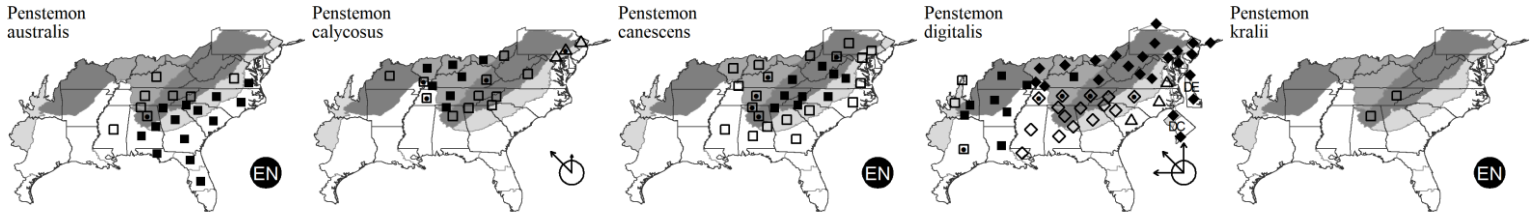
Penstemon australis Small. SOUTHERN BEARDTONGUE, SANDHILL BEARDTONGUE. **Hab:** Longleaf pine sandhills, pine flatwoods, dry hammocks, dry sandy roadsides, woodland margins. **Dist:** Se. VA south to c. peninsular FL, west to s. and wc. AL, primarily on the Coastal Plain, but not uncommon westward into the Piedmont and lower Mountains, and extending in the interior into c. TN. **Phen:** May-Jul; Jul-Aug. **Syn:** = Fl6, FNA17, K1, K3, K4, S, Clements, Baskin, & Baskin (1998), Estes (2012), Pennell (1935); = *Penstemon australis* ssp. *australis* – Bennett (1963); < *Penstemon australis* Small – C, F, G, RAB, Va, W, WH3. NatureServe G5TNR (Not Yet Ranked).

Penstemon calycosus Small. LONG-SEPAL BEARDTONGUE. **Hab:** Limestone ledges, other woodlands. **Dist:** OH, s. MI, IL, and se. MO (Freeman & Morse 2019) south to w. VA, GA, and AL. **Phen:** May-Jul. **Syn:** = F, FNA17, G, GW2, Il, K1, K3, K4, Mi, NE, NY, Pa, S, Tn, Va, W, Clements, Baskin, & Baskin (1998), Estes (2012), Pennell (1935); = *Penstemon laevigatus* ssp. *calycosus* (Small) R.W. Bennett – Bennett (1963); < *Penstemon laevigatus* Aiton – C.

Penstemon canescens (Britton) Britton. APPALACHIAN BEARDTONGUE. **Hab:** Woodlands, glades, forest edges, rocky woodlands, roadsides. **Dist:** PA and s. IN south to nc. GA, n. AL, and c. TN. **Phen:** May-Jul. **Syn:** = F, FNA17, G, Il, K4, S, Va, WV; > *Penstemon brittonorum* Pennell – S; > *Penstemon canescens* (Britton) Britton – C, K1, K3, Pa, RAB, W, Clements, Baskin, & Baskin (1998); > *Penstemon canescens* var. *brittonorum* (Pennell) Pennell – Pennell (1935); > *Penstemon canescens* var. *typicus* – Pennell (1935).

Penstemon digitalis Nuttall ex Sims. TALL WHITE BEARDTONGUE, SMOOTH BEARDTONGUE. **Hab:** Alluvial forests, moist fields, disturbed areas, ditches. **Dist:** NS and ME west to MN and SD, south to e. VA, w. SC, AL, and TX. The original distribution is somewhat uncertain. **Phen:** May-Jul; Jul-Aug. **Syn:** = C, F, FNA17, G, GrPl, GW2, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Tx, Va, W, WV, Clements, Baskin, & Baskin (1998), Estes (2012), Pennell (1935); < *Penstemon digitalis* Nuttall ex Sims; > *Penstemon laevigatus* ssp. *digitalis* (Nuttall ex Sime) R.W. Bennett var. *angustus* R.W. Bennett – Bennett (1963); > *Penstemon laevigatus* ssp. *digitalis* (Nuttall ex Sims) R.W. Bennett var. *digitalis* – Bennett (1963).

Penstemon kralii D. Estes. KRAL'S BEARDTONGUE. **Hab:** Dry, calcareous juniper-oak-hickory woodlands. **Dist:** Endemic to the sw. Cumberland Escarpment of ne. AL and se. Tennessee (Blount, Madison, Morgan, and Jackson counties, AL, and Franklin County, TN. **Phen:** May-Jun. **Tax:** See Estes (2012) for detailed information. **Syn:** = FNA17, K3, K4, Tn, Estes (2012). NatureServe G2 (Imperiled).



Penstemon laevigatus Aiton. EASTERN SMOOTH BEARDTONGUE. **Hab:** Low meadows, bottomlands, forest edges, hammocks. **Dist:** ME west to MI, south to s. GA, Panhandle FL, MS, and AR. **Phen:** May-Jul; Jul-Aug. **Syn:** = F, Fl6, FNA17, G, GW2, K1, K3, K4, NE, Pa, RAB, Tn, Va, W, WH3, WV, Clements, Baskin, & Baskin (1998), Estes (2012), Pennell (1935); = *Penstemon laevigatus* ssp. *laevigatus* – Bennett (1963); = *Penstemon pentstemon* (Linnaeus) MacMillan – S; < *Penstemon laevigatus* Aiton – C, (also see P. calycosus).

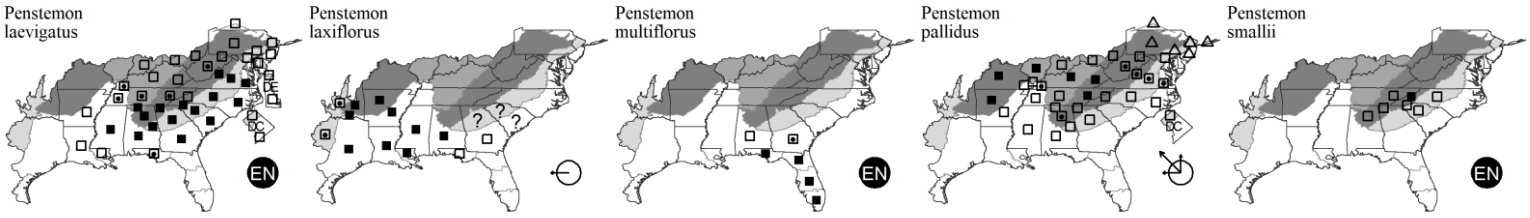
Penstemon laxiflorus Pennell. NODDING BEARDTONGUE. **Hab:** Dry sandy areas in woodlands and openings. **Dist:** C. GA, FL Panhandle, and n. AL west to c. OK and c. TX. **Phen:** Apr-May. **Syn:** = Ar, FNA17, GrPl, K1, K3, K4, NcTx, S, Tx, Clements, Baskin, & Baskin (1998), Pennell (1935); = *Penstemon australis* Small ssp. *laxiflorus* (Pennell) Bennett – Bennett (1963); < *Penstemon australis* Small – WH3. NatureServe G5T4 (Apparently Secure).

Penstemon multiflorus Chapman ex Bentham. **Hab:** Longleaf pine sandhills, dry pine flatwoods, pine rocklands. **Dist:** S. and e. GA and s. AL south to s. FL. **Phen:** Mar-Jul (-Aug). **Syn:** = Fl6, FNA17, K1, K3, K4, S, WH3, Clements, Baskin, & Baskin (1998), Estes (2012), Pennell (1935). NatureServe G4 (Apparently Secure).

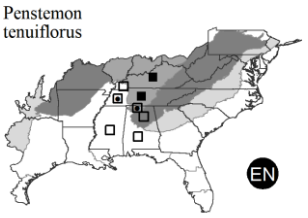
Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Penstemon pallidus Small. EASTERN WHITE BEARDTONGUE. **Hab:** Limestone and shale barrens, other dry, disturbed areas. **Dist:** ME west to MN, south to NC, GA, and AR. **Phen:** May-Jun. **Syn:** = Ar, C, F, FNA17, G, GrPl, Il, K1, K4, Mi, NE, NY, Pa, RAB, S, Va, W, Clements, Baskin, & Baskin (1998), Estes (2012), Pennell (1935); = *Penstemon pallidus* ssp. *pallidus* – Bennett (1963); < *Penstemon pallidus* Small – K3.

Penstemon smallii A. Heller. BLUE RIDGE BEARDTONGUE. **Hab:** Woodlands, cliffs, glades, roadbanks. **Dist:** A Southern Appalachian endemic, distributed from nw. NC and ne. TN south to nw. SC, n. GA, and n. AL. **Phen:** May-Jun (-Jul); Jul-Aug. **Syn:** = FNA17, K1, K3, K4, RAB, S, Tn, W, Clements, Baskin, & Baskin (1998), Estes (2012), Pennell (1935). NatureServe G3 (Vulnerable).



Penstemon tenuiflorus Pennell. PLATEAU BEARDTONGUE, LIMESTONE BEARDTONGUE, KENTUCKY BEARDTONGUE. **Hab:** Dry woodlands, glades, prairies, barrens, cliffs, especially over limestone or other calcareous rocks. **Dist:** Endemic to the Interior Low Plateau of wc. KY, c. TN, n. AL, extending slightly into the Coastal Plain to the west, and disjunct in the Black Belt of AL and MS. **Phen:** Apr-Jun. **Syn:** = C, F, FNA17, G, K1, K3, K4, S, Tn, Clements, Baskin, & Baskin (1998), Estes (2012), Pennell (1935). NatureServe G4? (Apparently Secure).



Plantago Linnaeus 1753 (PLANTAIN)

A genus of about 270 species, herbs and rarely shrubs, of cosmopolitan distribution. Harper (1944) discusses at length the interesting issue of the native distributions of the many weedy species of *Plantago*. The native or introduced status of many of our species is uncertain or controversial. References: Bassett (1966); Bassett (1967); Hassemer et al (2019); Rosatti (1984); Schwarzbach in Kadereit (2004); Shipunov (2019b) in FNA17 (2019).

2 Leaves pinnatifid; [subgenus *Coronopus*, section *Coronopus*] ..... ***Plantago coronopus***
2 Leaves unlobed and either entire or toothed (if so, obscurely so in most species).
  3 Leaf venation pinnate, some major veins departing from the midvein well above the leaf base; summer and winter leaves dimorphic, the winter leaves lanceolate (typically submersed), the summer leaves ovate or cordate (emersed except in floods); plants perennial from a thick, fleshy rootstock that is typically 3-8 cm wide near its summit, with a cavity below (like an inverted bowl), and with 3-10 fleshy roots 3-15 mm thick descending or spreading from the bowl rim; capsule 2-4-seeded; scapes hollow and terete; [aquatic or semi-aquatic]; [subgenus *Plantago*, section *Heptaneuron*] ..... ***Plantago cordata***
  3 Leaf venation parallel, with all of the major veins separating at the base of the leaf blade; leaves not dimorphic; plants either perennial from thin, fibrous roots or an erect caudex, or annual from a small taproot; capsule 2-30-seeded; scapes solid, terete or 5-angled; [terrestrial or wetland].
    4 Leaves ovate to broadly lanceolate or broadly oblanceolate, 1-10× as long as wide, distinctly broadened upward from a petiolar base, the larger leaves > 1 cm wide.
      5 Leaves broadly ovate-elliptic, the blades 1-3× as long as wide, distinctly petiolate; scapes solid and terete.
        7 Fruit (3-) 4-6 mm long, dehiscent below the middle (the terminal portion about 2× as long as the basal); sepals narrowly elliptic, 2-4× as long as wide, mostly acute; petioles usually purple and glabrous at the base; well-developed leaves with 5-7 major veins; seeds 4-10 per capsule, each 1.5-2.0 (-2.5) mm long; [subgenus *Plantago*, section *Pacifica*] ..... ***Plantago rugelii***
        7 Fruit (2-) 2.5-4 mm long, dehiscent near the middle (the terminal portion about as long as the basal); sepals broadly ovate, ca. 1.5× as long as wide, mostly obtuse; petioles usually green and pubescent at the base; well-developed leaves with 3-5 major veins; seeds (4-) 6-22 (-34) per capsule, each 0.7-1.7 mm long; [subgenus *Plantago*, section *Plantago*].
        ..... ***Plantago major***
      5 Leaves mostly broadly oblanceolate, broadly lanceolate, or spatulate, (3-) 4-10× as long as wide, attenuate to the only somewhat petiolar base; scapes solid and 5-angled, or hollow (to solid) and terete.
        9 Bracts and calyx glabrous; perennial, flowering Apr-Nov.
        ..... ***Plantago lanceolata***
        9 Bracts and calyx pubescent, at least on the keels; annual or perennial; flowering late Mar-Aug; [subgenus *Plantago*, section *Virginica*].
        ..... ***Plantago virginica***
    4 Leaves linear or narrowly lanceolate, (8-) 10-25× as long as wide, only slightly (if at all) broadened upward, the base not petiolar, the leaves typically < 1 cm wide.
      14 Seeds (3-) 4-25 (-30) per capsule; corollas radially symmetrical, the lobes 0.5-1 mm long; stamens 2; [subgenus *Plantago*, section *Micropsyllium*]
        15 Seeds 0.5-0.8 mm long; capsules with 10-25 (-30) seeds ..... ***Plantago heterophylla***
        15 Seeds 0.8-2.5 mm long; capsules with (3-) 4-9 (-12) seeds.
        ..... ***Plantago pusilla***
      14 Seeds 2 per capsule; corollas bilaterally or radially symmetrical, the lobes 1.3-3.6 mm long; stamens 4; [subgenus *Psyllium*, section *Gnaphaloides*].
        18 Stems (below the lowermost flowers) 20-40 cm long; bracts subtending the flowers either 2-3 mm long or 10-30 mm long.
          19 Bracts subtending the flowers 10-30 mm long; uppermost corolla lobe 1.4-2.3 mm long ..... ***Plantago aristata***
          19 Bracts subtending the flowers 2-3 mm long; uppermost corolla lobe 2.4-3.0 mm long ..... ***Plantago wrightiana***
        18 Stems 0-15 mm long; bracts 1.5-10 mm long; [mainly OK and TX westwards, rarely adventives eastwards].
          20 Leaves 4-10 mm wide, the margins toothed, the teeth to 4 mm long (rarely entire); corolla lobes 2.2-2.5 mm long ..... ***Plantago hookeriana***
          20 Leaves 1-4 mm wide, the margins entire (rarely toothed); corolla lobes 1.6-2.1 mm long ..... ***Plantago patagonica***

Plantago aristata Michaux. BUCKHORN PLANTAIN, LARGEBRACTED PLANTAIN. **Hab:** Sandy and other barren soils, disturbed areas, especially dry, barren, exposed soil, such as clay soils denuded by bulldozing. **Dist:** The original distribution obscure; perhaps from OH west to NE, south to

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

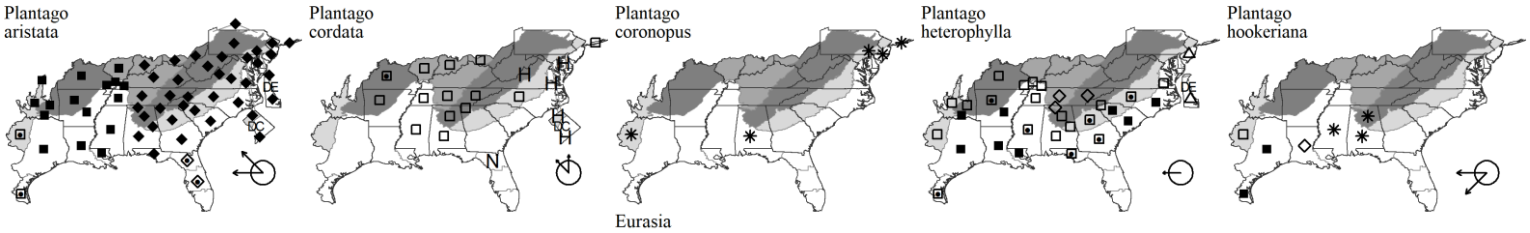
Panhandle FL and TX. **Phen:** Late Apr-Nov. **Syn:** = Ar, C, F, Fl6, FNA17, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV, Rosatti (1984). NatureServe G5 (Secure).

Plantago cordata Lamarck. KING-ROOT, HEARTLEAF PLANTAIN. **Hab:** Aquatic or semi-aquatic in streambeds with outcrops of slate, limestone, or calcareous clay, and aquatic in tidal estuaries. **Dist:** NY and s. ON west to WI, south to w. VA, c. NC, nw. GA, AL, sc. TN, and MO, very scattered and rare in every state in which it occurs, except MO. *P. cordata* is not known to be extant in VA, where it formerly occurred in the estuary of the Potomac River and in Smyth County in sw. VA. In NC, *P. cordata* is apparently limited to two slate-bottomed streams in s. Davidson County. **Phen:** Mar-May; May-Jul. **Tax:** A study of morphological and genetic variability in the species found the two NC populations to "represent sites of primary [conservation] concern with unique genetic composition" (Mymudes & Les 1993). **ID Notes:** Characteristically, *P. cordata* is a very robust plant, the inflorescences up to 1 meter in height, and the glabrous leaves with ovate blades to 30 cm long and 20 cm wide, on ascending petioles up to 40 cm long and 2 cm wide. Winter leaves are 3-10 cm long, ca. 1 cm wide, and remotely toothed. Spring leaves show a gradual transition from the winter form to the summer form. **Syn:** = Ar, C, F, FNA17, G, GW2, Il, K1, K3, K4, Mi, NY, RAB, S, Tn, Va, W, Bassett (1967), Rosatti (1984). NatureServe G4 (Apparently Secure).

* ***Plantago coronopus*** Linnaeus. BUCKHORN PLANTAIN. **Hab:** Disturbed areas, especially on ballast at old ports, and probably only a waif. **Dist:** Native of Eurasia. **Phen:** Late Apr-Jul. **Syn:** = C, F, FNA17, G, K3, K4, NcTx, NE, NY. NatureServe G5 (Secure).

Plantago heterophylla Nuttall. SLENDER PLANTAIN, MANY-SEEDED PLANTAIN, SMALL PLANTAIN. **Hab:** Fields, roadsides, disturbed areas. **Dist:** Se. VA and MO south to Panhandle FL and TX; adventive at scattered sites farther north (at least as far north as NY). **Phen:** Mar-May. **ID Notes:** Superficially similar to *P. pusilla*. **Syn:** = Ar, C, F, Fl6, FNA17, G, Il, K1, K3, K4, NcTx, NY, RAB, S, Tn, Va, W, WH3, Bassett (1966), Rosatti (1984); = *Plantago hybrida* W. Barton – GW2, Tx, (an older name but of uncertain application). NatureServe G5 (Secure).

Plantago hookeriana Fischer & C.A. Meyer. TALLOW-WEED. **Hab:** Sandy, gravelly, or rocky areas, dunes, clay flats; eastwards adventive in disturbed areas. **Dist:** Native of sc. North America: e., c. and w. TX south to n. Mexico (CHI, COA, TAM, NLE), scattered eastwards as a waif. **Phen:** Mar-Jul. **Syn:** = FNA17, K3, K4, NcTx, Tx.



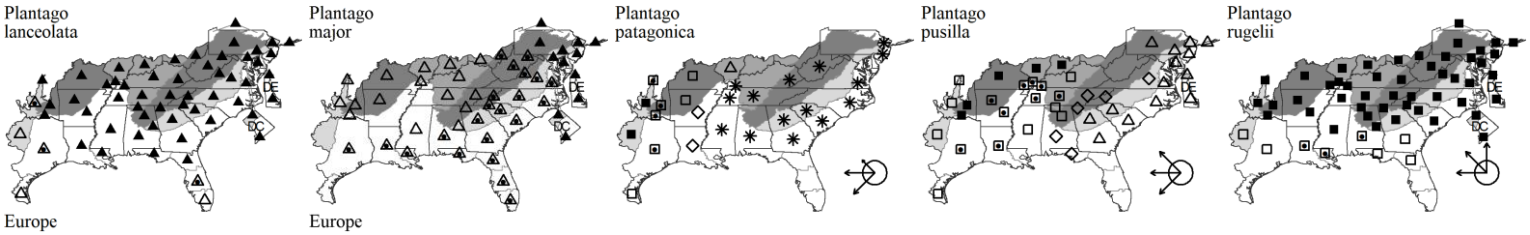
* ***Plantago lanceolata*** Linnaeus. ENGLISH PLANTAIN, RIB-GRASS, NARROWLEAF PLANTAIN. **Hab:** Lawns, roadsides, disturbed areas. **Dist:** Native of Europe. **Phen:** Apr-Nov. **Syn:** = Ar, Bah, C, Fl6, FNA17, GrPl, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV, Rosatti (1984); > *Plantago lanceolata* var. *angustifolia* Poiret – G; > *Plantago lanceolata* var. *lanceolata* – F, G; > *Plantago lanceolata* var. *sphaerostachya* Mertens & Koch – F, G. NatureServe G5 (Secure).

* ***Plantago major*** Linnaeus. COMMON PLANTAIN, WHITE-MAN'S-FOOT. **Hab:** Lawns, roadsides, disturbed areas. **Dist:** Native of Europe, possibly also native in ne. North America, possibly as far south as the northern part of our area. **Phen:** May-Nov. **Tax:** Very variable, and possibly worthy of some of the infraspecific subdivisions suggested by various authors. The Coastal Plain populations associated with the Chesapeake Bay in VA may represent a native, estuarine genotype. **Syn:** = Fl6, GrPl, GW2, Il, K4, Mi, NcTx, NY, RAB, S, Tn, Tx, Va, W, WH3, WV, Rosatti (1984); = *Plantago major* ssp. *major* – G; < *Plantago major* Linnaeus – C, FNA17, K1, K3, Pa; > *Plantago major* var. *major* – F; > *Plantago major* Linnaeus – F.

Plantago patagonica Jacquin. WOOLLY PLANTAIN. **Hab:** Sandy, gravelly, and rocky soils, prairies; eastwards on roadsides and in disturbed areas. **Dist:** ON and BC south to w. AR, TX, NM, AZ, CA, Mexico. **Phen:** Mar-Aug. **Syn:** = Ar, FNA17, Il, K1, K3, K4, Mi, NcTx, NE, NY, Rosatti (1984); > *Plantago patagonica* var. *breviscapa* (Shinners) Shinners – GrPl, Tx; > *Plantago patagonica* var. *gnaphaloides* (Nuttall) A. Gray – C, G, Tx; > *Plantago patagonica* var. *patagonica* – C, G, GrPl, Tx; > *Plantago patagonica* var. *spinulosa* (Decaisne) A. Gray – GrPl, Tx; > *Plantago purshii* Roemer & J.A. Schultes – F, RAB.

Plantago pusilla Nuttall. LITTLE PLANTAIN. **Hab:** Roadsides, disturbed areas. **Dist:** IN, IL, MN, MB, SK, AB, BC south to Panhandle FL, TX, CA, and Mexico. **Phen:** Mar-Jun. **Comm:** Belden et al. (2004) discuss the Virginia occurrence, on Fort Pickett Military Reservation, Nottoway County. **Syn:** = Ar, C, Fl6, FNA17, K1, K4, NE, NY, Pa, S, Tn, Va, WH3, Bassett (1966), Rosatti (1984); < *Plantago elongata* Pursh – GrPl, GW2, K3; > *Plantago pusilla* var. *major* Engelmann – F, G, Il; > *Plantago pusilla* var. *pusilla* – F, G, Il.

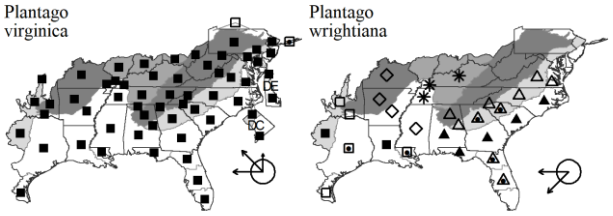
Plantago rugelii Decaisne. AMERICAN PLANTAIN, BROAD-LEAVED PLANTAIN, BLACKSEED PLANTAIN, RUGEL'S PLANTAIN. **Hab:** Roadsides, lawns, disturbed areas. **Dist:** NB to ND, south to Panhandle FL and e. TX. **Phen:** May-Nov. **Syn:** = Ar, C, F, Fl6, FNA17, G, GrPl, GW2, Il, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, Va, W, WH3, WV, Rosatti (1984); > *Plantago rugelii* var. *asperula* Farwell – K1; > *Plantago rugelii* var. *rugelii* – K1.



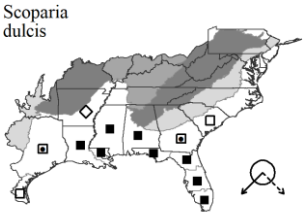
Plantago virginica Linnaeus. VIRGINIA PLANTAIN, HOARY PLANTAIN. **Hab:** Saline marshes, thin soils over rock, roadsides, lawns, disturbed areas. **Dist:** MA and NY west to SD, south to s. FL and TX. **Phen:** Mar-Jul. **Syn:** = Ar, Bah, C, Fl6, FNA17, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV, Rosatti (1984); > *Plantago virginica* var. *virginica* – F; > *Plantago virginica* var. *viridescens* Fernald – F. NatureServe G5 (Secure).

Key to Map Symbology: □ native; ◇ maybe exotic; △ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Plantago wrightiana Decaisne. WRIGHT'S PLANTAIN. **Hab:** Sandy, rocky, or gravelly prairies and open woodlands; eastwards in on roadsides, lawns, disturbed areas. **Dist:** Apparently native of sc. and sw. United States and n. Mexico, but the original distribution somewhat obscure. Now extending east to VA, NC, SC, GA, and FL. **Phen:** Apr-Jul. **Syn:** = Ar, Fl6, FNA17, GrPl, K1, K3, K4, NcTx, Tn, Tx, Va, WH3, Rosatti (1984); = *Plantago hookeriana* Fischer & C.A. Meyer var. *nuda* (A. Gray) Poe – RAB, W.



Scoparia Linnaeus 1753 (GOAT-WEED, SWEET-BROOM)



A genus of about 10-20 species, herbs, of tropical and subtropical America. References: Freeman (2019f) in FNA17 (2019); Pennell (1935).

Scoparia dulcis Linnaeus. GOAT-WEED, SWEET-BROOM, LICORICE-WEED. **Hab:** Marshes, wet hammocks, flatwoods, river sandbars, roadsides, disturbed places, rather weedy and the original distribution unclear. **Dist:** S. SC south to s. FL, west to e. and s. TX, south to South America. **Phen:** (Jan-) Apr-Nov (-Dec). **Syn:** = Ar, Bah, Fl6, FNA17, GW2, K1, K3, K4, RAB, S, Tx, WH3, Pennell (1935). NatureServe G4G5 (Apparently Secure).

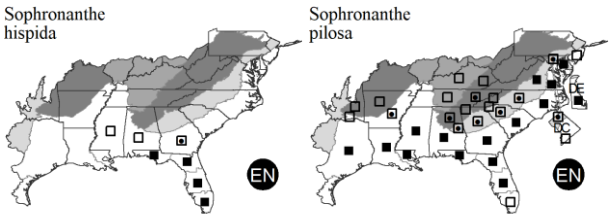
Sophronanthe Bentham 1836

A genus of 2 species, herbs, of southeastern North America. The two taxa included here are not part of *Gratiola*. References: Freeman (2019g) in FNA17 (2019); Pennell (1935).

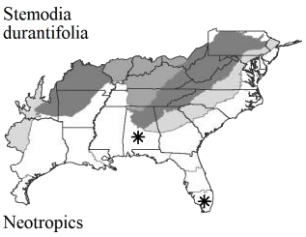
1 Leaves linear-subulate; corolla 2-3× as long as the calyx ..... ***Sophronanthe hispida***
1 Leaves ovate; corolla 1-1.5 × as long as the calyx ..... ***Sophronanthe pilosa***

Sophronanthe hispida Bentham. PINELAND HEDGE-HYSSOP. **Hab:** Dry-mesic pine savannas, scrubby pine savannas, longleaf pine sandhills, Florida scrub, grasslands, dunes. **Dist:** E. GA (within a few counties of SC) south to s. FL, and west to MS. **Phen:** May-Oct. **Syn:** = Fl6, FNA17, K3, K4, S, Pennell (1935); = *Gratiola hispida* (Bentham) Pollard – GW2, K1, WH3. NatureServe G3G5 (Apparently Secure).

Sophronanthe pilosa (Michaux) Small. SHAGGY HEDGE-HYSSOP. **Hab:** Marshes, wet areas, wet pine savannas. **Dist:** NJ south to s. FL, west to e. TX, northward in the interior to KY, TN, AR, and e. OK. **Phen:** May-Oct. **Syn:** = Fl6, FNA17, K3, K4, Tn, Va; = *Gratiola pilosa* Michaux= C, F, G, GW, K1, RAB, W, WH3 – Ar, C, F, G, GW2, K1, NcTx, RAB, Tx, WH3; = *Tragiola pilosa* (Michaux) Small & Pennell – S; > *Tragiola pilosa* (Michaux) Small & Pennell var. *typica* – Pennell (1935). NatureServe G5? (Secure).



Stemodia Linnaeus 1759 (TWINTIPS)



A genus of about 50 species, annual and perennial herbs, of tropical, subtropical, and warm temperate parts of the Old World and New World. References: Barringer (2019c) in FNA17 (2019).

* ***Stemodia durantifolia*** (Linnaeus) Swartz. PURPLE STEMODIA, WHITE-WOOLLY TWINTIP. **Hab:** Ditches. **Dist:** Native of the Neotropics. The AL occurrence was discovered by Howard Horne (pers. comm., June 2018). **Phen:** Jun-Jul. **Syn:** = Fl6, FNA17, K3, K4, Tx, WH3. NatureServe G5 (Secure).

Veronica Linnaeus 1753 (SPEEDWELL)

A genus of about 180 species, herbs, nearly cosmopolitan (at least now), most diverse in Europe. The genus appears to be paraphyletic as currently circumscribed (Albach & Chase 2001). Subgeneric classification (shown in the key) follows Albach in FNA (2019). References: Albach (2019) in FNA17 (2019); Atha et al (2021b); Bardy et al (2010); Crow & Hellquist (2000a); Pennell (1935); Stace (2010); Walters & Webb (1972).

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

370. PLANTAGINACEAE

Unkeyed waifs: *Veronica undulata*

1 Flowers in axillary racemes; upper bracteal leaves opposite throughout.
  5 Leaves (even the upper) short-petiolate; [subgenus *Beccabunga*].
    Veronica americana
  5 Leaves (at least the middle and upper) sessile.
    Veronica anagallis-aquatica
1 Flowers in terminal racemes or solitary and axillary, subtended by normally-sized leaves; upper bracteal leaves often alternate.
  9 Bracts abruptly smaller than the foliage leaves, the flowers thus in well-developed terminal racemes or spikes; perennials from rhizomes.
    Veronica serpyllifolia var. serpyllifolia
  9 Bracts gradually reduced in size upward, all of the flowers or at least those lower on the stem axillary in the axils of well-developed foliage leaves; annuals (except *V. filiformis*).
    12 Pedicels 0-2 mm long; flowers in the axils of bracts, all or at least the upper of which are very different than foliage leaves.
      13 Larger leaves 3-10× as long as wide, entire or dentate towards the apex; flowers white or very pale, ca. 2 mm across; stems usually glabrous (except *V. peregrina* var. *xalapensis*); [subgenus *Beccabunga*].
        14 Stem glabrous; sepals and fruit glabrous ***Veronica peregrina var. peregrina***
        14 Stem pubescent with short, gland-tipped hairs; sepals and fruit glabrous or pubescent with short, gland-tipped hairs ***Veronica peregrina var. xalapensis***
      13 Larger leaves 1-2.5× as long as wide, palmately lobed or toothed; flowers blue, 2-6 mm across; stems pubescent.
        Veronica arvensis
    12 Pedicels 5-40 mm long; flowers in the axils of leaves similar in shape and size to foliage leaves (though the upper are sometimes somewhat smaller).
      19 Leaves with usually > 7 small teeth or crenations; capsules either obviously compressed in ×-section, or nearly round (*V. polita*); [subgenus *Pocilla*].
        20 Lobes of the capsule with apices diverging at ca. 90 degrees, the apical notch of the capsule > 90°; corolla > 8 mm wide ***Veronica persica***
        20 Lobes of the capsule with apices parallel or diverging at an acute angle, the apical notch of the capsule < 90°; corolla < 8 mm wide.
          21 Capsule with all hairs straight and gland-tipped; corolla white to pale blue or violet ***Veronica agrestis***
          21 Capsule with a mixture of short, arching, non-glandular hairs and longer, straight, gland-tipped hairs; corolla bright blue ***Veronica polita***
      19 Leaves with 3-7 shallow lobes or large teeth; capsules nearly round in ×-section; [subgenus *Cochlidiosperma*].
        24 Corollas bright blue with bright white center, (4-) 5-7 (-9) mm in diameter; styles (0.6-) 0.7-0.9 (-1.1) mm long; pedicels 2-3× as long as the calyx; pedicels eglandular-hairy in a single line ***Veronica hederifolia***
        24 Corollas pale violet or pink to whitish, 4-5 (-6) mm in diameter; styles 0.2-0.7 mm long; pedicels 3-4 (-6)× as long as the calyx; pedicels densely eglandular-hairy around their circumference ***Veronica sublobata***

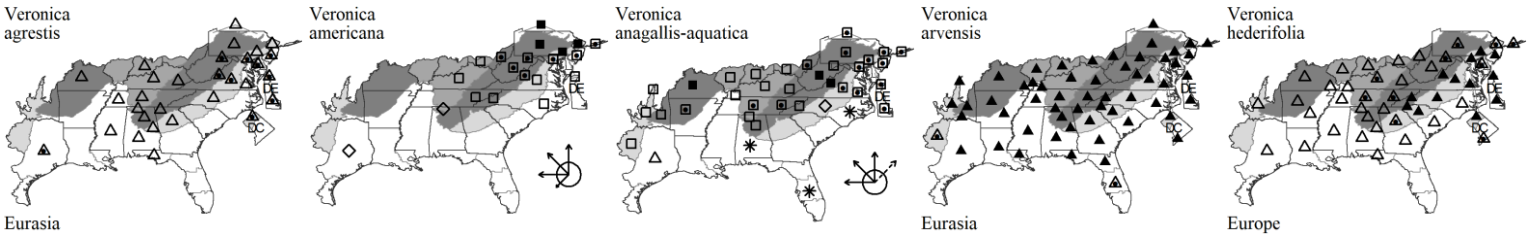
* ***Veronica agrestis*** Linnaeus. FIELD SPEEDWELL. **Hab:** Lawns and disturbed areas. **Dist:** Native of Eurasia. **Phen:** Feb-Jul. **Syn:** = C, F, Fl6, FNA17, G, K1, K3, K4, NcTx, NE, NY, Pa, WH3, Pennell (1935), Stace (2010), Walters & Webb (1972); < *Veronica agrestis* Linnaeus – G, GrPl, RAB, Va; ? *Veronica biloba* Linnaeus – Il; < *Veronica polita* Fries – WV.

Veronica americana Schweinitz ex Bentham. AMERICAN SPEEDWELL, BROOKLIME. **Hab:** Bogs, marshes, streamsides. **Dist:** NL (Newfoundland) west to AK, south to NC, TN, n. AL, MO, TX, and CA; ne. Asia. **Phen:** May-Oct; Jul-Nov. **Syn:** = C, F, FNA17, G, GrPl, Il, K1, K3, K4, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WV, Crow & Hellquist (2000a), Pennell (1935); = *Veronica beccabunga* Linnaeus var. *americana* Rafinesque – Mi.

Veronica anagallis-aquatica Linnaeus. WATER SPEEDWELL. **Hab:** Bogs, marshes, streamsides, ditches. **Dist:** Circumboreal, south in North America to c. peninsular FL, TX, and CA; some occurrences probably represent introductions of European material. Some authors interpret *V. anagallis-aquatica* as being strictly non-native in North America. **Phen:** Apr-Sep; Jul-Oct. **Syn:** = Ar, C, F, Fl6, FNA17, G, GrPl, Il, NcTx, NE, NY, Pa, Tn, Tx, Va, WV, Crow & Hellquist (2000a), Pennell (1935), Stace (2010); = *Veronica anagallis-aquatica* var. *anagallis-aquatica* – Mi; < *Veronica anagallis-aquatica* Linnaeus – C, K1, K3, K4, RAB, W, WH3, Walters & Webb (1972). NatureServe G5 (Secure).

* ***Veronica arvensis*** Linnaeus. CORN SPEEDWELL, WALL SPEEDWELL. **Hab:** Fields, roadsides, disturbed areas. **Dist:** Native of Eurasia. **Phen:** Feb-Sep (-Oct). **Syn:** = Ar, C, F, Fl6, FNA17, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV, Pennell (1935), Stace (2010), Walters & Webb (1972). NatureServe GNR (Not Yet Ranked).

* ***Veronica hederifolia*** Linnaeus. IVYLEAF SPEEDWELL. **Hab:** Lawns, fields, disturbed areas. **Dist:** Native of Europe. **Phen:** Feb-Jun. **Syn:** = Ar, Fl6, FNA17, K1, K3, K4, Mi, NY, Pa, Tn, Va, W, WH3; = *Veronica hederaefolia* – C, F, G, GrPl, Il, NE, RAB, S, WV, Pennell (1935), orthographic variant; = *Veronica hederifolia* ssp. *hederifolia* – Stace (2010), Walters & Webb (1972). NatureServe GNR (Not Yet Ranked).



Veronica peregrina Linnaeus *var.* ***peregrina***. COMMON PURSLANE SPEEDWELL, NECKLACE-WEED. **Hab:** Fields, roadsides, disturbed areas. **Dist:** NS and ND south to FL and TX; AK south to OR (perhaps only as an introduction?); South America. **Phen:** (Feb-) Apr-Aug. **Syn:** = C, F, G, GrPl, Il, Mi, S, Tx, Va, WV; = *Veronica peregrina* ssp. *peregrina* – K1, K3, K4, NcTx, NE, NY, Pa, Tn; = *Veronica peregrina* var. *typica* – Pennell (1935); < *Veronica peregrina* – Ar, Bah, Fl6, FNA17, RAB, W, WH3, Stace (2010), Walters & Webb (1972). NatureServe G5T5 (Secure).

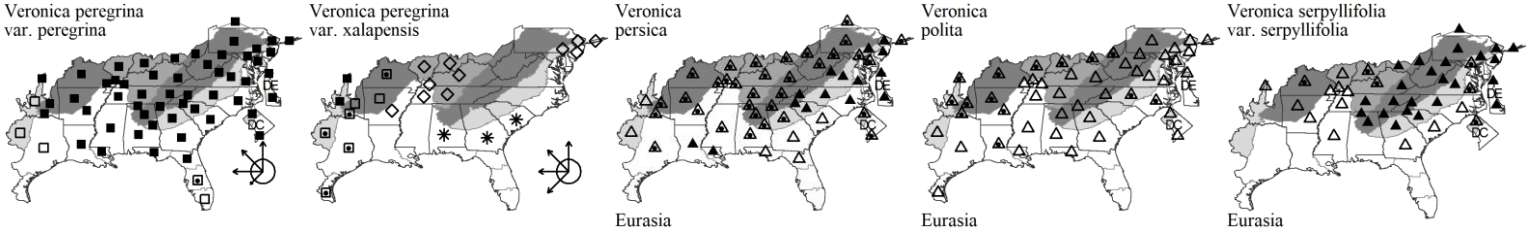
Veronica peregrina Linnaeus *var.* ***xalapensis*** (Kunth) Pennell. WESTERN PURSLANE SPEEDWELL. **Hab:** Fields, lawns, disturbed places; in the eastern part of our area probably introduced on ballast. **Dist:** QC and AK south to MA, KY, TX, and south to Guatemala. **Phen:** (Feb-) Apr-May. **Syn:** = C, F, G, GrPl, Il, Mi, S, Tx, Pennell (1935); = *Veronica peregrina* ssp. *xalapensis* (Kunth) Pennell – K1, K3, K4, NcTx, NE, NY, Pa, Tn; < *Veronica peregrina* – Ar, FNA17, RAB, W, Stace (2010), Walters & Webb (1972). NatureServe G5T5 (Secure).

* ***Veronica persica*** Poiret. BIRD'S-EYE SPEEDWELL. **Hab:** Lawns, fields, roadsides, disturbed areas. **Dist:** Native of Eurasia. **Phen:** Feb-Oct. **Syn:** = Ar, C, F, Fl6, FNA17, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV, Pennell (1935), Stace (2010), Walters & Webb (1972). NatureServe GNR (Not Yet Ranked).

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

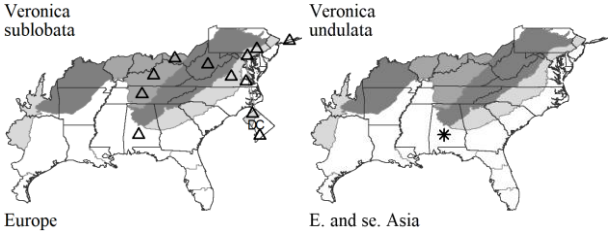
* ***Veronica polita*** Fries. WAYSIDE SPEEDWELL. **Hab:** Lawns, waste areas. **Dist:** Native of Eurasia. This species is introduced in c. TN (Chester, Wofford, & Kral 1997), WV, and s. PA (Rhoads & Klein 1993), FL (Pennell 1935; Kunzer et al. 2009), NC (Kartesz 1999), VA (Kartesz 1999), and AL (H. Horne, pers. comm., 2013), and w. NC (D. Mercier, pers. comm., specimen at BOON, 2008). **Phen:** Feb-Aug. **ID Notes:** *Veronica polita* is similar to *V. agrestis* and has been much confused with it. **Syn:** = Ar, C, F, Fl6, FNA17, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, S, Tn, Tx, WH3, Stace (2010), Walters & Webb (1972); < *Veronica agrestis* Linnaeus – G, GrPl, RAB, Va; ? *Veronica didyma* Tenore – Pennell (1935), misapplied; < *Veronica polita* Fries – WV.

* ***Veronica serpyllifolia*** Linnaeus *var*. ***serpyllifolia***. THYMELEAF SPEEDWELL. **Hab:** Meadows, lawns, roadsides, other disturbed areas. **Dist:** Native of Eurasia. **Phen:** Apr-Aug. **Syn:** = Ar, C, G, GrPl, Mi, Va; = *Veronica serpyllifolia* – Pennell (1935); = *Veronica serpyllifolia* ssp. *serpyllifolia* – K1, K3, K4, NE, NY, Stace (2010), Walters & Webb (1972); < *Veronica serpyllifolia* – F, FNA17, Il, Pa, RAB, S, Tn, W, WV. NatureServe G5TNR (Not Yet Ranked).

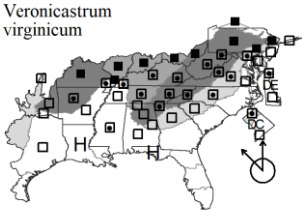


* ***Veronica sublobata*** M.A. Fischer. SMALL IVYLEAF SPEEDWELL. **Hab:** Lawns, fields, other disturbed areas. **Dist:** Native of Europe. **Phen:** Mar-May. **Tax:** Not distinguished in most North American floras, and likely more common than currently known, judging from iNaturalist observations and herbarium specimens. **Syn:** = FNA17, Atha et al (2021b); = *Veronica hederifolia* Linnaeus ssp. *lucorum* (Klett & Richter) Hartl – Stace (2010).

* ***Veronica undulata*** Wallich. WAVYLEAF WATER SPEEDWELL. **Hab:** Disturbed wet places, ballast. **Dist:** Native of Asia. **Phen:** (Mar-) Apr-Sep. **Syn:** = FNA17, K3, K4.



Veronicastrum Heister ex Fabricius 1759 (CULVER'S-ROOT)



A genus of ca. 20 species, herbs, of e. North America and e. Asia. References: Freeman (2019k) in FNA17 (2019); Pennell (1935).

Veronicastrum virginicum (Linnaeus) Farwell. CULVER'S-ROOT, CULVER'S-PHYSIC. **Hab:** Streambanks, bogs, wet meadows, moist prairies, dryish soils in areas with prairie affinities, woodlands on high pH soils. **Dist:** VT west to MB, south to nc. and nw. GA, w. FL Panhandle (Escambia County), and LA. **Phen:** Jun-Sep. **Comm:** Populations seem to be of somewhat sporadic or irregular appearance from year to year. **Syn:** = Ar, C, F, Fl6, FNA17, G, GrPl, GW2, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Tx, Va, W, WH3, WV, Pennell (1935). NatureServe G4 (Apparently Secure).

371. SCROPHULARIACEAE A.L. de Jussieu 1789 (FIGWORT FAMILY) [in LAMIALES]

There is now overwhelming evidence that the Scrophulariaceae as traditionally constituted includes disparate components and requires dismantling (Olmstead & Reeves 1995; Young, Steiner, & dePamphilis 1999; Albach, Meudt, & Oxelman 2005; Schäferhoff et al. 2010, and others). Based on molecular analysis, Young, Steiner, & dePamphilis (1999) suggest that Scrophulariaceae, Antirrhinanthaceae, and Orobanchaceae be restructured to include the current members of Orobanchaceae, Scrophulariaceae, and Callitrichaceae. Beardsley & Olmstead (2002) suggest that *Mimulus* and *Mazus* be included with *Phryma* in a redefined Phrymaceae. Additional changes have been suggested, as summarized below and reviewed and discussed by Schäferhoff et al. (2010).References: Beardsley & Olmstead (2002); Olmstead & Reeves (1995); Olmstead et al (2001); Pennell (1935); Rabeler, Freeman, & Elisens (2019c) in FNA17 (2019); Schäferhoff et al (2010); Young, Steiner, & dePamphilis (1999).

Disposition of the traditional Scrophulariaceae (including Antirrhinanthaceae), and related families:
Linderniaceae: *Lindernia, Hemianthus, Micranthemum, Torenia*
Orobanchaceae: *Agalinis, Aphyllon, Aureolaria, Buchnera, Castilleja, Conopholis, Dasistoma, Epifagus, Macranthera, Melampyrum, Myzorrhiza, Orobanche, Pedicularis, Phelipanche, Schwalbea, Seymeria, Striga.*
Paulowniaceae: *Paulownia*.
Plantaginaceae (VeronicaceaeMazaceae: *Mazus*.
Phrymaceae: *Glossostigma, Mimulus, Phryma, Erythranthe.*
{add to key: Capraria}

Key to Map Symbology: □⊙■ └native┘ ◇◈◆ └maybe exotic┘ △◬▲ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated

1 Plant a shrub; inflorescence a terminal thyrse ..... ***Buddleja***
1 Plant an herb; inflorescence either a raceme, a spike, or a diffuse panicle (*Scrophularia* and *Verbascum*), or the flowers solitary from basal axils (*Limosella*).
3 Corolla cylindric, purplish; fertile stamens 4 ..... ***Scrophularia***
3 Corolla rotate, yellowish; fertile stamens 5 ..... ***Verbascum***

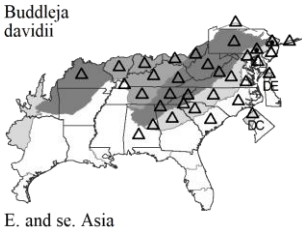
Buddleja Linnaeus 1753 (BUTTERFLY-BUSH)

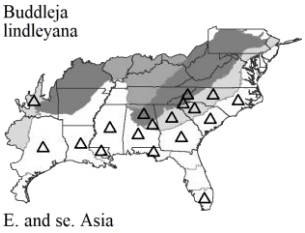
A genus of about 90-100 species, trees and shrubs, of subtropical and tropical America, Asia, and Africa. Members of the genus are grown for ornament and for their attractiveness as nectaring sites for butterflies. References: Norman (2019) in FNA17 (2019); Oxelman, Kornhall, & Norman in Kadereit (2004); Rogers (1986).

1 Leaves serrate or crenate; corolla, calyx, pedicels, and inflorescence rachis pubescent (not granular-farinose) ..... ***Buddleja davidii***
1 Leaves entire or remotely dentate; corolla, calyx, pedicels, and inflorescence rachis granular-farinose ..... ***Buddleja lindleyana***

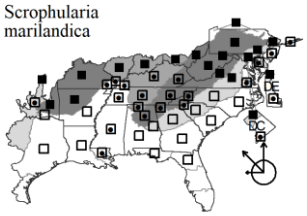
* ***Buddleja davidii*** Franchet. SUMMER-LILAC, ORANGE-EYE BUTTERFLY-BUSH. **Hab:** Spreading from horticultural use to disturbed places, thickets, and streambanks. **Dist:** Native of China. **Phen:** May-Oct; Jul-Nov. **Syn:** = C, F, FNA17, G, Il, K1, K3, K4, Mi, Mo1, NE, NY, Pa, RAB, Tn, Va, Rogers (1986). NatureServe G4G5 (Apparently Secure).

* ***Buddleja lindleyana*** Fortune ex Lindley. LINDLEY'S BUTTERFLY-BUSH. **Hab:** Rarely escaped to disturbed areas. **Dist:** Native of China. **Phen:** Jun-Oct; Aug-Nov. **Syn:** = Fl6, FNA17, K1, K3, K4, RAB, Tx, WH3, Rogers (1986); = *Adenoplea lindleyana* (Fortune ex Lindley) Small – S. NatureServe GNR (Not Yet Ranked).





Scrophularia Linnaeus 1753 (FIGWORT)



A genus of about 200 species, of temperate and tropical regions of the Old and New Worlds. Though our two species are only subtly distinct morphologically, they are clearly distinct. References: Fischer in Kadereit (2004); Kersh (2019) in FNA17 (2019); Pennell (1935).

Scrophularia marilandica Linnaeus. EASTERN FIGWORT. **Hab:** Moist to dry, nutrient-rich woodlands and forests, especially over mafic or calcareous rocks. **Dist:** QC west to MN, south to SC, ne. GA, Panhandle FL, LA, and ne. TX. **Phen:** Mid Jul-Oct. **Syn:** = Ar, C, F, Fl6, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV, Pennell (1935); < *Scrophularia marilandica* Linnaeus – FNA17.

Verbascum Linnaeus 1753 (MULLEIN)

A genus of about 360 species, herbs (annual, biennial, and perennial), of Eurasia and ne. Africa. References: Fischer in Kadereit (2004); Nesom (2019c) in FNA17 (2019); Pennell (1935).

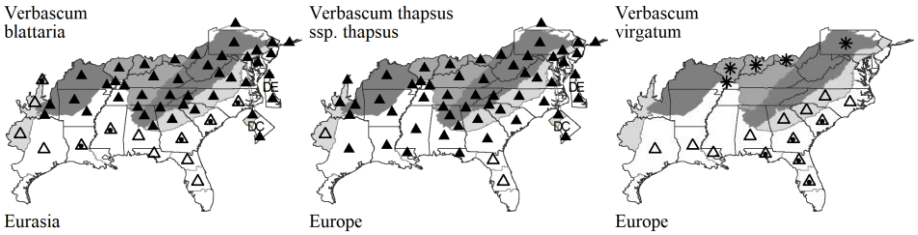
1 Flowers usually 1 per node throughout the inflorescence or with lowermost nodes with > 1 flower; inflorescences usually unbranched; leaves green and glabrous on both sides, or sparsely or densely pubescent with glandular hairs; hairs of the calyx and upper stem simple and glandular.
2 Flowers yellow; bracteoles 2 on the pedicel; pedicels 1-3 mm long, shorter than the calyx; glandular hairs dense on the leaves and on the stems (and extending on the stems to the base) ..... ***Verbascum virgatum***
2 Flowers purple, white, or yellow; bracteoles 0 on the pedicel; pedicels 5-20 (-25) mm long, longer than the calyx; glandular hairs sparse to absent on the leaves and the stems (and restricted to the upper stems).
..... ***Verbascum blattaria***
1 Flowers mostly in axillary clusters of 2-10; inflorescences either branched or unbranched; leaves densely tomentose at least on the lower surface, and often the upper as well; hairs of the calyx and upper stem branched (dendritic), not glandular (except in *V. sinuatum*).
..... ***Verbascum thapsus ssp. thapsus***

* ***Verbascum blattaria*** Linnaeus. MOTH MULLEIN. **Hab:** Fields, roadsides, disturbed areas. **Dist:** Native of Eurasia. **Phen:** May-Jun (-Nov); Jun-Jul (-Dec). **Syn:** = C, F, Fl6, FNA17, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV, Pennell (1935). NatureServe GNR (Not Yet Ranked).

* ***Verbascum thapsus*** Linnaeus *ssp. **thapsus***. WOOLLY MULLEIN, COMMON MULLEIN, FLANNEL-PLANT, VELVET-PLANT. **Hab:** Fields, roadsides, disturbed areas, sometimes weedy on rock outcrops. **Dist:** Native of Europe. **Phen:** May-Sep; Jul-Oct. **Syn:** = FNA17; < *Verbascum thapsus* – Ar, C, F, Fl6, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV, Pennell (1935). NatureServe GNRTNR (Not Yet Ranked).

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

* ***Verbascum virgatum*** Stokes. TWIGGY MULLEIN. **Hab:** Longleaf pine sandhills, sandy disturbed areas, roadsides. **Dist:** Native of Europe. **Phen:** Apr-Jul; Jun-Aug. **Syn:** = C, F, Fl6, FNA17, G, Il, K1, K3, K4, Pa, RAB, S, Tx, WH3, Pennell (1935). NatureServe GNR (Not Yet Ranked).



373. LINDERNIACEAE Borsch, Kai Müller, & Eb. Fischer 2005 (FALSE-PIMPERNEL FAMILY) [in LAMIALES]

A family of about 13 genera and 195 species, herbs, pantropical and warm temperate. References: Fischer in Kadereit (2004); Fischer, Schäferhoff, & Müller (2013); Lewis et al (2019) in FNA17 (2019); Pennell (1935); Tank et al (2006).

1 Calyx conspicuously 5-winged (each calyx segment strongly keel-winged) ..... ***Torenia***
1 Calyx not winged.
  2 Flowers < 2 mm long.
    ..... ***Micranthemum***
  2 Flowers > 4 mm long.
    4 Fertile stamens 4; calyx lobes connate at anthesis for > ½ their length, later separating ..... ***Torenia***
    4 Fertile stamens 2 (with 2 staminodia without anthers, or with rudimentary anthers); calyx lobes separate, or connate at base for < ¼ the length of the calyx.
      ..... ***Lindernia***

Lindernia Allioni 1755 (FALSE-PIMPERNEL)

A genus of about 30 species, of warm temperate and subtropical regions of the Old and New Worlds. The narrower circumscription follows Fischer, Schäferhoff, & Müller (2013). References: Cooperrider & McCready (1975); Fischer in Kadereit (2004); Fischer, Schäferhoff, & Müller (2013); Lewis (2000); Lewis (2019a) in FNA17 (2019); Pennell (1935); Qualls (1984).

1 Fertile stamens 4; calyx lobes connate at anthesis for > ½ their length, later separating ..... ***Torenia crustacea***
1 Fertile stamens 2 (with 2 staminodia without anthers, or with rudimentary anthers); calyx lobes separate, or connate at base for < ¼ the length of the calyx.
  3 Leaves thick in texture; leaf blades glandular punctate; seeds ca. 1× as long as wide.
    4 Leaves primarily in a basal rosette, leaves of the stem strongly reduced upward to bracts; capsule (1.8-) 3.4-7 mm long; [primarily of seepage of flatrocks] .....
      ..... ***Lindernia monticola***
    4 Leaves primarily on the stem, not conspicuously reduced upward; capsule 1.4-3.4 mm long; [of stream or river banks] ..... ***Lindernia saxicola***
  3 Leaves thin in texture; leaf blades eglandular; seeds ca. 1.5-3× as long as wide.
    6 Leaf blades 5-15 mm long; lower leaves (and upper as well) widest at base and rounded or clasping; bracteal leaves subtending flowers much smaller (< 1/2 × as long) than the lower stem leaves; pedicels much longer than the reduced bracteal leaves subtending them; flowers all chasmogamous (opening) .....
      ..... ***Lindernia anagallidea***
    6 Leaf blades 10-30 mm long; lower leaves narrowed towards the base; bracteal leaves subtending flowers only somewhat shorter than lower stem leaves; pedicels shorter than or somewhat longer than the slightly reduced bracteal leaves subtending them; flowers all or in part cleistogamous (remaining closed).
      ..... ***Lindernia dubia var. dubia***

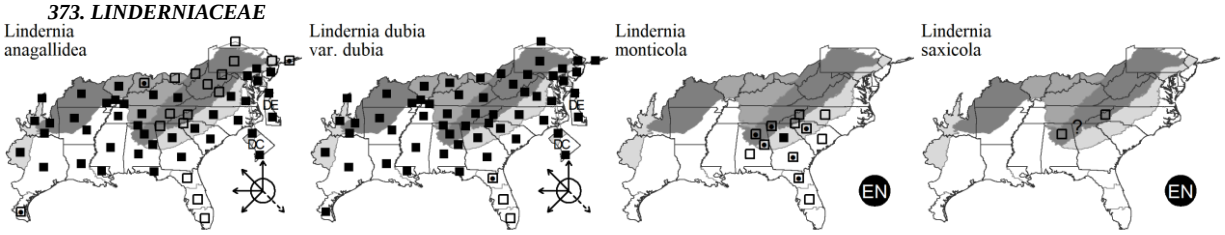
Lindernia anagallidea (Michaux) Pennell. **Hab:** Wet sandy or muddy areas. **Dist:** Nearly throughout North America, Central America, and South America. **Phen:** Jun-Sep. **Syn:** = F, G, GW2, Il, RAB, Tx, WV, Pennell (1935); = *Ilysanthes inequalis* – S; = *Lindernia dubia* var. *anagallidea* – C, K1, K3, Mi, NcTx, NE, NY, Pa, Tn, Va, WH3, Lewis (2000), Qualls (1984); < *Lindernia dubia* (Linnaeus) Pennell – Ar, FNA17, GrPl, K4, W, Cooperrider & McCready (1975), Fischer, Schäferhoff, & Müller (2013). NatureServe G5T4 (Apparently Secure).

Lindernia dubia (Linnaeus) Pennell *var. **dubia***. YELLOWSEED FALSE-PIMPERNEL. **Hab:** Wet sandy or muddy areas. **Dist:** Nearly throughout North America, Central America, and South America. **Phen:** (Apr-) Jun-Sep (-Oct). **Tax:** The extensive and essentially coincident ranges of the taxa "*dubia*" and "*anagallidea*" has suggested that they are merely forms (Voss 1996, Cooperrider & McCready 1975, and others). **Syn:** = K1, Pa; < *Ilysanthes dubia* (Linnaeus) Barnhart – S; < *Lindernia dubia* (Linnaeus) Pennell – Ar, FNA17, GrPl, GW2, K4, RAB, Tx, W, WV, Cooperrider & McCready (1975), Fischer, Schäferhoff, & Müller (2013); > *Lindernia dubia* ssp. *major* (Pursh) Pennell var. *major* – Pennell (1935); > *Lindernia dubia* ssp. *typica* – Pennell (1935); < *Lindernia dubia* (Linnaeus) Pennell var. *dubia* – C, K3, Mi, NE, NY, Tn, Va, WH3, Lewis (2000), Qualls (1984); > *Lindernia dubia* (Linnaeus) Pennell var. *dubia* – F, G, Il; > *Lindernia dubia* (Linnaeus) Pennell var. *inundata* (Pennell) Pennell – Pa; > *Lindernia dubia* var. *riparia* (Rafinesque) Fernald – F, G, Il; > *Lindernia pyxidaria* Linnaeus – Pennell (1935), misapplied.

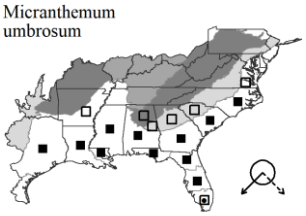
Lindernia monticola Muhlenberg ex Nuttall. FLATROCK PIMPERNEL, RIVERBANK PIMPERNEL, PIEDMONT PIMPERNEL. **Hab:** In seasonal seepage on granitic flatrocks, mesic hammocks, pine savannas. **Dist:** Nc. NC south to ne. FL and ec. AL. **Phen:** Mar-Jun (-Oct). **Syn:** = GW2, RAB, W, Pennell (1935), Qualls (1984); = *Ilysanthes monticola* (Muhlenberg ex Nuttall) Rafinesque – S; < *Lindernia monticola* Muhlenberg ex Nuttall – Fl6, FNA17, K1, K3, K4, WH3, Fischer, Schäferhoff, & Müller (2013), Lewis (2000). NatureServe G4 (Apparently Secure).

Lindernia saxicola M.A. Curtis. RIVERBANK PIMPERNEL. **Hab:** On river-scoured siliceous rocks. **Dist:** Sw. NC south to n. AL. **Phen:** Mar-Jun (-Oct). **Tax:** *L. saxicola* has been considered to be merely a form of *L. monticola*, the leafy stems the result of the basal leaves being covered by silt deposited by floodwaters (Qualls 1984; Lewis 2000); this needs additional study. **Syn:** = RAB, W, Pennell (1935), Qualls (1984); = *Ilysanthes saxicola* (M.A. Curtis) Chapman – S; < *Lindernia monticola* Muhlenberg ex Nuttall – Fl6, FNA17, K1, K3, K4, WH3, Fischer, Schäferhoff, & Müller (2013), Lewis (2000).

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



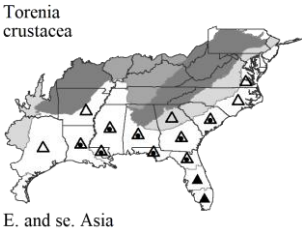
Micranthemum Michaux 1803



A genus of 14-17 species, annual herbs, of s. North America, Central America, and South America. The recognition of *Hemianthus* as separate from *Micranthemum* is uncertain and needs additional study; Fischer, Schäferhoff, & Müller (2013) show that *Micranthemum* is very close to *Lindernia* s.s., but leave it separate for now (based on inadequate sampling). References: Fischer in Kadereit (2004); Keener (2019b) in FNA17 (2019); Pennell (1935).

Micranthemum umbrosum (J.F. Gmelin) Blake. SHADE MUDFLOWER. **Hab:** Shallow pools, stagnant streams, wet depressions in swamp forests. **Dist:** Se. VA south to FL, west to TX, and south into tropical America (Mexico, Central America, West Indies, e. South America). **Phen:** May-Oct. **Syn:** = C, F, FNA17, G, GW2, K1, K3, K4, RAB, Va, WH3, Pennell (1935); = *Globifera umbrosa* J.F. Gmelin – S; = *Micranthemum umbros* – Fl6, orthographic variant. NatureServe G5 (Secure).

Torenia Linnaeus 1753 (BLUE-WINGS)



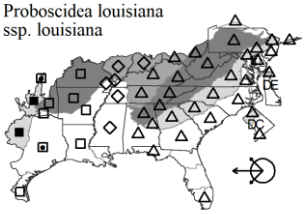
A genus of about 51 species, annual and perennial herbs, of the Old World tropics. References: Fischer in Kadereit (2004); Fischer, Schäferhoff, & Müller (2013); Lewis (2000); Lewis (2019b) in FNA17 (2019); Qualls (1984).

* ***Torenia crustacea*** (Linnaeus) Chamisso & Schlechtendal. MALAYSIAN FALSE-PIMPERNEL. **Hab:** Lawns, roadsides, sand and mudbars. **Dist:** Native of Malaysia. **Phen:** May-Sep (-Apr). **Syn:** = Fl6, K4, Fischer, Schäferhoff, & Müller (2013); = *Lindernia crustacea* (Linnaeus) F. Mueller – Ar, FNA17, GW2, K1, K3, RAB, WH3, Lewis (2000), Pennell (1935), Qualls (1984). NatureServe GNR (Not Yet Ranked).

375. MARTYNIACEAE Horaninow 1847 (MARTYNIA FAMILY) [in LAMIALES]

A family of 5 genera and about 16 species, herbs, tropical and subtropical. Bretting & Nilsson (1988) present evidence for maintaining the Martyniaceae as distinct from the Pedaliaceae. References: Ihlenfeldt in Kadereit (2004).

Proboscidea Schmidel 1763 (UNICORN-PLANT)



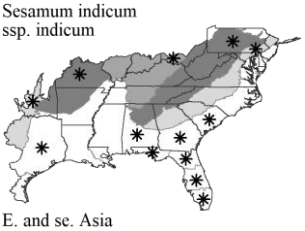
A genus of about 9 species, herbs, of warm temperate to subtropical America. References: Bretting & Nilsson (1988); Thieret (1977).

Proboscidea louisiana (Miller) Thellung *ssp.* ***louisiana***. UNICORN-PLANT, DEVIL'S-CLAW, COW CATCHER. **Hab:** Disturbed areas, pastures. **Dist:** Native of the Great Plains; populations eastwards are adventive. **Phen:** Jun-Sep. **Comm:** The curious fruits are unmistakable. **Syn:** = K3; = *Proboscidea louisianica* ssp. *louisianica* – K1, NE, NY, Bretting & Nilsson (1988), orthographic variant; < *Martynia louisiana* Miller – S; < *Proboscidea louisiana* – C, G, Mi; < *Proboscidea louisianica* (Miller) Thellung – Ar, F, Fl6, GrPl, GW2, Il, K4, NcTx, Pa, RAB, Tn, Tx, WH3, WV, Thieret (1977), orthographic variant. NatureServe GUTU (Unrankable).

376. PEDALIACEAE R. Brown 1810 (SESAME FAMILY) [in LAMIALES]

A family of about 13 genera and 80 species, herbs, shrubs, and trees, of the Old World tropics. References: Christenhusz, Fay, & Byng (2018); Rabeler, Freeman, & Elisens (2019a) in FNA17 (2019).

Sesamum Linnaeus 1753 (SESAME)



A genus of about 20 species, of the Old World tropics. References: Barringer (2019g) in FNA17 (2019); Bedigian (2014).

* ***Sesamum indicum*** Linnaeus *ssp.* ***indicum***. SESAME, BENNY-SEED. **Hab:** Disturbed areas. **Dist:** Native of India and the East Indies. **Phen:** Jan-Dec. **Comm:** The wild ancestor is *S. indicum* ssp. *malabaricum* (Burman) Bedigian (Bedigian 2014). **Syn:** = Bedigian (2014); = *Sesamum indicum* Linnaeus – Bah, FNA17, K3, K4, NE, NY, S; = *Sesamum orientale* Linnaeus – K1, Pa, WH3. NatureServe GNR (Not Yet Ranked).

Key to Map Symbology:

←rare ←uncommon ←common (see introduction for more)

* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable

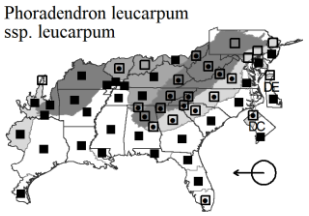
X : extirpated

376e. VISCACEAE Batsch 1802 (CHRISTMAS MISTLETOE FAMILY) [in SANTALALES]

A family of 7 genera and about 575 species, epiphytic herbs and shrubs, nearly cosmopolitan. References: Nickrent (2016d) in FNA12 (2016).

Phoradendron Nuttall 1848 (MISTLETOE)

A genus of 235-250 species, epiphytic hemiparasites, of tropical and rarely temperate America. *Phoradendron* is placed in the segregate family Viscaceae by Nickrent et al. (2010) and Nickrent in FNA (2016). References: Abbott & Thompson (2011); Hawkins (2010); Kuijt (1982); Kuijt (2003); Nickrent (2016d) in FNA12 (2016).



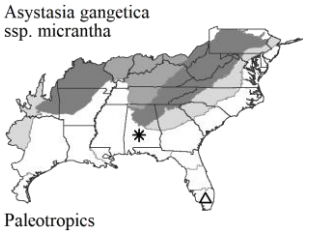
Phoradendron leucarpum (Rafinesque) Reveal & M.C. Johnston *ssp.* ***leucarpum***. AMERICAN MISTLETOE, CHRISTMAS MISTLETOE. **Hab:** Parasitic on various species of trees, especially abundant in swamp forests (perhaps because they are less frequently cut and have older, more mature hardwoods). **Dist:** NJ west to s. OH, s. IN, and s. MO, south to s. FL and s. TX. **Phen:** Oct-Nov (-Mar); Nov-Jan (-May). **Tax:** Kuijt (2003) interprets this as a species with four subspecies; ssp. *serotinum* is the eastern component, ranging from NJ west to s. OH, s. IN, and s. MO, south to s. FL and s. TX. Hawkins (2010) studied the subspecies and population structure in *P. leucarpum* and found complex patterns of molecular and morphological variation that do not readily correspond to the subspecies. While the best taxonomic resolution is unclear, I here retain ssp. *leucarpum* for the easternmost element in this complex (the only element in our area). The other three subspecies of Kuijt (2003) are distributed in sw. United States and n. Mexico. The same four subspecies are recognized by Abbott & Thompson, under what has now been ruled to be the correct species name: *P. leucarpum* (Applequist 2012). The lengthy and arcane debates about the correct nomenclature are summarized by Abbott & Thompson (2011), and references cited therein. **Comm:** *Phoradendron* is, of course, the mistletoe familiar (at least traditionally) in e. United States as a Christmas decoration. Kuijt (1982) comments that "the superficial likeness of *Phoradendron serotinum* to the European *Viscum album* has made the transfer of the latter's folklore to North America easy;" *Viscum album* was a sacred plant of Celtic and druidical pre-Christian European societies. The white berries of *P. leucarpum* are extremely poisonous. Their sticky flesh promotes the dispersal of the seeds by birds from tree to tree. **Syn:** = K3, Va, Abbott & Thompson (2011); = *Phoradendron leucarpum* (Rafinesque) Reveal & M.C. Johnston – K4; = *Phoradendron serotinum* (Rafinesque) M.C. Johnston ssp. *serotinum* – Kuijt (2003); = *Phoradendron tomentosum* ssp. *tomentosum* – Tx; > *Phoradendron eatonii* Trelease – S; < *Phoradendron flavescens* (Pursh) Nuttall – F, G, WV; > *Phoradendron flavescens* (Pursh) Nuttall – S; < *Phoradendron leucarpum* (Rafinesque) Reveal & M.C. Johnston – Ar, Fl4, FNA12, Il, K1, NY, Pa, Tn, WH3; > *Phoradendron macrotomum* Trelease – S; < *Phoradendron serotinum* (Rafinesque) M.C. Johnston – C, RAB, W, Kuijt (1982); > *Phoradendron serotinum* (Rafinesque) M.C. Johnston – GrPl; > *Phoradendron tomentosum* (A.P. de Candolle) Engelmann ex A. Gray – GrPl, NcTx.

377. ACANTHACEAE A.l. de Jussieu 1789 (ACANTHUS FAMILY) [in LAMIALES]

A family of about 230 genera and about 3450 species, herbs, shrubs, vines, and trees, largely tropical. References: Long (1970); McDade & Moody (1999); Washausen (1998).

2 Leaves in a basal rosette (sometimes with smaller leaves on a scape).
..... ***Ruellia ciliosa***
2 Leaves cauline.
5 Fertile stamens 2; corolla distinctly 2-lipped (except salverform in *Pseuderanthemum* and with 4 nearly equal lobes in *Yeatesia*).
8 Bracts and bractlets inconspicuous, 2-5 mm long, linear or triangular; stem subterete or obscurely 4-angled ..... ***Justicia***
8 Bracts and/or bractlets subtending the flowers conspicuous, 5-15 mm long, obovate; stem terete or 6-angled.
9 Stem six-angled in cross-section; corolla conspicuously 2-lipped ..... ***Dicliptera***
9 Stem terete in cross-section; corolla 4-lobed, the lobes nearly equal ..... ***Yeatesia***
5 Fertile stamens 4; corolla not distinctly 2-lipped, the corolla lobes of nearly equal size (except distinctly 2-lipped in *Hygrophila*).
10 Corolla distinctly 2-lipped..... ***Hygrophila***
10 Corolla not distinctly 2-lipped, the corolla lobes of nearly equal size.
11 Plant an herbaceous vine; leaves cordate-hastate at the base; flowers yellow to orange, usually with a dark purple "eye" ..... ***Thunbergia***
11 Plant an herb; leaves cuneate to rounded at the base; flowers white to various shades of blue or pink.
12 Flowers axillary, solitary.
13 Calyx lobes linear-aristate; anther sacs awned or pointed at the base..... ***Dyschoriste***
13 Calyx lobes lanceolate or linear; anther sacs blunt..... ***Ruellia***
12 Flowers in elongate terminal racemes
..... ***Asystasia***

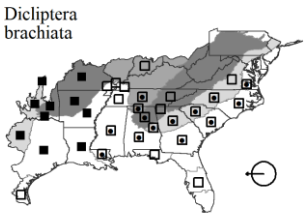
Asystasia Blume 1826 (CHINESE VIOLET)



A genus of ca. 70 species, of the Paleotropics. References: Washausen (1998).

* ***Asystasia gangetica*** (Linnaeus) T. Anderson *ssp.* ***micrantha*** (Nees) Ensermu. CHINESE VIOLET, COROMANDEL, CREEPING FOXGLOVE, ASYSTASIA. **Hab:** Disturbed areas. **Dist:** Native of India. See Barger et al. (2012) for additional information on the AL occurrence. See Lange, Bradley, & Sadle [in prep.] for report of the s. FL occurrence, described as "abundant and aggressive". **Syn:** = K3, K4; < *Asystasia gangetica* – Bah, K2, Washausen

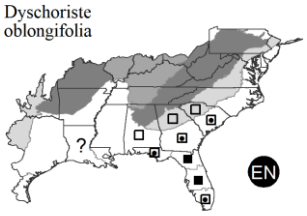
Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



Dicliptera A.L. de Jussieu 1807 (DICLIPTERA, FOLDWING)

A genus of about 150 species, largely tropical, but extending into warm temperate regions. References: Long (1970); Wasshausen (1998).

Dicliptera brachiata (Pursh) Sprengel. DICLIPTERA, BRANCHED FOLDWING. **Hab:** Bottomland forests. **Dist:** Se. VA south to c. peninsular FL, west to c. TX, and north in the interior to c. TN, s. IN, s. IL, MO, and se. KS. **Phen:** Aug-Oct. **Syn:** = Ar, C, F, Fl6, GrPl, GW2, Il, K1, K3, K4, Mo2, NcTx, RAB, Tn, Tx, Va, WH3, Wasshausen (1998); = *Diapedium brachiatum* (Pursh) Kuntze – S; > *Dicliptera brachiata* var. *brachiata* – Long (1970). NatureServe G5 (Secure).



Dyschoriste Nees 1832 (TWINFLOWER, SNAKEHERB, DYSCHORISTE)

A genus of about 65 species, of tropical and warm temperate regions. References: Long (1970); Wasshausen (1998).

Dyschoriste oblongifolia (Michaux) Kuntze. BLUE TWINFLOWER, PINELAND DYSCHORISTE. **Hab:** Pine savannas, pine flatwoods, and longleaf pine sandhills. **Dist:** SC to s. FL, west to se. AL and e. Panhandle FL. The basis of Small's (1933) attribution of this species to VA is unknown. **Phen:** Apr-May. **Syn:** = Fl6, K1, K3, K4, RAB, S, WH3, Wasshausen (1998); = *Dyschoriste oblongifolia* var. *oblongifolia* – Long (1970). NatureServe G4G5 (Apparently Secure).

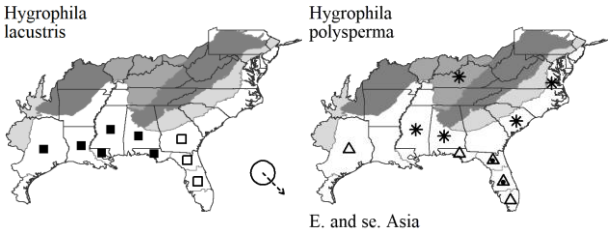
Hygrophila R. Brown 1810 (SWAMPWEED)

A genus of about 25 species, of tropical regions. References: Daniel (2013); Les & Wunderlin (1981); Wasshausen (1998).

3 Leaf blades 1-3.5 cm long; calyx segments ca. 2 mm long, pubescent; flowers borne in terminal and axillary spikes ..... ***Hygrophila polysperma***
3 Leaf blades 5-12 cm long; calyx segments ca. 5 mm long, glabrous; flowers borne in axillary clusters.
..... ***Hygrophila lacustris***

Hygrophila lacustris (Schlechtendal & Chamisso) Nees. GULF SWAMPWEED. **Hab:** Shallow water of swamps and shores. **Dist:** Sw. GA south to c. FL Peninsula, west to e. TX; West Indies. **Phen:** Jun-Sep. **Tax:** *H. lacustris* has recently been interpreted as a component within *H. costata*, widespread in the Neotropics (Daniel 2013). **Syn:** = GW2, K1, K3, K4, S, Tx, Les & Wunderlin (1981), Wasshausen (1998); < *Hygrophila costata* Nees et al. – Fl6, WH3, Daniel (2013).

* ***Hygrophila polysperma*** (Roxburgh) T. Anderson. EAST INDIAN SWAMPWEED, HYGRO, MIRAMAR-WEED, EAST INDIAN HYGROPHILA. **Hab:** Lakes, rivers, canals; established in AL, FL, and SC (Hook & Nelson 2011), doubtfully established in VA. **Dist:** Native of the East Indies. Grown for the aquarium trade, and sporadically introduced to bodies of water, apparently well-established in FL (Les & Wunderlin 1981). **Syn:** = Fl6, GW2, K1, K3, WH3, Les & Wunderlin (1981), Wasshausen (1998); = n/a – RAB. NatureServe GNR (Not Yet Ranked).



Justicia Linnaeus 1753 (WATER-WILLOW)

A genus of 600 or more species, herbs and shrubs of the tropics and warm temperate North America. *Justicia* as circumscribed is highly polyphyletic and will need to be expanded further or split into smaller, monophyletic units. Any splitting will remove *Justicia* from our native flora, as the type of *Justicia* is Old World, and all the New World taxa form a separate clade. References: Daniel (2013); Long (1970); Wasshausen (1998).

5 Spike densely flowered; seeds verrucose; primary leaves averaging 6-8× as long as wide; [of the Piedmont, Mountains, and Coastal Plain] .....
..... ***Justicia americana***
5 Spike loosely flowered; seeds smooth or minutely muricate (with very fine, sharp projections); primary leaves either ca. 2-6× as long as wide or > 8× as long as wide; [of the Coastal Plain].
8 Spikes lax, the flowers usually borne singly, secund; seeds smooth; leaves averaging ca. 5× as long as wide ..... ***Justicia lanceolata***
8 Spikes somewhat congested, the flowers borne in opposite pairs; seeds minutely muricate (with very fine, sharp projections); leaves averaging ca. 3× as long as wide ..... ***Justicia ovata***

Justicia americana (Linnaeus) Vahl. AMERICAN WATER-WILLOW. **Hab:** River and stream beds, in shallow water, often rooted in rocky shallows. **Dist:** W. QC west to s. MI and NE, south to sw. GA, Panhandle FL, and s. TX; COA and CHH. **Phen:** (Apr-) Jun-Oct. **Syn:** = Ar, C, Fl6,

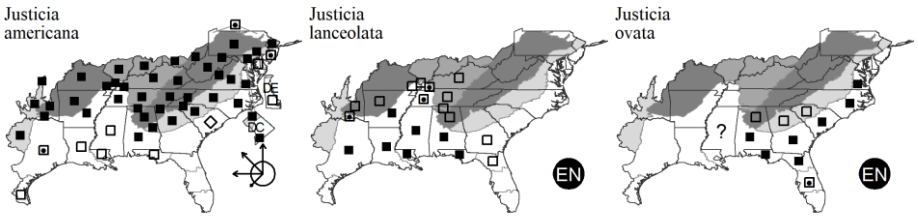
Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

377. ACANTHACEAE

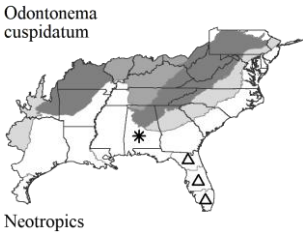
GrPl, GW2, Il, K1, K3, K4, Mi, Mo2, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, W, WH3, WV, Daniel (2013), Long (1970), Washausen (1998); = *Dianthera americana* Linnaeus – S; > *Justicia americana* var. *americana* – F, G; > *Justicia americana* var. *subcoriacea* Fernald – F, G; > *Justicia mortuifluminis* Fernald – F.

Justicia lanceolata (Chapman) Small. **Hab:** Swamps, marshes. **Dist:** Se. GA west to TX, north in the Mississippi Embayment to s. IL, s. IN, w. KY. **Phen:** Mar-Jun. **Syn:** = K3, K4, S, Tx, Daniel (2013); = *Justicia ovata* (Walter) Lindau var. *lanceolata* (Chapman) R.W. Long – Ar, Fl6, Il, K1, Mo2, NcTx, Tn, WH3, Long (1970), Washausen (1998); < *Justicia ovata* (Walter) Lindau – GW2. NatureServe G5T4T5 (Apparently Secure).

Justicia ovata (Walter) Lindau. COASTAL PLAIN WATER-WILLOW, LOOSE-FLOWER WATER-WILLOW. **Hab:** Swamps, marshes. **Dist:** S. VA south to c. peninsular FL, Panhandle FL, and se. AL; s. IL. **Phen:** May-Jul. **Syn:** = K3, K4, S, Daniel (2013); = *Justicia ovata* (Walter) Lindau var. *ovata* – C, Fl6, Il, K1, Va, WH3, Long (1970), Washausen (1998); ? *Justicia humilis* Michaux var. *humilis* – G; > *Justicia mortuifluminis* Fernald – F; < *Justicia ovata* (Walter) Lindau – GW2, RAB; >< *Justicia ovata* (Walter) Lindau – F.



Odontonema Nees 1842 (FIRESPIKE)



A genus of ca. 20 species, herbs, or tropical America. References: Washausen (1998).

* ***Odontonema cuspidatum*** (Nees) Kuntze. FIRESPIKE. **Hab:** Disturbed hammocks and other uplands. **Dist:** Native of tropical America. **Phen:** May-Sep. **Comm:** Reported for s. AL (Mobile County) by Barger et al. (2019). {not yet keyed}. **Syn:** = Fl6, K3, K4, WH3, Washausen (1998). NatureServe GNR (Not Yet Ranked).

Ruellia Linnaeus 1753 (WILD-PETUNIA)

A genus of about ca. 300 species, of the tropics and temperate North America (E. Tripp, pers. comm., 2009). References: Daniel (2013); Ezcurra & Daniel (2007); Fernald (1945); Long (1970); Tripp et al (2009); Turner (1991); Ward (2007c); Washausen (1998).

Unkeyed taxa: *Ruellia yucatana*

1 Flowers borne in terminal cymose panicles (the flower not directly subtended by a leaf).
..... ***Ruellia nudiflora var. nudiflora***

1 Flowers borne in leaf axils (including at upper and terminal nodes), solitary or in either sessile or pedunculate clusters.
5 Principal leaf blades linear-lanceolate, > 10× as long as wide (8-27 cm long, 0.7-2 cm wide); [alien, cultivated and naturalized] ..... ***Ruellia simplex***
5 Principal leaf blades elliptic, ovate or broadly lanceolate, 2-5 × as long as wide (2-16 cm long, 0.5-7 cm broad); [native or alien].
6 Plant with a rosette of basal leaves, flat on the ground, and 0 (-2) pairs of leaves on the stem; [restricted to dry pinelands in the Coastal Plain]..... ***Ruellia ciliosa***
6 Plant with all leaves on the stem; leaves ovate, lanceolate, elliptic, or oblong; [collectively widespread in our area].
7 Calyx lobes narrowly linear-lanceolate, flattened to the tip, 1-4 mm wide; larger leaf blades 7-18 cm long, 3-9 cm wide ..... ***Ruellia strepens***
7 Calyx lobes linear, filiform or setaceous at least apically, < 1.2 mm wide at their widest point (usually the base), hairlike at the tip; larger leaf blades 2-11 cm long, 0.8-5 cm wide.
8 Flowers borne on peduncles 0.2-7 cm long, from the axils of lower and median nodes, not from the terminal node or terminal cluster; capsules glabrous (*R. pinetorum*) or variously hairy (*R. purshiana*, *R. pedunculata*).
9 Stem simple (rarely with a few ascending branches); calyx pubescent, without cystoliths; calyx lobes 0.7-1.2 mm wide, widest near the middle and tapering to the apex; capsules puberulent; [of dry woodlands, forests, and glades of the Piedmont and Mountains] ..... ***Ruellia purshiana***
9 Stem divergently branched (rarely simple); calyx lobes 0.5-1 mm wide, tapering from the base to a very slender tip; capsules glabrous or puberulent.
..... ***Ruellia pinetorum***
8 Flowers sessile or subsessile, in the axils of median and upper nodes, and usually also from the terminal node or cluster; capsules glabrous (or at most with a few scattered hairs).
11 Corolla 6-10 cm long, opening at night and withering by mid-morning, white to pale lavender; calyx lobes 2.5-4.5 cm long; [of Coastal Plain seepage bogs and wet pine flatwoods] ..... ***Ruellia noctiflora***
11 Corolla 3-7 cm long, opening during the day, lavender to lavender-blue (rarely white in *R. humilis*); calyx lobes 1-2.5 (-3) cm long; [of various habitats].
13 Leaves sessile or subsessile; flower-bearing nodes usually 4-8; stem typically branched at base ..... ***Ruellia humilis***
13 Leaves short-petioled; flower-bearing nodes usually 1-3; stem typically simple below (unless damaged), sometimes branched upward
..... ***Ruellia caroliniensis***

Ruellia caroliniensis (J.F. Gmelin) Steudel. CAROLINA WILD-PETUNIA, COMMON WILD-PETUNIA. **Hab:** Dry to moist forests and woodlands. **Dist:** NJ, s. OH, s. IN, s. IL, and OK, south to s. FL and e. TX. **Phen:** (May-) Jun-Sep. **Syn:** = Ar, C, Fl6, G, NcTx, Pa, RAB, Va, WH3, Turner (1991), Ward (2007c); = *Ruellia caroliniensis* ssp. *caroliniensis* var. *caroliniensis* – K1, K3, K4, Long (1970), Washausen (1998); < *Ruellia caroliniensis* (J.F. Gmelin) Steudel – Tn, W; > *Ruellia caroliniensis* var. *caroliniensis* – F, Tx; > *Ruellia caroliniensis* var. *cheloniformis* Fernald – F, Fernald (1945); > *Ruellia caroliniensis* var. *dentata* (Nees) Fernald – F, Il, WV, Fernald (1945); > *Ruellia caroliniensis* var. *membranacea* Fernald – F, WV, Fernald (1945); > *Ruellia caroliniensis* var. *nanella*

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

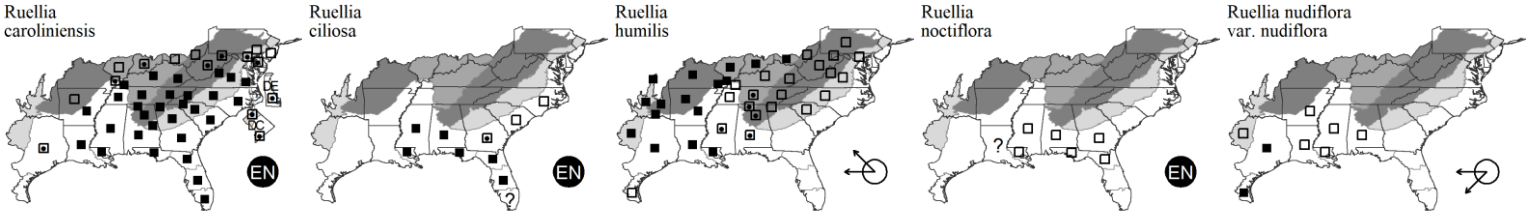
Fernald – F, Fernald (1945); > *Ruellia caroliniensis* var. *salicina* Fernald – F, Tx, Fernald (1945); > *Ruellia caroliniensis* var. *semicalva* Fernald – F, Tx, Fernald (1945); > *Ruellia caroliniensis* var. *serrulata* Tharp & Barkley – Tx; > *Ruellia caroliniensis* var. *typica* – Fernald (1945); ? *Ruellia parviflora* (Nees) Britton – S.

Ruellia ciliosa Pursh. SANDHILL WILD-PETUNIA, DWARF WILD-PETUNIA. **Hab:** Sandhills, particularly in loamy, submesic swales. **Dist:** Sc. NC south to c. peninsular FL, west to se. LA. **Phen:** May-Sep. **Tax:** Although treated as only subspecifically distinct from *R. caroliniensis* by many recent authors, there seem ample differences in morphology, distribution, and habitat to warrant specific distinction. Var. *cinerascens* Fernald of the FL Panhandle needs additional assessment, but is here tentatively submerged in *R. ciliosa*. **Syn:** = Fl6, RAB, S, WH3, Ward (2007c); = *Ruellia caroliniensis* ssp. *ciliosa* var. *ciliosa* – Long (1970), Wasshausen (1998); = *Ruellia caroliniensis* (J.F. Gmelin) Steudel ssp. *ciliosa* (Pursh) R.W. Long var. *cinerascens* (Fernald) Kartesz & Gandhi – K1, K3, K4; < *Ruellia caroliniensis* (J.F. Gmelin) Steudel – W; > *Ruellia ciliosa* var. *cinerascens* Fernald – Fernald (1945); > *Ruellia ciliosa* var. *typica* – Fernald (1945).

Ruellia humilis Nuttall. LOW WILD-PETUNIA, HAIRY WILD-PETUNIA, FRINGELEAF RUELLIA. **Hab:** Calcareous or mafic glades and woodlands, prairies, dry woodlands and fields. **Dist:** S. PA west to se. MN and e. NE, south to c. NC, nc. SC (York County; Schmidt & Barnwell 2002), c. AL, s. MS, s. LA, and c. and s. TX. **Phen:** May-Oct. **Tax:** This species badly needs taxonomic re-evaluation, looking at variation (some previously recognized -- see synonymy) across its wide and fragmented distribution. **Comm:** Piedmont plants of NC and SC are uniformly white-flowered. **Syn:** = Ar, GrPl, K1, K3, K4, Mi, Mo2, NcTx, NY, Pa, RAB, Tn, Va, W, WV, Long (1970), Wasshausen (1998); > *Ruellia humilis* var. *calvescens* Fernald – C, F, G, Fernald (1945); > *Ruellia humilis* var. *depauperata* Tharp & Barkley – Tx, Turner (1991); > *Ruellia humilis* var. *expansa* Fernald – F, Tx; > *Ruellia humilis* var. *frondosa* Fernald – F, G, Tx, Fernald (1945), Fernald (1945); > *Ruellia humilis* var. *humilis* – C, F, G, Il, Turner (1991); > *Ruellia humilis* var. *longiflora* A. Gray – Il, Tx, Fernald (1945); > *Ruellia humilis* var. *typica* – Fernald (1945).

Ruellia noctiflora (Nees) A. Gray. NIGHT-FLOWERING WILD-PETUNIA. **Hab:** Wet pinelands and savannas. **Dist:** E. GA (in counties immediately adjacent to SC) south to ne. FL; Panhandle FL west to se. LA. **Phen:** (May-) Jun-Jul (-Aug). **Syn:** = Fl6, GW2, K1, K3, K4, S, WH3, Long (1970), Turner (1991), Ward (2007c), Wasshausen (1998). NatureServe G3? (Vulnerable).

Ruellia nudiflora (Engelmann & A. Gray) Urban *var*. ***nudiflora***. VIOLET WILD-PETUNIA. **Hab:** Moist to dry woodlands and forests. **Dist:** AL west to TX, south into Mexico. **Phen:** Jan-Dec. **Syn:** = K2, K3, NcTx, Turner (1991); < *Ruellia ciliatiflora* Hooker – K4, Daniel (2013); > *Ruellia nudiflora* var. *hispidula* Shinners – Tx; > *Ruellia nudiflora* (Engelmann & A. Gray) Urban var. *nudiflora* – Tx.



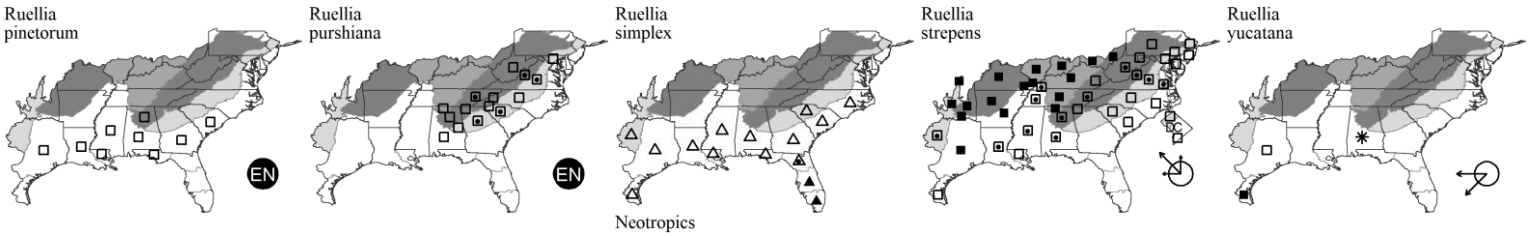
Ruellia pinetorum Fernald. PINELAND WILD-PETUNIA. **Hab:** Dry to wet pinelands and prairies. **Dist:** SC south to Panhandle FL, west to e. TX. **Phen:** May-Sep. **Tax:** Although treated as only subspecifically distinct from *R. pedunculata* by many recent authors, there seem ample differences in morphology, distribution, and habitat to warrant specific distinction. First reported for GA by Sorrie (1998b). **Syn:** = F, RAB, Tx, Turner (1991), Ward (2007c); = *Ruellia pedunculata* Torrey ex A. Gray ssp. *pinetorum* (Fernald) R.W. Long – Fl6, K1, K3, K4, WH3, Long (1970), Wasshausen (1998). NatureServe G5T3T4 (Vulnerable).

Ruellia purshiana Fernald. PURSH'S WILD-PETUNIA. **Hab:** Dry woodlands and forests, especially over mafic or calcareous rocks. **Dist:** MD south to c. GA and c. AL, in and adjacent to the Appalachians. Reported occurrences (Kartesz 2020) in w. TN and ne. LA are questionable and need verification. **Phen:** May-(Jun). **Syn:** = F, K1, K3, K4, RAB, Tn, Va, W, WV, Long (1970), Wasshausen (1998); < *Ruellia pedunculata* Torrey ex A. Gray – C, G.

* ***Ruellia simplex*** C. Wright. MEXICAN BLUEBELL, MEXICAN PETUNIA. **Hab:** Disturbed areas, commonly cultivated, especially in maritime situations along the south Atlantic and Gulf coasts, persistent and spreading (including by seed) to adjacent areas. **Dist:** Native of e. Mexico. **Phen:** May-Sep. **Syn:** = Fl6, K3, WH3, Ezcurra & Daniel (2007); = *Ruellia brittoniana* Leonard – GW2, RAB, Turner (1991), Ward (2007c), Wasshausen (1998); = *Ruellia caerulea* – K1; = *Ruellia malacosperma* – S; > *Ruellia brittoniana* Leonard – NcTx, Tx; > *Ruellia malacosperma* – NcTx, Tx.

Ruellia strepens Linnaeus. LIMESTONE WILD-PETUNIA, LIMESTONE RUELLIA. **Hab:** Calcareous forests, woodlands, and fields. **Dist:** NJ west to OH and IA, south to se., sc., and ne. NC, e. SC, AL, and TX. **Phen:** May-Oct. **Syn:** = Ar, C, F, G, GrPl, Il, K1, K3, K4, Mi, Mo2, NcTx, Pa, RAB, S, Tn, Va, W, WV, Long (1970), Turner (1991), Wasshausen (1998); > *Ruellia strepens* Linnaeus var. *cleistantha* A. Gray – Tx; > *Ruellia strepens* var. *strepens* – Tx.

Ruellia yucatana (Leonard) Tharp & F.A. Barkley. YUCATAN WILD-PETUNIA. **Hab:** Grasslands, on caliche, chaparral, thicket edges; eastwards in disturbed areas. **Dist:** E. and c. TX southwards; also in s. Alabama in disturbed ground. **Phen:** Mar-Oct. **Syn:** = K3, K4, Tx, Turner (1991). NatureServe G4? (Apparently Secure).

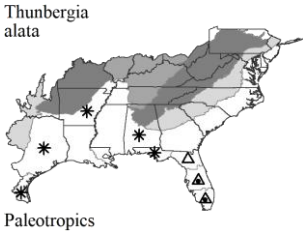


Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more)

* : waif EN : endemic H : historic

N : no P : planted ? : questionable X : extirpated

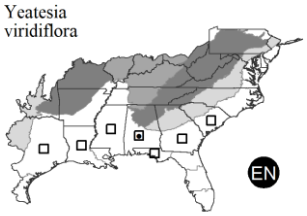
Thunbergia Retzius 1776 (CLOCK-VINE)



A genus of 100-200 species, of the Old World tropics. References: Long (1970); Washhausen (1998).

* ***Thunbergia alata*** Bojer ex Sims. BLACK-EYED-SUSAN VINE. **Hab:** Disturbed areas. **Dist:** Native of Africa. **Phen:** Jan-Dec. **Syn:** = Bah, Fl6, K1, K3, K4, NcTx, S, Tx, WH3, Long (1970), Washhausen (1998). NatureServe GNR (Not Yet Ranked).

Yeatesia Small 1896 (BRACTSPIKE)



A genus of 3-4 species, of warm temperate to tropical areas, se. United States to ne. Mexico. References: Long (1970); Washhausen (1998).

Yeatesia viridiflora (Nees) Small. YELLOW BRACT-SPIKE. **Hab:** Rich bottomlands, calcareous river bluffs and hammocks, prairies, marshes. **Dist:** Sw. GA and Panhandle FL west to TX (Kartesz 1999). See Sorrie & LeBlond (2008) for additional distributional information. **Phen:** Apr-Oct. **Syn:** = Fl6, K1, K3, K4, S, Tx, WH3, Washhausen (1998); = *Dicliptera viridiflora* (Nees) R.W. Long – Long (1970). NatureServe G3G5 (Apparently Secure).

378. BIGNONIACEAE A.L. de Jussieu 1789 (BIGNONIA FAMILY) [in LAMIALES]

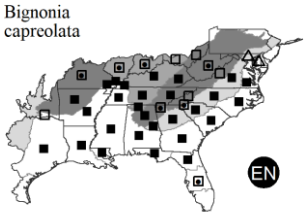
A family of about 110 genera and 800 species, trees, shrubs, and lianas, mainly tropical and especially of South America. The monophyly of the Bignoniaceae (excluding *Paulownia*) has now been confirmed many times (Spangler & Olmstead 1999; Olmstead et al. 2009; etc.). References: Fischer, Theisen, & Lohmann in Kubitzki et al (2004); Gentry (1992); Krings & Braham (2004); Lohmann & Taylor (2014); Manning (2000); Olmstead et al (2009); Spangler & Olmstead (1999).

1 Leaves simple; plant a tree or shrub.
..... ***Catalpa***

1 Leaves compound; plant a liana, tree, or shrub.
5 Leaves either all 2-foliolate, with a tendril in the terminal position (this often withered and absent on older leaves), or a mixture of 2-foliolate and 3-foliolate, with at least some leaves on a branch 2-foliolate; plant a liana; [tribe *Bignonieae*].
..... ***Bignonia capreolata***

5 Leaves 3-many-foliolate; plant a tree, shrub, or liana.
..... ***Campsis radicans***

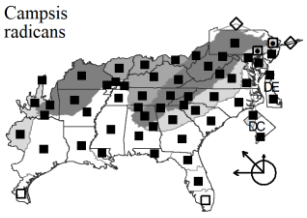
Bignonia Linnaeus 1753 (CROSS-VINE)



A genus of ca. 28 species, lianas and shrubs, of se. North America, Central America, and n. South America, as recircumscribed by Lohmann & Taylor (2014). References: Fischer, Theisen, & Lohmann in Kubitzki et al (2004); Lohmann & Taylor (2014); Manning (2000).

Bignonia capreolata Linnaeus. CROSS-VINE. **Hab:** Swamp forests, bottomlands, forests, woodlands. **Dist:** MD west to s. OH and s. MO, south to c. peninsular FL and e. TX. **Phen:** (Mar-) Apr-May (-Jul); Jul-Aug. **Comm:** This species is absent from most of the Mountains in our area (also scarce in the Piedmont of Virginia and upper Piedmont of NC), reappearing at lower elevations on the west side of the Blue Ridge. Though primarily a species of swamp and bottomland forests, *Bignonia* often occurs as well in mesic or even dry forests, where it generally remains stunted (most individuals with only a few leaves) and does not flower or fruit. **Syn:** = Ar, C, F, Fl6, GW2, Il, K1, K3, K4, NcTx, Tn, Tx, Va, W, WH3, Lohmann & Taylor (2014), Manning (2000); = *Anisostichus capreolata* (Linnaeus) Bureau – G, RAB; = *Anisostichus crucigera* (Linnaeus) Bureau – S. NatureServe G5 (Secure).

Campsis Loureiro 1790 (TRUMPET-CREEPER)



The only other species in the genus is the e. Asian *C. grandiflora* (Thunberg) K. Schumann. Wen & Jansen (1995) estimated the age since divergence to be 24.4 million years, based on molecular divergence. References: Fischer, Theisen, & Lohmann in Kubitzki et al (2004); Gentry (1992); Manning (2000); Wen & Jansen (1995).

Campsis radicans (Linnaeus) Seemann ex Bureau. TRUMPET-CREEPER. **Hab:** Bottomland forests, swamp forests, fencerows, old fields, forests, thickets, disturbed areas. **Dist:** NJ west to IA, south to s. FL and c. TX. **Phen:** (May-) Jun-Jul (-Aug); Sep-Oct. **Comm:** In the pre-Columbian landscape this plant was primarily limited to swamps and bottomlands; it has done well as a weedy colonizer of abandoned farmland, fencerows, and thickets (where particularly conspicuous on fenceposts and old tobacco barns). In swamps of the Coastal Plain it is a common liana, often with its foliage in the canopy 30-40 m above the ground, and with stems to 15 cm in diameter. **ID Notes:** Even when the foliage cannot be seen, *Campsis* is immediately recognizable by its shreddy tannish bark (unlike any of our other high-climbing vines). **Syn:** = Ar, C, F, Fl6, G, GrPl, GW2, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, W, WH3, Gentry (1992), Manning (2000); = *Bignonia radicans* Linnaeus – S. NatureServe G5 (Secure).

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

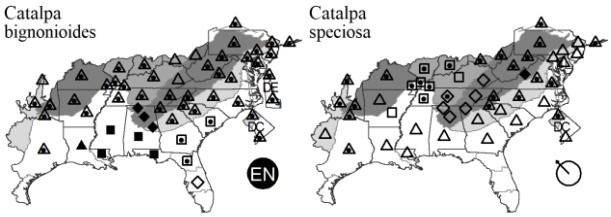
Catalpa Scopoli 1777 (CATALPA, CATAWBA-TREE)

A genus of about 10 species, trees, of e. North America (2 species), e. Asia (4 species), and the West Indies (4 species). References: Fischer, Theisen, & Lohmann in Kubitzki et al (2004); Gentry (1992); Li (2008); Manning (2000); Olsen & Kirkbride (2017); Paclt (1952).

2 Corolla 2-4 cm wide, the lower corolla lobe densely spotted with purple, entire; capsule 6-10 mm in diameter, each valve 9-15 mm wide when flattened; seeds with 2 elongated wings, each wing narrowing to an acutish end, the hairs at the end appressed to one another in 2 planes, thus forming a pointed tail (like a sharply pointed paintbrush); fresh foliage with a fetid odor; leaves abruptly acuminate ..... ***Catalpa bignonioides***
2 Corolla 4-6 cm wide, the lower corolla lobe sparsely spotted with purple, notched; capsule 10-15 mm in diameter, each valve 13-18 mm wide when flattened; seeds with 2 elongated wings, each wing narrowing only slightly to a rounded or oblique end, the hairs at the end appressed to one another only in one plane, thus forming a flattish fringe (like a flat paintbrush); fresh foliage essentially odorless; leaves long-acuminate ..... ***Catalpa speciosa***

Catalpa bignonioides Walter. SOUTHERN CATALPA. **Hab:** Bottomlands and streambanks (as a native), escaped or persistent after cultivation. **Dist:** S. SC, s. GA, ne. FL, n. peninsular FL, and Panhandle FL west to s. MS (or LA?), on the Coastal Plain, early naturalized in a more widespread area, and now extending north to CT and MI. **Phen:** May-early Jul; Oct. **Syn:** = Ar, C, F, Fl6, G, GrPl, GW2, Il, K1, K3, K4, NE, NY, Pa, RAB, Tn, Tx, Va, W, WH3, Manning (2000), Olsen & Kirkbride (2017); = *Catalpa catalpa* (Linnaeus) Karsten – S. NatureServe G4 (Apparently Secure).

Catalpa speciosa (Warder) Warder ex Engelmann. NORTHERN CATALPA. **Hab:** Bottomland forests, stream banks, and mesic upland forests (as a native), also old fields, roadsides, moist disturbed areas, suburban woodlands, eastwards of its native range escaped or persistent after cultivation, and sometimes thoroughly naturalized. **Dist:** Apparently native in the upper Mississippi River Embayment of s. IN and s. IL, south to w. TN and e. AR; early naturalized in a more widespread area. **Phen:** May-Jul; Jul-Aug. **Syn:** = Ar, C, F, G, GrPl, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, Manning (2000), Olsen & Kirkbride (2017). NatureServe G4? (Apparently Secure).



379. LENTIBULARIACEAE Richard 1808 (BLADDERWORT FAMILY) [in LAMIALES]

A family of 3 genera and about 270-320 species, insectivorous herbs, cosmopolitan. References: Fischer et al. in Kadereit (2004).

1 Leaves ovate or elliptic, in a basal rosette; carnivory via the viscid-slimy upper leave surfaces; flowers solitary on bractless peduncles ..... ***Pinguicula***
1 Leaves or leaf segments linear, borne along a subterranean or submersed stem; carnivory via specialized bladder-like traps; flowers in (1-) many-flowered racemes, each flower pedicel subtended by a bract ..... ***Utricularia***

Pinguicula Linnaeus 1753 (BUTTERWORT)

A genus of about 46-80 species, herbs, of America, Mediterranean Europe, and circumboreal America and Eurasia. References: Fischer et al. in Kadereit (2004); Godfrey & Stripling (1961); Schnell (1980a); Schnell (2002b); Wood & Godfrey (1957).

1 Expanded corolla < 1.5 cm across; palate not exserted from the throat of the corolla; rosettes usually 2-4 cm in diameter; flowers usually white to pale violet (rarely medium violet or yellow); seeds 0.4 mm long ..... ***Pinguicula pumila***
1 Expanded corolla > 1.8 cm across; palate markedly exserted from the throat of the corolla; rosettes usually 5-10 (-15) cm across; corolla yellow, violet, or white; seeds (0.4-) 0.5-0.8 mm long.
  2 Corolla yellow ..... ***Pinguicula lutea***
  2 Corolla lavender-blue or white.
    4 Fresh leaves dull red or reddish green; corolla lobes ca. 2× as long than broad, the lobes notched about 1/2 their length ..... ***Pinguicula planifolia***
    4 Fresh leaves bright yellow-green; corolla lobes ca. 1× as long than broad, the lobes notched about 1/4 their length ..... ***Pinguicula primuliflora***

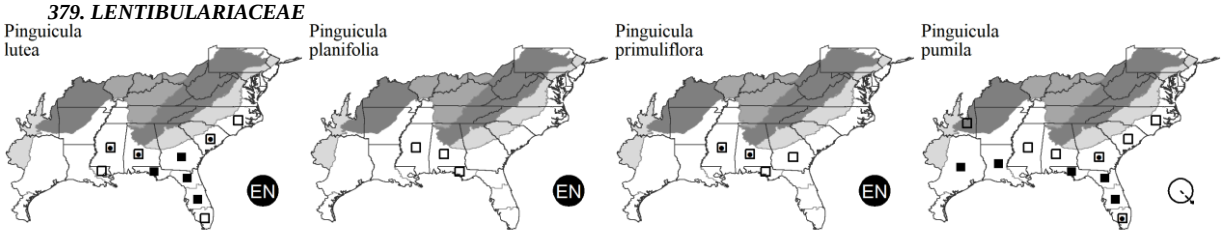
Pinguicula lutea Walter. YELLOW BUTTERWORT. **Hab:** Pine savannas and wet pine flatwoods, mostly in the outer Coastal Plain, rarely extending inland to seepages and sandhill-pocosin ecotones in the fall-line Sandhills of SC. **Dist:** Se. NC (Pender and New Hanover counties) south to s. FL, west to e. LA. **Phen:** (Late Dec-) Feb-May. **Syn:** = Fl6, GW2, K1, K3, K4, RAB, S, WH3, Schnell (2002b). NatureServe G4G5 (Apparently Secure).

Pinguicula planifolia Chapman. CHAPMAN'S BUTTERWORT. **Hab:** Pond margins, bogs, flatwoods, margins of cypress stringers. **Dist:** S. AL, Panhandle of FL, and s. MS. **Phen:** (Early Dec-) Feb-Mar. **Syn:** = Fl6, GW2, K1, K3, K4, S, WH3, Schnell (2002b). NatureServe G3? (Vulnerable).

Pinguicula primuliflora C.E. Wood & Godfrey. CLEARWATER BUTTERWORT. **Hab:** Mucky margins of clearwater streams, seeps. **Dist:** Sw. GA, s. AL, Panhandle FL, and s. MS. **Phen:** Mar-Apr. **Syn:** = Fl6, GW2, K1, K3, K4, WH3, Schnell (2002b). NatureServe G3G4 (Vulnerable).

Pinguicula pumila Michaux. SMALL BUTTERWORT. **Hab:** Pine savannas and wet pine flatwoods. **Dist:** Se. NC (Carteret and Pender counties) south to s. FL, west to se. TX; Bahamas. **Phen:** (Oct-) Feb-May. **Syn:** = Bah, Fl6, GW2, K1, K3, K4, RAB, S, Tx, WH3, Schnell (2002b). NatureServe G4 (Apparently Secure).

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



Utricularia Linnaeus 1753 (BLADDERWORT)

As monographed by Taylor (1989), *Utricularia* consists of 214 species in 35 sections, with a nearly cosmopolitan distribution. References: Fischer et al. in Kadereit (2004); Müller & Borsch (2005); Schnell (2002b); Silva et al (2018); Taylor (1989).

1 Flowers white or cream-white, 1-3 mm long; inflorescence peduncles very reduced, the pedicels appearing to arise directly from the stolons; traps 0.3-0.8 mm long; plants floating unattached in water (sometimes deposited on land by dropping water, but then the principal branch systems stranded on the soil surface); capsules ca. 1 mm long, fusiform, indehiscent, with 1 seed; seeds essentially smooth, unornamented; leaves absent; [subgenus *Utricularia*, section *Utricularia*]..... ***Utricularia olivacea***

1 Flowers yellow, pink, or purple (sometimes fading whitish), (2-) 5-20 mm long; inflorescence peduncles well-developed, the inflorescence clearly a raceme; traps 0.2-5.0 mm long; plants either attached (with principal branch systems within the soil), or floating unattached in water (sometimes deposited on land by dropping water, but then the principal branch systems stranded on the soil surface); capsules 1-8 mm long, globose, subglobose, or ovoid, with many seeds; seeds reticulate, papillose, echinate, multi-angled, or winged (rarely more-or-less smooth); leaves present (sometimes absent in the terrestrial species).

2 Plants attached (with principal branch systems within the soil); leaves aerial, from near the rooted base of the plant (rosulate or from nodes of stolons), simple, linear or spatulate (sometimes absent); traps 0.2-1.1 mm long, most or all on a plant usually < 1.0 mm long; seeds reticulate-alveolate (also angled in *U. resupinata*), 0.2-0.4 mm long.

4 Flowers pink; inflorescence 1 (-2)-flowered; leaves terete, septate, acute at its apex; bract at base of the pedicel tubular, 1.2-1.5 mm long, attached circumferentially around the stem (bractlets absent); [subgenus *Utricularia*, section *Lecticula*] ..... ***Utricularia resupinata***

4 Flowers yellow (sometimes fading whitish); inflorescence (1-) 2-15-flowered; leaves flattened, non-septate, acute to obtuse at the apex; bracts attached at their base (one end free) or near their middle (both ends free).

6 Bracts subtending the pedicels peltate (attached near their middles), unattached at either end; pair of bracteoles absent; spur of the corolla oriented forward, more-or-less appressed to the lower lip; leaves with subacute to obtuse apex; [subgenus *Utricularia*, section *Setiscapella*]..... ***Utricularia subulata***

6 Bracts subtending the pedicels ovate (attached at their bases), free only at their upper end; pair of bracteoles associated with each bract present, linear to lanceolate; spur of the corolla oriented downward or backward, at approximately a right angle to the lower lip; leaves with acute apex; [subgenus *Bivalvaria*, section *Stomoisia*].

7 Corolla 1.5-2.0 cm long; spur 8-12 mm long; raceme usually short, the (1-) 2-6 flowers crowded together, all of them chasmogamous ..... ***Utricularia cornuta***

7 Corolla 0.25-1.5 cm long; spur 5-7 (-9) mm long; raceme usually elongate, the (1-) 2-15 flowers well-spaced, often the lower (sometimes all) cleistogamous and much smaller than the chasmogamous flowers..... ***Utricularia juncea***

2 Plants floating unattached in water (sometimes deposited on land by dropping water, but then the principal branch systems stranded on the soil surface); leaves present and dissected into linear segments, normally submersed; traps 0.7-5.0 mm long, most or all on a plant > 1.0 mm long; seeds papillose, reticulate, ridged, angled, or winged, 0.5-2.0 mm long.

8 Flowers purple; leaves divided into verticillate segments with terminal traps; [subgenus *Utricularia*, section *Vesiculina*]..... ***Utricularia purpurea***

8 Flowers yellow; leaves divided into alternate segments with lateral traps; [subgenus *Utricularia*, section *Utricularia*].

9 Peduncle with whorl of inflated leaf-like organs (floats).

10 Floats 4-7, not fused basally to one another, fusiform, tapering gradually to base and apex from a widest point near the middle; leaves with the 2 primary divisions unequal; bracts of the scape longer than broad, entire; flowers (6-) 9-14 (-17) per scape; apex of corolla spur bifid..... ***Utricularia inflata***

10 Floats (5-) 6-8 (-10), fused basally to one another, cylindrical, more-or-less parallel-sided through most of their length, tapering abruptly to base and apex; leaves with the 2 primary divisions equal; bracts of the scape broader than long, the apex slightly to strongly 3-lobed; flowers (1-) 3-4 (-7) per scape; apex of corolla spur usually entire (rarely bifid)..... ***Utricularia radiata***

9 Peduncle without whorl of inflated leaf-like organs (floats).

11 Main axes distinctly flattened in cross-section, up to 10 mm wide..... ***Utricularia foliosa***

11 Main axes round in cross-section.

13 Upper corolla lip smaller than the lower, entire; capsule circumscissilely dehiscent; seeds 0.7-1.0 mm long, 4-6-angled; corolla without stipitate glands on its external surface. ..... ***Utricularia macrorhiza***

13 Upper corolla lip larger than the lower, obscurely 3-lobed; capsule laterally 2-valved or indehiscent; seeds 0.8-2.5 mm long, lenticular, with an irregular, lobed, or continuous wing; corolla (or at least the spur) with a few to many short stipitate glands (sometimes patchily distributed).

16 Vegetative shoots uniform, all bearing rather sparsely divided leaf segments bearing traps, seeds 0.8-1.1 mm long, with a continuous, circumferential wing, slightly to irregularly lobed.

17 Lower corolla lip 8-10 mm long, about equaling or slightly shorter than the conical, 5-9 mm long spur; leaves usually forked twice ..... ***Utricularia biflora***

17 Lower corolla lip 5-6 mm long, exceeding the blunt, 3.5-4.5 mm long spur; leaves usually forked once..... ***Utricularia gibba***

16 Vegetative shoots of 2 kinds, some bearing leafy segments and few or no traps, others bearing reduced segments and more-or-less numerous traps; seeds 1.0-2.5 mm long, with an irregularly deeply lobed or partial wing.

18 Plant anchored in mud up to 100 cm below water surface; green leafy shoots up to 40 cm long and 5 cm wide; peduncle flexuous, to 100 cm long, only the uppermost ca. 10 cm emergent..... ***Utricularia floridana***

18 Plant in shallow water or stranded; green leafy shoots usually not > 10 cm long and 2 cm wide; peduncle erect, straight, to 30 cm long, the uppermost 10-25 cm emergent ..... ***Utricularia striata***

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

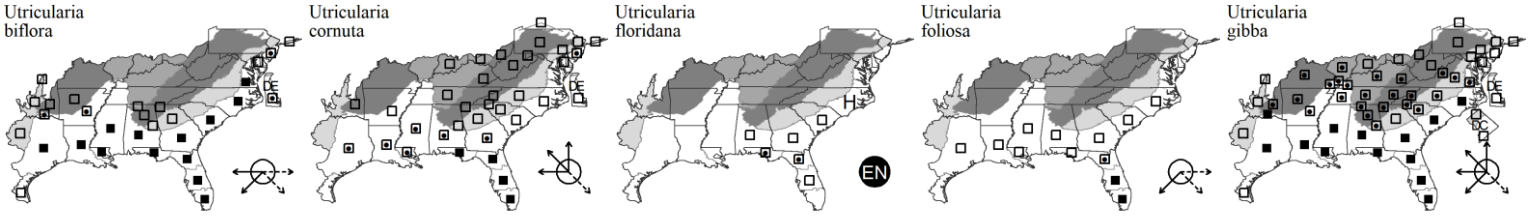
Utricularia biflora Lamarck. LONGSPUR CREEPING BLADDERWORT. **Hab:** Ponds, lakes, and diches. **Dist:** E. MA south to FL, west to TX and OK, primarily on the Coastal Plain; also apparently widespread in the New World and Old World tropics. **Phen:** Jun-Oct. **Comm:** This species may not be distinct from *U. gibba* (which see for discussion). **Syn:** = C, F, G, GrPl, GW2, RAB, Tx, Va, W; = *Utricularia pumila* Walter – Bah, S, misapplied; < *Utricularia gibba* Linnaeus – Fl6, K1, K3, K4, NE, WH3, Schnell (2002b), Taylor (1989).

Utricularia cornuta Michaux. HORNED BLADDERWORT. **Hab:** Saturated peaty soils of shores of limesink ponds (dolines), bogs, fens, wet barrens. **Dist:** NL (Newfoundland) and QC west to n. ON, AB, and MN, south to s. FL and e. TX; Bahamas and Cuba. **Phen:** May-Sep. **Comm:** Taylor (1989) states that where sympatric with *U. juncea*, *U. cornuta* flowers much earlier. **Syn:** = Bah, C, F, Fl6, G, GW2, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, Tn, Tx, W, WH3, WI, WV, Schnell (2002b), Taylor (1989); = *Stomoisia cornuta* (Michaux) Rafinesque – S. NatureServe G5 (Secure).

Utricularia floridana Nash. FLORIDA BLADDERWORT. **Hab:** In deep water of natural Carolina bay lakes, other natural lakes, and limesink ponds (dolines). **Dist:** Se. NC south to c. peninsular FL, west to Panhandle FL and sw. GA. **Phen:** Jul-Aug. **Syn:** = Fl6, GW2, K1, K3, K4, S, WH3, Schnell (2002b), Taylor (1989). NatureServe G3G5 (Apparently Secure).

Utricularia foliosa Linnaeus. FLATSTEM BLADDERWORT. **Hab:** In deep water of natural lakes and ponds. **Dist:** Se. NC south to s. FL, west to TX (Brown & Marcus 1998); West Indies, South America, Africa. This species was reported for NC by Taylor (1989). **Phen:** Aug. **Tax:** See Godfrey & Wooten (1981) for a detailed description of this species. **Syn:** = Bah, Fl6, GW2, K1, K3, K4, S, WH3, WI, Schnell (2002b), Taylor (1989). NatureServe G5 (Secure).

Utricularia gibba Linnaeus. SHORTSPUR CREEPING BLADDERWORT. **Hab:** Ponds, lakes, and diches. **Dist:** QC west to WI, south to FL and LA; also apparently widespread in the West Indies and Central America and apparently the Old World tropics. **Phen:** May-Sep. **Tax:** Taylor (1989) includes *U. biflora* in *U. gibba*. Other authors have expressed doubts about the distinction, including RAB ('doubtfully distinct'). Taylor suggests that "further research is clearly indicated, but to be at all meaningful, it must be conducted on a worldwide basis". I have here, for the moment, retained the two traditionally recognized species, though intermediates will be encountered. **Syn:** = Bah, C, F, G, GrPl, NcTx, RAB, S, Va, W, WV; > *Utricularia fibrosa* Walter – Tx; < *Utricularia gibba* Linnaeus – Ar, Fl6, K1, K3, K4, Mi, NE, NY, Pa, Tn, WH3, Schnell (2002b), Taylor (1989); > *Utricularia gibba* Linnaeus – Tx.



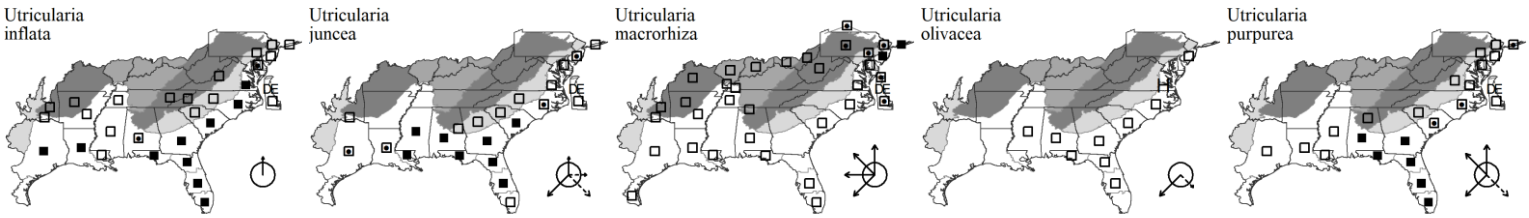
Utricularia inflata Walter. SWOLLEN BLADDERWORT, INFLATED BLADDERWORT. **Hab:** Ponds, lakes, ditches. **Dist:** NJ south to s. FL, west to e. TX; disjunct in WA (probably introduced). **Phen:** May-Nov. **Comm:** Also disjunct in an artificial pond in Henderson County, NC (Carl Sandburg Home National Historic Site). **Syn:** = C, Fl6, G, GW2, K1, K3, K4, NE, NY, Pa, S, Tn, Tx, Va, WH3, Schnell (2002b), Taylor (1989); = *Utricularia inflata* var. *inflata* – F, RAB. NatureServe G5 (Secure).

Utricularia juncea M. Vahl. SOUTHERN BLADDERWORT. **Hab:** Shores of limesink ponds (dolines), borrow pits, wet sands. **Dist:** NY (Long Island) and NJ south to s. FL, west to e. TX and se. AR; also in the West Indies, Central America and South America. **Phen:** Jul-Sep. **Syn:** = C, F, Fl2, G, GW2, K1, K3, K4, NY, RAB, Tx, Va, WH3, WI, Schnell (2002b), Taylor (1989); > *Stomoisia juncea* (M. Vahl) Barnhart – S; > *Stomoisia virgatula* Barnhart – S. NatureServe G5 (Secure).

Utricularia macrorhiza Le Conte ex Torrey. GREATER BLADDERWORT. **Hab:** Pools and ponds. **Dist:** NL (Newfoundland) west to AK, south to NC, SC, TX, CA, and Mexico; also in e. Asia. **Phen:** May-Sep. **Comm:** See Taylor (1989) for a discussion of the differences between this species and *U. vulgaris* of Europe and w. Asia, with which it has often been combined or associated as a variety or subspecies. **Syn:** = Ar, Il, K1, K3, Pa, S, Tn, Va, Schnell (2002b), Taylor (1989); = *Utricularia vulgaris* ssp. *macrorhiza* (Le Conte ex Torrey) R.T. Clausen – Mi, NE, NY; < *Utricularia vulgaris* Linnaeus – C, F, G, GrPl, RAB, Tx, WV.

Utricularia olivacea Wright ex Grisebach. DWARF BLADDERWORT, MINUTE BLADDERWORT. **Hab:** In floating mats (often algal) in water of limesink ponds (dolines), artificial lakes or beaver ponds. **Dist:** NJ south to FL, west to s. AL and s. MS (Sorrie & Leonard 1999), in the Coastal Plain; also in the West Indies (Cuba), Central America, and South America. **Phen:** Sep-Oct. **Syn:** = Fl6, GW2, K1, K3, K4, RAB, Va, WH3, WI, Schnell (2002b), Taylor (1989); = *Biovularia olivacea* (Wright ex Grisebach) Kam. – S. NatureServe G4 (Apparently Secure).

Utricularia purpurea Walter. PURPLE BLADDERWORT. **Hab:** In water of ponds, ditches, other slow-moving water. **Dist:** NS and QC west to MN, south to NY, n. IN, s. MI, and WI, and on the Coastal Plain south to s. FL, west to se. TX; also in Mexico, the West Indies, and Central America. **Phen:** May-Sep (-Apr). **Syn:** = Bah, C, F, Fl6, G, GW2, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, Tx, Va, WH3, WI, Schnell (2002b), Taylor (1989); = *Vesiculina purpurea* (Walter) Rafinesque – S. NatureServe G5 (Secure).



Utricularia radiata Small. FLOATING BLADDERWORT, SMALL SWOLLEN BLADDERWORT. **Hab:** Ponds, depression ponds, lakes, and ditches. **Dist:** NS south to s. FL, west to TX; disjunct in w. VA, w. TN, nw. IN; reports of this species in Cuba and South America are apparently in error. **Phen:**

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more)

* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable

X : extirpated

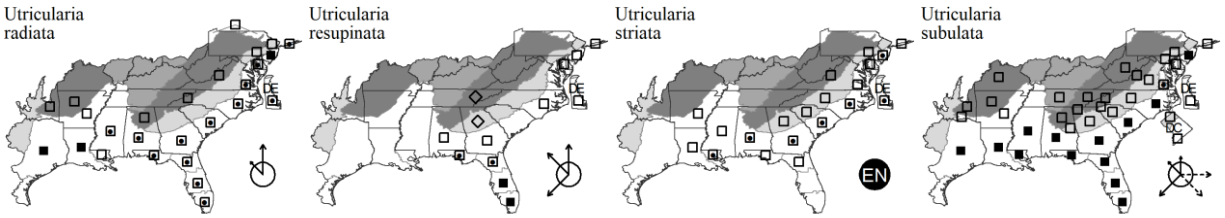
379. LENTIBULARIACEAE

May-Nov. **Syn:** = Ar, C, Fl6, G, GW2, K1, K3, K4, Mi, NE, NY, Pa, S, Tx, Va, W, WH3, Schnell (2002b), Taylor (1989); = *Utricularia inflata* var. *minor* Chapman – F, RAB. NatureServe G4 (Apparently Secure).

Utricularia resupinata B.D. Greene ex Bigelow. NORTHEASTERN BLADDERWORT, RESUPINATE BLADDERWORT. **Hab:** Wet pine flatwoods, pond margins, shores of natural lakes. **Dist:** NS west to nw. WI, south (irregular and scattered in part) to FL and sw. GA; also in the Bahamas (Sorrie & LeBlond 1997). **Phen:** May-Oct. **Comm:** Although "the curious gap in the North American range" [NC, SC, and VA] (Taylor 1989) is no longer strictly a gap, *U. resupinata* does appear to have a strangely bimodal range, with a center of distribution in ne. United States and se. Canada and a second extending from se. United States south into the West Indies and Central America. **Syn:** = C, F, Fl6, G, GW2, K1, K3, K4, Mi, NE, NY, Pa, Tn, WH3, WI, Schnell (2002b), Taylor (1989); = *Lecticula resupinata* (B.D. Greene) Barnhart – S. NatureServe G4 (Apparently Secure).

Utricularia striata Le Conte ex Torrey. FIBROUS BLADDERWORT. **Hab:** Ponds, lakes, and ditches. **Dist:** Se. MA south to n. FL, west to e. TX and e. OK. **Phen:** May-Nov. **Syn:** = Ar, Fl6, K1, K3, K4, NE, NY, Va, WH3, Schnell (2002b), Taylor (1989); = *Utricularia fibrosa* Walter – C, F, G, GW2, RAB, S, misapplied.

Utricularia subulata Linnaeus. SLENDER BLADDERWORT, ZIGZAG BLADDERWORT. **Hab:** Moist sands or peats of various kinds of acidic wetlands, including wet pine savannas and flatwoods, shores of limesink ponds (dolines), borrow pits, ditches. **Dist:** In North America primarily in the Coastal Plain, from NS and e. MA south to s. FL, west to TX, north in the interior to TN and AR; also in the West Indies, Central America, South America, Africa, and Asia. **Phen:** Jan-Dec. **Comm:** Taylor (1989) termed this "the most widespread of *Utricularia* species". **Syn:** = Ar, Bah, C, F, Fl6, G, GW2, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, Tn, Tx, Va, W, WH3, WI, Schnell (2002b), Taylor (1989); > *Setiscapella cleistogama* (A. Gray) Barnhart – S; > *Setiscapella subulata* (Linnaeus) Barnhart – S. NatureServe G5 (Secure).



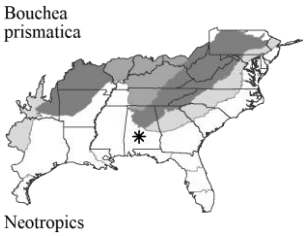
382. VERBENACEAE J. Saint-Hilaire 1805 (VERBENA FAMILY) [in LAMIALES]

As recently reworked, a family of about 34-41 genera and 950-1200 species, trees, shrubs, vines, and herbs, widespread in tropical, subtropical, and warm temperate regions of the Old World and New World. Tribal classification follows Marx et al. (2010).References: Atkins in Kadereit (2004); Marx et al (2010); Yuan & Olmstead (2008).

{add *Citharexylum, Lippia, Priva*}

1 Shrubs; fruits fleshy ..... ***Lantana***
1 Herbs; fruits dry.
  3 Flowers and fruits embedded in a thickened, somewhat fleshy rachis ..... ***Stachytarpheta***
  3 Flowers and fruits not embedded in a thickened, somewhat fleshy rachis.
    4 Mericarps 2; corolla 4-lobed, evidently zygomorphic (bilabiate); [tribe *Lantaneae*] ..... ***Phyla***
    4 Mericarps 4; corolla 5-lobed, actinomorphic or only weakly irregular; [tribe *Verbeneae*].
      5 Styles > 6 mm long; calyx 8-10 mm long, longer than the fruit; corolla salverform ..... ***Glandularia***
      5 Styles < 3 mm long; calyx 2-4 mm long, often shorter than the fruit; corolla funnelform ..... ***Verbena***

Bouchea Chamisso 1832 (BOUCHEA)



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* ***Bouchea prismatica*** (Linnaeus) Kuntze. PRISM BOUCHEA. **Hab:** On ballast. **Dist:** Native of tropical America. **Syn:** = Bah, K3, K4, Meso4.2. NatureServe G4G5 (Apparently Secure).

Glandularia J.F. Gmelin 1796 (VERVAIN)

A genus of about 100 species, herbs, of s. North America, Central America, and South America. Christenhusz, Fay, & Byng (2018) propose including *Glandularia* in *Verbena*, a course not followed here. References: Atkins in Kadereit (2004); Christenhusz, Fay, & Byng (2018); Nesom (2010); O'Leary & Thode (2016); Umber (1979).

Unkeyed taxa: *Glandularia species 1*
Unkeyed waifs: *Glandularia tenera*

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

382. VERBENACEAE

1 Leaves finely dissected, the divisions 1 mm or less wide, the margins strongly revolute.
  2 Bracts as long as or longer than the calyx; leaf segments 1-4 mm wide ..... ***Glandularia bipinnatifida var. bipinnatifida***
  2 Bracts much shorter than the calyx; leaf segments 0.5-1.5 mm wide ..... ***Glandularia aristigera***
1 Leaves coarsely dissected or lobed, the divisions > 1 mm wide, the margins slightly or not at all revolute.
  5 Calyx lobes > 3 mm long ..... ***Glandularia canadensis***
  5 Calyx lobes < 3 mm long ..... ***Glandularia ×hybrida***

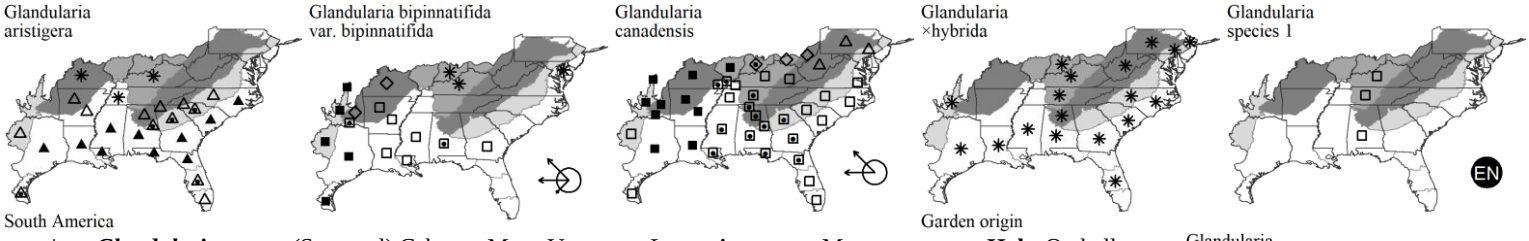
* ***Glandularia aristigera*** (S. Moore) Troncoso. MOSS VERVAIN, SOUTH AMERICAN VERVAIN. **Hab:** Pastures, roadsides, other disturbed areas. **Dist:** Native of South America. **Phen:** Mar-Nov. **Syn:** = Fl6, K3, K4, O'Leary & Thode (2016); = *Glandularia pulchella* (Sweet) Troncoso – Ar, K1, WH3, Umber (1979), misapplied; = *Glandularia tenuisecta* (Briquet) Small – S; = *Verbena tenuisecta* Briquet – C, Meso4.2, RAB, Tx. NatureServe G5? (Secure).

Glandularia bipinnatifida (Nuttall) Nuttall *var*. ***bipinnatifida***. DAKOTA VERVAIN. **Hab:** Dry prairies on clay soils. **Dist:** KY, MO, SD, and CO south to c. GA, AL, AZ and s. Mexico; elsewhere in e. North America as waifs. **Comm:** {synonymy incomplete}. **Syn:** = Ar, K1, K4, Umber (1979); = *Glandularia bipinnatifida* (Nuttall) Nuttall – K3, NcTx, Nesom (2010); < *Verbena bipinnatifida* Nuttall – C, GrPl, Meso4.2. NatureServe G5T5 (Secure).

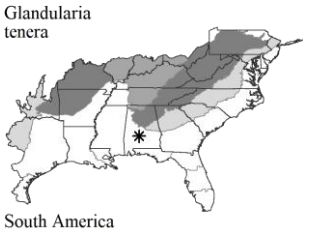
Glandularia canadensis (Linnaeus) Nuttall. ROSE VERVAIN, ROSE VERBENA, CREEPING VERVAIN. **Hab:** Roadsides, longleaf pine sandhills, calcareous glades, rocky prairies, other dry sandy or rocky soils. **Dist:** IL and CO, south to FL, TX, and NM; introduced elsewhere. **Phen:** Mar-May. **Syn:** = Ar, Fl6, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, S, Tn, Va, WH3, Umber (1979); = *Verbena canadensis* Linnaeus – C, F, G, Pa, RAB; > *Verbena canadensis* var. *compacta* Dermen – Tx; > *Verbena canadensis* var. *drummondii* (Lindley) Baxter – Tx; > *Verbena canadensis* var. *grandiflora* (Haage & Schmidt) Moldenke – Tx; > *Verbena canadensis* var. *lambertii* (Sims) Thellung – Tx.

* ***Glandularia ×hybrida*** (Groenland & Rümpler) Nesom & Pruski. GARDEN VERVAIN. **Hab:** Cultivated in gardens, uncommonly cultivated, rarely escaped or persistent; of garden origin. **Phen:** Mar-Jul. **Tax:** Nesom & Pruski (1992) provided the transfer to *Glandularia* of this common garden plant. **Syn:** = Fl6, K3, K4, NcTx, WH3; = *Verbena ×hybrida* Grönland & Rümpler – G, K1, Meso4.2, RAB; = *Verbena hybrida* – C, Tx.

Glandularia species 1. LIME-BLUFF VERVAIN, CUMBERLAND RIVER VERVAIN. **Hab:** Limestone and chalk bluffs. **Dist:** Endemic to limestone bluffs and talus slopes in Smith, DeKalb, Clay, and Jackson counties, TN, and adjacent KY (D. Estes, pers. comm., 2012). Also reported to be in the Black Belt of AL.



* ***Glandularia tenera*** (Sprengel) Cabrera. MOSS VERBENA, LATIN AMERICAN MOCK-VERVAIN. **Hab:** On ballast. **Dist:** Native of South America. **Syn:** = K3, K4. NatureServe GNR (Not Yet Ranked).



Lantana Linnaeus 1753 (LANTANA)

A genus of about 150 species, shrubs and subshrubs, of tropical and subtropical America and Africa. References: Atkins in Kadereit (2004); Sanders (1987); Sanders (2006); Sanders (2012); Sanders in FNA () (in prep).

1 Inflorescence axes not thickened or spongy; inflorescence bracts broadly elliptic, broadly ovate, or reniform; corollas either pink or white to pale lavender and often with a pale yellow 'eye'; drupes white, tan, brown, pink, or purplish black, succulent to nearly dry when ripe; stems trailing, ascending, or erect. ..... ***Lantana montevidensis***
1 Inflorescence axes clavate-thickened, spongy; inflorescence bracts lanceolate-triangular or oblanceolate; corollas at least in part orange, variously entirely orange or varicolored in the inflorescence with oranges, pinks, and/or purples; drupes bluish-black and juicy when ripe; stems ascending to erect.
  4 Inflorescence bracts (excluding lowermost one or two that sometimes develop leaflike structure) widest at or just above base, deciduous after flowering; twigs with curled or appressed hairs usually < 0.5 mm long ..... ***Lantana strigocamara***
  4 Inflorescence bracts widest near or above the middle, persistent in fruit; twigs with spreading hairs 0.5-2 mm long.
    5 Leaf blades rotund to broadly cordate or ovate-triangular, 1-1.5× as long as wide; leaf teeth spreading, with sinuses 2-5 mm deep; bracts oblanceolate or spatulate ..... ***Lantana urticoides***
    5 Leaf blades elliptic, 1.7-3× as long as wide; leaf teeth arched forward, with sinuses 1 (-2) mm deep; bracts elliptic lanceolate. ..... ***Lantana depressa var. floridana***

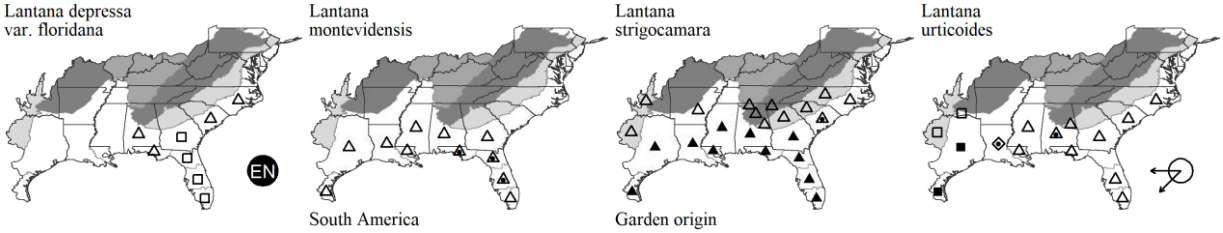
Lantana depressa Small *var*. ***floridana*** (Moldenke) R.W. Sanders. FLORIDA LANTANA, EAST FLORIDA LANTANA. **Hab:** Coastal strands, xeric hammocks, scrubby pine flatwoods, edges of brackish marshes, dunes; the AL, SC, and NC occurrences apparently introduced from FL. **Dist:** Native from extreme se. GA and ne. FL south to se. FL. **Phen:** Mar-Nov. **Syn:** = Fl6, K1, K3, K4, Sanders (1987), Sanders (2006), Sanders (2012); < *Lantana camara* Linnaeus – WH3; < *Lantana ovatifolia* Britton – RAB, S, misapplied.

* ***Lantana montevidensis*** (Sprengel) Briquet. TRAILING SHRUB-VERBENA, TRAILING LANTANA, POLECAT-GERANIUM. **Hab:** Landscaped areas, disturbed areas. **Dist:** Native of South America. Scattered locations in s. and e. GA (Jones & Coile 1988). **Phen:** Mar-Nov. **Syn:** = Fl6, K1, K3, K4, Tx, WH3, Sanders (2012); = *Lantana sellowiana* Link & Otto – S. NatureServe GNR (Not Yet Ranked).

* ***Lantana strigocamara*** R.W. Sanders. COMMON LANTANA, HEDGEFLOWER. **Hab:** Disturbed areas, especially near the coast. **Dist:** Of garden hybrid origin. **Phen:** Jan-Dec. **Tax:** Sanders (2006) described in careful detail the history and nomenclature of this species. **Syn:** = Fl6, Meso4.2, Sanders (2006), Sanders (2012); = *Lantana camara* Linnaeus – Ar, Bah, K1, K2, NcTx, RAB, S, Tx, Sanders (1987), misapplied; < *Lantana camara* Linnaeus – WH3; > *Lantana camara* ssp. *camara* – K4; > *Lantana strigocamara* R.W. Sanders – K4. NatureServe G5TNRQ (Not Yet Ranked).

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Lantana urticoides Hayek. TEXAS LANTANA, HIERBA DE CRISTO. **Hab:** Disturbed and brackish areas. **Dist:** S. OK, TX, s. NM, and s. AZ southwards into tropical America (West Indies and sw. and sc. United States southwards). **Phen:** May-Dec. **Syn:** = K1, K3, K4, NcTx, Sanders (1987), Sanders (2006), Sanders (2012); < *Lantana horrida* Kunth – RAB, misapplied; >< *Lantana horrida* Kunth – Tx; > *Lantana scorta* Moldenke – Tx. NatureServe G5 (Secure).



Phyla Loureiro 1790 (FROGFRUIT)

A genus of 5 species, herbs, of tropical, subtropical, and warm temperate regions of the Old and New Worlds. References: Atkins in Kadereit (2004); O'Leary & Múlgura (2012).

1 Leaves 2-7.5 cm long, lanceolate, widest at or below the middle, acute at the tip; leaf teeth (5-) 7-11 per leaf side ..... ***Phyla lanceolata***

1 Leaves 1-4 cm long, obovate, widest above the middle, obtuse to rounded at the tip; leaf teeth (0-) 1-5 (-7) per leaf side.

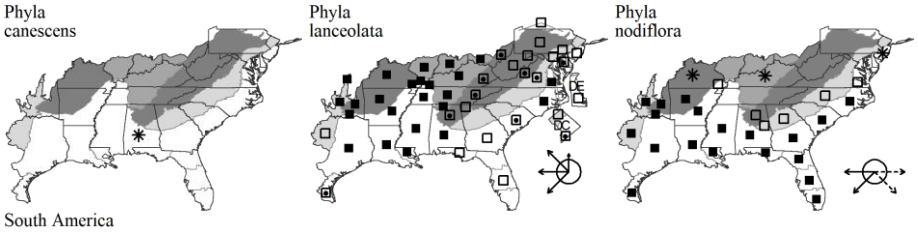
4 Leaf blades elliptic or obovate, 0.5-2 (-4) cm long, 0.2-1.0 cm wide, the apex mostly acute; leaf surfaces and stems densely white-strigose or canescent; [rare waif in our area] ..... ***Phyla canescens***

4 Leaf blades obovate, spatulate, 2-4(-7.5) cm long, 0.5-1.5 (-3) cm wide, the apex mostly obtuse; leaf surfaces 1.5(3) cm, apex mostly subobtuse, subglabrous or with scattered and subappressed hairs; [widespread and common in our area] ..... ***Phyla nodiflora***

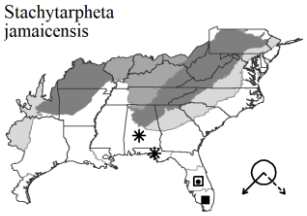
* ***Phyla canescens*** (Kunth) Greene. **Hab:** Disturbed areas. **Dist:** Native of South America. Discovered in Mobile, AL by Howard Horne (2014). **Phen:** Jul-Aug. **Syn:** = K4; = *Phyla nodiflora* (Linnaeus) Greene var. *minor* (Hooker) O'Leary & Múlgara – O'Leary & Múlgara (2012); < *Phyla nodiflora* (Linnaeus) Greene – K1; < *Phyla nodiflora* (Linnaeus) Greene var. *nodiflora* – K3.

Phyla lanceolata (Michaux) Greene. MARSH FROGFRUIT, NORTHERN FROGFRUIT. **Hab:** Oligohaline tidal marshes, tidal swamps, maritime swamps, dune swales and ponds, other marshes, seasonally exposed shores of rivers, ditches. **Dist:** ON west to SD, south to Panhandle FL, AL, MS, LA, CA, and n. Mexico. **Phen:** (May-) Jun-Nov. **Syn:** = Ar, C, Fl6, G, GW2, Il, K1, K3, K4, Mi, NY, Pa, S, Tn, Tx, Va, W, WH3, O'Leary & Múlgara (2012); = *Lippia lanceolata* Michaux – GrPl, NcTx, RAB, WV; > *Lippia lanceolata* var. *lanceolata* – F; > *Lippia lanceolata* var. *recognita* Fernald & Griscom – F. NatureServe G5 (Secure).

Phyla nodiflora (Linnaeus) Greene. CREEPING FROGFRUIT, CAPEWEED, TURKEY-TANGLE, MATGRASS. **Hab:** Interdune swales, shell middens, sandy soils of roadsides, lawns, ditches, impoundments, disturbed areas. **Dist:** Pantropical, in North America from se. VA south to s. FL and west to CA, north in the interior to AR, se. MO, and southward into the tropics. **Phen:** May-Nov. **Comm:** This species is very weedy, and is a familiar component of road margins and lawns in the southeastern Coastal Plain. **Syn:** = K4; = *Phyla nodiflora* (Linnaeus) Greene var. *nodiflora* – Bah, GrPl, O'Leary & Múlgura (2012); < *Lippia nodiflora* (Linnaeus) Michaux – F, RAB; > *Phyla incisa* Small – Tx; < *Phyla nodiflora* (Linnaeus) Greene – Ar, C, Fl6, G, GW2, K1, Meso4.2, NcTx, S, Va, WH3; > *Phyla nodiflora* (Linnaeus) Greene – Tx; < *Phyla nodiflora* (Linnaeus) Greene var. *nodiflora* – K3.



Stachytarpheta Vahl 1804 (BLUE-FLOWER, JAMAICA VERVAIN)



A genus of about 100 species, herbs, of tropical and subtropical America. References: Atkins in Kadereit (2004).

Stachytarpheta jamaicensis (Linnaeus) Vahl. BLUE-FLOWER, JAMAICA VERVAIN, RAT-TAIL VERVAIN, JOEE. **Hab:** Dunes, pine rocklands, coastal rock barrens, roadsides. **Dist:** FL peninsula; West Indies; Mexico, Central America, and South America. **Phen:** Jan-Dec. **Syn:** = Bah, Fl6, K3, K4, Meso4.2, WH3; = *Valerianoides jamaicensis* (Linnaeus) Kuntze – S. NatureServe G5 (Secure).

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Verbena Linnaeus 1753 (VERBENA, VERVAIN)

A genus of about 70 species, herbs, of tropical, subtropical, and warm temperate regions of the New World and (rarely) Old World. Infrageneric taxonomy follows Nesom (2010b). References: Atkins in Kadereit (2004); Barber (1982); Jiménez-Mejías & Naczi (2019); Nesom (2010b); Nesom (2010c); Nesom (2010d); O'Leary, Múlgara, & Morrone (2007); Verloove (2011); Yuan & Olmstead (2008).

Unkeyed waifs: *Verbena supina*

1 Spikes short and stout, the flowers or fruits overlapping and completely obscuring all of the rachis (except in *V. montevidensis*, the fruits spaced toward the base of the spike); [weedy aliens usually of disturbed areas]
- 2 Plant procumbent or decumbent; leaves pinnately lobed or dissected; [section *Verbena*, series *Bracteatae*] ..... ***Verbena bracteata***
- 2 Plant erect; leaves coarsely serrate.
  - 3 Leaves basally attenuate to short-petiolate; corolla tubes 2.5-5 mm long.
    - 4 Central spikes sessile to subsessile, spikes compact, 3-5 mm wide, fruits remaining densely overlapping at maturity; [section *Verbenaca*, series *Pachystachyae*] ..... ***Verbena brasiliensis***
    - 4 Central spikes pedunculate, spikes loose, 2-3 mm wide, with fruits becoming remote at least in the proximal portion at maturity; [section *Verbenaca*, series *Litorales*] ..... ***Verbena montevidensis***
  - 3 Leaves basally clasping to subclasping; corolla tubes 2.5-9 (-11) mm long; [section *Verbenaca*, series *Pachystachyae*].
    - 5 Corolla tube (5-) 6.5-9 (-11) mm long ..... ***Verbena rigida***
    - 5 Corolla tube 2.5-6 (-7) mm long. ..... ***Verbena incompta***

1 Spikes elongate, the flowers or fruits well-spaced and not obscuring the rachis; [aliens and natives, collectively of a range of habitats].
- 7 Leaves mostly lobed or dissected.
  - 8 Plants much branched at base, stems decumbent to ascending; leaves 1-5 cm long; [section *Verbena*, series *Tricesimae*] ..... ***Verbena canescens***
  - 8 Plants little branched, stems erect; leaves 3-12 cm long.
    - 9 Bractlets about as long as the calyx; [AL westward]; [section *Verbena*, series *Candelabrae*] ..... ***Verbena xutha***
    - 9 Bractlets about ½ as long as the calyx; [collectively widespread].
      - 10 Basal and lower cauline leaves persistent, relatively thick, large and spatulate, margins revolute, cauline leaves quickly reduced in size distally and becoming linear-entire; rachis and calyces eglandular; [section *Verbena*, series *Haleae*] ..... ***Verbena halei***
      - 10 Basal leaves usually deciduous, relatively thin, margins not revolute, cauline leaves relatively even-sized upward or largest near midstem; rachis and calyces stipitate-glandular, sometimes sparsely so; [section *Verbena*, series *Verbena*] ..... ***Verbena officinalis***
- 7 Leaves not lobed or dissected, or some of the leaves lower on the stem 3-lobed.
  - 11 Stem leaves sessile or subsessile, cuneate to base.
    - 12 Leaves linear to narrowly oblancolate, < 1.5 cm wide, > 6× as long as wide; [section *Verbena*, series *Simplices*] ..... ***Verbena simplex***
    - 12 Leaves ovate, 2-4 cm wide, < 4× as long as wide
      - 13 Mericarps tightly adhering in fruit, appearing as one; calyx lobes curved inward in fruit; corolla pink to pinkish lavender; [section *Verbena*, series *Connaticarpae*] ..... ***Verbena carnea***
      - 13 Mericarps separate in fruit; calyx lobes erect to divergent in fruit; corolla blue to violet; [section *Verbena*, series *Candelabrae*] ..... ***Verbena stricta***
  - 11 Stem leaves with well-developed petioles.
    - 14 Flowers and fruits distinctly overlapping in the upper part of the spikes; [section *Verbena*, series *Candelabrae*] ..... ***Verbena hastata***
    - 14 Flowers and fruits well-spaced throughout the inflorescence; [section *Verbena*, series *Leptostachyae*].
      - 15 Upper leaf surfaces densely scabrous or hispidulous to hispid or hispid-hirsute; calyx lobes triangular, connivent; corollas mostly pinkish to bluish, lavender, or purple; nutlet outer surfaces deeply ridged and grooved, often with prominent cross-ridges, commisural faces consistently densely silver-white minutely papillate-bullate; fibrous-rooted ..... ***Verbena scabra***
      - 15 Upper leaf surfaces hirsutulous to hirsute or strigose-hirsute; calyx lobes deltate-subulate, not connivent or subconnivent; corollas white, rarely pinkish; nutlet outer surfaces smooth to longitudinally ridged, sometimes with cross-ridges distally, commisural faces smooth or rarely with slight development of minutely bullate ornamentation; taprooted ..... ***Verbena urticifolia***

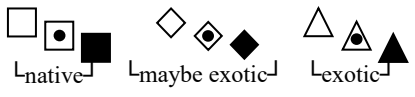
Verbena bracteata Lagasca y Segura & Rodriguez. PROSTRATE VERVAIN, BIG-BRACTED VERVAIN. **Hab:** Glades, riverbanks, sandy fields, other disturbed areas, waste areas near wool-combing mills. **Dist:** The original distribution uncertain, now distributed from ME west to BC, south to FL and Mexico, but apparently native of mw. and w. North America. **Phen:** Late Apr-Oct. **Syn:** = Ar, C, F, Fl6, G, GrPl, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, Tn, Tx, WH3, WV, Barber (1982), Nesom (2010b); = *Verbena bracteosa* Michaux – S. NatureServe G5 (Secure).

* ***Verbena brasiliensis*** Vellozo. BRAZILIAN VERVAIN. **Hab:** Roadsides, disturbed areas, old fields, clearings. **Dist:** Native of South America. **Phen:** May-Oct. **Syn:** = Ar, C, F, Fl6, G, GW2, K1, K3, K4, RAB, S, Tn, Va, WH3, Nesom (2010b), Nesom (2010c), Verloove (2011); = *Verbena litoralis* Kunth var. *brevibracteata* (Kuntze) N. O'Leary – O'Leary, Múlgara, & Morrone (2007); > *Verbena brasiliensis* Vellozo – Tx; > *Verbena litoralis* – Il, Tx.

Verbena canescens Kunth. GRAY VERVAIN. **Hab:** Limestone outcrops, eastwards in disturbed areas. **Dist:** Sc. OK south to se., s., and w. TX and Mexico. Reported for s. AL. **Phen:** (Mar-) Apr-Oct. **Syn:** = K1, K3, K4, NcTx, Tx, Nesom (2010b). NatureServe G5 (Secure).

Verbena carnea Medikus. CAROLINA VERVAIN. **Hab:** Sandy woodlands, longleaf pine sandhills. **Dist:** E. NC (se. VA?) south to c. peninsular FL, west to e. TX. **Phen:** Apr-Jul. **Comm:** *Verbena carnea* is sometimes placed in a monotypic genus, *Stylodon* Rafinesque, but apparently evolved from within *Verbena*. See discussion in Nesom (2010b, 2010e). **Syn:** = F, Fl6, K3, K4, RAB; = *Stylodon carneum* – WH3, orthographic variant; = *Stylodon carneus* (Medikus) Moldenke – K1, Tx; = *Stylodon carolinensis* (Walter) Small – S. NatureServe G4? (Apparently Secure).

Verbena halei Small. TEXAS VERVAIN. **Hab:** Dry hammocks, prairies, open woodlands, roadsides, pastures. **Dist:** C. GA south to c. peninsular FL, TX, AZ, and Mexico; scattered as an introduction farther north, as in NC and SC. **Phen:** (Feb-) Apr-Jun (-Nov). **Syn:** = Ar, Fl6, GrPl, K1, K3, K4, NcTx, RAB, S, Tx, Nesom (2010b); = *Verbena officinalis* ssp. *halei* (Small) S.C. Barber – WH3, Barber (1982). NatureServe G5 (Secure).

Key to Map Symbology: 

* : waif
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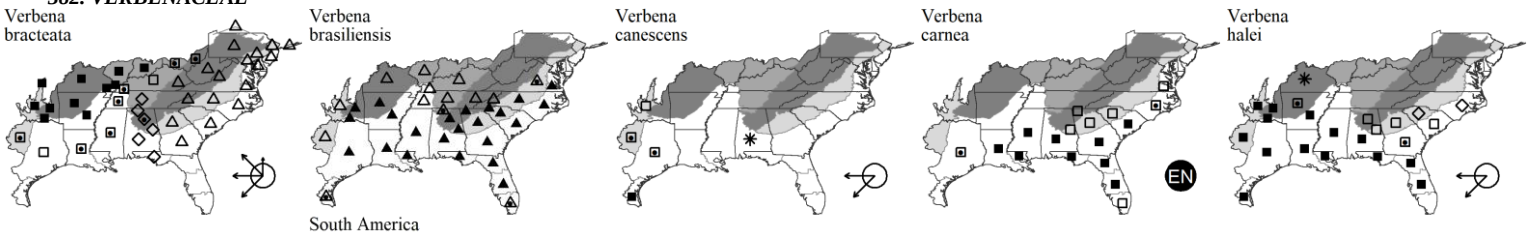


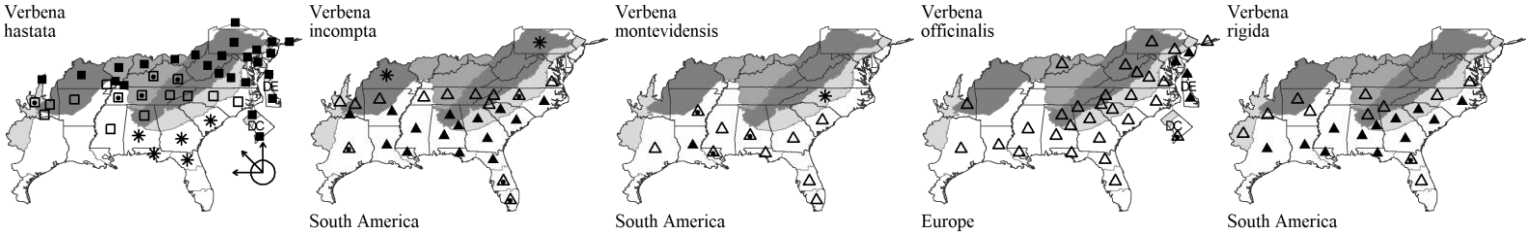
Verbena hastata Linnaeus. COMMON VERVAIN, BLUE VERVAIN, SIMPLER'S-JOY. **Hab:** Fens, marshes, bogs, meadows, calcareous spring marshes, riverbanks, low fields. **Dist:** NS west to BC, south to NC, n. AL, AR, OK, n. TX, NM, AZ, CA; scattered occurrences farther south appear to be introductions. **Phen:** Jun-Oct. **Tax:** The hybrid with *V. urticifolia*, *Verbena* ×*engelmannii* Moldenke, is known from our area. **Syn:** = Ar, C, F, G, GrPl, GW2, Il, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WV, Barber (1982), Nesom (2010b); > *Verbena hastata* var. *hastata* – K1; > *Verbena hastata* var. *scabra* Moldenke – K1.

* ***Verbena incompta*** P.W. Michael. PURPLETOP VERVAIN. **Hab:** Roadsides, disturbed areas, old fields. **Dist:** Native of South America. **Phen:** May-Oct. **Syn:** = Ar, Fl6, K4, Nesom (2010b), Nesom (2010c), Verloove (2011); = *Verbena litoralis* Kunth var. *brevibracteata* (Kuntze) N. O'Leary - Y= V. – O'Leary, Múlgara, & Morrone (2007); < *Verbena bonariensis* Linnaeus – C, F, G, GW2, RAB, S, Tx; > *Verbena bonariensis* Linnaeus – K1; < *Verbena incompta* P.W. Michael – WH3; > *Verbena litoralis* Kunth var. *brevibracteata* (Kuntze) N. O'Leary - Y= V. – K1.

* ***Verbena montevidensis*** Sprengel. URUGUAYAN VERVAIN. **Hab:** Disturbed areas. **Dist:** Native of South America. **Phen:** Jun-Jul (-Sep). **Syn:** = Ar, Fl6, K1, K3, K4, WH3, Nesom (2010b), Nesom (2010c). NatureServe GNR (Not Yet Ranked).

* ***Verbena officinalis*** Linnaeus. EUROPEAN VERVAIN, JUNO'S TEARS, HERB-OF-THE-CROSS. **Hab:** Disturbed areas, riverbanks. **Dist:** Native of Europe. **Phen:** Jun-Oct. **Comm:** The enigmatic *V. riparia* is represented by a few collections, and the taxonomic status of the taxon is unclear; it probably represents an unusual form of *V. officinalis*. Jiménez-Mejías & Naczi (2019) clarify its typification and mention that if what Small and Heller believed to be a separate and native species proves to be so, it will need a new name. **Syn:** = Fl6, K3, K4, Mi, NE, NY, Tn, Va, Nesom (2010b); = *Verbena officinalis* ssp. *officinalis* – WH3, Barber (1982); > *Verbena officinalis* Linnaeus – C, F, G, Pa, RAB, S; > *Verbena officinalis* var. *officinalis* – K1; > *Verbena officinalis* var. *prostrata* Grenier & Godron – K1; > *Verbena riparia* Rafinesque ex Small & Heller – C, F, G, K1, RAB, S, W.

* ***Verbena rigida*** Sprengel. VEINY VERVAIN. **Hab:** Prairies, pastures, roadsides, disturbed areas. **Dist:** Native of South America, distributed as an introduction from OK, CO, and AZ south to c. and s. TX and Mexico. **Phen:** Late Mar-Jul (-Oct). **Syn:** = Ar, Fl6, K1, K3, K4, Meso4.2, NcTx, S, Tx, WH3, Nesom (2010b), O'Leary, Múlgara, & Morrone (2007). NatureServe GNR (Not Yet Ranked).



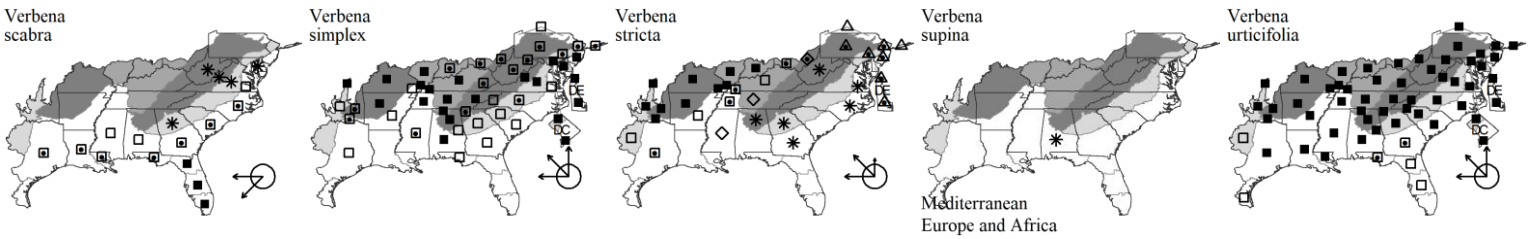
Verbena scabra Vahl. ROUGH VERVAIN, HARSH VERVAIN. **Hab:** Oligohaline tidal marshes, shell deposits, river shores, other wet habitats. **Dist:** VA and WV south to s. FL, west to TX and CA, south into tropical America; mainly coastal in our area but with scattered inland records (probably adventive). **Phen:** (Mar-) May-Oct (-Dec). **Syn:** = Bah, C, F, Fl6, G, GW2, K1, K3, K4, NcTx, RAB, S, Tx, Va, WH3, WV, Nesom (2010b), Nesom (2010d). NatureServe G5 (Secure).

Verbena simplex Lehmann. NARROWLEAF VERVAIN. **Hab:** Glades, prairies, woodlands, forests, rock outcrops, and roadsides, over limestone or mafic rocks. **Dist:** NH west to MN and NE, south to Panhandle FL (Jackson County) and TX. **Phen:** May-Sep. **Syn:** = Ar, C, F, Fl6, G, GrPl, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, Tn, Va, W, WH3, Barber (1982), Nesom (2010b); = *Verbena angustifolia* Michaux – S, illegitimate name. NatureServe G5 (Secure).

Verbena stricta Ventenat. HOARY VERVAIN. **Hab:** Prairies, glades, barrens, pastures, and roadsides. **Dist:** W. NY ON, MI, MN, ND, and MT south to KY, TN, MS, AR, TX, and NM; the eastern extent of nativity is uncertain. **Phen:** Jun-Sep. **Syn:** = Ar, C, F, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, W, WV, Barber (1982), Nesom (2010b). NatureServe G5 (Secure).

* ***Verbena supina*** Linnaeus. TRAILING VERBENA. **Hab:** On ballast. **Dist:** Native of Mediterranean Europe. **Syn:** = K3, K4.

Verbena urticifolia Linnaeus. WHITE VERVAIN, NETTLELEAF VERVAIN. **Hab:** Floodplain forests, mesic and dry upland forests, disturbed habitats. **Dist:** NB west to SK, south to Panhandle FL and TX. **Phen:** May-Nov. **Tax:** Two varieties have been distinguished by many authors (see synonymy), but the characters used are poorly correlated and the distributional ranges largely overlapping. The hybrid with *V. hastata*, *Verbena* ×*engelmannii* Moldenke, is known from our area. **Syn:** = Ar, Fl6, GW2, K3, K4, Mi, NcTx, NY, RAB, Va, W, WH3, Barber (1982), Nesom (2010b), Nesom (2010d); = *Verbena urticaefolia* – S, orthographic variant; > *Verbena urticifolia* var. *leiocarpa* Perry & Fernald – C, F, G, GrPl, Il, K1, NE, Pa, Tx, WV; > *Verbena urticifolia* var. *urticifolia* – C, F, G, GrPl, Il, K1, NE, Pa, Tx, WV.



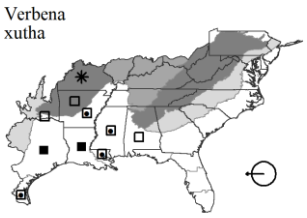
Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more)

* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable
X : extirpated

382. VERBENACEAE

Verbena xutha Lehmann. GULF VERVAIN, COARSE VERVAIN. **Hab:** Beaches, blackland prairies, bottomlands along streams, fields, roadsides. **Dist:** AL west to TX. **Phen:** Jun-Oct. **Syn:** = Ar, K1, K3, K4, NcTx, S, Tx, Nesom (2010b). NatureServe G5 (Secure).



383. LAMIACEAE Martinov 1820 (MINT FAMILY) [in LAMIALES]

A family of about 230-250 genera and 6700-7170 species, herbs, shrubs, vines, and trees, cosmopolitan. The placement in the Lamiaceae of several genera traditionally placed in Verbenaceae (e.g. *Clerodendrum*) is strongly supported by several lines of evidence.References: Harley et al. in Kadereit (2004); Li et al (2016a); Pastore et al (2021).

incertae sedis: *Callicarpa*.
subfamily Viticoideae: *Vitex*.
subfamily Ajugoideae: *Ajuga, Teucrium, Clerodendrum, Trichostema*.
subfamily Scutellarioideae: *Scutellaria*.
subfamily Lamioideae:
tribe Synandreae: *Synandra, Macbridea, Physostegia*
tribe Stachydeae: *Ballota, Galeopsis, Stachys, Sideritis*
tribe Leonuridae: *Leonurus, Chaiturus*
tribe Marrubieae: *Marrubium*
tribe Lamieae: *Lamium*
subfamily Nepetoideae:
tribe Elsholtzieae: *Collinsonia, Elsholtzia, Mosla, Perilla*.
tribe Mentheae:
subtribe Salviinae: *Rosmarinus, Salvia*.
subtribe Menthinae: *Blephilia, Clinopodium, Conradina, Cunila, Dicerandra, Hedeoma, Stachydeoma, Hyssopus, Lycopus, Mentha, Monarda, Origanum, Piloblephis, Prunella, Pycnanthemum, Thymus*.
subtribe Nepetinae: *Agastache, Dracocephalum, Glechoma, Meehania, Nepeta*.
incertae sedis: *Melissa*.
tribe Ocimeae:
subtribe Hyptidinae: *Hyptis, Cantinoa, Condea*.
subtribe Ociminae: *Ocimum*.

1 Fruit a fleshy drupe; plant a small tree, shrub, or sprawling vine; mature stems terete or obscurely 4-sided (by secondary growth).
2 Flowers zygomorphic; leaves simple or palmately (3-) 5-7 (-9) foliolate; [subfamily *Viticoideae*] ..... ***Vitex***
2 Flowers essentially actinomorphic; leaves simple.
3 Stems pubescent with dendritic hairs; inflorescence axillary; calyx 0.5-2 mm, lobes diminutive to nearly obsolete; [genus incertae sedis] ..... ***Callicarpa***
3 Stems glabrous or pubescent with simple hairs; inflorescence terminal (rarely only axillary); calyx 5-18 mm, lobes conspicuous; [subfamily *Ajugoideae*] ..... ***Clerodendrum***
1 Fruit a schizocarp of 4 dry mericarps; plant either an herb or a shrub to 5 (-20) dm tall; mature stems usually distinctly 4-sided (sometimes terete or obscurely 4-sided).
4 Calyx with either a distinctly enlarged protuberance on the upper surface, or the upper lobe expanded and "cap-like". ..... ***Scutellaria***
4 Calyx without an enlarged protuberance or "cap-like" upper lobe.
6 Upper lip of corolla greatly reduced or lobes laterally disposed, thus the corolla appearing to consist of one large lower lip; [subfamily *Ajugoideae*].
7 Lower lip with 2-4 lobes; flowers yellow or deep blue-purple; plants stoloniferous ..... ***Ajuga***
7 Lower lip appearing 5-lobed (proximal 2 lateral, erect lobes represent the cryptic upper lip); flowers white to pink; plants cespitose ..... ***Teucrium***
6 Upper lip of corolla conspicuous, flaring or galeate.
8 Plants distinctly repent and rooting at the nodes, or producing elongate stolons.
9 Plants repent. ..... ***Glechoma***
9 Plants stoloniferous. ..... ***Lycopus***
8 Plants not distinctly repent or stoloniferous.
12 Calyx with 6-10 lobes or teeth.
13 Calyx zygomorphic, canescent with simple trichomes, spinose lobe tips straight ..... ***Leonotis***
13 Calyx actinomorphic or essentially so, densely pubescent with stellate hairs, spinose lobe tips uncinate ..... ***Marrubium***
12 Calyx with 5 or fewer lobes or teeth.
14 Calyx with 3-4 prominent lobes (rarely 5, if one includes small teeth).
15 Calyx and corolla essentially actinomorphic ..... ***Lycopus***
15 Calyx and corolla zygomorphic.
16 Calyx with 4 unequal primary lobes; flowers large, 2.5-3.5 cm long, in bracteate terminal racemes ..... ***Synandra***
16 Calyx with 3 primary lobes (upper lobe occasionally with 3 apiculate teeth, e.g. *Salvia lyrata*); flowers 3 cm or less, in terminal thyrses.

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

.....***Salvia***

14 Calyx usually with 5 prominent lobes (except for *Clinopodium* with rarely fused upper lobes).
19 Fertile stamens 0-2.
20 Calyx actinomorphic or essentially so; corollas actinomorphic or zygomorphic.
21 Corolla actinomorphic, lobes spreading and nearly equal (one lobe slightly emarginate and/or enlarged).
22 Inflorescences axillary; foliage not or faintly aromatic.....***Lycopus***
22 Inflorescences terminal; foliage strongly aromatic.....***Mentha***
21 Corolla zygomorphic (bilabiate).
23 Inflorescence in loose terminal and axillary cymules; corollas not galeate or arching.....***Cunila***
23 Inflorescence densely capitate (often also axillary); corollas strongly galeate, arching.....***Monarda***
20 Calyx and corollas clearly zygomorphic.
24 Corolla 7-20 mm; inflorescence a densely clustered terminal or axillary cyme, or a well developed panicle.
25 Inflorescence a dense cluster of one or more terminal cymules (occasionally just axillary); lower lip of corolla not fringed .....***Blephilia***
25 Inflorescence a panicle; lower lip of corolla conspicuously fringed.....***Collinsonia***
24 Corolla ca. 3-10 mm long; inflorescence a loose axillary cyme or slender terminal spike or spike-like panicle.
26 Corolla 3.5-4 mm, borne 2 per node in a slender terminal spike; middle lobe of upper calyx reduced.....***Mosla***
26 Corolla 4-10 mm, borne in axillary cymes or spike-like panicle; upper calyx lobes similar.
.....***Hedeoma***
19 Fertile stamens 4.
28 Stamens ascending under the upper corolla lip, either included within the tube (or at least not clearly exserted beyond it).
29 Calyx actinomorphic.
30 Flowers borne in terminal verticils or thyrses, with reduced bracteal leaves.
31 Calyx 15-nerved; verticils tightly aggregated.....***Nepeta***
31 Calyx 5-10-nerved; verticils well spaced.....***Stachys***
30 Flowers borne in axils of well-developed leaves, or a terminal raceme with 1 flower per node.
32 Calyx lobes with thickened spinescent apices.
34 Corolla 5-7 mm long, not much longer than the calyx, weakly bilabiate and lacking an annulus.....***Chaiturus***
34 Corolla 8-14 mm long and well-exceeding the calyx, strongly galeate and annulate.....***Leonurus***
32 Calyx lobes without spinescent apices (although lobes may be pointed or acute).
35 Flowers in terminal racemes, corolla tube broadly inflated.....***Physostegia***
35 Flowers borne in axils of well developed leaves, corolla tube not broadly inflated.
37 Corolla 10-15 mm long; calyx with 10+ nerves.....***Ballota***
37 Corolla 10-30 mm long; calyx 5-nerved.....***Lamium***
29 Calyx zygomorphic.
38 Shrubs, diffusely branched; [restricted to se. Coastal Plain and Cumberland Plateau].....***Conradina***
38 Herbs, branched or unbranched; [collectively widespread].
39 Calyx teeth distinctly white or pink, noticeably different from the tube.....***Dicerandra***
39 Calyx teeth coloration not noticeably different from the tube.
40 Flowers 1 per bracteal axil.
41 Corolla nearly regular, 4-6 mm long.....***Perilla***
41 Corolla bilabiate, >10 mm long.....***Physostegia***
40 Flowers 2-many per bract or leaf axil.
42 Plants lemon-scented, flowers in the axils of well-developed leaves.....***Melissa***
42 Plants mint-scented or non-aromatic, flowers terminal and/or axillary.
44 Bracts broadly rounded, apiculate or absent.
.....***Prunella***
44 Bracts setaceous or elliptic, but not broadly rounded or apiculate, present.
.....***Clinopodium***
28 Stamens (at least some) well exserted beyond the upper corolla lobe.
47 Lower lip of corolla distinctly fringed.....***Collinsonia***
47 Lower lip of corolla not fringed.
48 Calyx zygomorphic.
49 Flowers in dense terminal capitate clusters, subtended by large bracteal leaves (these often whitened on the upper surface and especially towards the base).....***Pycnanthemum***
49 Flowers borne otherwise.
50 Flowers borne in few-flowered cymose axillary clusters, overall appearing paniculate; [subfamily *Ajugoideae*] .....***Trichostema***
50 Flowers borne in a spike-like terminal thyrse.
.....***Dicerandra***
48 Calyx actinomorphic.
52 Flowers borne in a dense terminal spike, 2-3-verticilled globose head, or spiciform thryse.
55 Bracts broadly rounded; corolla distinctly bilabiate; plants 1-3 m tall.....***Agastache***
55 Bracts linear-lanceolate; corolla nearly regular; plants < 1 m tall.....***Mentha***
52 Flowers borne in axillary verticils or terminal (capitate to loosely flowered) clusters.
56 Flowers in axillary clusters, corolla nearly regular.
57 Axillary clusters loose, 1-3-flowered; [subfamily *Ajugoideae*].....***Trichostema***
57 Axillary clusters dense, many-flowered; corolla white-pink
58 Stems scabrous; corolla mostly blue-violet.....***Cantinoa mutabilis***
58 Stems glabrous to pubescent; corolla mostly white-pink.....***Mentha***
56 Flowers in densely capitate or loosely flowered terminal clusters, corolla distinctly bilabiate.
60 Inflorescence either capitate or a spike, not subtended by large bracteal leaves.....***Hyptis***

60 Inflorescence capitate, subtended by large bracteal leaves (these often whitened on the upper surface and especially towards the base)..... ***Pycnanthemum***

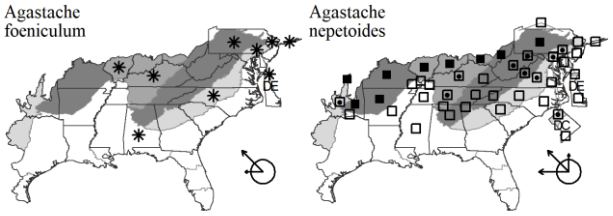
Agastache Clayton ex Gronovius 1762 (GIANT-HYSSOP)

A genus of about 22 species, herbs, of c. and e. Asia, and North America to Mexico. References: Harley et al. in Kadereit (2004); Lint & Epling (1945); Vogelmann (1985).

1 Leaves densely white tomentose below (felty white, the surface obscured or nearly so); corolla blue; petioles of median leaves 10-15 (-20) mm long; calyx tube 5-7 mm long at flowering; [cultivated as an ornamental and rarely naturalized]..... ***Agastache foeniculum***
1 Leaves glabrous to villous beneath, appearing green; corolla yellow, greenish-yellow, pinkish, rose, or purple; petioles of median leaves 20-50 mm long; calyx tubes 3-5 mm long at flowering; [native or alien].
..... ***Agastache nepetoides***

* ***Agastache foeniculum*** (Pursh) Kuntze. LAVENDER GIANT-HYSSOP. **Hab:** Disturbed areas, spread from cultivation. **Dist:** Native of w. North America. Cultivated as an ornamental and naturalized in scattered locations in PA (Rhoads & Klein 1993), KY (Kartesz 1999), and elsewhere. **Phen:** Jul-Aug. **Syn:** = C, F, G, GrPl, K1, K3, K4, Mi, NE, NY, Pa, Lint & Epling (1945). NatureServe G5 (Secure).

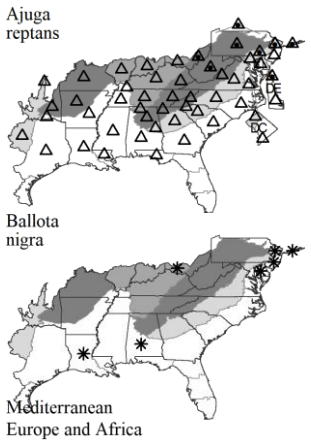
Agastache nepetoides (Linnaeus) Kuntze. YELLOW GIANT-HYSSOP. **Hab:** Woodlands and forests, generally over calcareous or mafic rocks. **Dist:** VT west to MN, south to nw. GA and OK. **Phen:** Jul-Sep; Sep-Oct. **Comm:** In our area, this species occurs mostly in the Piedmont or at lower elevations west of the Blue Ridge. **Syn:** = Ar, C, F, G, GrPl, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Va, W, Lint & Epling (1945). NatureServe G5 (Secure).



Ajuga Linnaeus 1753 (BUGLE, BUGLEWEED)

A genus of about 40-50 species, herbs, of the temperate Old World. References: Harley et al. in Kadereit (2004).

* ***Ajuga reptans*** Linnaeus. CARPET BUGLE. **Hab:** Lawns and roadsides. **Dist:** Native of Europe. **Phen:** Mar-Jun. **Syn:** = Ar, C, F, Fl6, G, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, WH3. NatureServe GNR (Not Yet Ranked).



Ballota Linnaeus 1753 (BLACK HOREHOUND)

A genus of about 30 species, herbs or small shrubs, of Africa and Eurasia. References: Harley et al. in Kadereit (2004); Stace (2010).

* ***Ballota nigra*** Linnaeus. BLACK HOREHOUND. **Hab:** Disturbed areas. **Dist:** Native of the Mediterranean region. Introduced in several northern localities, and apparently documented from sw. AL. **Phen:** Jun-Sep. **Syn:** = C, F, G, Il; > *Ballota nigra* ssp. *foetida* (Lamarck) Hayek – NY; > *Ballota nigra* ssp. *meridionalis* (Béguinot) Béguinot – Stace (2010); > *Ballota nigra* ssp. *nigra* – Stace (2010); > *Ballota nigra* var. *alba* (Linnaeus) Tinant – K3, K4, NE; > *Ballota nigra* var. *nigra* – K3, K4, NE; > *Ballota nigra* var. *ruderalis* (Swartz) Reichenbach f. – K4.

Blephilia Rafinesque 1819 (WOODMINT, PAGODA-PLANT)

Contributed by A. Floden & E.E. Schilling

A genus of 4 species, perennial herbs, of e. North America. References: Floden & Schilling (2020); Harley et al. in Kadereit (2004); Simmers & Kral (1992).

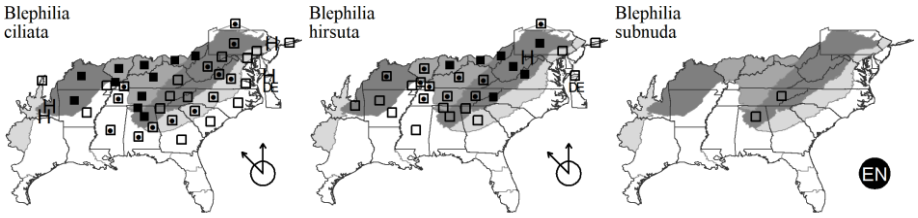
1 Erect stems with numerous branches; typically each stem terminated by an inflorescence; bracteoles long-acuminate; leaves acuminate and acute; lower calyx lobes deltoid, not reaching the sinuses of the upper calyx lip; plants flowering late Jun-Aug (Sep). ..... ***Blephilia hirsuta***
1 Erect stems typically unbranched or with 1-2 branches; typically a single inflorescence on the central axis; bracteoles acute; leaves acute to obtuse; lower calyx lobes linear, more-or-less reaching the sinuses of the upper calyx lip; plants flowering in Apr - early Jun.
2 Plants densely canescent, pubescence of stem typically short and retrorse or short and spreading; leaf apices obtuse; sterile stems prostrate and stolon-like forming clonal patches; live plants typically without minty odor (or tending towards oregano-like) ..... ***Blephilia ciliata***
2 Plants variously pubescent, but not canescent (typically sparse), pubescence of stem spreading or nearly absent; leaf apices acute to acuminate, typically glabrate to sparsely hirsute; sterile stems erect and numerous; live plants typically with minty odor or odor absent.
..... ***Blephilia subnuda***

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated

Blephilia ciliata (Linnaeus) Bentham. DOWNY WOODMINT. **Hab:** Woodlands, meadows, forests, prairies, usually in circumneutral soils (over diabase, limestone, shell, etc.). **Dist:** MA and WI south to c. GA and AR. **Phen:** May-early Jul; Aug-Oct. **Syn:** = Ar, C, F, G, GrPl, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, Floden & Schilling (2020), Simmers & Kral (1992). NatureServe G5 (Secure).

Blephilia hirsuta (Pursh) Bentham. HAIRY WOODMINT. **Hab:** Rich, rocky or alluvial forests, montane forests up to at least 5000 feet elevation. **Dist:** QC and MN south to NC, AL, AR, and e. TX. **Phen:** May-Oct; Aug-Nov. **Syn:** = Ar, C, G, GrPl, Il, Mi, NY, Pa, RAB, S, Tn, Tx, Va, W, Floden & Schilling (2020), Simmers & Kral (1992); > *Blephilia hirsuta* var. *hirsuta* – F, K1, K3, K4, NE. NatureServe G5T5? (Secure).

Blephilia subnuda R.W. Simmers & Kral. SMOOTH WOODMINT, CUMBERLAND WOODMINT. **Hab:** Moist to dry calcareous forests, limestone ledges. **Dist:** Endemic (so far as is known) to the Cumberland Plateau of ne. AL (Jackson and Madison counties) and se. TN (Franklin County). **Syn:** = K1, K3, K4, Tn, Floden & Schilling (2020), Simmers & Kral (1992). NatureServe G1G2 (Critically Imperiled).



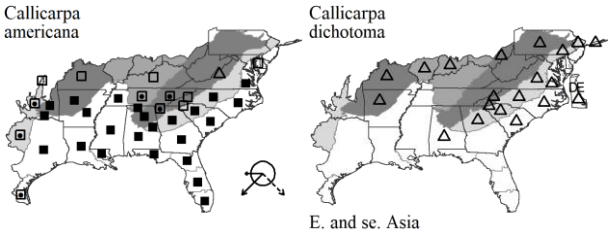
Callicarpa Linnaeus 1753 (BEAUTYBERRY)

A genus of about 140 species, small trees, shrubs, and lianas, mainly tropical and subtropical. References: Atha et al (2019b); Harley et al. in Kadereit (2004); Moldenke (1980).

1 Leaves 7-23 cm long, stellate-scurfy pubescent beneath; peduncles 1-5 mm long.....***Callicarpa americana***
1 Leaves 2-13 cm long, glabrous or nearly so beneath (except on the midrib); peduncles 10-20 mm long.
.....***Callicarpa dichotoma***

Callicarpa americana Linnaeus. BEAUTYBERRY, AMERICAN BEAUTYBERRY, FRENCH-MULBERRY. **Hab:** Hammocks, other forests (especially with sandy or rocky soils), maritime forests (the main habitat northward), pine flatwoods, disturbed areas. **Dist:** MD and AR south to s. FL, TX, Mexico; West Indies. Reported as native for Lyon County, KY (Brock 2020). **Phen:** Jun-Aug; Aug-Oct (persisting into the winter). **Syn:** = Ar, Bah, C, F, Fl6, G, GrPl, K1, K3, K4, NcTx, RAB, S, Tn, Tx, Va, W, WH3, Atha et al (2019b). NatureServe G5 (Secure).

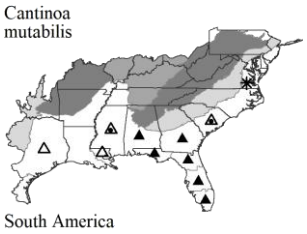
* ***Callicarpa dichotoma*** (Loureiro) K. Koch. CHINESE BEAUTYBERRY. **Hab:** Roadsides, powerline rights-of-way, woodland edges, suburban woodlands, bogs, bottomlands. **Dist:** Native of Asia. This species is beginning to spread more rapidly in the Southeast. **Phen:** Jul-Nov. **Syn:** = Ar, C, K1, K3, K4, RAB, Atha et al (2019b). NatureServe GNR (Not Yet Ranked).



Cantinoa Harley & J.F.B. Pastore 2012 (CANTINOA)

A genus of about 25 species, herbs and shrubs, of warm temperate, subtropical, and tropical America. References: Harley & Pastore (2012); Harley et al. in Kadereit (2004); Pastore et al (2021).

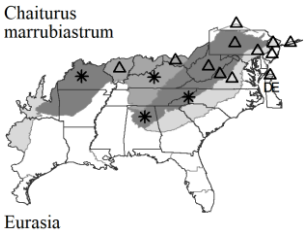
* ***Cantinoa mutabilis*** (A. Richard) Harley & J.F.B. Pastore. TROPICAL BUSHMINT. **Hab:** Moist disturbed areas. **Dist:** Native of South America. **Phen:** Jan-Dec. **Syn:** = Fl6, K3, K4, Meso4.2, Harley & Pastore (2012); = *Hyptis mutabilis* (A. Richard) Briquet – GW2, K1, S, WH3. NatureServe GNR (Not Yet Ranked).



Chaiturus Willdenow 1787 (HOREHOUND MOTHERWORT)

A monotypic genus, an herb, of Europe and n. Asia.

* ***Chaiturus marrubiastrum*** (Linnaeus) Reichenbach. HOREHOUND MOTHERWORT. **Hab:** Floodplains, disturbed areas. **Dist:** Native of Europe and n. Asia. **Phen:** Jun-Sep. **Syn:** = Il, K1, K3, K4, Mi, NY, Va; = *Leonurus marrubiastrum* Linnaeus – C, F, G, GrPl, Mo1, Pa, S. NatureServe GNR (Not Yet Ranked).



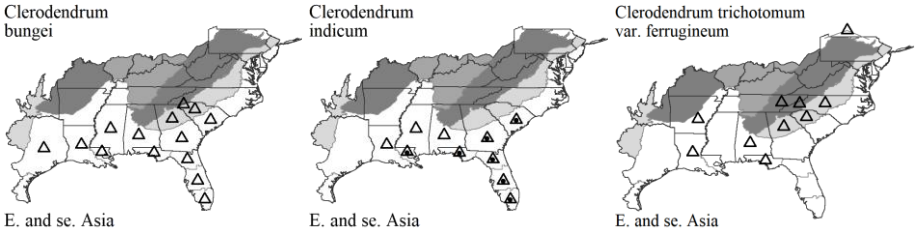
Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Clerodendrum Linnaeus 1753 (GLORY-BOWER)

A genus of about 150 species, trees and shrubs (rarely perennial or annual herbs), mostly tropical and warm temperate, African and Asian (after removal of the "Pantropical Coastal" clade into *Volkameria*) (Yuan et al. 2010). References: Harley et al. in Kadereit (2004); Hsiao & Lin (1995); Steane et al (1999); Steane, de Kok, & Olmstead (2004); Yuan et al (2010).

1 Corolla tube 5-12 cm long.
..... ***Clerodendrum indicum***
1 Corolla tube < 3 cm long.
3 Corolla white or pale pink.
..... ***Clerodendrum trichotomum var. ferrugineum***
3 Corolla strongly pink, red, or orange.
..... ***Clerodendrum bungei***

* ***Clerodendrum bungei*** Steudel. ROSE GLORYBOWER, KASHMIR-BOUQUET, BROCAMELIA. **Hab:** Roadsides and suburban woodlands, spread from horticultural use. **Dist:** Native of e. Asia. First reported from South Carolina by Hill & Horn (1997); also reported for our area by W. Duncan (pers. comm.). **Phen:** Aug-Sep. **Syn:** = Fl6, K1, K3, K4, Meso4.2, Tx, WH3. NatureServe GNR (Not Yet Ranked).
* ***Clerodendrum indicum*** (Linnaeus) Kuntze. TUBEFLOWER, TURK'S-TURBAN. **Hab:** Disturbed areas, roadsides, spread from horticultural use. **Dist:** Native of the Malaysian Archipelago. **Phen:** Aug-Oct; Nov-Dec. **Syn:** = Fl6, K1, K3, K4, Tx, WH3; = *Clerodendron indicum* – RAB, orthographic variant. NatureServe GNR (Not Yet Ranked).
* ***Clerodendrum trichotomum*** Thunberg *var*. ***ferrugineum*** Nakai. HARLEQUIN GLORY-BOWER. **Hab:** Roadsides, streambanks; cultivated and strongly naturalized. **Dist:** Native of e. Asia. **Syn:** = K1, K3; < *Clerodendrum trichotomum* – Fl6, K4, WH3. NatureServe GNR (Not Yet Ranked).



Clinopodium Linnaeus 1753 (CALAMINT)

A genus of uncertain circumscription and size, herbs and shrubs, of temperate and subtropical areas of the w. and e. hemispheres. The circumscription will certainly change in the future, with the native species here placed in *Clinopodium* rearrayed into several genera, based on the clear polyphyly of a broad *Clinopodium* and its clear interdigitation with other genera (such as *Conradina*, *Piloblephis*, and *Stachydeoma*), as shown by Bräuchler, Meimberg, & Heubl (2010), Drew & Sytsma (2012), and Edwards, Soltis, & Soltis (2006). References: Bräuchler et al. (2012); Cantino & Wagstaff (1998); Drew & Sytsma (2012); Edwards, Soltis, & Soltis (2006); Floden et al (2020); Shinners (1962a); Shinners (1962f).

2 Plant a shrub, not flowering the first year; [of sandy or rocky habitats of the Coastal Plain and Piedmont, from s. NC southward].
3 Corolla bright scarlet, 27-50 mm long; calyx 8-18 mm long.
..... ***Clinopodium coccineum***
3 Corolla light lavender or pink with darker spots, 10-20 mm long; calyx 5.0-7.5 mm long.
6 Lower calyx lobes with short antrorsely appressed pubescence (to 0.2 mm long) along margin and on the outer surface ..... ***Clinopodium georgianum***
6 Lower calyx lobes with long erect pubescence (to 0.7 mm long) along margin only, the outer surface glabrous..... ***Clinopodium talladeganum***
2 Plant an herbaceous to suffrutescent perennial, often flowering the first year; [of various habitats, collectively widely distributed in our area].
8 Stem glabrous or pubescent at the nodes only; leaves of flowering stems linear to oblanceolate; [native, of limestone glades, barrens, and bluffs].
..... ***Clinopodium glabellum***
8 Stem pubescent; leaves of flowering stems elliptic to ovate; [alien or native, generally of disturbed or weedy situations].
10 Axillary flower clusters in peduncled, contracted cymes.
..... ***Clinopodium calamintha***
10 Axillary flower clusters sessile, dense.
..... ***Clinopodium gracile***

* ***Clinopodium calamintha*** (Linnaeus) Stace. LESSER CALAMINT, BASIL-THYME. **Hab:** Disturbed areas. **Dist:** Native of Europe. **Phen:** Jun-Oct. **Syn:** = K3, NY, Va; = *Calamintha nepeta* (Linnaeus) Savi – Il, Tn, Shinners (1962a); = *Clinopodium nepeta* (Linnaeus) Kuntze – Ar, K4, S; = *Satureja calamintha* (Linnaeus) Scheele – C; > *Calamintha nepeta* ssp. *glandulosa* (Riquien) P.W. Ball – K1, Pa; > *Calamintha nepeta* (Linnaeus) Savi ssp. *nepeta* – K1; > *Calamintha officinalis* Moench – Shinners (1962a); > *Satureja calamintha* var. *calamintha* – F; > *Satureja calamintha* var. *glandulosa* (Riquien) Briquet – F; > *Satureja calamintha* (Linnaeus) Scheele var. *nepeta* (Linnaeus) Briquet – F, G, RAB, W; > *Satureja calamintha* var. *nepetoides* (Jordan) Briquet – F, G.

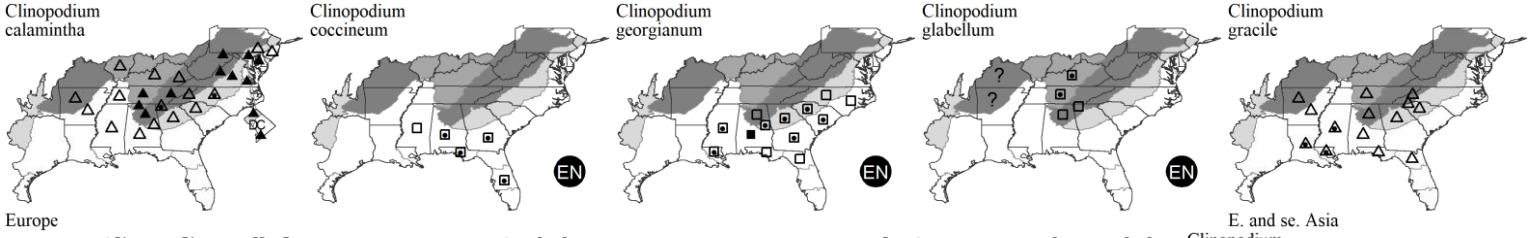
Clinopodium coccineum (Nuttall ex Hooker) Kuntze. SCARLET CALAMINT, SCARLET WILD BASIL, RED MINT SHRUB. **Hab:** Longleaf pine sandhills and pine flatwoods. **Dist:** E. GA south to c. peninsular FL, west to s. MS. **Phen:** Apr-May. **Syn:** = S; < *Calamintha coccinea* (Nuttall ex Hooker) Bentham – Fl6, WH3, Shinners (1962a); < *Clinopodium coccineum* (Nuttall ex Hooker) Kuntze – K1, K3, K4, Cantino & Wagstaff (1998).

Clinopodium georgianum R.M. Harper. GEORGIA CALAMINT. **Hab:** Longleaf pine sandhills, dry rocky or sandy woodlands. **Dist:** S. NC south to Panhandle FL and west to LA. **Phen:** Jul-Sep. **Syn:** = K1, K3, K4, S, Cantino & Wagstaff (1998); = *Calamintha georgiana* (R.M. Harper) Shinners – Fl6, WH3, Shinners (1962a); = *Satureja georgiana* (R.M. Harper) H.E. Ahles – RAB. NatureServe G5 (Secure).

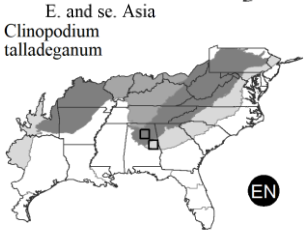
Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Clinopodium glabellum (Michaux) Kuntze. **Hab:** Dry-mesic to mesic shaley forests, dry to moist limestone barrens and glades. **Dist:** Nc. KY, c. TN, south to c. AL; possibly in AR and s. MO as well. Reports of this for VA (Kartesz 1999) are apparently based on confusion with *Clinopodium arkansanum*. **Syn:** = K1, K3, K4, Tn, Cantino & Wagstaff (1998); = *Satureja glabella* (Michaux) Briquet var. *glabella* – C; < *Calamintha arkansana* (Nuttall) Shinners – GW2; < *Clinopodium glabellum* (Michaux) Kuntze – S.

* ***Clinopodium gracile*** (Bentham) Kuntze. SLENDER WILD BASIL. **Hab:** Disturbed areas, roadsides, bottomland forests. **Dist:** Native of Asia. Introduced in s. AL, FL, LA (Kartesz 1999; Woods, Diamond, & Searcy 2003), MS (S.W. Leonard, pers. comm. 2005), GA (Zomlefer et al. 2011, 2012), and SC (Bradley et al. [in prep.]). **Phen:** Jun-Aug; Aug-Oct. **Tax:** This taxon is part of *Clinopodium* s.s. **Syn:** = Ar, Fl6, K1, K3, K4, WH3. NatureServe GNR (Not Yet Ranked).



Clinopodium talladeganum B.R. Keener & Floden. TALLADEGA WILD BASIL. **Hab:** Open to sparsely wooded, upland, dry rocky or older dry sandy alluvium substrates. **Dist:** Endemic to the Talladega Mountains/Piedmont transition of AL (Calhoun, Clay, & Cleburne counties). **Phen:** Jul-Sep; Sep-Oct. **Tax:** See Floden et al. (2020) for detailed information. **Comm:** Under study by Brian Keener. **Syn:** = Floden et al (2020).



Collinsonia Linnaeus 1753 (HORSEBALM, RICHWEED, STONEROOT)

A genus of about 4 species, perennial herbs, of e. North America. References: Harley et al. in Kadereit (2004); Peirson, Cantino, & Ballard (2006); Shinners (1962b).

1 Inflorescence an unbranched thyrse, the lower nodes with (3-) 6 flowers per node; floral bracts absent; pedicels flattened at base; leaves (2-) 4 (-6), the 4 upper (or only) leaves subverticillate; flowers light pink to lavender; flowering Apr-Jun; [subgenus *Micheliella*]..... ***Collinsonia verticillata***
1 Inflorescence a panicle (rarely unbranched), the flowers 2 per node; floral bracts present, minute to large; pedicels not enlarged basally; leaves 6 or more, opposite; flowers cream to yellow; flowering Jul-Sep; [subgenus *Collinsonia*].
2 Fertile stamens 4; fresh plants with anise scent; [GA southward and westward]..... ***Collinsonia anisata***
2 Fertile stamens 2; fresh plants with lemon scent; [collectively widespread in our area].
3 Blades of the larger stem leaves 4.0-10.5 cm long, with 5-15 teeth on each margin, glabrous or hispidulous on the main veins beneath; plant from a small, rounded tuber-like crown, to 6 cm long and 5 cm in diameter..... ***Collinsonia tuberosa***
3 Blades of the larger stem leaves 8-25 cm long, with 11-42 teeth on each margin, glabrous or variously pubescent beneath; plant from an elongate, woody, rhizome-like crown, to 15 cm long.
4 Calyx 2-5 mm long; calyx teeth lance-subulate to narrowly lanceolate; flowers 8-13 mm long..... ***Collinsonia canadensis***
4 Calyx 4.5-7 mm long; calyx teeth broadly lanceolate; flowers 12-17 mm long..... ***Collinsonia punctata***

Collinsonia anisata Sims. SOUTHERN HORSEBALM, ANISE HORSEBALM. **Hab:** Rich forests. **Dist:** C. GA south and west to Panhandle FL and west to s. MS, on the Piedmont and Coastal Plain. **Phen:** Late Jul-Sep; Sep-Oct. **Tax:** This species is apparently distinct, but Shinners's concept of it included hybrids with *C. canadensis* and aberrant *C. canadensis* (Peirson, Cantino, & Ballard 2006). **Syn:** = K3, Peirson, Cantino, & Ballard (2006); < *Collinsonia canadensis* var. *punctata* (Elliott) A. Gray – F, misapplied; < *Collinsonia punctata* Elliott – S; < *Collinsonia serotina* Walter – Fl6, K1, K4, W, WH3, Shinners (1962b); ? *Micheliella anisata* (Sims) Briquet – S.

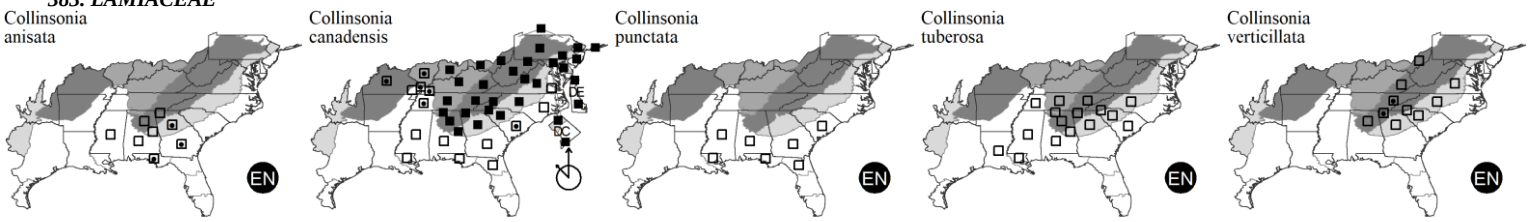
Collinsonia canadensis Linnaeus. RICHWEED, NORTHERN HORSEBALM. **Hab:** Cove forests, rich forests, especially over calcareous or mafic substrates. **Dist:** QC, MI, and WI, south to Panhandle FL and LA. **Phen:** Late Jul-Sep; Sep-Oct. **Syn:** = C, F, Fl6, G, Il, K1, K3, K4, Mi, Mo1, NE, NY, Pa, RAB, S, Tn, Va, W, WH3, WV, Shinners (1962b); < *Collinsonia canadensis* Linnaeus – Peirson, Cantino, & Ballard (2006).

Collinsonia punctata Elliott. FLORIDA HORSEBALM. **Hab:** Rich woods. **Dist:** S. SC (Barnwell County) to e. LA, on the Coastal Plain. **Phen:** Late Aug-mid Oct; Sep-Oct. **Syn:** = K3, K4, Peirson, Cantino, & Ballard (2006); < *Collinsonia serotina* Walter – Fl6, K1, WH3, Shinners (1962b).

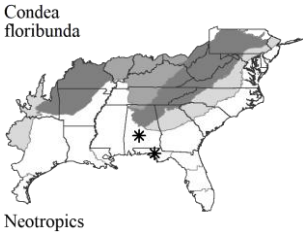
Collinsonia tuberosa Michaux. STONEROOT. **Hab:** Rich forests, over calcareous or mafic substrates. **Dist:** C. NC west to c. TN, south to n. GA and MS (or LA?). **Phen:** Late Jul-Sep; Sep-Oct. **Comm:** Peirson, Cantino, & Ballard (2006) conclude that *C. tuberosa* should be merged into *C. canadensis*, a conclusion not followed here. **Syn:** = K1, K3, K4, RAB, S, Tn, W, Shinners (1962b); < *Collinsonia canadensis* Linnaeus – Peirson, Cantino, & Ballard (2006).

Collinsonia verticillata Baldwin. WHORLED HORSEBALM. **Hab:** Rich forests, ranging from moist (cove) forests to rather dry oak forests over mafic or calcareous rocks. **Dist:** Sc. VA west to e. TN, south to w. NC, nw. SC, c. GA, and MS; disjunct in s. OH. **Phen:** Late Apr-early Jun; Jun-Jul. **Comm:** The range is strangely scattered and fragmented. **Syn:** = C, G, K1, K3, K4, RAB, Tn, Va, W, Peirson, Cantino, & Ballard (2006), Shinners (1962b); = *Micheliella verticillata* (Baldwin) Briquet – F, S. NatureServe G3G4 (Vulnerable).

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



Condea Adanson 1764



A genus of about 26 species, herbs, of warm temperate, subtropical, and tropical America. References: Harley & Pastore (2012); Harley et al. in Kadereit (2004); Pastore et al (2021).

* ***Condea floribunda*** (Briquet ex Micheli) Harley & J.F.B. Pastore. **Hab:** Disturbed coastal sands. **Dist:** Native of Argentina and Paraguay. **Phen:** Jun-Sep. **Comm:** See Franck et al. (2016). **Syn:** = Fl6, K4, Zhang, Zhang, & Endress (2003).

Conradina A. Gray 1870 (CONRADINA, ROSEMARY)

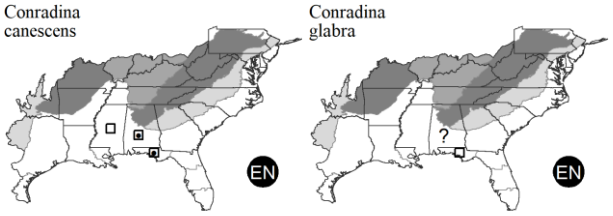
A genus of 6 species, shrubs and suffrutescent herbs, of temperate se. North America. References: Edwards et al (2008); Edwards et al (2009); Edwards, Soltis, & Soltis (2006); Harley et al. in Kadereit (2004); Shinners (1962g); Ward (2012a).

4 Leaves green or gray-pubescent above; midrib on lower leaf surface glabrous or glabrate, contrasting with the more densely pubescent lower leaf surface. ..... ***Conradina glabra***

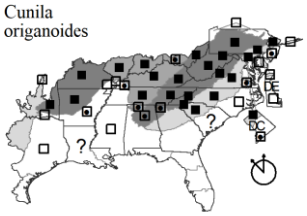
4 Leaves densely gray-pubescent above and below; midrib on lower leaf surface densely gray-pubescent to gray-pilose. ..... ***Conradina canescens***

Conradina canescens A. Gray. GRAY ROSEMARY. **Hab:** Longleaf pine sandhills, Florida scrub, pine flatwoods, riverine sandbars. **Dist:** Panhandle FL and s. AL west to s. MS. **Phen:** Jan-May. **Tax:** Less densely hairy populations on riverine sandbars in Santa Rosa County, FL and adjacent AL may warrant taxonomic recognition; additional study is needed. Additionally, *C. puberula* Small, usually included here, appears to be genetically and morphologically differentiable and may warrant "re-recognition". **Syn:** = Fl6, K1, K3, K4, Edwards et al (2009), Shinners (1962g); < *Conradina canescens* A. Gray – WH3; > *Conradina canescens* A. Gray – S; > *Conradina puberula* Small – S.

Conradina glabra Shinners. APALACHICOLA ROSEMARY. **Hab:** Longleaf pine sandhills. **Dist:** Panhandle FL (Liberty County). **Phen:** Mar-Jun. **Syn:** = Fl6, K1, K3, K4, WH3, Edwards et al (2009), Shinners (1962g). NatureServe G1 (Critically Imperiled); USESA E.



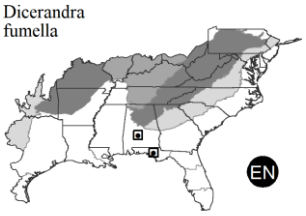
Cunila D. Royen ex Linnaeus 1759 (STONE-MINT, AMERICAN-DITTANY, WILD-OREGANO)



A genus of 1 or 9 species, of e. North America (1 species) and (depending on circumscription) Mexico (8 species). Agostini, Echeverrigaray, & Souza-Chies (2012) and Drew & Sytsma (2012) show that the South American species previously included in *Cunila* definitely do not belong there, and that *Cunila* may best be treated as monophyletic, including only our species (the 8 Mexican species removed to a new genus). References: Agostini, Echeverrigaray, & Souza-Chies (2012); Drew & Sytsma (2012); Harley et al. in Kadereit (2004).

Cunila origanoides (Linnaeus) Britton. STONE-MINT, AMERICAN-DITTANY, WILD-OREGANO. **Hab:** Dry rocky slopes, shale barrens, other dry (usually sloping) woodlands and barrens. **Dist:** S. NY and PA west to MO, south to c. SC, n. GA, n. AL, nw. MS, c. and s. LA (allegedly), and ne. TX (Singhurst & Holmes 2004). **Phen:** Aug-Oct; Oct-Dec. **Syn:** = Ar, C, F, G, GrPl, Il, K1, K3, K4, NcTx, NY, Pa, RAB, Tn, Tx, Va, W, WV; = *Mappia origanoides* (Linnaeus) House – S. NatureServe G5 (Secure).

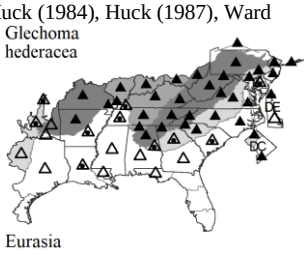
Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



Dicerandra Bentham 1830 (DICERANDRA, SCRUB-BALM)

A genus of 12-15 species, perennial herbs and shrubs, endemic to se. North America. References: Harley et al. in Kadereit (2004); Huck & Chambers (1997); Huck (1984); Huck (1987); Huck (2007); Huck (2008); Huck (2010); Huck et al (1989); Oliveira et al (2007); Ward (2009d).

Dicerandra fumella R.B. Huck. SMOKY BALM, ALABAMA BALM. **Hab:** Sandhills and dry sandy hammocks. **Dist:** Panhandle of FL west to s. AL. **Phen:** Mid Sep-late Nov. **Tax:** A hexaploid species. **Syn:** = Fl6, K3, Huck (2010); < *Dicerandra linearifolia* – S, Huck et al (1989); < *Dicerandra linearifolia* (Elliott) Bentham var. *linearifolia* – K1, WH3, Huck (1984), Huck (1987), Ward (2009d).



Glechoma Linnaeus 1753 (GILL-OVER-THE-GROUND)

A genus of about 4-10 species, herbs, of temperate Eurasia. References: Harley et al. in Kadereit (2004).

* ***Glechoma hederacea*** Linnaeus. GILL-OVER-THE-GROUND, GROUND-IVY, CREEPING CHARLIE. **Hab:** Lawns, gardens, disturbed areas. **Dist:** Native of Eurasia. **Phen:** Late Mar-Jun; May-Jul. **Syn:** = Ar, C, Fl6, K1, K3, K4, Mi, NcTx, NE, NY, Pa, Tn, Va, WH3; = *Glecoma hederacea* – GrPl, RAB, S, W, misspelling; > *Glechoma hederacea* var. *hederacea* – F, Il, WV; > *Glechoma hederacea* var. *micrantha* Moricand – F, Il, WV; > *Glecoma hederacea* var. *parviflora* (Bentham) House – G.

Hedeoma Persoon 1807 (AMERICAN PENNYROYAL)

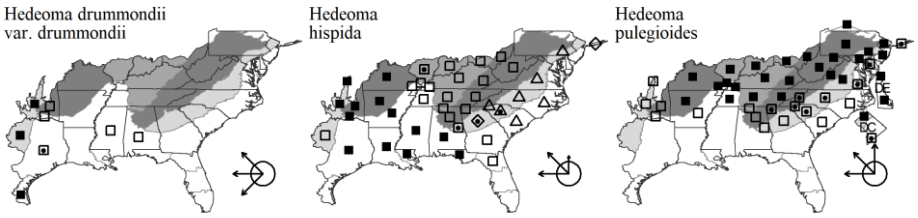
A genus of about 38-42 species, herbs, of North America, Central America, and South America. References: Harley et al. in Kadereit (2004); Irving (1980); Turner (2011).

1 Leaves elliptic, 4-11 mm wide, slightly to strongly crenate; nutlets subspherical, 0.7-1.0 mm long, 0.6-0.9 mm wide, the surface smoothish, mottled, not glaucous; [subgenus *Hedeoma*] ..... ***Hedeoma pulegioides***
1 Leaves linear to narrowly elliptic, 1-4 mm wide, entire; nutlets narrowly ovoid, 1.0-1.3 mm long, 0.4-0.6 mm wide, the surface areolate and strongly glaucous; [subgenus *Saturejoides*].
  2 Calyx teeth convergent, closing the orifice at maturity; bracteoles subtending the individual flower pedicels 1-2 mm long, about ½ as long as the pedicel; leaves (5.0-) avg. 7.7 (-11.0) mm long, (1.2-) avg. 2.2 (-4.0) mm wide, 3-5× as long as wide ..... ***Hedeoma drummondii var. drummondii***
  2 Calyx teeth spreading (the upper) to slightly convergent (the lower), not closing the orifice at maturity; bracteoles subtending the individual flower pedicels (1.5-) 2.5-6 mm long, generally as long as or longer than the pedicel; leaves (11.0-) avg. 16.4 (-21.0) mm long, (1.0-) avg. 2.2 (-3.0) mm wide, > 5× as long as wide ..... ***Hedeoma hispida***

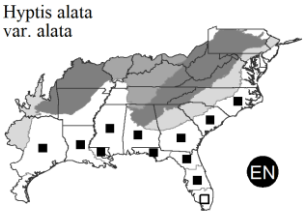
Hedeoma drummondii Bentham *var. **drummondii***. DRUMMOND'S HEDEOMA. **Hab:** Blackland prairies. **Dist:** MN and MT south to TX, n. Mexico, and CA; disjunct eastward in MS and AL. **Phen:** Jun-Sep. **Tax:** A second variety, var. *crenulata* Irving, is restricted to sc. Mexico. **Syn:** = Tx, Turner (2011); < *Hedeoma drummondii* – GrPl, K1, K3, K4, NcTx, Irving (1980). NatureServe G5 (Secure).

Hedeoma hispida Pursh. ROUGH PENNYROYAL, MOCK PENNYROYAL. **Hab:** Prairies, Disturbed areas, pastures, barrens, granitic flatrocks, especially in exposed, thin soil; apparently adventive eastwards in the eastern portions of our area from farther west, but the native distribution unclear. **Dist:** BC and NM east to ME, MA, PA, VA, NC, SC, and GA. Irving (1980) shows *H. hispida* east to e. Panhandle FL, c. AL, nc. TN, and s. OH; some of the scattered records further east are adventive. It may be recently arrived farther east or was previously overlooked. First reported for SC by Hill & Horn (1997). **Phen:** May-Aug. **Syn:** = Ar, C, F, Fl6, G, Il, K1, K3, K4, Mi, NcTx, NE, NY, Tn, WV, Irving (1980); = *Hedeoma hispidum* – GrPl, Pa, Tx, WH3, orthographic variant. NatureServe G5 (Secure).

Hedeoma pulegioides (Linnaeus) Persoon. AMERICAN PENNYROYAL. **Hab:** Dry soils of woodlands, roadbanks, woods-roads, especially common in shaly parts of the mountains. **Dist:** NS, s. QC, s. ON, MI, WI, and IA south to c. SC, c. GA, and AR. **Phen:** Jul-Oct. **Comm:** The fragrant oil is apparently very similar to that of the European Pennyroyal, *Mentha pulegium* Linnaeus. The oil is a powerful insect repellent and insecticide, often used on pets to repel fleas. It is also poisonous to humans, however, at least in substantial quantities. It is sometimes used as a tea; native Americans are reputed to have used it as an abortion inducer. This plant should be used with great caution, if at all. **Syn:** = Ar, C, F, G, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Va, W, WV, Irving (1980); = *Hedeoma pulgioides* – GrPl, orthographic error. NatureServe G5 (Secure).



Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



Hyptis Jacquin 1786 (CLUSTER BUSHMINT)

A genus of about 145 species, herbs and shrubs, of warm temperate, subtropical, and tropical America. References: Harley & Pastore (2012); Harley et al. in Kadereit (2004); Shinners (1962j).

1 Flowers borne in irregular verticillate spikes, sessile to pedunculate on peduncles 1-2 mm long; leaves either ovate to deltate, narrowed to a broadly cuneate to truncate base and well-developed petiole (4-6 cm long on larger leaves), or lanceolate and narrowed to a cuneate, subpetiolar base.
  2 Stem scabrous on the angles; corolla blue-purple; leaves ovate to deltate, narrowed to a broadly cuneate to truncate base and well-developed petiole (4-6 cm long on larger leaves) ..... ***Cantinoa***
  2 Stem glabrous or pubescent; corolla white; leaves lanceolate, narrowed to a cuneate, subpetiolar base ..... ***Condea***
1 Flowers borne in large, globose heads, 1.5-2.5 cm across, borne on peduncles 2-6 cm long; leaves lanceolate, narrowed to a narrowly cuneate, subpetiolar base. ..... ***Hyptis alata var. alata***

Hyptis alata (Rafinesque) Shinners *var*. ***alata***. CLUSTER BUSHMINT. **Hab:** Wet pine savannas, margins of swamp forests, wet powerline rights-of-way, ditches. **Dist:** E. NC south to s. FL, west to se. TX. **Phen:** May-Oct. **Syn:** = Shinners (1962j); < *Hyptis alata* (Rafinesque) Shinners – Fl6, GW2, K1, K3, K4, RAB, Tx, WH3; < *Hyptis radiata* Willdenow – S.

Lamium Linnaeus 1753 (DEAD-NETTLE, HENBIT, ARCHANGEL)

A genus of about 17-40 species, herbs, of n. Africa and Eurasia. References: Harley et al. in Kadereit (2004); McMullen & Lowry (2019); Mennema (1989).

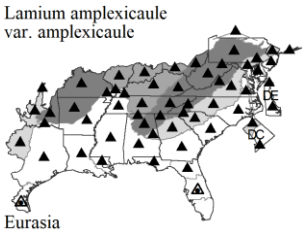
1 Corolla yellow; anthers glabrous; bracts present, reflexed ..... ***Lamium galeobdolon***
1 Corolla blue or white; anthers with tufts of hairs; bracts absent or present (if present not reflexed).
  4 Leaves subtending flower clusters sessile; [section *Amplexicaule*] ..... ***Lamium amplexicaule var. amplexicaule***
  4 Leaves all petiolate; [section *Lamium*].
    5 Leaves subtending whorls deeply serrate, with many teeth > 2 mm long; nutlets (2.5-) 2.7-3.0 (-3.3) mm long ..... ***Lamium dissectum***
    5 Leaves subtending whorls crenate-serrate, with teeth < 2 mm long; nutlets (2.0-) 2.2-2.5 (-2.8) mm long ..... ***Lamium purpureum***

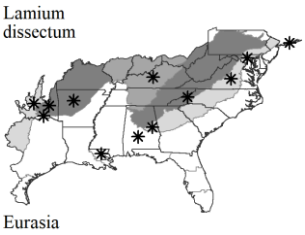
* ***Lamium amplexicaule*** Linnaeus *var*. ***amplexicaule***. HENBIT, HENBIT DEAD-NETTLE. **Hab:** Lawns, fields, roadsides, disturbed areas, gardens, pastures. **Dist:** Native of Eurasia and n. Africa. **Phen:** Jan-Dec. **Syn:** = NE, NY, Mennema (1989); = *Lamium amplexicaule* – Mo1; < *Lamium amplexicaule* – Ar, C, F, Fl6, G, GrPl, Il, K1, K3, K4, Meso4.2, Mi, NcTx, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV. NatureServe GNRTNR (Not Yet Ranked).

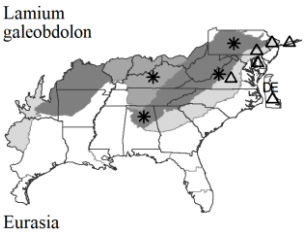
* ***Lamium dissectum*** Withering. CUTLEAF DEAD-NETTLE. **Hab:** Lawns, fields, roadsides, disturbed areas. **Dist:** Native of Eurasia. **Phen:** Apr-May. **Tax:** This taxon is apparently an allopolyploid derivative (2n=36), resulting from hybridization of *L. purpureum* and another species, perhaps *L. amplexicaule*. Because of its allopolyploid status, this taxon should not be treated as a variety of *L. purpureum*. It is, however, possible that some individuals identified here may be sterile hybrids (2n=18). **Syn:** = *Lamium hybridum* Villars – C, F, G, NY, RAB, probably misapplied; = *Lamium purpureum* Linnaeus var. *incisum* (Willdenow) Persoon – K1, K3, NcTx, NE, Mennema (1989). NatureServe GNRTNR (Not Yet Ranked).

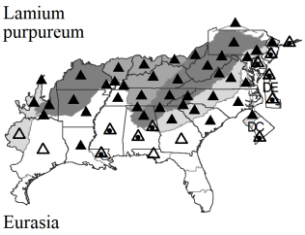
* ***Lamium galeobdolon*** (Linnaeus) Linnaeus. YELLOW ARCHANGEL, GOLDEN DEAD-NETTLE. **Hab:** Gravelly roadsides, other disturbed areas. **Dist:** Native of Europe and e. Asia. **Tax:** Several subspecies are recognized in Europe. **Comm:** Reported for Rockingham County, VA by McMullen & Lowry (2019) and Jefferson and Todd counties, KY (Brock 2020). **Syn:** = Il, K3, K4, NY, Va, Mennema (1989); = *Lamiastrum galeobdolon* (Linnaeus) Ehrendorfer & Polatschek – K1, Mi, Pa; < *Lamium galeobdolon* ssp. *galeobdolon* – NE. NatureServe GNR (Not Yet Ranked).

* ***Lamium purpureum*** Linnaeus. PURPLE ARCHANGEL, RED DEAD-NETTLE, PURPLE DEAD-NETTLE. **Hab:** Lawns, fields, roadsides, disturbed areas, pastures. **Dist:** Native of Eurasia. Only recently documented in the Coastal Plain of GA and in FL (Carter, Baker, & Morris 2009; Wunderlin & Hansen 2008). **Phen:** (Jan)-Mar-Oct. **Syn:** = Ar, C, F, Fl6, G, GrPl, Il, Mi, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV; = *Lamium purpureum* var. *purpureum* – K1, K3, K4, NcTx, NE, Mennema (1989). NatureServe GNRTNR (Not Yet Ranked).



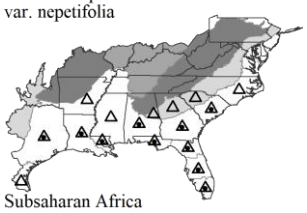






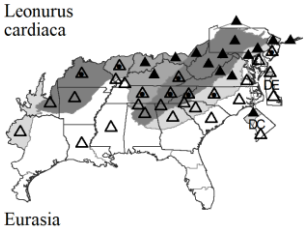
Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Leonotis nepetifolia var. nepetifolia



Subsaharan Africa

Leonurus cardiaca



Eurasia

Leonotis (Persoon) R. Brown 1810 (LION'S-EARS)

A genus of about 9 species, herbs, shrubs, and small trees, of sub-Saharan Africa. References: Iwarsson & Harvey (2003).

* ***Leonotis nepetifolia*** (Linnaeus) W.T. Aiton *var*. ***nepetifolia***. LION'S-EARS, LIGHTNING-ROD-PLANT. **Hab:** Pastures, field edges, roadsides, other disturbed areas. **Dist:** Native of s. Africa. **Phen:** Late Aug-Oct. **Syn:** = Iwarsson & Harvey (2003); < *Leonotis nepetaefolia* – RAB, S, Tx, orthographic variant; < *Leonotis nepetifolia* – Ar, Bah, Fl6, K1, K3, K4, Meso4.2, NcTx, WH3. NatureServe GNR (Not Yet Ranked).

Leonurus Linnaeus 1753 (MOTHERWORT)

A genus of 25 species, herbs, of temperate Eurasia. References: Harley & Paton (2001).

1 Calyx strongly 5-angled, the lower 2 lobes deflexed; upper corolla lip white-villous; leaves lacerately toothed and the larger shallowly lobed ..... ***Leonurus cardiaca***

1 Calyx slightly 5-angled, no lobes notably deflexed; upper corolla lip with densely and finely puberulent; leaves either entire to few-toothed (but not lobed) or deeply 3-parted, the 3 divisions further lacerately toothed or lobed. ..... ***Chaiturus marrubiastrum***

* ***Leonurus cardiaca*** Linnaeus. MOTHERWORT, LION'S-TAIL. **Hab:** Roadsides, pastures, disturbed areas. **Dist:** Native of c. Asia. Nelson (1993) reports the occurrence of this species in SC. **Phen:** May-Aug; Jul-Oct. **Syn:** = Ar, C, F, G, GrPl, Il, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, Va, W, WV; > *Leonurus cardiaca* ssp. *cardiaca* – K1, K3. NatureServe GNRTNR (Not Yet Ranked).

Lycopus Linnaeus 1753 (BUGLEWEED, WATER-HOREHOUND)

A genus of about 10-14 species, herbs, of temperate Eurasia, North America, and Australia. References: Harley et al. in Kadereit (2004); Henderson (1962); Sorrie (1997).

Unkeyed taxa: *Lycopus ×sherardii*

1 Calyx lobes acute at the apex, shorter than or equaling the nutlets. ..... ***Lycopus virginicus***

1 Calyx lobes acuminate to subulate-tipped, much exceeding the nutlets.

4 Nutlet tubercles not developed or only weakly so. ..... ***Lycopus americanus***

4 Nutlet tubercles well developed.

6 Leaves evidently petiolate, the petioles narrowly winged ..... ***Lycopus rubellus***

6 Leaves sessile or subsessile.

7 Leaves ovate to lanceolate, usually rounded at the base, scarcely reduced upward on the stem ..... ***Lycopus amplectens***

7 Leaves lanceolate to linear, cuneate at the base, upper leaves conspicuously narrower (and often also shorter) than the lower leaves ..... ***Lycopus angustifolius***

Lycopus americanus Muhlenberg ex W.P.C. Barton. AMERICAN BUGLEWEED. **Hab:** Marshes, bottomlands. **Dist:** NL (Newfoundland) west to BC, south to FL Panhandle and CA. **Phen:** Jun-Nov. **Tax:** See comment under *L. europaeus* about hybridization between *L. americanus* and *L. europaeus*. **Syn:** = Ar, C, Fl6, GrPl, GW2, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, Va, W, WH3, WV, Henderson (1962), Sorrie (1997); > *Lycopus americanus* var. *americanus* – F, G, Tx; > *Lycopus americanus* var. *longii* Benner – F, G; > *Lycopus americanus* var. *scabrifolius* Fernald – F, Tx.

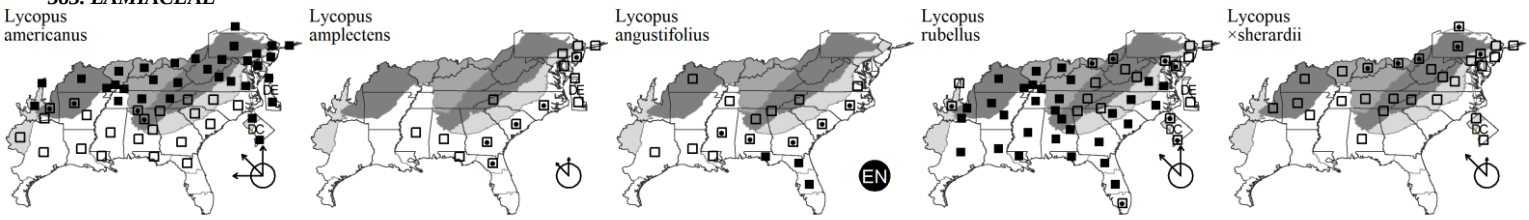
Lycopus amplectens Rafinesque. CLASPING WATER-HOREHOUND. **Hab:** Clay-based Carolina bays, other moist habitats. **Dist:** MA south to ne. FL; disjunct inland around the Great Lakes and (allegedly) in w. NC. **Phen:** Jun-Nov. **Syn:** = C, Fl6, GW2, Il, K1, K3, K4, NE, NY, RAB, W, WH3, Henderson (1962), Sorrie (1997); > *Lycopus amplectens* var. *amplectens* – F, G; > *Lycopus amplectens* var. *pubens* (Britton) Fernald – F, G; > *Lycopus pubens* Britton – S; > *Lycopus sessilifolius* A. Gray – S. NatureServe G5 (Secure).

Lycopus angustifolius Elliott. NARROWLEAF BUGLEWEED, SOUTHERN BOG WATER-HOREHOUND. **Hab:** Bogs, marshes. **Dist:** Se. VA south to FL, west to e. TX, north in the interior to s. TN and s. MO. **Phen:** Jun-Nov. **Syn:** = C, Va, Henderson (1962), Sorrie (1997); = *Lycopus rubellus* Moench var. *angustifolius* (Elliott) H.E. Ahles – GW2, RAB; = *Lycopus rubellus* Moench var. *lanceolatus* Benner – F; < *Lycopus rubellus* Moench – Fl6, G, K1, K3, K4, W, WH3; < *Lycopus rubellus* var. *rubellus* – Tx.

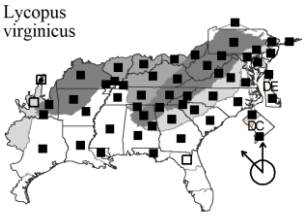
Lycopus rubellus Moench. STALKED BUGLEWEED. **Hab:** Marshes, swamp forests, bottomlands. **Dist:** ME west to MI, south to FL and TX. **Phen:** Jun-Nov. **Syn:** = Ar, C, GrPl, Il, Mi, NE, NY, Pa, S, Va, Henderson (1962), Sorrie (1997); = *Lycopus rubellus* var. *rubellus* – GW2, RAB; < *Lycopus rubellus* Moench – Fl6, G, K1, K3, K4, NcTx, W, WH3; > *Lycopus rubellus* Moench – S; > *Lycopus rubellus* var. *arkansanus* (Fresenius) Brenner – Tx; >< *Lycopus rubellus* var. *rubellus* – Tx; > *Lycopus velutinus* Rydberg – S.

Lycopus ×sherardii E.S. Steele. **Hab:** Swamps, bogs, roadsides. **Dist:** Scattered in the eastern US where the ranges of the two parents overlap, apparently resulting in large hybrid swarms (see Henderson1962). **Phen:** Jul-Nov. **Comm:** Additional study needed. {not yet keyed}. **Syn:** = C, GrPl, K3, K4, Mi; = *Lycopus ×sherardi* – Henderson (1962), orthographic variant; = *Lycopus uniflorus* × *virginicus* – NY.

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



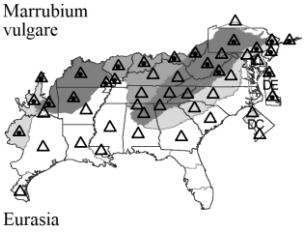
Lycopus virginicus Linnaeus. VIRGINIA BUGLEWEED. **Hab:** Swamps, bottomlands, tidal marshes, other wet habitats. **Dist:** MA west to PA, s. IN, MO, and OK, south to n. peninsular FL, Panhandle FL, and e. TX. **Phen:** Jul-Nov. **Syn:** = Ar, C, F, Fl6, G, GrPl, GW2, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV, Henderson (1962), Sorrie (1997). NatureServe G5 (Secure).



Marrubium Linnaeus 1753 (HOREHOUND)

A genus of about 30-40 species, herbs, of Mediterranean Europe and Asia. References: Harley et al. in Kadereit (2004).

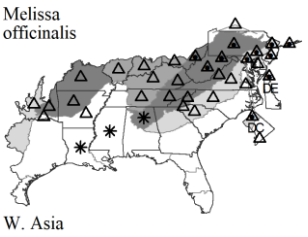
* ***Marrubium vulgare*** Linnaeus. WHITE HOREHOUND. **Hab:** Fencerows, disturbed places, formerly widely planted and escaped, now declining in abundance. **Dist:** Native of Eurasia. **Phen:** Jun-Aug. **Comm:** Used for cough-syrups in folk medicine. **Syn:** = Ar, C, F, G, GrPl, Il, K1, K3, K4, Meso4.2, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WV. NatureServe GNR (Not Yet Ranked).



Melissa Linnaeus 1753 (BALM)

A genus of 3-4 species, herbs, from Europe to Iran and c. Asia. References: Harley et al. in Kadereit (2004).

* ***Melissa officinalis*** Linnaeus. LEMON BALM, COMMON BALM. **Hab:** Disturbed areas. **Dist:** Native of w. Asia. **Phen:** Jun-Aug. **Syn:** = Ar, C, F, G, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Va, W; < *Melissa officinalis* ssp. *officinalis* – Mo1.



Mentha Linnaeus 1753 (MINT)

A genus of about 20-25 species, herbs, of temperate Eurasia and n. North America. References: Denslow & Poindexter (2009); Harley et al. . Key largely adapted from C, Y, and Z in Kadereit (2004); Stace (2010); Tucker & Naczi (2007).

Identification Notes: The distribution, habitats, phenology, and abundance of all *Mentha* species need substantial additional herbarium investigation.

7 Calyx tube glabrous; leaves glabrous, or with scattered hairs on the lower surface.
  8 Petioles of the main leaves 4-15 mm long; spikes stout; plants sterile; fresh plant with peppermint odor or flavor ..... ***Mentha ×piperita var. piperita***
  8 Petioles of the main leaves 0-3 mm long; spikes slender; plants fertile; fresh plant with spearmint odor or flavor ..... ***Mentha spicata var. spicata***
7 Calyx tube pubescent; leaves moderately to densely hairy on the lower surface.
  9 Leaves lanceolate to oblong-lanceolate, > 3× as long as wide.
    10 Hairs of the leaf undersurface unbranched; leaves widest near the middle, slightly rugose; fertile anthers 0.28-0.38 mm long; fresh plant with musty flavor or odor ..... ***Mentha longifolia ssp. longifolia***
    10 Hairs of the leaf undersurface dendritic; leaves oblong lanceolate, widest toward the base, conspicuously rugose; fertile anthers 0.38-0.52 mm long; fresh plant with spearmint odor or flavor ..... ***Mentha spicata var. spicata***
  9 Leaves oblong to ovate, 1-3× as long as wide.
    11 Leaves generally 1-2× as long as wide, ovate-orbicular, broadly rounded to subcordate at the base, obtuse at the apex; leaf serrations rounded and often turned downward (thus appearing crenate); leaf surface strongly rugose, with scattered dendritic hairs below; fresh plant with sickly or sweet flavor or odor ..... ***Mentha suaveolens ssp. suaveolens***
    11 Leaves generally 1-3× as long as wide, ovate to oblong, broadly cuneate to rounded at the base, acute at the apex; leaf serrations sharp; leaf surface moderately rugose; fresh plant with spearmint odor.
      ..... ***Mentha ×rotundifolia***

* ***Mentha longifolia*** (Linnaeus) Linnaeus *ssp.* ***longifolia***. HORSE MINT. **Hab:** {VA}. **Comm:** Native of Europe. **Syn:** = Mo1, Tucker & Naczi (2007); < *Mentha longifolia* – C, G, Il, NE, NY, Pa, RAB, WV; > *Mentha longifolia* (Linnaeus) Hudson var. *longifolia* – F; > *Mentha longifolia* var. *undulata* (Willdenow) Fiori & Paoletti – F; < *Mentha spicata* – K4.

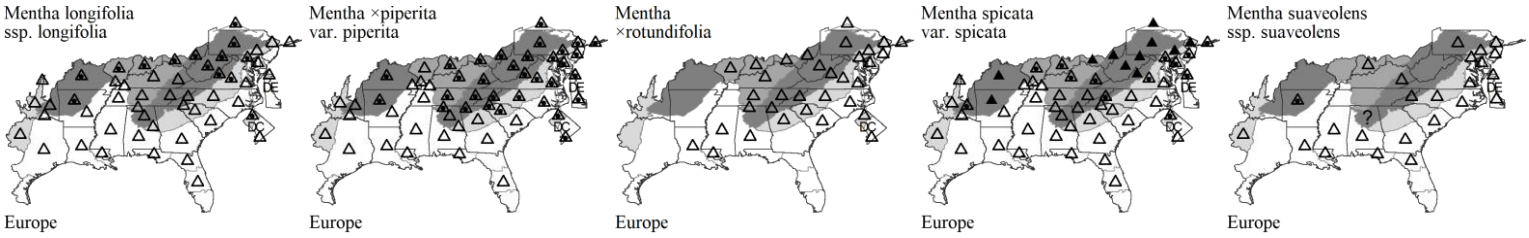
* ***Mentha ×piperita*** Linnaeus (pro sp.) *var.* ***piperita*** [*Mentha aquatica* × *spicata*]. PEPPERMINT. **Hab:** Disturbed areas. **Dist:** Native of Europe. **Syn:** = C, K1, Stace (2010), Tucker & Naczi (2007); = *Mentha ×piperata* – Pa, misspelling; = *Mentha ×piperita* – K4; = *Mentha aquatica* × *spicata* – NY; = *Mentha piperita* – G, RAB, S, Tx, Va, WV; < *Mentha ×piperita* – Ar, Fl6, GrPl, Il, K3, Mi, NcTx, NE, Tn, WH3; > *Mentha crispa* Linnaeus – F; > *Mentha piperita* – F.

* ***Mentha ×rotundifolia*** (Linnaeus) Hudson. **Hab:** Disturbed areas. **Dist:** Native of Europe. **Phen:** Jun-Sep. **Syn:** = C, Il, K1, K3, K4, NcTx, Pa, Tn, Tucker & Naczi (2007); = *Mentha longifolia* × *suaveolens* – NY; = *Mentha rotundifolia* – G, S, Tx, Va, WV.

* ***Mentha spicata*** Linnaeus *var.* ***spicata***. SPEARMINT. **Hab:** Disturbed areas. **Dist:** Native of Europe. **Phen:** Jun-Sep. **Syn:** = Tucker & Naczi (2007); = *Mentha spicata* ssp. *spicata* – NE, NY; < *Mentha spicata* – Ar, C, F, Fl6, G, GrPl, Il, K1, K3, K4, Mi, NcTx, Pa, RAB, S, Tn, Tx, Va, WH3, WV, Stace (2010).

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

* ***Mentha suaveolens*** Ehrhart *ssp. **suaveolens***. APPLE MINT, PINEAPPLE MINT, ROUND-LEAVED MINT. **Hab:** Disturbed areas. **Dist:** Native of Europe. **Phen:** Jun-Sep. **Comm:** See Denslow & Poindexter (2009) for helpful information on distinguishing *M. suaveolens* from *M. ×rotundifolia*. **Syn:** = Tucker & Naczi (2007); < *Mentha suaveolens* – Ar, C, Fl6, Il, K1, K3, K4, Mi, WH3, Stace (2010). NatureServe GNRTNR (Not Yet Ranked).



Monarda Linnaeus 1753 (BERGAMOT, BEEBALM)

A genus of about 12-20 species, herbs, of North America. Many of our species are cultivated, especially *M. didyma* in various selected forms. Additional studies are needed on a number of taxonomic problems in *Monarda*. Most of the varieties recognized have been considered valid by a succession of workers; they do seem to describe morphologically distinguishable (if not entirely discrete) entities which make phytogeographic sense. References: Floden (2015); Floden (2017a) in Weakley et al (2017); Fosberg & Artz (1953); Gill (1977); Harley et al. in Kadereit (2004); McClintock & Epling (1942); Prather & Keith (2003); Sammons (2011); Scora (1967); Singhurst & Holmes (2011); Turner (1994); Waterfall (1970).

1 Flowers in a single, terminal glomerule (rarely also 1 at the next node down the stem); stamens exserted; leaves ovate to ovate-lanceolate, broadest near the rounded, truncate, or subcordate base, 1.5-3 (-4)× as long as wide.
  2 Leaves all sessile, or the best-developed with petioles < 5 mm long.
    3 Upper corolla lip about as long as the corolla tube.....***Monarda bradburiana***
    3 Upper corolla lip about ½ as long as the corolla tube.....***Monarda russeliana***
  2 Leaves petiolate, the well-developed leaves with petioles (5-) 10-40 mm long.
    4 Corolla 30-45 mm long, scarlet-red, (3-) 4-8 mm broad at the expanded portion of the throat; [primarily of mountain seepages, streambanks, and boggy places].....***Monarda didyma***
    4 Corolla 14-35 (-36) mm long, white, lavender, or purple, 1-3 (-4) mm broad at the expanded portion of the throat; [of various habitats, usually dryish to mesic].
      5 Leaves deltoid-ovate to ovate, 2-6 cm wide, usually ca. 2× as long as wide; orifice of the calyx glabrous to slightly hirsute with a few long hairs; upper lip of the corolla 5-8 mm long and not bearded (*M. clinopodia*) or 13-16 mm long and slightly bearded (*M. media*) near its apex; outer surface of the corolla glabrous to evenly pubescent with short curled hairs.
      .....***Monarda clinopodia***
      5 Leaves narrowly-deltoid, ovate-lanceolate to lanceolate, 1-4 cm wide, usually ca. 3-4× as long as wide; orifice of the calyx densely hirsute with numerous erect, stiff, white hairs; upper lip of the corolla prominently bearded or merely pilose near its apex; outer surface of the corolla evenly pubescent with short curled hairs.
      .....***Monarda fistulosa var. mollis***
1 Flowers in 2-6 glomerules, terminal and at 2-5 successive nodes down the stem; stamens included; leaves linear, lanceolate, to narrowly elliptic, usually broadest near the middle and tapered to a cuneate base, (2.5-) 3-8× (or more) as long as wide.
  12 Calyx lobes (3-) 5-10× as long as wide, the length including a spinose awn 2-7 mm long; corolla white to pink or lavender; inner bracts subtending the flowers 4-9 mm wide, abruptly acuminate into a spinose bristle
  .....***Monarda citriodora var. citriodora***
  12 Calyx lobes 1-3× as long as wide, narrowly to broadly triangular, acute or long-acuminate but not awned; corolla yellow, spotted with purple; inner bracts 8-14 mm wide, acuminate.
  .....***Monarda punctata var. punctata***

Monarda bradburiana L.C. Beck. BRADBURY BEEBALM. **Hab:** Mesic and dry woodlands and forests. **Dist:** IN west to e. KS, south through KY, TN, and MO to AL, AR, and OK. **Phen:** Apr-Jun. **Syn:** = Ar, G, GrPl, Il, K1, K3, K4, S, Tn, Tx; = *Monarda russeliana* Nuttall ex Sims – C, F, misapplied.

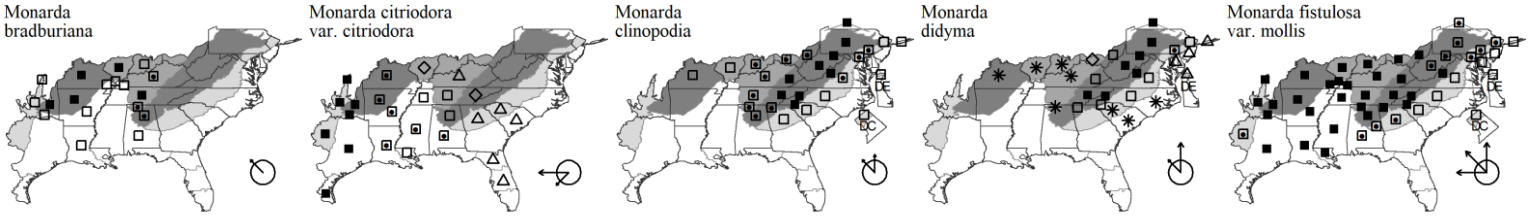
Monarda citriodora Cervantes ex Lagasca y Segura *var. **citriodora***. LEMON BERGAMOT. **Hab:** Prairies, oak savannas, roadsides, other disturbed places. **Dist:** IL, MO, KS south to AL, MS, LA, TX, NM, and Mexico; also naturalized outside that range (the native distribution unclear). **Phen:** Apr-Sep; Jul-Nov. **Syn:** = Ar, Il, Tx, Scora (1967), Turner (1994); = *Monarda citriodora* ssp. *citriodora* – McClintock & Epling (1942); = *Monarda citriodora* ssp. *citriodora* var. *citriodora* – K1, K3, K4; < *Monarda citriodora* – F, Fl6, G, GrPl, NcTx, RAB, Tn, WH3, Sammons (2011); ? *Monarda dispersa* – S.

Monarda clinopodia Linnaeus. BASIL BERGAMOT, BASIL BEEBALM. **Hab:** Mesic, forested slopes. **Dist:** NJ, w. NY, and IL, south to n. GA and c. AL (some of the range perhaps accountable to cultivation). **Phen:** Late May-Sep; Jul-Oct. **Comm:** There appear to be a number of chemical races in *M. clinopodia* which may warrant taxonomic status. **Syn:** = C, F, G, Il, K1, K3, K4, Mi, Mo1, NE, NY, Pa, RAB, S, Tn, Va, W, McClintock & Epling (1942), Scora (1967). NatureServe G5 (Secure).

Monarda didyma Linnaeus. BEEBALM, OSWEGO TEA. **Hab:** Seepage slopes, periglacial boulderfields with abundant seepage, streambanks, boggy places, usually in strong to moderately filtered sunlight. **Dist:** ME west to MI, south to PA and OH, and in the Appalachians south to sw. NC, se. TN, and ne. GA (part of the northern range is likely only by introduction). **Phen:** Jul-Sep; Sep-Oct. **Tax:** McClintock & Epling (1942) describe two forms of *M. didyma*: the "broad-leaved form", with leaves averaging 9.2 cm long and 5.2 cm wide and corollas averaging 35 mm long, ranging south to sc. PA and ne. WV, and the "narrow-leaved form", with leaves averaging 11.8 cm long and 4.4 cm wide and corollas averaging 39 mm long, occurring throughout the range of the species. Further study seems warranted. **Syn:** = C, F, G, GrPl, Il, K1, K3, Mi, Mo1, NE, NY, Pa, S, Tn, Va, W, WV, McClintock & Epling (1942), Scora (1967).

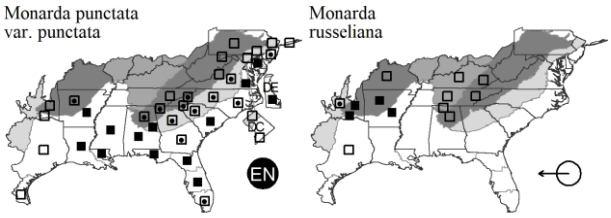
Monarda fistulosa Linnaeus *var. **mollis*** (Linnaeus) Bentham. EASTERN BERGAMOT, PALE WILD BERGAMOT. **Hab:** Moist wooded slopes. **Dist:** ME west to MN, south to GA, AL, and se. TX. **Phen:** Jun-Sep; Aug-Oct. **Tax:** See comments under var. *fistulosa*. **Syn:** = Ar, F, Il, Mi, NcTx, NY, WV,

Fosberg & Artz (1953), Scora (1967), Turner (1994), Waterfall (1970); = *Monarda fistulosa* ssp. *fistulosa* var. *mollis* (Linnaeus) Bentham – K1, K3, K4, NE; < *Monarda fistulosa* – Pa, RAB, Tn, Tx, W; < *Monarda fistulosa* ssp. *fistulosa*; < *Monarda fistulosa* Linnaeus var. *fistulosa* – C, G, GrPl, Va, McClintock & Epling (1942); > *Monarda mollis* Linnaeus – S; > *Monarda scabra* Beck – S.



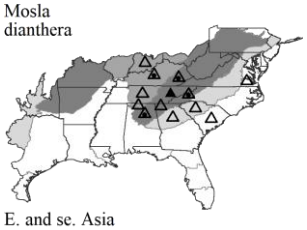
Monarda punctata Linnaeus *var*. ***punctata***. EASTERN HORSEMINT. **Hab:** Maritime forests, dunes, roadsides, rocky or sandy woodlands. **Dist:** NJ to s. FL, west to TX, mainly on the Coastal Plain, but extending inland. **Phen:** Late Jul-Sep; Sep-Oct. **Syn:** = C, F, NY, Va, Scora (1967), Turner (1994); = *Monarda punctata* ssp. *punctata* – G, McClintock & Epling (1942); = *Monarda punctata* ssp. *punctata* var. *punctata* – K1, K3, K4; < *Monarda punctata* – Ar, Fl6, Pa, RAB, S, Tn, W, WH3, Sammons (2011).

Monarda russeliana Nuttall ex Sims. WHITE BEEBALM. **Hab:** Open areas and woodlands. **Dist:** AR and OK south to ne. TX; disjunct east of the Mississippi River in AL and KY. **Phen:** Apr-Jun. **Syn:** = Ar, G, K1, K3, K4, NcTx, Tx, Singhurst & Holmes (2011), Turner (1994); = *Monarda virgata* Rafinesque – C, F.



Mosla (Bentham) Buchanan-Hamilton ex Maximowicz 1875 (MOSLA)

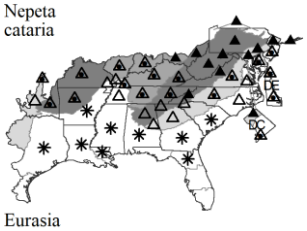
A genus of about 10-22 species, of e. Asia. References: Harley et al. in Kadereit (2004).



* ***Mosla dianthera*** (Buchanan-Hamilton ex Roxburgh) Maximowicz. MOSLA, MINI-SHISO. **Hab:** Disturbed areas. **Dist:** Native of e. Asia. This species is becoming a noxious weed in KY, TN, and w. NC; it should be expected to become more widespread in our area. **Phen:** Aug-Sep. **Syn:** = F, G, K1, K3, K4, RAB, Tn, Va; = *Orthodon dianthera* (Buchanan-Hamilton) Handel-Mazzetti – C. NatureServe GNR (Not Yet Ranked).

Nepeta Linnaeus 1753 (CATNIP, CATMINT)

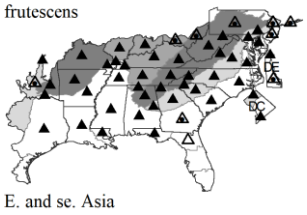
A genus of about 250 species, herbs, of Eurasia and n. Africa. References: Harley et al. in Kadereit (2004).



* ***Nepeta cataria*** Linnaeus. CATNIP, CATMINT. **Hab:** Fencerows, barnyards, disturbed areas. **Dist:** Native of Eurasia. **Phen:** Jul-Oct. **Syn:** = Ar, C, F, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WV. NatureServe GNR (Not Yet Ranked).

Perilla Linnaeus 1764 (PERILLA, BEEFSTEAK-PLANT, SHISO)

A genus of about 1-6 species, herbs, of s. and e. Asia. References: Harley et al. in Kadereit (2004).



* ***Perilla frutescens*** (Linnaeus) Britton. PERILLA, BEEFSTEAK-PLANT, SHISO. **Hab:** Moist disturbed areas. **Dist:** Native of India. **Phen:** Aug-Oct; Oct-Dec. **Tax:** Var. *crispa* (Bentham) Deane (leaves purple above and below; leaf margins laciniate-dentate and also crisped) and var. *frutescens* (leaves purple below; leaf margins dentate, not crisped) are sometimes recognized; these appear to be recently-derived cultivars rather than taxonomically distinct entities. **Syn:** = Ar, C, Fl6, G, GrPl, K4, Mi, Pa, RAB, S, Tn, Tx, W, WH3; = *Perilla fructescens* – NcTx, orthographic variant; > *Perilla frutescens* (Linnaeus) Britton var. *crispa* (Bentham) Deane – F, Il, K1, K3, NE, NY, WV; > *Perilla frutescens* var. *frutescens* – F, Il, K1, K3, NE, NY, WV.

Physostegia Bentham 1829 (OBEDIENT-PLANT)

A genus of about 12 species, perennial herbs, of North America. References: Cantino (1982); Harley et al. in Kadereit (2004).

1 Leaves petiolate or sessile, none of them clasping the stem.
2 All or most of the largest leaves sharply serrate; apex of the leaves acute to attenuate.

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

3 Axis of raceme with at least some of the hairs 0.13-0.25 mm long; nutlets 2-3 mm long; flowering Apr to early Jul (or later if burned)..... ***Physostegia angustifolia***

3 Axis of raceme with hairs < 0.1 mm long; nutlets usually 3-4 mm long; flowering Jul-Oct. ..... ***Physostegia virginiana ssp. praemorsa***

2 Half or more of the larger leaves bluntly toothed to entire; apex of the leaves obtuse, or acute to attenuate. ..... ***Physostegia leptophylla***

1 Leaves, 1 or more of them, conspicuously or inconspicuously clasping the stem.

8 Perennating buds borne directly on the primary rhizome or at the ends of short, vertical secondary rhizomes (horizontal secondary rhizomes lacking), the plant thus forming clumps

9 Most or all of the larger leaves sharply serrate; larger leaves usually < 2.5 cm wide and > 5× as long as wide ..... ***Physostegia angustifolia***

9 Most or all of the larger leaves bluntly serrate to entire; larger leaves usually > 3 cm wide or < 5× as long as wide. ..... ***Physostegia digitalis***

8 Perennating buds borne at the ends of elongate, horizontal, secondary rhizomes, the plant thus forming clonal patches.

12 Flowers 22-35 mm long; larger stem leaves acute to attenuate at the tip; axis of raceme with at least some of the hairs 0.13-0.25 mm long; larger stem leaves mostly sharply serrate ..... ***Physostegia angustifolia***

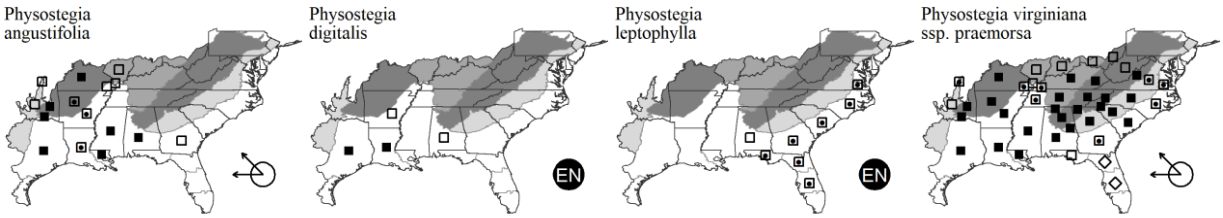
12 Flowers smaller, or most of the leaves obtuse at the tip, or hairs of the raceme axis < 0.13 mm long; larger stem leaves bluntly toothed to entire. ..... ***Physostegia leptophylla***

Physostegia angustifolia Fernald. NARROWLEAF DRAGONHEAD, NARROWLEAF OBEDIENT-PLANT. **Hab:** Calcareous openings, glades, prairies, bottomlands. **Dist:** Sw. GA and AL west to KS and TX. **Phen:** May-Sep. **Syn:** = Ar, GrPl, GW2, Il, K1, K3, K4, NcTx, Tx, Cantino (1982). NatureServe G4G5 (Apparently Secure).

Physostegia digitalis Small. FOXGLOVE DRAGONHEAD, FOXGLOVE OBEDIENT-PLANT. **Hab:** Pinelands and prairies. **Dist:** W. LA and e. TX; disjunct in AL Coastal Plain (Choctaw County). **Phen:** Jun-Jul (-Aug). **Syn:** = Ar, GW2, K3, K4, NcTx, Tx, Cantino (1982). NatureServe G5 (Secure).

Physostegia leptophylla Small. TIDAL MARSH OBEDIENT-PLANT, SWAMP OBEDIENT-PLANT. **Hab:** Bottomland hardwood forests, swamps, tidal freshwater or slightly brackish (oligohaline) marshes, rarely wet savannas (GA). **Dist:** Se. VA south to sc. peninsular FL, west to sw. GA., s. AL, and Panhandle FL. **Phen:** Late May-early Aug; Jun-Sep. **Tax:** *P. leptophylla* is a tetraploid; Cantino (1982) suggests that this species may be an allotetraploid, perhaps originating from *P. purpurea* × *virginiana*. **Syn:** = C, Fl6, GW2, K1, K3, K4, WH3, Cantino (1982); > *Dracocephalum leptophyllum* Small – S; < *Dracocephalum purpureum* (Walter) McClintock ex Gleason – G, RAB; > *Dracocephalum veroniciformis* Small – S; > *Physostegia aboriginorum* Fernald – F; > *Physostegia denticulata* (Aiton) Britton – F, misapplied. NatureServe G4? (Apparently Secure).

Physostegia virginiana (Linnaeus) Bentham *ssp.* ***praemorsa*** (Shinners) Cantino. SOUTHERN OBEDIENT-PLANT. **Hab:** Woodlands, glades, seepages, especially over calcareous or mafic rock. **Dist:** OH west to n. IL, south to c. NC, n. FL, TX, NM, and Mexico. **Phen:** Jul-Nov. **Syn:** = GrPl, K1, K3, K4, NcTx, Tn, W, Cantino (1982); = *Physostegia praemorsa* Shinners – Tx; = *Physostegia virginiana* var. *arenaria* Shimek – C; < *Dracocephalum virginianum* Linnaeus – G, RAB, S; >< *Physostegia speciosa* (Sweet) Sweet – Il; < *Physostegia virginiana* – Fl6, GW2, WH3; >< *Physostegia virginiana* – Il; >< *Physostegia virginiana* var. *speciosa* (Sweet) A. Gray – F; >< *Physostegia virginiana* var. *virginiana* – F.



Prunella Linnaeus 1753 (SELF-HEAL, HEAL-ALL)

A genus of about 4-7 species, herbs, of n. temperate areas. References: Harley et al. in Kadereit (2004).

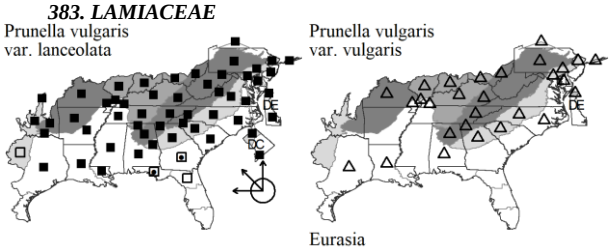
2 Principal or median cauline leaves lanceolate to oblong, (2-) avg. 3 (-5)× as long as wide; leaf cuneate at the base..... ***Prunella vulgaris var. lanceolata***

2 Principal or median cauline leaves ovate to ovate-oblong, (1.5-) avg. 2 (-2.5)× as long as wide; leaf broadly rounded at the base..... ***Prunella vulgaris var. vulgaris***

Prunella vulgaris Linnaeus *var.* ***lanceolata*** (W.P.C. Barton) Fernald. AMERICAN SELF-HEAL. **Hab:** Disturbed areas, pastures, roadsides, bottomland forests; other forests and woodlands. **Dist:** NL (Newfoundland) west to AK, south to NC, SC?, TN, MO, KS, NM, AZ, and CA. **Phen:** Apr-Dec. **Tax:** Additional herbarium work is needed to determine the relative ranges, distributions, habitats, and abundances of the two varieties. **Syn:** = C, F, G, GrPl, Pa, Tx; = *Prunella vulgaris* ssp. *lanceolata* (W. Barton) Hultén – Ar, K1, K3, K4, NcTx, NE, NY; = *Prunella vulgaris* var. *elongata* Bentham – Il; < *Prunella vulgaris* – Fl6, Mi, RAB, S, Tn, Va, W. NatureServe G5T5 (Secure).

* ***Prunella vulgaris*** Linnaeus *var.* ***vulgaris***. EURASIAN SELF-HEAL. **Hab:** Disturbed areas, pastures, roadsides, bottomland forests; other forests and woodlands. **Dist:** Native of Eurasia. Additional herbarium work is needed to clearly determine the relative ranges, distributions, habitats, and abundances of the two varieties, var. *vulgaris* and var. *lanceolata*. **Phen:** Apr-Dec. **Comm:** The possible additional recognition of var. *hispida* also needs assessment. Var. *hispida* Bentham, considered to have been originally e. Asian, is alleged to be widespread in se. United States. According to Fernald (1950), it differs from *P. vulgaris* var. *vulgaris* in having the "stems, petioles, and often the lower surfaces of leaves densely villous-hispid" (vs. "only sparingly and not conspicuously pilose"). **Syn:** = Il, Pa; = *Prunella vulgaris* ssp. *vulgaris* – K1, K3, K4, NE, NY; < *Prunella vulgaris* – Fl6, Meso4.2, Mi, RAB, S, Tn, Va, W, WH3; > *Prunella vulgaris* var. *hispida* Bentham – C, F, G, Tx; > *Prunella vulgaris* Linnaeus var. *vulgaris* – C, F, G. NatureServe G5TU (Unrankable).

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



Pycnanthemum Michaux 1803 (MOUNTAIN-MINT, WILD-BASIL)

A genus of 20-25 species, herbs, of temperate North America. *Pycnanthemum* remains a complicated and difficult group, with speciation apparently having proceeded by allopolyploidy, autoploidy, and aneuploidy. Numerous aberrant forms and (probably) sterile hybrids complicate identification and understanding. References: Chambers & Hamer (1992); Chambers (1993); Grant & Epling (1943); Harley et al. in Kadereit (2004).

1 Leaves 1-15 mm wide (to 30 mm wide in *P. setosum*), mostly > 3× as long as wide (except in *P. nudum*); calyx lobes not tipped with a tuft of long, jointed bristles (except *P. clinopodioides*).
  2 Longer calyx lobes 1.5-5 mm long, attenuate-aristate, stiff, whitened; [Coastal Plain pinelands, rarely in Mountain bogs with Coastal Plain affinities]. ..... ***Pycnanthemum flexuosum***
  2 Longer calyx lobes 0.5-1.6 mm long, deltoid to narrowly triangular, not notably stiff (except in *P. tenuifolium*) or whitened; [widespread in our area, but mainly of the Piedmont and Mountains].
    4 Leaves 10-15 mm wide (or more often even wider, to 25 mm wide, in *P. clinopodioides*); longer calyx lobes 0.7-1.6 mm long, tipped with a few long (1-3 mm) jointed bristles (*P. clinopodioides*) or not tipped (*P. nudum*).
      5 Leaves 1-2.5× as long as wide, coriaceous; stems and leaves glabrous; [Coastal Plain, se. SC southward and westward to FL and AL] ..... ***Pycnanthemum nudum***
      5 Leaves 3-6× as long as wide, herbaceous; stems and leaves pubescent; [inland provinces and Coastal Plain, NC northward] ..... ***Pycnanthemum pilosum***
    4 Leaves 1-12 (-15) mm wide; longer calyx lobes 0.5-1.5 mm long, variously pubescent but not tipped with a tuft of long jointed bristles.
      7 Leaves glabrous on the lower and upper surface, with 2-3 pairs of lateral veins; stems glabrous on the faces and angles (rarely with a few small upwardly-curled hairs on the angles).
        8 Leaves 5-15 mm wide, 1-2.5× as long as wide; calyx lobes and inner bracts of the inflorescence herbaceous ..... ***Pycnanthemum nudum***
        8 Leaves 1-4 (-5.5) mm wide, 8-15× as long as wide; calyx lobes and inner bracts of the inflorescence semi-spinose, their tips subulate, thickened, and stiff ..... ***Pycnanthemum tenuifolium***
      7 Leaves pubescent at least on the lower surface along the midrib and main veins; leaves with 4-5 pairs of lateral veins; stems glabrous or pubescent on the faces, pubescent on the angles. ..... ***Pycnanthemum virginianum***

1 Leaves broad, 15-40 mm wide, mostly 1.5-3× as long as wide; calyx lobes usually tipped with a tuft of long, jointed bristles (except *P. curvipes*, *P. muticum*, *P. setosum*).
  12 Calyx lobes not tipped with a tuft of long, jointed bristles.
    14 Calyx distinctly bilabiate, the lower 2 lobes 1.5-2.5× longer than the upper 3 lobes, and separated from each other and the upper 3 lobes by deeper sinuses ..... ***Pycnanthemum albescens***
    14 Calyx not distinctly bilabiate, all of the calyx lobes about the same length, the sinuses about the same depth.
      15 Petioles (2-) 3-15 mm long; inflorescence corymbose, loose, the branches apparent; [dry, sandy or rocky habitats]. ..... ***Pycnanthemum curvipes***
      15 Petioles 0-2 (-3) mm long; inflorescence capitate, tight, the branches within the clusters not apparent; [moist habitats, widespread]. ..... ***Pycnanthemum muticum var. muticum***
  12 Calyx lobes usually tipped with a tuft of long, jointed bristles.
    22 Calyx lobes broadly triangular, their apices obtuse, acute, or somewhat acuminate; calyx tube > 2× as long as the longest (lower) calyx lobes. ..... ***Pycnanthemum incanum var. puberulum***
    22 Calyx lobes narrowly triangular, their apices acuminate to attenuate; calyx tube 1-2× as long as the longest (lower) calyx lobes.
      24 Mericarps 0.5-1.3 mm long, with a smooth surface, glabrous or with a few short hairs at the tip ..... ***Pycnanthemum loomisii***
      24 Mericarps 1.2-1.5 mm long, with a rugose or pitted surface, densely pubescent at the tip.
        25 Stems and lower leaf surfaces canescent, the short hairs often intermixed with longer, spreading ones ..... ***Pycnanthemum pycnanthemoides var. pycnanthemoides***
        25 Stems and lower leaf surfaces with coarse, spreading hairs only ..... ***Pycnanthemum pycnanthemoides var. viridifolium***

Pycnanthemum albescens Torrey & A. Gray. WHITE MOUNTAIN-MINT, WHITE-LEAVED MOUNTAIN-MINT. **Hab:** Bluff forests, hammocks, other open, mesic forests. **Dist:** S. IL, MO, and se. KS south to GA, AL, MS, LA, and TX. Reported for NC by Small (as *Koellia albescens*), the basis of the report unknown to me. It is known from nc. GA (Jones & Coile 1988). **Phen:** Aug-Sep. **Syn:** = Ar, C, F, G, GrPl, Il, K1, K3, K4, NcTx, Tx, WH3; = *Koellia albescens* (Torrey & A. Gray) Kuntze – S. NatureServe G5 (Secure).

Pycnanthemum curvipes (Greene) E. Grant & Epling. TENNESSEE MOUNTAIN-MINT, STONE MOUNTAIN MOUNTAIN-MINT. **Hab:** Dry rocky woodlands and rock outcrops (granite or mafic). **Dist:** Sw. NC and se. TN south nc. GA and n. AL; disjunct in nc. TN (Chester, Wofford, & Kral 1997). **Phen:** Jun-Aug. **Comm:** A diploid species (n= 20). **Syn:** = K1, K3, K4, Tn, Chambers & Hamer (1992), Grant & Epling (1943); = *Koellia curvipes* Greene – S. NatureServe G3 (Vulnerable).

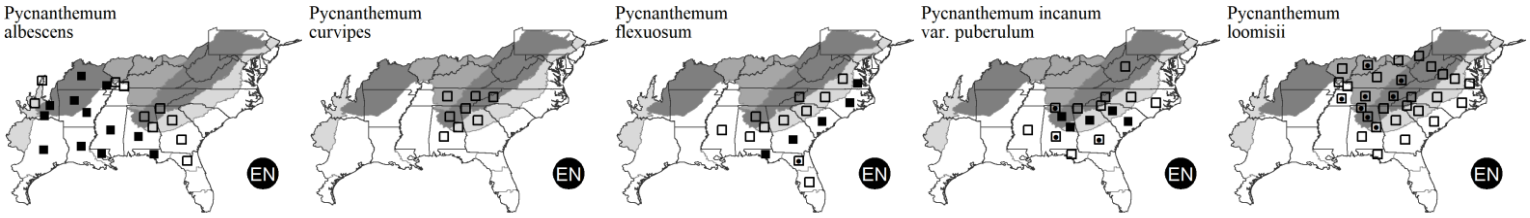
Pycnanthemum flexuosum (Walter) Britton, Sterns, & Poggenburg. SAVANNA MINT, SAVANNA MOUNTAIN-MINT. **Hab:** Moist to wet pine savannas, pine flatwoods, pocosin margins, mountain bogs, seepage areas on low elevation granite domes. **Dist:** Se. VA south to ne. FL, west to Panhandle FL and s. MS (Sorrie & LeBlond 2008) on the Coastal Plain; disjunct inland in bogs and rock outcrops of sw. NC with Coastal Plain affinities, and in sc. TN. **Phen:** Jun-Sep; Sep-Oct. **Tax:** A diploid species (n = 18). *Koellia hugeri* Small, alleged to differ details of the calyx, was

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

established for the plants of bogs of the Blue Ridge; it apparently is not morphologically segregated from other variation within the species (Grant & Epling 1943). **ID Notes:** Sometimes mistaken in vegetative condition for *Eupatorium leucolepis*, *P. flexuosum* can be distinguished by its square stem and aromatic odor. **Syn:** = C, F, Fl6, K1, K3, K4, RAB, Va, W, WH3, Chambers & Hamer (1992); = *Pycnanthemum hyssopifolium* Bentham – G, GW2, Grant & Epling (1943); > *Koellia hugeri* Small – S; > *Koellia hyssopifolia* (Bentham) Britton – S.

Pycnanthemum incanum (Linnaeus) Michaux *var*. ***puberulum*** (E. Grant & Epling) Fernald. **Hab:** Forests and woodland borders. **Dist:** WV and NC south to FL and AL. **Phen:** Late Jun-Aug; Sep-Oct. **Comm:** A tetraploid species (n = 38). **Syn:** = F, K1, K3, K4; = *Pycnanthemum puberulum* E. Grant & Epling – WV, Grant & Epling (1943); < *Koellia incana* (Linnaeus) Kuntze – S; < *Pycnanthemum incanum* – C, G, Pa, RAB, Tn, W, Chambers & Hamer (1992). NatureServe G5T4? (Apparently Secure).

Pycnanthemum loomisii Nuttall. LOOMIS'S MOUNTAIN-MINT. **Hab:** Forests and woodland borders. **Dist:** VA west to IL, south to n. FL. **Phen:** Late Jun-Aug; Sep-Oct. **Tax:** A diploid species (n = 19). **Syn:** = C, Il, K1, K3, K4, Tn, Va, WV, Chambers & Hamer (1992), Grant & Epling (1943); = *Pycnanthemum incanum* var. *loomisii* (Nuttall) Fernald – F; < *Pycnanthemum incanum* – RAB; < *Pycnanthemum pycnanthemoides* (Leavenworth) Fernald var. *pycnanthemoides* – G.



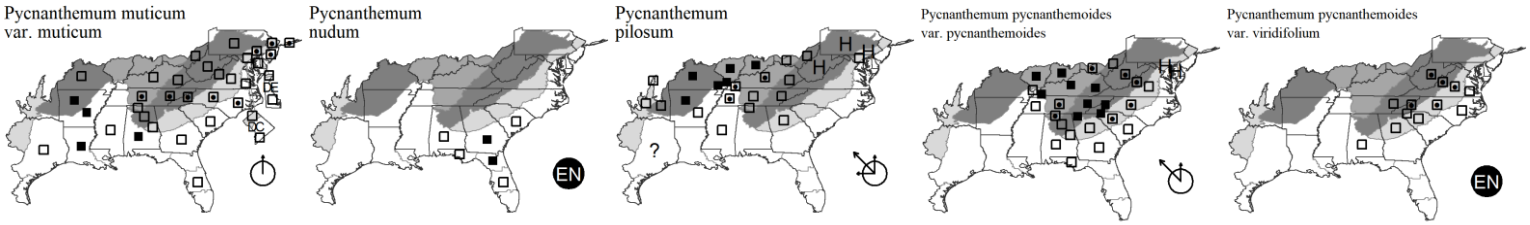
Pycnanthemum muticum (Michaux) Persoon *var*. ***muticum***. **Hab:** Bogs, wet meadows, moist to wet forests. **Dist:** NJ and MO south to FL and LA. **Phen:** Jun-Aug; Sep-Oct. **Tax:** A diploid, tetraploid, and hexaploid (?) species (n = 20, 40, ca. 54), under study by D.B. Poindexter. **Syn:** < *Koellia mutica* (Michaux) Kuntze – S; < *Pycnanthemum muticum* – Ar, C, F, G, GW2, Il, K1, K3, K4, Mi, NcTx, NY, Pa, RAB, Tn, Tx, Va, Chambers & Hamer (1992).

Pycnanthemum nudum Nuttall. SMOOTH MOUNTAIN-MINT. **Hab:** Wet pine flatwoods. **Dist:** Se. SC south to n. peninsular FL, Panhandle FL, and se. AL. Small (1933) attributes this species to NC; the documentation is unknown (and doubtful). **Comm:** This is a diploid species (n = 20). **Syn:** = Fl6, GW2, K1, K3, K4, WH3, Grant & Epling (1943); = *Koellia nuda* (Nuttall) Kuntze – S. NatureServe G5? (Secure).

Pycnanthemum pilosum Nuttall. HAIRY MOUNTAIN-MINT. **Hab:** Upland woodlands. **Dist:** S. ON west to MI and IA, south to TN, AR, and OK. In c. TN, and reported from a single county in e. TN (Chester, Wofford, & Kral 1997), in se. PA (Rhoads & Klein 1993), and WV (Kartesz 1999). **Phen:** Jul-Sep. **ID Notes:** *P. pilosum* differs from *P. verticillatum* in having the stems thickly (vs. thinly pubescent), the lower surface of the leaves evenly pubescent (vs. pubescence chiefly restricted to the midrib). **Syn:** = Ar, F, G, GrPl, K4, Mi, Tn; = *Koellia pilosa* (Nuttall) Britton – S; = *Pycnanthemum verticillatum* (Michaux) Persoon var. *pilosum* (Nuttall) Cooperrider – C, K1, K3, NE, NY, Pa; < *Pycnanthemum verticillatum* (Michaux) Persoon – Il. NatureServe G5T5 (Secure).

Pycnanthemum pycnanthemoides (Leavenworth) Fernald *var*. ***pycnanthemoides***. **Hab:** Forests and woodland borders. **Dist:** VA and IL south to w. SC and n. GA. **Phen:** Jul-Aug. **Comm:** A tetraploid species (n = 36). **Syn:** = F, K1, K3, K4; < *Koellia pycnanthemoides* (Leavenworth) Kuntze – S; < *Pycnanthemum incanum* – RAB; < *Pycnanthemum pycnanthemoides* – C, Fl6, Il, Tn, Va, Chambers & Hamer (1992); < *Pycnanthemum pycnanthemoides* (Leavenworth) Fernald var. *pycnanthemoides* – G, (also see P. loomisii); > *Pycnanthemum tullia* Bentham – Grant & Epling (1943).

Pycnanthemum pycnanthemoides (Leavenworth) Fernald *var*. ***viridifolium*** Fernald. **Hab:** Forests and woodland borders. **Dist:** VA and WV south to ec. GA, AL, and Panhandle FL. **Phen:** Jul-Aug. **Tax:** The recognition of this variety is doubtful. **Comm:** A tetraploid species (n = 36). **Syn:** = F, G, K1, K3, K4; = *Pycnanthemum viridifolium* (Fernald) E. Grant & Epling – Grant & Epling (1943); > *Koellia dubia* (Gray) Small – S; > *Koellia pycnanthemoides* (Leavenworth) Kuntze – S; < *Pycnanthemum incanum* – RAB; < *Pycnanthemum pycnanthemoides* – C, Tn, WH3, Chambers & Hamer (1992).

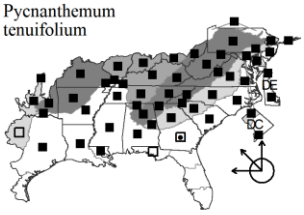


Pycnanthemum tenuifolium Schrader. SLENDER MOUNTAIN-MINT. **Hab:** Bogs, wet meadows, moist to wet forests. **Dist:** ME west to MN, KS, and OK, south to FL and TX. **Phen:** Jun-Aug; Sep-Oct. **Tax:** A diploid and tetraploid species (n = 20 and 40). **Syn:** = Ar, C, F, Fl6, GrPl, GW2, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, Tn, Tx, Va, W, WH3, Chambers & Hamer (1992); = *Koellia flexuosa* – S, misapplied; = *Pycnanthemum flexuosum* (Walter) Britton, Sterns, & Poggenburg – G, Grant & Epling (1943), misapplied.

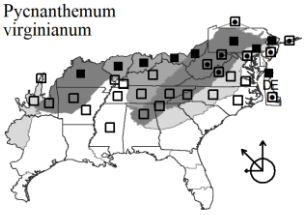
Pycnanthemum virginianum (Linnaeus) T. Durand & B.D. Jackson ex B.L. Robinson & Fernald. VIRGINIA MOUNTAIN-MINT. **Hab:** Wet meadows, marshes, prairie sloughs, over calcareous or mafic rocks or sediments. **Dist:** ME west to ND, south to NC, nw. GA, n. AL, and OK. **Phen:** Jun-Sep; Sep-Oct. **Tax:** A tetraploid species (n = 40). **Syn:** = Ar, C, F, G, GrPl, GW2, K1, K3, K4, Mi, NY, Pa, RAB, Tn, Va, W, Chambers & Hamer (1992), Grant & Epling (1943); = *Koellia virginiana* (Linnaeus) MacMillan – S. NatureServe G5 (Secure).

Key to Map Symbology: □⊡■ └native┘ ◇◈◆ └maybe exotic┘ △◬▲ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated

Pycnanthemum tenuifolium



Pycnanthemum virginianum



Salvia Linnaeus 1753 (SAGE, CLARY)

A genus of about 900 species, shrubs and herbs, almost cosmopolitan. Walker et al. (2004) and Walker & Sytsma (2007) have determined that *Salvia* as traditionally circumscribed is polyphyletic. Will & Claßen-Bockhoff (2017) proposed splitting *Salvia* into multiple genera (and retaining *Rosmarinus* as a genus), while Drew et al. (2017) proposed treating *Salvia* broadly and including *Rosmarinus* in it. At least until a coherent system of splitting *Salvia* is presented, it seems best to include *Rosmarinus*. References: Drew et al (2017); Epling (1938); Keener & Diamond (2018) in Weakley et al (2018a); Stace (2010); Walker & Sytsma (2007); Walker et al (2004); Will & Claßen-Bockhoff (2017).

1 Leaves predominantly basal.
  2 Veins of the 3 upper calyx lobes parallel, the lobes themselves minute and widely-spaced (> 1 mm between the 2 lateral teeth), separated by flattish sinuses; basal leaves lobed; [native, though weedy, common throughout our area]..... ***Salvia lyrata***
  2 Veins of the 3 upper calyx lobes converging, the lobes themselves minute and spaced within a distance of 1 mm; basal leaves lobed or toothed; cauline leaves toothed (rarely lobed); [alien weeds, rarely naturalized in our area].
..... ***Salvia verbenaca***
1 Leaves predominantly cauline, not lobed.
  4 Leaves rhombic-ovate, the base cordate, subcordate, truncate, or broadly cuneate.
    5 Petiole not clearly differentiated from the leaf blade (leaf tissue decurrent on the petiole for most or all its length); corolla blue
      6 Leaves with cuneate bases extending into a winged petiole; plants typically with both terminal and axillary inflorescences; corolla 7-12 mm long; flowering Aug-Oct..... ***Salvia chapmanii***
      6 Leaves with abruptly truncate bases into a winged petiole; plants typically with a single terminal inflorescence; corolla 10–17 mm long; flowering Apr–May..... ***Salvia urticifolia***
    5 Petiole clearly differentiated from the leaf blade; corolla blue, white, or scarlet.
..... ***Salvia coccinea***
  4 Leaves lanceolate, linear, or narrowly elliptic, the base cuneate to attenuate.
    10 Leaves canescent, gray; [introduced, rarely persistent from cultivation in gardens]..... ***Salvia officinalis***
    10 Leaves puberulent, green; [native, of dry woodlands from sc. NC southward and westward].
      12 Stem usually with sparse, antrorse or somewhat spreading pubescence; calyx with antrorse hairs limited to major veins; flowers of mature inflorescences spaced out, most internodes elongate and ranging up to 25 (-34) mm; [Atlantic and Gulf Coastal Plain and adjacent piedmont, from south-central NC to central FL to southeast LA] ..... ***Salvia azurea var. azurea***
      12 Stem usually with dense, retrorse pubescence; calyx with dense antrorse pubescence; flowers of mature inflorescences densely arranged, internodes between flowers very short, only the lowermost 1-3 internodes elongate and ranging up to 12 (-17) mm; [inland and prairie sites, ranging from IL, IA, NE, and e. CO south to nw. GA, n. AL, ne. MS, LA, and se. and c. TX]..... ***Salvia azurea var. grandiflora***

Salvia azurea Michaux ex Lamarck *var.* ***azurea***. AZURE SAGE. **Hab:** Longleaf pine sandhills, pine flatwoods, hammocks, other sandy or rocky woodlands. **Dist:** S. NC south to Panhandle FL, west to TX. **Phen:** (May-) Aug-Nov; Oct-Dec. **Syn:** = K1, K3, K4, Tx; < *Salvia azurea* – Fl6, RAB, S, WH3. NatureServe G4G5T4?Q (Apparently Secure).

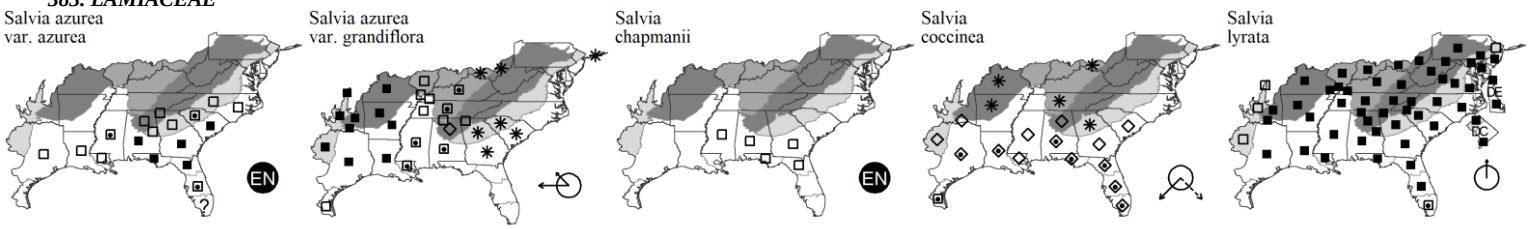
Salvia azurea Michaux ex Lamarck *var.* ***grandiflora*** Bentham. BLUE SAGE, PRAIRIE AZURE SAGE. **Hab:** Prairies, woodlands over calcareous or mafic rocks. **Dist:** IL, IA, NE, and e. CO south to nw. GA, n. AL, ne. MS, LA, se. TX, and c. TX. **Phen:** (May-) Aug-Oct; Oct-Nov. **Syn:** = Ar, F, GrPl, K1, K3, K4, Mi, NcTx, NE, NY, Tn, Tx; = *Salvia pitcheri* Torrey ex Bentham – C, G; < *Salvia azurea* – Il, S.

Salvia chapmanii A. Gray. CHAPMAN'S SAGE. **Hab:** Calcareous glades, calcareous woodlands. **Dist:** N. FL, sw. GA, s. AL, and ec. MS. **Phen:** Sep. **Tax:** This species has usually been included in *S. urticifolia*, but warrants specific status (Keener & Diamond in Weakley et al. 2018a). **Comm:** {synonymy incomplete, add Z}. **Syn:** = K1, K4, S, Keener & Diamond (2018) in Weakley et al (2018a); < *Salvia urticifolia* Linnaeus – Fl6, K3, WH3.

Salvia coccinea P.J. Buc'hoz ex Etlinger. SCARLET SAGE, BLOOD SAGE, COUNTRY BELLE, BANDERILLA COLORADO, MIRTO. **Hab:** Hammocks, longleaf pine sandhills, disturbed areas. **Dist:** The species is certainly only an introduction in the more northern parts of its distribution in our region. Whether it is native in the more southern parts of the region is uncertain and disputed. **Phen:** (Feb-) May-Nov. **Syn:** = Ar, Bah, Fl6, G, K1, K3, K4, Meso4.2, NcTx, RAB, S, Tx, WH3. NatureServe G5? (Secure).

Salvia lyrata Linnaeus. LYRELEAF SAGE, CANCER-WEED. **Hab:** Hammocks, lawns, roadsides, dry to mesic woodlands and forests, floodplains, calcareous barrens. **Dist:** CT west to MO, south to FL and TX. **Phen:** (Dec-) Apr-May; (Feb-) May-Jul. **Comm:** A common and familiar "native weed". **Syn:** = Ar, C, F, Fl6, G, GrPl, Il, K1, K3, K4, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV. NatureServe G5 (Secure).

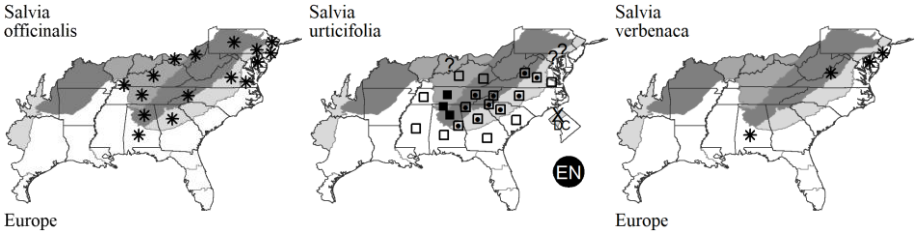
Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated



* ***Salvia officinalis*** Linnaeus. GARDEN SAGE. **Hab:** Cultivated as a garden herb, rarely persistent. **Dist:** Native of Europe. **Syn:** = C, F, G, K1, K3, K4, Mi, NE, NY, WV, Stace (2010). NatureServe GNR (Not Yet Ranked).

Salvia urticifolia Linnaeus. NETTLE-LEAF SAGE. **Hab:** Woodlands and glades, usually over mafic or calcareous rocks. **Dist:** N. VA (and allegedly MD and s. PA) west to w. KY (and allegedly a single county in IN), south to SC, c. GA, c. AL, and nw. MS. Records from further south (sw. GA, Panhandle FL, s. AL, and ec. MS) represent *S. chapmanii*. **Phen:** Apr-Jun; May-Jul. **Tax:** See discussion of this and the related *S. chapmanii* in Keener & Diamond in Weakley et al. (2018a). **Comm:** Quite showy when in flower. **Syn:** = K1, S, Keener & Diamond (2018) in Weakley et al (2018a); < *Salvia urticifolia* Linnaeus – C, F, G, K3, K4, RAB, Va, W, WH3.

* ***Salvia verbenaca*** Linnaeus. WILD CLARY. **Hab:** Fields and disturbed areas. **Dist:** Native of Europe. **Tax:** The correct spelling of the epithet is 'verbenaca'. **Syn:** = K4; = *Salvia verbenacea* Linnaeus – C, G, K1, K3, S; > *Salvia verbenaca* Linnaeus ssp. *horminioides* (Pourret) Nyman – Stace (2010); > *Salvia verbenaca* Linnaeus ssp. *verbenaca* – Stace (2010). NatureServe GNR (Not Yet Ranked).



Scutellaria Linnaeus 1753 (SKULLCAP)

Contributed by Bruce A. Sorrie, Derick B. Poindexter, and Keith A. Bradley

A genus of about 350-360 species, herbs and shrubs, almost cosmopolitan. References: Bradley (2020) in Weakley et al (2020); Collins (1976); Epling (1942); Harley et al. in Kadereit (2004); Leonard (1927); Pittman (1988); Poindexter & Weakley (2018a) in Weakley et al (2018a).

Identification Notes: Recognizable by the "tractor seat"-shaped protuberance (scutellum) on the upper calyx. To discern annulate vs. non-annulate species, the corolla must be dissected to determine if a sharply defined ring of hairs (annulus) exists inside the corolla tube at the base of the calyx. *Note: in key break 26b, corollas of *S. alabamensis* may reach 22 mm long; its calyces are both stipitate glandular and punctate glandular, thus differing from *S. arenicola* and *S. mellichampii*. In key break 26a, corollas of *S. mellichampii* may be as short as 21 mm; its calyces are punctate glandular only, unlike *S. incana* var. *australis* which has both punctate glands and stipitate glands on calyces.

1 Flowers axillary (the bracts subtending flowers resembling stem leaves in size and shape); stem leaves sessile or petioles < 4 mm.
  4 Lower leaves hastate; plants glabrous ..... ***Scutellaria racemosa***
  4 Lower leaves ovate or deltoid-ovate; plants puberulent or pubescent.
    5 Stems glabrate, the pubescence ascending, curled or appressed, eglandular.
      6 Median leaves 10-15 mm long; corolla 6.5-9 mm long ..... ***Scutellaria leonardii***
      6 Median leaves 20-40 mm long; corolla 8-10 mm long ..... ***Scutellaria nervosa***
    5 Stems obviously hairy, the pubescence spreading, glandular, eglandular, or a mixture of both.
      7 Mid-stem leaves sessile; [widespread, southward to the FL panhandle].
        8 Upper stems antrorse eglandular and spreading stipitate-glandular; leaf veins tending to anastomose along margins, lower surfaces with only stipitate-glandular hairs, or nearly so; fresh plants inodorous ..... ***Scutellaria australis***
        8 Upper stems retrorse or spreading eglandular and/or stipitate-glandular; leaf veins usually unbranched along margins, lower surfaces clothed like stem with glandular and/or eglandular hairs; fresh plants with strong turpentine odor ..... ***Scutellaria parvula***
      7 Mid-stem leaves petiolate.
        ..... ***Scutellaria drummondii var. drummondii***
1 Flowers in racemes (bracts subtending flowers much reduced, not leaf-like); stem leaf petioles > 4 mm.
  10 Corolla tube interior lacking a sharply defined ring of hairs (annulus) at the bend of the tube near the mouth of the calyx (= non-annulate).
    11 Racemes secund.
      ..... ***Scutellaria lateriflora***
    11 Racemes not secund, flowers on more than one side of the axis.
      15 Margins of lower lip cleft and erose; lower lip with large lateral auricles (flabelliform) ..... ***Scutellaria ovata var. bracteata***
      15 Margins of lip entire; lip undulate or weakly auriculate.
        ..... ***Scutellaria ovata var. ovata***
  10 Corolla tube interior with a sharply defined ring of hairs (annulus) at the bend of the tube near the mouth of the calyx (= annulate).
    17 At least some upper leaves entire.
      20 Corolla glabrous, lower lip with an immaculate the white central band; leaf bases long-attenuate ..... ***Scutellaria glabriuscula***
      20 Corolla short pilose, lower lip with blue spots or lines on the white central band; leaf bases cuneate to deltoid.

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

..... ***Scutellaria integrifolia***

17 All leaves serrate or crenate.
22 Second internode below the base of the inflorescence stipitate glandular.
23 Calyces stipitate glandular.
24 Corollas 14-23 mm long..... ***Scutellaria elliptica var. hirsuta***
24 Corollas 24-39 mm long..... ***Scutellaria pseudoserrata***
23 Calyces not stipitate glandular.
..... ***Scutellaria mellichampii***
22 Second internode below the base of the inflorescence eglandular.
26 Corollas > 21 mm long*.
..... ***Scutellaria mellichampii***
26 Corollas < 21 mm long*.
29 Calyces densely to sparsely canescent, eglandular or with punctate glands (stipitate glands may also be present).
31 Stems canescent; calyces and bracts densely punctate glandular ..... ***Scutellaria incana var. australis***
31 Stems glabrate (rarely puberulent); calyces and bracts eglandular ..... ***Scutellaria incana var. punctata***
29 Calyces pilose with spreading stipitate glandular hairs.
32 Bracts with stipitate glands.
..... ***Scutellaria elliptica var. elliptica***
32 Bracts without stipitate glands; leaves densely punctate glandular.
..... ***Scutellaria alabamensis***

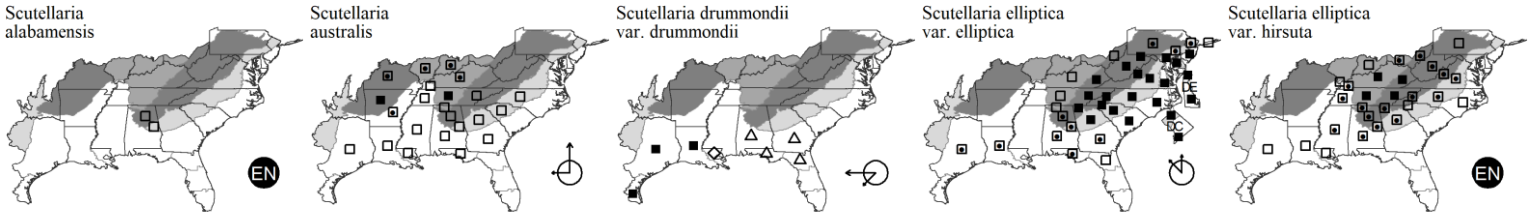
Scutellaria alabamensis Alexander. ALABAMA SKULLCAP. **Hab:** Dry woodlands. **Dist:** Endemic to c. and n. AL. **Phen:** Early Jun-early Jul. **Syn:** = K1, K3, K4, S, Collins (1976), Epling (1942). NatureServe G2 (Imperiled).

Scutellaria australis (Fassett) Epling. SOUTHERN SKULLCAP. **Hab:** Bottomland forests, rocky woodlands, glades, barrens, prairies. **Dist:** NC, s. WV, KY, IN, IL, MO, and KS, south to Panhandle FL, LA, and e. TX. **Phen:** May-July. **Syn:** = G, Il, WV, Epling (1942); = *Scutellaria parvula* Michaux var. *australis* Fassett – Ar, F, GrPl, K1, NcTx, NE, Tn, Tx; < *Scutellaria parvula* Michaux – Fl6, K3, K4, RAB, S, WH3. NatureServe G4T4? (Apparently Secure).

Scutellaria drummondii Bentham *var*. ***drummondii***. DRUMMOND'S SKULLCAP. **Hab:** Blackland prairies, dry disturbed areas. **Dist:** GA west to LA and TX, south into Mexico. First reported for GA by Lee Echols in 2005 (pers. comm.). **Phen:** Apr-May. **Syn:** = K1, K3, K4, NcTx; < *Scutellaria drummondii* Bentham – Fl6, GrPl, Tx, WH3. NatureServe G4G5TNR (Not Yet Ranked).

Scutellaria elliptica Muhlenberg ex Sprengel *var*. ***elliptica***. HAIRY SKULLCAP. **Hab:** Mesic to dry forests. **Dist:** NY, KY, and IN, south to s. GA, ne. and Panhandle FL, MS, LA, and e. TX. **Phen:** Late May-Jun; Jun-Jul. **Tax:** See discussion in Poindexter & Weakley (2018a). **Syn:** = Ar, C, F, G, K1, NY, Pa, Tn, Tx, Va, W, WV, Collins (1976), Weakley et al (2018a); = *Scutellaria ovalifolia* ssp. *mollis* Epling – Epling (1942); < *Scutellaria elliptica* – Fl6, Il, K3, RAB, Tx, WH3; < *Scutellaria elliptica* Muhlenberg ex Sprengel var. *elliptica* – K4; < *Scutellaria ovalifolia* – S.

Scutellaria elliptica Muhlenberg ex Sprengel *var*. ***hirsuta*** (Short & Peter) Fernald. KENTUCKY SKULLCAP. **Hab:** Mesic to dry forests. **Dist:** PA and MI south to w. VA, w. NC, nw. GA, s. AL, and e. TX. **Phen:** Late May-Jun; Jun-Jul. **Tax:** See discussion in Poindexter & Weakley (2018a). **Syn:** = C, F, G, K1, Mi, Pa, Tn, Tx, Va, W, WV, Collins (1976); = *Scutellaria ovalifolia* ssp. *hirsuta* (Short & Peter) Epling – Epling (1942); < *Scutellaria elliptica* – Il, K3, RAB, Tx; < *Scutellaria elliptica* Muhlenberg ex Sprengel var. *elliptica* – K4; < *Scutellaria ovalifolia* – S.



Scutellaria glabriuscula Fernald. GEORGIA SKULLCAP, GULF SKULLCAP. **Hab:** Longleaf pine sandhills. **Dist:** Sw. GA and w. FL Panhandle west through s. AL to s. MS, an East Gulf Coastal Plain endemic. **Phen:** Late Sep-early Nov. **Syn:** = Fl6, K1, K3, K4, S, WH3, Collins (1976). NatureServe G2 (Imperiled).

Scutellaria incana Biehler *var*. ***australis*** (Epling) J.L. Collins ex D.B. Poindexter & Weakley. **Hab:** Longleaf pine sandhills, other dry sandy open woods or woodland margins. **Dist:** Gulf Coastal Plain of sw. GA, nw. FL, s. AL, and c. MS; disjunct to Brunswick County, NC. **Phen:** Jul-Aug. **Tax:** See Weakley et al. (2018a) for detailed discussion. **Syn:** = Weakley et al (2018a); < *Scutellaria incana* – Fl6, K3, K4, WH3.

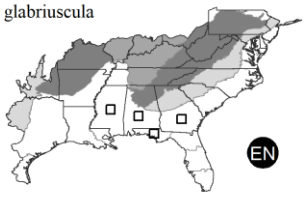
Scutellaria incana Biehler *var*. ***punctata*** (Chapman) C. Mohr. **Hab:** Dry to mesic forests and woodlands. **Dist:** A broad southern Appalachian endemic: sw. VA and WV south through w. NC, nw. SC, e. TN to n. GA and ne. AL. **Phen:** Mid Jul-mid Aug. **Tax:** See Weakley et al. (2018a) for detailed discussion. **Syn:** = C, F, G, K1, Tn, W, WV, Collins (1976), Weakley et al (2018a); < *Scutellaria incana* – RAB, S, Va; ? *Scutellaria punctata* (Chapman) Leonard – Epling (1942). NatureServe G5T4T5 (Apparently Secure).

Scutellaria integrifolia Linnaeus. NARROWLEAF SKULLCAP. **Hab:** Wet pine savannas, pine flatwoods, seeps in forests, bottomlands, other moist sites, ditches. **Dist:** MA south to c. peninsular FL, west to e. TX, northward in the interior to OH, KY, and TN. **Phen:** May-Jul; Jul-Aug. **Syn:** = Ar, C, Fl6, G, GW2, K1, K3, K4, NE, NY, Pa, S, Tn, Va, W, WH3, Collins (1976); > *Scutellaria integrifolia* var. *hispida* Bentham – F, RAB, Tx; > *Scutellaria integrifolia* var. *integrifolia* – F, RAB, Tx. NatureServe G5 (Secure).

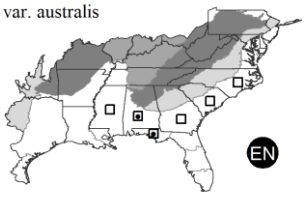
Scutellaria lateriflora Linnaeus. MAD-DOG SKULLCAP, TALL BLUE SKULLCAP. **Hab:** Alluvial forests, bogs, seeps, marshes, shores. **Dist:** NL (Newfoundland) west to BC, south to GA, Panhandle FL, and CA. **Phen:** Jul-Nov. **Syn:** = Ar, C, F, Fl6, G, GrPl, GW2, Il, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV; > *Scutellaria lateriflora* var. *lateriflora* – K1, K3, K4. NatureServe G5T5 (Secure).

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

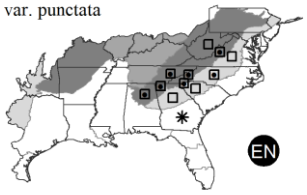
Scutellaria glabriuscula



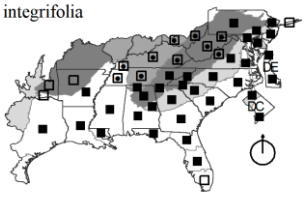
Scutellaria incana var. australis



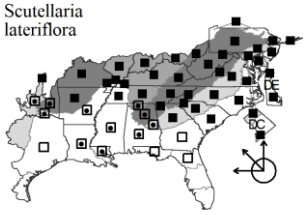
Scutellaria incana var. punctata



Scutellaria integrifolia



Scutellaria lateriflora



Scutellaria leonardii Epling. SHALE-BARREN SKULLCAP, GLADE SKULLCAP. **Hab:** Limestone glades, diabase barrens, shale barrens and woodlands, dry sandy soils. **Dist:** MA west to MI and ND, south to se. VA, nc. NC, AR, and OK. **Phen:** Apr-Jun; May-Jul. **Syn:** = C, G, Il, Pa, Va, W, WV, Epling (1942); = *Scutellaria ambigua* Nuttall – S; = *Scutellaria parvula* Michaux var. *leonardii* (Epling) Fernald – Mi, Tx; = *Scutellaria parvula* Michaux var. *missouriensis* (Torrey) Goodman & C.A. Lawson – Ar, K1, NcTx, NE, NY, Tn; > *Scutellaria nervosa* Pursh var. *ambigua* (Nuttall) Fernald – F; < *Scutellaria parvula* Michaux – K3, K4, RAB; > *Scutellaria parvula* Michaux var. *leonardii* (Epling) Fernald – F, GrPl. NatureServe G4T4 (Apparently Secure).

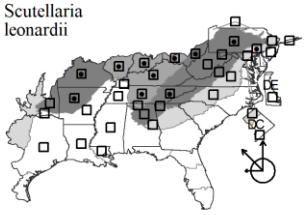
Scutellaria mellichampii Small. MELLICHAMP'S SKULLCAP. **Hab:** Sandy deciduous forests on river bluffs, maritime hammocks. **Dist:** C. and e. SC south to e. GA; disjunct in c. and ne. AL. **Phen:** Early Jul-Sep. **Tax:** See Bradley (2020) for details about this species. **Syn:** = K4, S, Bradley (2020) in Weakley et al (2020), Collins (1976), Epling (1942); = *Scutellaria incana* Biehler var. *australis* (Epling) J.L. Collins ex D.B. Poindexter & Weakley – K1, misapplied; < *Scutellaria mellichampii* Small – K3, RAB.

Scutellaria nervosa Pursh. BOTTOMLAND SKULLCAP, VEINED SKULLCAP. **Hab:** Alluvial forests, mesic to dry forests (especially over mafic or calcareous rocks). **Dist:** S. NY, s. MI, and e. IA, south to c. GA, n. AL, and (allegedly) LA. **Phen:** May-Jun; Jun-Jul. **Syn:** = Il, K1, K3, K4, Mi, NY, Pa, RAB, S, Tn, Va, W, WV; > *Scutellaria nervosa* var. *calvifolia* Fernald – C, F, G; > *Scutellaria nervosa* var. *nervosa* – C, F, G. NatureServe G5 (Secure).

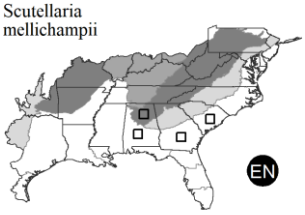
Scutellaria ovata Hill *var*. ***bracteata*** Bentham. **Hab:** Dry forests and woodlands, hammocks. **Dist:** MO south through AR and OK to c. TX and Mexico; disjunct eastward in s. MS, c. and n. AL, w. Panhandle FL, and nw. GA. **Phen:** May-Oct. **Syn:** = GrPl, Il; = *Scutellaria ovata* Hill ssp. *bracteata* (Bentham) Epling – Fl6, NcTx, W, WH3, Epling (1942); = *Scutellaria ovata* ssp. *bracteata* (Bentham) Epling var. *bracteata* – Pittman (1988); > *Scutellaria cuthbertii* Alexander – S; < *Scutellaria ovata* – Ar; > *Scutellaria ovata* Hill ssp. *bracteata* (Bentham) Epling – K1, Tx; > *Scutellaria ovata* Hill ssp. *cuthbertii* (Alexander) Epling – K1, Epling (1942); > *Scutellaria ovata* Hill ssp. *mexicana* Epling – K4, Tx, Epling (1942), invalid name; < *Scutellaria ovata* Hill ssp. *ovata* – K3; < *Scutellaria ovata* Hill var. *ovata* – C, F, G.

Scutellaria ovata Hill *var*. ***ovata***. HEARTLEAF SKULLCAP. **Hab:** Mesic to submesic forests and woodlands. **Dist:** VA, OH, s. MI, s. WI, and se. MN south to FL Panhandle, and e. TX. **Phen:** Jun-Jul. **Syn:** = Il; = *Scutellaria ovata* Hill ssp. *ovata* – K3, K4; = *Scutellaria ovata* Hill ssp. *ovata* var. *ovata* – Pittman (1988); < *Scutellaria ovata* – RAB, S, Tn; > *Scutellaria ovata* ssp. *calcarea* Epling – Epling (1942), invalid name; > *Scutellaria ovata* Hill ssp. *ovata* – K1, Va, W; > *Scutellaria ovata* Hill ssp. *venosa* Epling – K1, Epling (1942); > *Scutellaria ovata* ssp. *versicolor* (Nuttall) Epling – Epling (1942); > *Scutellaria ovata* var. *calcarea* (Epling) Gleason – C, G; >< *Scutellaria ovata* Hill var. *ovata* – C, F, G; > *Scutellaria ovata* var. *versicolor* (Nuttall) Fernald – C, G, GrPl, Mi, WV.

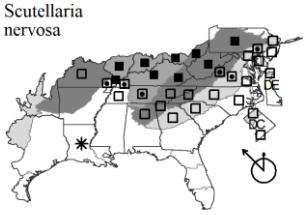
Scutellaria leonardii



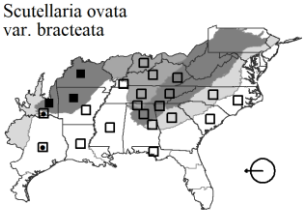
Scutellaria mellichampii



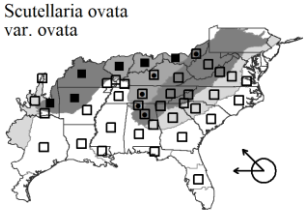
Scutellaria nervosa



Scutellaria ovata var. bracteata



Scutellaria ovata var. ovata

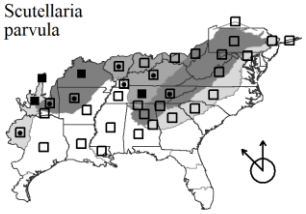


Scutellaria parvula Michaux. DWARF SKULLCAP. **Hab:** Upland prairies and rock outcrops. **Dist:** ME west to MN, south to GA and TX. In c. TN and scattered locations in e. TN (Chester, Wofford, & Kral 1997). Map is speculative because of past confusion of records. **Phen:** Apr-Jun. **Syn:** = G, Il, W, Epling (1942); = *Scutellaria parvula* var. *parvula* – Ar, C, F, GrPl, K1, Mi, NcTx, NE, NY, Tn, Tx; < *Scutellaria parvula* Michaux – K3, K4, RAB, S, WH3. NatureServe G4T4 (Apparently Secure).

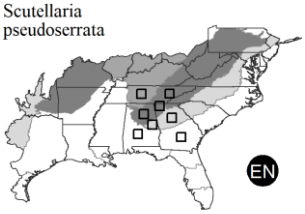
Scutellaria pseudoserrata Epling. **Hab:** Rich, rocky forests. **Dist:** Also in e. TN (Chester, Wofford, & Kral 1997), nc. and c. GA (Jones & Coile 1988). Cultivated in Highlands, Macon Co., NC. **Phen:** Mad May-Jun. **Syn:** = K1, K3, K4, Tn, W, Collins (1976), Epling (1942). NatureServe G3 (Vulnerable).

* ***Scutellaria racemosa*** Persoon. SOUTH AMERICAN SKULLCAP. **Hab:** Landscaped areas, disturbed areas. **Dist:** Native of South America. Reported from FL, AL, GA, and SC by Kral (1981). Krings & Neal (2001a, 2001b) report it for Chatham Co., NC and discuss its occurrence in se. United States. **Phen:** May-Sep. **Syn:** = Ar, Fl6, GW2, K1, K3, K4, Meso4.2, WH3. NatureServe GNR (Not Yet Ranked).

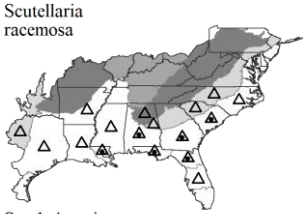
Scutellaria parvula



Scutellaria pseudoserrata

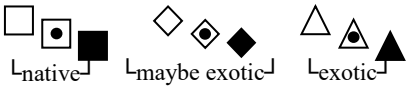


Scutellaria racemosa



South America

Key to Map Symbology:



←rare ←uncommon ←common (see introduction for more)

* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable

X : extirpated

Stachys Linnaeus 1753 (HEDGE-NETTLE)

Contributed by John B. Nelson, Gary P. Fleming, and Derick B. Poindexter

A genus of about 300 species, herbs and shrubs, mainly temperate, nearly cosmopolitan (except Australia and New Zealand). References: Fleming, Nelson, & Townsend (2011); Floden (2016); Harley et al. in Kadereit (2004); Keener & Davenport (2016); Mulligan & Munro (1989); Nelson & Fairey (1979); Nelson & Rayner (2014); Nelson (1981); Nelson (2008); Poindexter & Nelson (2011); Pringle (2002).

Unkeyed taxa: *Stachys alabamica*, *Stachys nelsonii*

3 Annuals from fibrous roots, typically freely branching from the base or from lower nodes; leaf blades 1-5 cm long, with rounded or obtuse apices (except acute to acuminate in *S. annua*); [aliens, except *S. agraria*].
..... ***Stachys agraria***

3 Perennials from rhizomes, not branching in the lower portion (unless damaged); leaf blades often > 5 cm long, with acute apices; [natives, except *S. floridana* and *S. palustris*].

6 Petioles (at least some of those of the principal stem leaves) > 1/5 as long as the blades.

7 Calyx strongly glandular with atomiferous glands or gland-tipped hairs, or both.

8 Calyx lobes narrowly lanceolate, about as long as the calyx tube; leaf blades lance-ovate to lanceolate, < 3 cm wide; stem angles glabrate to short retrorse pubescent; root tips with moniliform tubers; [native and weedy species, mostly of the Coastal Plain]..... ***Stachys floridana***

8 Calyx lobes deltoid to deltoid-lanceolate, shorter than the calyx tube; leaf blades broadly cordate-ovate, usually > 3 cm wide; stem angles hispid; roots without tubers; [native species of rich mountain forests].

11 Calyx lobes deltoid; leaves broadly rounded with a cordate base and crenulate margins ..... ***Stachys cordata***

11 Calyx lobes deltoid-lanceolate; leaves various. ..... ***Stachys nuttallii***

7 Calyx sparsely glandular or eglandular.

12 Leaves ovate to broadly ovate, deeply cordate at base..... ***Stachys cordata***

12 Leaves oblong, lanceolate, elliptic, or ovate-elliptic, not cordate or only slightly so.
..... ***Stachys tenuifolia***

6 Petioles < 1/5 as long as the blade or absent.

16 Calyx lobes lanceolate, more than half as long as the tube; leaf blades velvety-pubescent; flowers 6 per verticil.
..... ***Stachys palustris***

16 Calyx lobes deltoid, no more than half as long as the calyx tube; leaf blades pubescent but never velvety; flowers 8 or more per verticil.
..... ***Stachys nuttallii***

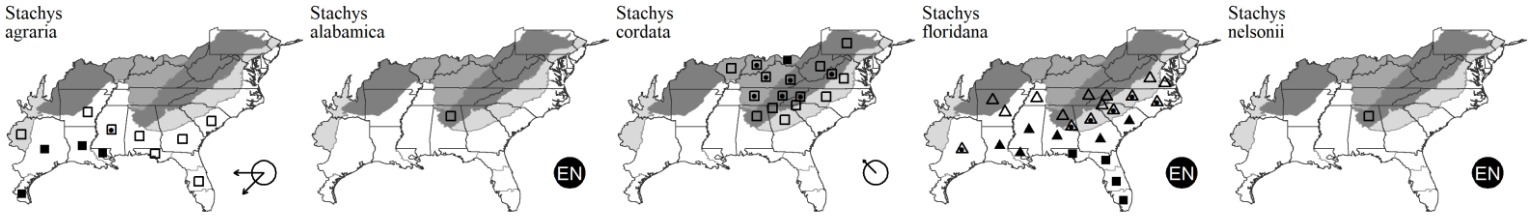
Stachys agraria Chamisso & Schlechtendal. MOUSE'S-EAR, SHADE BETONY. **Hab:** Calcareous hammocks, ditches, damp forests. **Dist:** E. SC south to s. FL, west to sw. AR and c. and s. TX; Mexico south to Guatemala. **Phen:** (Feb-) Apr-May. **Syn:** = Meso4.2, Fleming, Nelson, & Townsend (2011); = *Stachys crenata* Rafinesque – Ar, Fl6, K1, K3, K4, NcTx, Tx, WH3. NatureServe G5 (Secure).

Stachys alabamica B.R. Keener & L.J. Davenport. ALABAMA HEDGE-NETTLE. **Syn:** = Keener & Davenport (2016). NatureServe G1 (Critically Imperiled).

Stachys cordata Riddell. HEART-LEAVED HEDGE-NETTLE. **Hab:** Moist forests, especially alluvial bottomlands or over calcareous rocks. **Dist:** NY west to IL, south to SC, GA, AL, and AR. **Phen:** Jun-Aug; Sep-Oct. **Tax:** Primarily montane, but extending east to Stokes County, NC, and Campbell County, VA. See Pringle (2002) for a discussion of nomenclature. Floden (2015) recognizes *S. salvioides* as separate from *S. cordata*. **Syn:** = C, Il, K3, K4, Va, Fleming, Nelson, & Townsend (2011), Poindexter & Nelson (2011); = *Stachys riddellii* House – F, G; > *Stachys cordata* Riddell – S, Floden (2016); < *Stachys nuttallii* Shuttleworth ex Bentham – K1, Pa, W, Nelson (1981); > *Stachys salvioides* Small – S, Floden (2016).

Stachys floridana Shuttleworth ex Bentham. FLORIDA BETONY, RATTLESNAKE-WEED. **Hab:** Disturbed sites, roadsides, gardens; probably not native northward of Florida. **Dist:** Native from n. FL and Panhandle FL south to s. FL. **Phen:** Apr-Jul; May-Aug. **Comm:** The common name "Rattlesnake-weed" refers to the moniliform rhizomes. **Syn:** = Ar, Fl6, GW2, K1, K3, K4, RAB, S, Tn, Tx, Va, WH3, Fleming, Nelson, & Townsend (2011), Floden (2016), Nelson (1981). NatureServe G5? (Secure).

Stachys nelsonii B.R. Keener & L.J. Davenport. NELSON'S HEDGE-NETTLE. **Syn:** = K4, Keener & Davenport (2016). NatureServe G1 (Critically Imperiled).



Stachys nuttallii Shuttleworth ex Bentham. NUTTALL'S HEDGE-NETTLE. **Hab:** Moist forests, especially alluvial bottomlands or over calcareous rocks. **Dist:** {distribution} Primarily montane, but extending east to Stokes County, North Carolina. **Phen:** Jun-Aug; Sep-Oct. **Comm:** See Pringle (2002) for a discussion of nomenclature. **Syn:** = K1, Pa, Tn, W, Fleming, Nelson, & Townsend (2011), Floden (2016), Nelson (1981), Poindexter & Nelson (2011); = *Stachys riddellii* House – F, G; < *Stachys clingmanii* Small – RAB; ? *Stachys cordata* Riddell – K4; > *Stachys nuttallii* Shuttleworth ex Bentham – S; > *Stachys salvioides* Small – S.

* ***Stachys palustris*** Linnaeus. **Hab:** Disturbed areas. **Dist:** Native of Europe. Introduced mainly in ne. North America, south to MD, PA, NJ. **Phen:** Jul-Aug. **Syn:** = Il, K1, K3, Mi, NE, NY, Va, Fleming, Nelson, & Townsend (2011); > *Stachys palustris* var. *palustris* – C, F, G, Pa.

Stachys tenuifolia Willdenow. SMOOTH HEDGE-NETTLE. **Hab:** Wooded alluvial river bottoms, swamp forests, and roadsides. **Dist:** NB west to MB, south to Panhandle FL and e. TX. **Phen:** Jun-Aug; Sep-Oct. **Syn:** = Ar, C, G, GrPl, Il, Mi, NcTx, RAB, S, Tn, Tx, Va, Fleming, Nelson, & Townsend

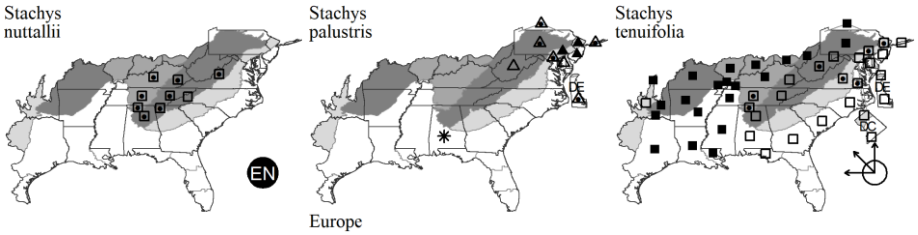
Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more)

* : waif
EN : endemic
H : historic

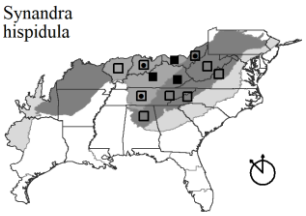
N : no
P : planted
? : questionable

X : extirpated

(2011), Floden (2016), Poindexter & Nelson (2011); = *Stachys tenuifolia* var. *tenuifolia* – W; < *Stachys tenuifolia* Willdenow – GW2, K3, K4, Pa; > *Stachys tenuifolia* var. *perlonga* Fernald – F, WH3, Nelson (1981); > *Stachys tenuifolia* var. *platyphylla* Fernald – F; > *Stachys tenuifolia* var. *tenuifolia* – F, Nelson (1981).



Synandra Nuttall 1818 (SYNANDRA)



A monotypic genus, an herb, of e. North America. References: Cantino (1985); Harley et al. in Kadereit (2004).

Synandra hispidula (Michaux) Baillon. SYNANDRA, GYANDOTTE BEAUTY. **Hab:** Moist, rich forests. **Dist:** A broad Appalachian endemic: s. OH west to s. IL, south to sw. VA, w. NC, and ne. AL. **Phen:** Late Apr-May; May-Jun. **Syn:** = C, F, G, Il, K1, K3, K4, RAB, S, Tn, Va, W, WV. NatureServe G4 (Apparently Secure).

Teucrium Linnaeus 1753 (GERMANDER)

A genus of about 100-250 species, herbs and shrubs, nearly cosmopolitan in distribution. References: Harley et al. in Kadereit (2004); McClintock & Epling (1946); Shinners (1963).

1 Leaves (at least the better-developed) deeply pinnatifid-lobed, the lobes extending > ½ way to the midvein; corolla white or pink, with pink or purple markings; flowers axillary to well-developed leaves. ..... ***Teucrium cubense var. cubense***

1 Leaves entire or serrate; corolla lavender with dark purple markings; flowers in a terminal raceme, each subtended by a small bract clearly different than the main cauline leaves.

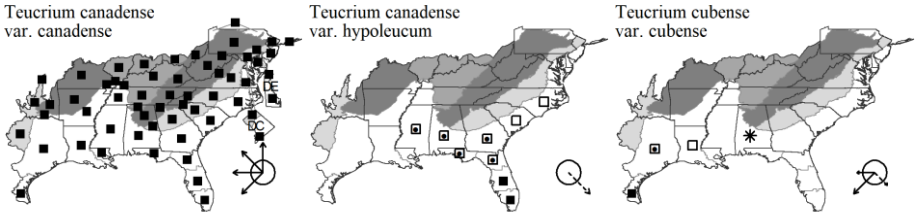
5 Midvein on lower surface of leaves with loose hairs, or if somewhat appressed, antrorse or retrorse; leaves grayish-green or gray beneath; [widespread in our area] ..... ***Teucrium canadense var. canadense***

5 Midvein on lower surface of leaves with closely appressed retrorse hairs towards the base of the leaf; leaves silvery beneath; [largely or entirely on the se. United States Coastal Plain] ..... ***Teucrium canadense var. hypoleucum***

Teucrium canadense Linnaeus *var.* ***canadense***. COMMON GERMANDER. **Hab:** Rich bottomlands, prairies, marshes. **Dist:** Mainly coastal, NS south to FL, west to TX and OK. **Phen:** Jun-Sep. **Syn:** = Ar, GrPl, Il, K3, K4, NE, Tx; < *Teucrium canadense* – Fl6, GW2, NcTx, NY, RAB, Tn, Va, W, WH3; > *Teucrium canadense* – S; >< *Teucrium canadense* var. *angustatum* A. Gray – McClintock & Epling (1946); > *Teucrium canadense* Linnaeus var. *canadense* – C, F, G, K1, Pa, McClintock & Epling (1946); > *Teucrium canadense* var. *virginicum* – C, F, G, K1; > *Teucrium littorale* E.P. Bicknell – S.

Teucrium canadense Linnaeus *var.* ***hypoleucum*** Grisebach. SOUTHERN GERMANDER. **Hab:** Marshes. **Dist:** E. NC south to FL, west to s. MS. **Phen:** Jun-Jul. **Syn:** = K1, K3, K4; = *Teucrium canadense* var. *nashii* (Kearney) Shinners – Shinners (1963); = *Teucrium nashii* Kearney – S; < *Teucrium canadense* – GW2, RAB, W, WH3; >< *Teucrium canadense* var. *angustatum* A. Gray – McClintock & Epling (1946). NatureServe G5TNR (Not Yet Ranked).

Teucrium cubense Jacquin *var.* ***cubense***. **Hab:** Coastal areas, eastwards (AL) as a ballast waif, not recently seen. **Dist:** Native of West Indies, TX to Mexico. **Syn:** = K1, Tx; = *Teucrium cubense* ssp. *chamaedrifolium* – K3, McClintock & Epling (1946); = *Teucrium cubense* ssp. *cubense* – K2; < *Tuecrium cubense* – Bah, K4, Meso4.2. NatureServe G4G5T4T5 (Apparently Secure).



Trichostema Linnaeus 1753 (BLUE CURLS)

A genus of about 18 species, shrubs, annual and perennial herbs, of temperate North America (especially diverse in w. North America, with a second center of diversity in se. North America). References: Harley et al. in Kadereit (2004); Lewis (1945); McClelland & Weakley (2019) in Weakley et al (2019a).

1 Calyx lobes essentially equal; stamens straight, < 10 mm long; leaves acute to slightly acuminate, the two main lateral veins reconnecting to the midvein near the leaf tip; [section *Orthopodium*] ..... ***Trichostema brachiatum***

1 Calyx strongly bilabiate; stamens strongly arched, 12-20 mm long; leaves obtuse, the two main lateral veins not reconnecting to the midvein; [section *Trichostema*].

Key to Map Symbology: □ native; ◇ maybe exotic; △ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

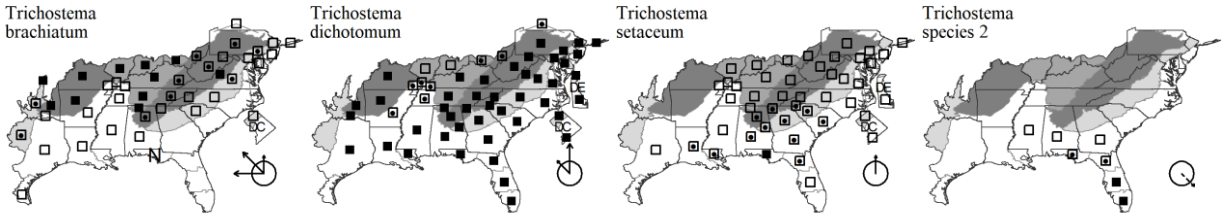
2 Plants annual; larger leaves 3-7 cm long (including the petiole); plants with long internodes near the base, near-basal branches absent, the best-developed branches from the mid or upper stem; hairs on the upper stem long (0.5-2.0 mm long) or short (0.1-0.4 mm long); [collectively widespread, in a wide variety of habitats, primarily inland, though occasionally occurring as a weed in coastal areas].
3 Leaves 2.5-4× as long as wide; longer hairs of the upper stem (0.3-) 0.5-2.0 mm long..... ***Trichostema dichotomum***
3 Leaves 5-15× as long as wide; longer hairs of the upper stem 0.1-0.3 (-0.4) mm long..... ***Trichostema setaceum***
2 Plants perennial; larger leaves 1-4 cm long (including the petiole); plants with short internodes near the base, near-basal branches well-developed, these often branching again (except in *T. suffrutescens*); hairs on the upper stem short (0.1-0.4 mm long); [of the Coastal Plain].
..... ***Trichostema species 2***

Trichostema brachiatum Linnaeus. GLADE BLUE CURLS, FALSE PENNYROYAL. **Hab:** Shale barrens, outcrops of calcareous or mafic rock, diabase barrens, calcareous dry prairies, disturbed rocky areas. **Dist:** VT and s. ON west to MN and NE, south to c. and w. NC, nc. SC, nw. GA, AL, TX, and AZ. **Phen:** (Jul-) Aug-Sep (-Oct). **Syn:** = Ar, GrPl, K3, K4, Mi, NcTx, NE, NY, Pa, Tx, Va, W, Lewis (1945); = *Isanthus brachiatus* (Linnaeus) Britton, Sterns, & Poggenburg – C, F, Il, K1, S, Tn, WV; = n/a – RAB; > *Isanthus brachiatus* var. *brachiatus* – G; > *Isanthus brachiatus* var. *linearis* Fassett – G. NatureServe G5 (Secure).

Trichostema dichotomum Linnaeus. COMMON BLUE CURLS. **Hab:** Dry woodlands, disturbed areas, thin soils around rock outcrops. **Dist:** ME, ON, QC, MI, and IA, south to FL and TX. **Phen:** Aug-Nov. **Syn:** = Ar, C, Il, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WV, McClelland & Weakley (2019) in Weakley et al (2019a); = *Trichostema dichotomum* var. *dichotomum* – G; < *Trichostema dichotomum* Linnaeus – Fl6, K1, K3, K4, WH3; > *Trichostema dichotomum* var. *dichotomum* – F; >< *Trichostema dichotomum* var. *puberulum* Fernald & Griscom – F.

Trichostema setaceum Houttuyn. NARROWLEAF BLUE CURLS. **Hab:** Thin soils around rock outcrops, especially granite flatrocks, dry sandy soils of the Coastal Plain. **Dist:** CT west to OH, south to FL and TX, primarily on the Coastal Plain. **Phen:** Aug-Nov. **Syn:** = C, F, Fl6, Il, K1, K3, K4, NE, NY, Pa, RAB, Tn, Tx, Va, W, WH3, Lewis (1945), McClelland & Weakley (2019) in Weakley et al (2019a); = *Trichostema dichotomum* var. *lineare* (Walter) Pursh – G; = *Trichostema lineare* Walter – S. NatureServe G5 (Secure).

Trichostema species 2. FLORIDA BLUE CURLS. **Hab:** Maritime hammocks, maritime dunes, grasslands, and coastal scrub. **Dist:** E. GA around the FL peninsula west to s. MS; Bahamas. **Phen:** Aug-Nov. **Syn:** = McClelland & Weakley (2019) in Weakley et al (2019a); < *Trichostema dichotomum* Linnaeus – Bah, Fl6, K4, WH3, Lewis (1945), ("pubescence type B"); >< *Trichostema dichotomum* var. *puberulum* Fernald & Griscom – F; < *Trichostema suffrutescens* Kearney – Lewis (1945).



Vitex Linnaeus 1753 (CHASTE-TREE)

A genus of about 250 species, trees and shrubs, tropical to temperate. References: Chen & Gilbert (1994); de Kok (2007); Harley et al. in Kadereit (2004).

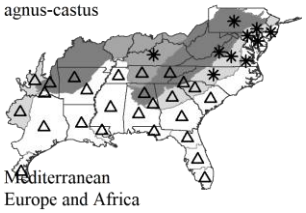
1 Leaves unifoliolate (or palmately 3-foliolate); leaflets orbicular or obovate; plant a sprawling and spreading shrub/vine ..... ***Vitex rotundifolia***
1 Leaves palmately (3-) 5-7-(-9) foliolate; leaflets lanceolate; plant an upright small tree.
3 Leaves (3-) 5-9-foliolate; fruits 2-3 mm in diameter; leaflet margins entire; inflorescence axes straight and stiff ..... ***Vitex agnus-castus***
3 Leaves 3-7-foliolate; fruits 3-5 mm in diameter; leaflet margins either entire or coarsely toothed; inflorescence axes lax and often curved.....
..... ***Vitex negundo***

* ***Vitex agnus-castus*** Linnaeus. CHASTE-TREE. **Hab:** Pastures, woodland edges, suburban woodlands. **Dist:** Native of Mediterranean Europe. **Phen:** Jun-Aug. **Syn:** = Ar, C, Fl6, G, GrPl, Meso4.2, Pa, RAB, S, WH3; > *Vitex agnus-castus* var. *agnus-castus* – K1, K3, K4, NcTx, Tx; > *Vitex agnus-castus* var. *caerulea* Rehder – K1, K3, K4, NcTx, Tx.

* ***Vitex negundo*** Linnaeus. CHINESE CHASTE-TREE. **Hab:** Disturbed areas, road shoulders. **Dist:** Native of China. Reported for FL, MS, LA, KY, with uncertain documentation. See Barger et al. (2012) for additional discussion of this species in AL. **Phen:** Jun-Jul; Aug-Nov. **Tax:** It is unclear what varieties are naturalizing in our region. The varieties may warrant recognition (see Chen & Gilbert 1994). **Syn:** = Fl6, WH3; > *Vitex negundo* var. *cannabifolia* (Siebold & Zuccarini) Handel-Mazzetti – Ar, K4, Chen & Gilbert (1994); > *Vitex negundo* var. *heterophylla* (Franchet) Rehder – K1, K3, NcTx, Tx, Chen & Gilbert (1994); > *Vitex negundo* var. *intermedia* (S.J. Pei) Moldenke – K1, K3, Tx; > *Vitex negundo* var. *negundo* – Ar, K1, K3, K4, Chen & Gilbert (1994).

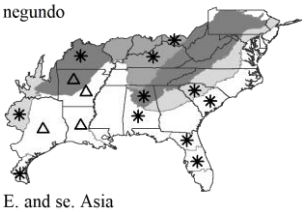
* ***Vitex rotundifolia*** Linnaeus f. BEACH VITEX, ROUNDLEAF CHASTE-TREE. **Hab:** Coastal dunes, planted for ornament and stabilization and now spreading aggressively as an invasive species. **Dist:** Native of e. Asia, se. Asia, and nearby islands. **Tax:** See Cousins et al. (2010) and Roecker & Socha (2004) for additional information. **Comm:** The runners are reported to reach 10m in length. **Syn:** = Fl6, K1, K3, K4, Va, Chen & Gilbert (1994); = n/a – RAB; = *Vitex trifolia* Linnaeus ssp. *littoralis* Steenis – de Kok (2007); < *Vitex trifolia* Linnaeus – WH3.

Vitex agnus-castus



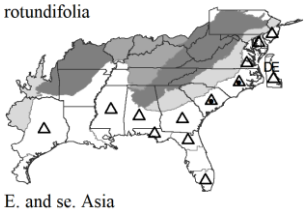
Mediterranean Europe and Africa

Vitex negundo



E. and se. Asia

Vitex rotundifolia



E. and se. Asia

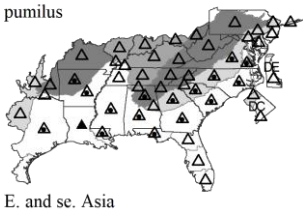
384. MAZACEAE Reveal 2011 (MAZUS FAMILY) [in LAMIALES]

A family of 2 genera and ca. 36 species, herbs, of e. Asia south to Australia. References: Rabeler & Freeman (2019a) in FNA17 (2019).

Mazus Loureiro 1790 (MAZUS)

A genus of ca. 33 species, herbs, of Asia to Australia. References: Keener (2019a) in FNA17 (2019); Pennell (1935); Pringle (2018).

Mazus pumilus



E. and se. Asia

* ***Mazus pumilus*** (Burman f.) Steenis. MAZUS. **Hab:** Lawns, sandy, rocky, or muddy shores and bars along lakes and rivers. **Dist:** Native of e. Asia. **Phen:** Dec-Oct. **Tax:** See Pringle (2018) for additional, detailed discussion of the species. **Syn:** = Ar, Bah, C, Fl6, FNA17, Il, K1, K3, K4, NcTx, NE, NY, Pa, Tn, Va, WH3, Pringle (2018); = *Mazus japonicus* (Thunberg) Kuntze – F, G, RAB, Tx, WV, Pennell (1935). NatureServe GNR (Not Yet Ranked).

385. PHRYMACEAE Schauer 1847 (LOPSEED FAMILY) [in LAMIALES]

As radically circumscribed, a family of about 20 genera and 240 species, herbs, cosmopolitan. See Tank et al. (2006) and Barker et al. (2012). References: Cantino in Kadereit (2004); Fischer in Kadereit (2004); Lee et al (1996); Rabeler, Freeman, & Elisens (2019b) in FNA17 (2019); Tank et al (2006); Thieret (1972); Wagstaff & Olmstead (1997).

2 Inflorescence of a solitary, terminal flower; bracteal leaves alternate ..... ***Mazaceae***
2 Inflorescence either of axillary flowers or of terminal and axillary spikes; bracteal leaves or bracts opposite.
3 Inflorescence of terminal and axillary spikes; flowers 6-8 mm long ..... ***Phryma***
3 Inflorescence of axillary flowers; flowers 17-30 mm long ..... ***Mimulus***

Mimulus Linnaeus 1753 (MONKEYFLOWER)

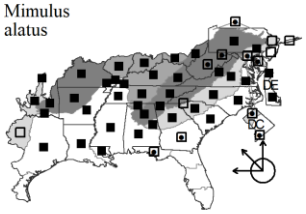
A genus of about 7-8 species, perennial herbs, of e. North America, Australia, s. and se. Asia, s. Africa, and Madagascar, as narrowed by Barker et al. (2012). References: Barker et al (2012); Grant (1924); Lowry et al (2019); Nesom (2019f) in FNA17 (2019); Nesom et al (2019); Pennell (1935).

1 Leaves petiolate (the upper sessile or nearly so); pedicels 2-15 mm long; stem with 4 winged angles ..... ***Mimulus alatus***
1 Leaves sessile; pedicels 20-45 mm long; stem with 4 rounded angles ..... ***Mimulus ringens var. ringens***

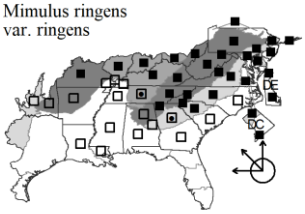
Mimulus alatus Aiton. WINGED MONKEYFLOWER. **Hab:** Marshes, bottomlands, ditches. **Dist:** MA and CT west to s. MI and s. IA, south to Panhandle FL and TX. **Phen:** Jul-Nov. **Syn:** = C, F, Fl6, FNA17, G, GrPl, GW2, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV, Grant (1924), Pennell (1935). NatureServe G5 (Secure).

Mimulus ringens Linnaeus *var*. ***ringens***. ALLEGHENY MONKEYFLOWER. **Hab:** Marshes, bogs, wet meadows, bottomlands. **Dist:** NS and QC west to SK, south to c. GA, LA, OK, and CO. **Phen:** Jun-Sep. **Syn:** = G, K1, K3, K4, Va; = *Mimulus ringens* var. *typica* – Pennell (1935); < *Mimulus ringens* – C, GrPl, GW2, Mi, NE, NY, Pa, RAB, S, Tn, Tx, W, WV; > *Mimulus ringens* var. *minthodes* (Greene) A.L. Grant – F, Il, Grant (1924); > *Mimulus ringens* Linnaeus var. *ringens* – F, Il, Grant (1924). NatureServe G5T5 (Secure).

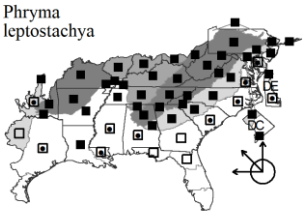
Mimulus alatus



Mimulus ringens var. ringens



Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



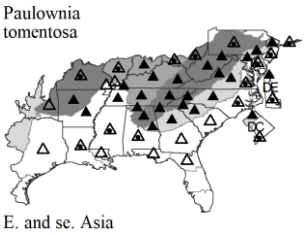
Phryma Linnaeus 1753 (LOPSEED)

A genus of 2 species, herbs, of e. North America and Asia. The disjunct populations in e. North America and e. Asia have been variously treated as species, varieties, or races; following the analysis of Nie et al. (2006), I opt to recognize the continentally disjunct populations as being morphologically and genetically different enough (and with a long enough time since separation) to warrant specific status. References: Barker et al (2012); Cantino in Kadereit (2004); Lee et al (1996); Nie et al (2006); Thieret (1972); Wagstaff & Olmstead (1997); Walker (2019) in FNA17 (2019).

Phryma leptostachya Linnaeus. AMERICAN LOPSEED. **Hab:** Bottomland forests, nutrient-rich slopes, mesic hammocks, in the Coastal Plain primarily in places underlain by coquina limestone ('marl') and essentially absent from the more acidic portions of the Coastal Plain. **Dist:** QC west to MB, south to ne. FL, Panhandle FL, and TX. **Phen:** May-Aug; Jul-Oct. **Tax:** An e. Asian relative has been variously treated as a separate species (as here), subspecies, variety, or merely form; the treatment here of the American and Asian plants as separable at species plant makes the Asian plant *P. asiatica* (H. Hara) O. Degener & I. Degener. **ID Notes:** The fruits "lopped down" against the stem are unmistakable. **Syn:** = *Phryma leptostachya* ssp. *leptostachya* – Fl6; = *Phryma leptostachya* var. *leptostachya* – FNA17, Va, Lee et al (1996); < *Phryma leptostachya* Linnaeus – Ar, C, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, RAB, S, Tn, Tx, W, WH3, WV; > *Phryma leptostachya* var. *confertifolia* Fernald – F; > *Phryma leptostachya* var. *leptostachya* – F.

386. PAULOWNIACEAE Nakai 1949 (PAULOWNIA FAMILY) [in LAMIALES]

A monogeneric family, trees, of e. Asia. There has been disagreement over whether *Paulownia* is best placed in Scrophulariaceae, Bignoniaceae, or its own family, Paulowniaceae; superficially it closely resembles *Catalpa* of the Bignoniaceae. Armstrong (1985) concluded that *Paulownia's* affinities lie with the Scrophulariaceae, based on floral anatomy, embryo morphology, and seed morphology. A molecular study by Spangler & Olmstead (1999) conclude that *Paulownia* is best retained in its own family. Manning (2000) concurs with its removal from Bignoniaceae. Molecular evidence supports that it is sister to the reconstituted Orobanchaceae. References: Freeman, Rabeler, & Elisens (2019b) in FNA17 (2019); Manning (2000); Spangler & Olmstead (1999).



Paulownia Siebold & Zuccarini 1835 (PRINCESS-TREE)

A genus of 6-7 species, trees, of e. Asia. References: Armstrong (1985); Freeman (2019i) in FNA17 (2019).

* ***Paulownia tomentosa*** (Thunberg) Siebold & Zuccarini ex Steudel. PRINCESS TREE, EMPRESS TREE, PAULOWNIA. **Hab:** Roadsides, disturbed areas, roadcuts, forests. **Dist:** Native of China. **Phen:** Apr-Jun; Sep-Oct. **Comm:** *Paulownia* is becoming a nuisance, showing an ability to invade pristine woodlands. The very soft wood is highly prized in Asia. The leaves of stump sprouts can reach very large sizes (at least to 80 cm long and wide). The woody capsules are persistent, and the densely tomentose, tan flower buds are conspicuous through the winter. **Syn:** = Ar, C, F, Fl6, FNA17, G, Il, K1, K3, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV. NatureServe GNR (Not Yet Ranked).

387. OROBANCHACEAE Ventenat 1799 (BROOMRAPE FAMILY) [in LAMIALES]

A family of about 96 genera and 2060 species, root-parasitic herbs lacking chlorophyll (Orobanchaceae sensu stricto) and chlorophyllose hemi-parasites (formerly placed in the Scrophulariaceae), of temperate and subtropical regions of the Northern Hemisphere (Manen et al. 2004). References: Fischer in Kadereit (2004); Freeman, Rabeler, & Elisens (2019d) in FNA17 (2019); Olmstead et al (2001); Schneeweiss (2013); Schneeweiss et al (2004); Schneider (2016); Thieret (1971).

1 Plants lacking chlorophyll (parasitic), variously pink, purple, brown, tan, orange, or white.
  2 Stem paniculately branched; flowers dimorphic, those low in the inflorescences small, pistillate, and fertile, those high in the inflorescence larger, apparently perfect but functionally staminate; [tribe *Orobancheae*] ..... ***Epifagus***
  2 Stem simple (rarely few-branched); flowers all alike.
    3 Calyx deeply cleft on the lower side; stamens exserted; [tribe *Rhinantheae*] ..... ***Conopholis***
    3 Calyx either nearly regular, or deeply cleft above and below into 2 lateral halves; stamens included; [tribe *Orobancheae*].
      4 Flowers solitary on a long pedicel (appearing as a scape, the true stem entirely underground or nearly so) ..... ***Aphyllon***
      4 Flowers several-many, sessile or subsessile in a dense spike.
        5 Calyx 5-lobed, the lobes subequal, all well-developed ..... ***Myzorrhiza***
        5 Calyx 2-4-lobed, rarely 5-lobed, but then the fifth lobe minute and much smaller than the other lobes. ..... ***Phelipanche***
1 Plants with chlorophyll (hemiparasitic), with foliage and stems normally green.
  7 Stem leaves alternate.
    8 Leaves pinnately lobed; [tribe *Rhinantheae*] ..... ***Pedicularis***
    8 Leaves entire or 3-5-lobed at the tip.
      9 Bracts subtending flowers orange, red, or yellow; calyx 4-lobed; capsule loculicidal; pedicel lacking bracteoles; seeds broad, wingless; [tribe *Castillejeae*]. ..... ***Castilleja***
      9 Bracts subtending flowers green; calyx 5-lobed; capsule septicidal and tardily also loculicidal; pedicel with 2 bracteoles; seeds narrow, winged; [tribe *Cymbarieae*] ..... ***Schwalbea***
  7 Stem leaves (at least the lower) opposite.
    10 Corolla salverform; [tribe *Buchnereae*].

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

.....***Buchnera***

10 Corolla various, but not salverform.
12 Calyx 4-lobed or essentially unlobed; corolla strongly bilabiate, the upper lip consisting of 2 petals almost wholly connate and strongly cucullate (hooded); corolla white or yellow; [tribe *Rhinantheae*].
.....***Pedicularis***
12 Calyx 5-lobed; corolla 5-lobed, the lobes relatively similar in size and shape, spreading; corolla yellow, orange, red, or pink; [tribe *Gerardieae*].
14 Corolla pink; leaves linear and thread-like (except lanceolate in *A. auriculata*).....***Agalinis***
14 Corolla yellow or orange; leaves either lanceolate or broader, at least the basal pinnately or bipinnately lobed or toothed, or pinnately or bipinnately divided into linear segments.
15 Leaves pinnately or bipinnately divided into linear segments up to 2 mm wide; corolla rotate, the tube shorter than the lobes.....***Seymeria***
15 Leaves not lobed or divided, or the segments broader; corolla tubular, campanulate, or funnelform, the tube much longer than the lobes.
16 Corolla orange, tubular, the tube narrow and straight, > 5× as long as the diameter.....***Macranthera***
16 Corolla yellow, campanulate or funnelform, the tube conical, < 4× as long as the diameter.
17 Anthers pubescent; lower leaves < 12 cm long.....***Aureolaria***
17 Anthers glabrous; lower leaves 20-40 cm long.....***Dasistoma***

Agalinis Rafinesque 1836 (AGALINIS, PURPLE-FOXGLOVE)

A genus of about 60 species, hemiparasitic annual (*A. linifolia* perennial) herbs, of tropical and warm temperate regions of America. References: Canne (1979); Canne-Hilliker & Hays (2019) in FNA17 (2019); Hays (1998a); Hays (1998b); Hays (2010); Pennell (1935); Sorrie (2017b) in Weakley et al (2017).

[Key adapted from FNA]

1 Bracts either lanceolate (and usually with 2 basal lobes) or (3-) 5-7-lobed, the lobes linear; calyx lobes (5-) 7-13 mm long; leaves (2-) 5-45 mm wide, lanceolate to broadly ovate in outline, 1-4× as long as wide, > 12 mm long
.....***Agalinis auriculata***
1 Bracts either linear or < 3 mm long; calyx lobes 0.2-8 mm long; leaves 0.2-6 (-7) mm wide, either filiform, linear, or narrowly lanceolate, 5-25× as long as wide, or ovate to lanceolate, 2.5-4× as long as wide and also < 3 mm long.
3 Leaves fleshy; upper leaf surfaces with sessile, dome-shaped trichomes; [wetland habitats].
4 Plant perennial, from horizontal rhizomes, 7-16 dm tall; corollas 25-35 mm long; [of saturated, seasonally ponded, and tidal freshwater to brackish wetlands]..
.....***Agalinis linifolia***
4 Plant annual, from fibrous roots, 0.5-7.5 dm tall; corollas 7.5-21 mm long.
.....***Agalinis maritima var. grandiflora***
3 Leaves filiform, membranous, or stiff; upper leaf surfaces distinctly or minutely scabrous; [a wide range of habitats, including wetlands].
6 Lower corolla lobes glabrous on the outer surface; calyx lobes (1.5-) 2-8 mm long, narrowly triangular to lanceolate, 1.5-4× as long as wide.
.....***Agalinis heterophylla***
6 Lower corolla lobes pilose on the outer surface; calyx lobes 0.3-3 (-5) mm long, deltate to broadly lanceolate, 0.8-2× as long as wide.
8 Pedicels shorter than the subtending bract.
9 Upper corolla lobes projecting prominently over the upper anthers; inner surface of corolla throat glabrous across the bases of the upper lobes; pedicels 6-25 mm long.....***Agalinis tenuifolia***
9 Upper corolla lobes spreading to reflexed, not or slightly projected past the throat; inner surface of corolla throat villous across the bases of the upper lobes; pedicels 0.5-8 mm long.
10 Axillary leaf fascicles well-developed, shorter than or roughly equal to the subtending leaves.
11 Corollas 22-36 mm long; leaves 15-40 (-50) mm long; styles 14-22 mm long; plants (1-) 5-20 dm tall; [widespread in our region].....
.....***Agalinis fasciculata var. fasciculata***
11 Corollas 12-14 mm long; leaves 10-15 (-20) mm long; styles 4-7.7 mm long; plants 2-4 (-5) dm tall; [Coastal Plain of GA, s. AL, and n. FL].....
.....***Agalinis georgiana***
10 Axillary leaf fascicles absent or shorter than the subtending leaves.
12 Leaves filiform, 0.2-0.8 mm wide; flowers 1 per node, the uppermost on each branch appearing terminal.....***Agalinis plukenetii***
12 Leaves filiform to linear-lanceolate, 0.6-4 (-5) mm wide; flowers 1-2 per node.
13 Leaves 0.5-1.4 mm wide; calyx lobes keeled; seeds black; corollas 15-23 mm long.....***Agalinis harperi***
13 Leaves 0.5-4 (-5) mm wide; calyx lobes rounded on the back; seeds dark brown; corollas 9-36 mm long.
.....***Agalinis purpurea***
8 Pedicels longer than or equal to the subtending bract.
17 Leaves (all) 0.5-3 mm long.
18 Inflorescence a raceme (or with several branches), the flowers borne all along the axes; branches stiff and straight, ascending, quadrangular in cross-section; [NC to n. FL, west to e. LA].....***Agalinis aphylla***
18 Inflorescence a diffuse panicle, with flowers borne in 1's (or 2's or 3's) at the ends of long branches; branches lax, initially spreading, then curving upwards, nearly terete in cross-section; [e. GA south to c. FL peninsula, west to w. LA].....***Agalinis filicaulis***
17 Leaves (1-) 4-70 mm long, at least some leaves > 4 mm long.
19 Outer surface of the lower corolla lobes pilose.
20 Leaves alternate; axillary leaf fascicles equal to or longer than the subtending leaves.....***Agalinis filifolia***
20 Leaves opposite; axillary leaf fascicles absent or shorter than the subtending leaves.
21 Upper corolla lobes projecting prominently over the upper anthers; inner surface of corolla throat glabrous across the bases of the upper lobes; leaves 0.3-6 mm wide; seeds tan to brown.....***Agalinis tenuifolia***
21 Upper corolla lobes spreading to reflexed, not or slightly projected past the throat; inner surface of corolla throat villous across the bases of the upper lobes; leaves 0.2-1.4 (-1.5) mm wide; seeds black or yellowish tan.
22 Flowers 2 per node; inflorescences racemes; capsules elliptic-ovoid.....***Agalinis setacea***
22 Flowers 1 per node; inflorescences racemes or panicles; capsules globular-ovoid.
.....***Agalinis gattingeri***
19 Outer surface of the lower corolla lobes glabrous.

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

24 Pedicels scabrous; axillary leaf fascicles usually present and > 1/2 the length of the subtending leaves (sometimes absent).
..... ***Agalinis pulchella***
24 Pedicels glabrous or ± scabridulous; leaf axillary fascicles absent or shorter than the subtending leaves.
26 Corolla throats glabrous externally, sometimes pilose externally proximal to sinuses.
..... ***Agalinis divaricata***
26 Corolla throats pilose externally.
31 Lower and mid stem branches stiffly arching-ascending, ascending, erect-ascending, or spreading-ascending; branches quadrangular in cross-section; capsules globular to oblong; leaves erect, erect-ascending, or ascending, or the lower slightly spreading.
32 Leaf blades subulate, elliptic, or filiform; anthers 1.8-2.6 mm long; corollas 15-25 mm long, pink to dark pink, with 2 yellow lines and red spots present in the floor of the throat; corolla lobes 4-7 (-9) mm long..... ***Agalinis oligophylla***
32 Leaf blades linear-elliptic, narrowly spatulate, linear-spatulate, or linear; anthers 0.6-2.1 mm long; corollas 8-16 (-17) mm long, whitish to pink, with 2 yellow lines and red or pink spots pale or absent in the floor of the throat; corolla lobes 3-5 mm long.
..... ***Agalinis obtusifolia***
31 Lower and mid stem branches spreading-ascending to laxly and widely spreading; branches subterete to quadrangular-ridged in cross-section; capsules ovoid, obovoid-oblong, ovoid-globular, or obovoid; leaves spreading to spreading-ascending.
34 Calyx lobes subulate to triangular or lanceolate, (0.2-) 0.5-2.5 mm long.
35 Branches ascending to spreading, quadrangular-ridged; capsules ovoid; calyx lobes subulate to triangular, (0.2-) 0.5-1.5 (-2) mm long; styles (5-) 7-12 mm long; [MS, TN, and KY eastwards] ..... ***Agalinis decemloba***
35 Branches laxly and widely spreading, proximal arching upward, strongly quadrangular; capsules obovoid; calyx lobes lanceolate, 1.3-2.5 mm long; styles 3-5 mm long; MO, AR, and MO west to e. OK and se. TX]..... ***Agalinis viridis***
34 Calyx lobes deltate-subulate or subulate, 0.2-0.5 mm long.
..... ***Agalinis tenella***

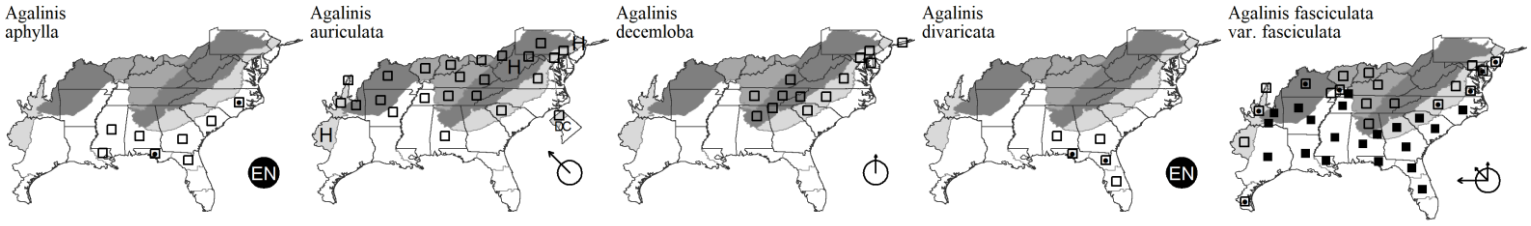
Agalinis aphylla (Nuttall) Rafinesque. SCALE-LEAF AGALINIS. **Hab:** Wet pine savannas. **Dist:** Se. NC south to ne. FL and Panhandle FL, west to e. LA. **Phen:** Sep-Oct; Oct-Nov. **Syn:** = Fl7, FNA12, GW2, K1, K3, K4, RAB, S, WH3; = *Gerardia aphylla* Nuttall – Pennell (1935). NatureServe G3G4 (Vulnerable).

Agalinis auriculata (Michaux) S.F. Blake. EARLEAF FOXGLOVE. **Hab:** Glades, barrens, blackbelt prairies, dry prairies, and disturbed clearings over mafic rocks (such as diabase and gabbro) or calcareous rocks. **Dist:** KY and OH west to MN, south to n. AL, wc. AL (Schotz 2009), AR, and TX; also rarely disjunct east of the Blue Ridge, in NJ, n. VA, and nc. SC. In Lewis County, KY (D. White, pers. comm.). **Phen:** Aug-Oct; Sep-Nov. **Syn:** = Ar, C, FNA17, K1, K3, K4, Mi, NcTx, Pa, Tn, Va; = *Gerardia auriculata* Michaux – F; = *Tomanthera auriculata* (Michaux) Rafinesque – G, GrPl, Il, S, Tx, Pennell (1935). NatureServe G3 (Vulnerable).

Agalinis decemloba (Greene) Pennell. SANDPLAIN AGALINIS. **Hab:** Dry clayey or sandy woodlands, coastal sand plains. **Dist:** MA south to GA and AL. **Phen:** Aug-mid-Oct. **Syn:** = FNA17, K4, NY, Sorrie (2017b) in Weakley et al (2017); > *Agalinis acuta* – C, K1, K2, NE; > *Agalinis decemloba* (Greene) Pennell – Pa, RAB, S, W; >< *Agalinis obtusifolia* Rafinesque – C, K1, K2; > *Gerardia acuta* (Pennell) Pennell – F, G, Pennell (1935); > *Gerardia decemloba* Greene – F, G, Pennell (1935).

Agalinis divaricata (Chapman) Pennell. PINELAND AGALINIS. **Hab:** Longleaf pine sandhills. **Dist:** GA (Decatur County) south to c. peninsular FL, west to MS (Sorrie & LeBlond 2008). **Phen:** Sep-mid Oct. **Syn:** = Fl7, FNA17, K1, K3, S, WH3; = *Gerardia divaricata* (Chapman) Pennell – Pennell (1935).

Agalinis fasciculata (Elliott) Rafinesque *var*. ***fasciculata***. **Hab:** Longleaf pine sandhills, pine savannas, prairies, barrens, oak savannas, disturbed sandy areas, roadsides. **Dist:** S. MD south to c. peninsular FL, west to e. TX, northward in the interior to s. IN, s. IL, sw. MO, AR, e. NE, and nc. TX. **Phen:** Aug-Sep. **Syn:** = K4; = *Gerardia fasciculata* – Pennell (1935); < *Agalinis fasciculata* (Elliott) Rafinesque – Ar, C, Fl7, FNA17, GW2, Il, K1, K3, NcTx, RAB, S, Tn, Tx, Va, W, WH3; < *Gerardia fasciculata* Elliott – F, G, GrPl.



Agalinis filicaulis (Bentham) Pennell. SPINDLY AGALINIS. **Hab:** Wet pine savannas, bogs, prairies. **Dist:** E. GA (Tattnall County) south to c. peninsular FL and Panhandle FL, west to w. LA. **Phen:** Sep-Oct. **Syn:** = Fl7, FNA17, K1, K3, K4, S, WH3; = *Gerardia filicaulis* (Bentham) Chapman – Pennell (1935). NatureServe G3 (Vulnerable).

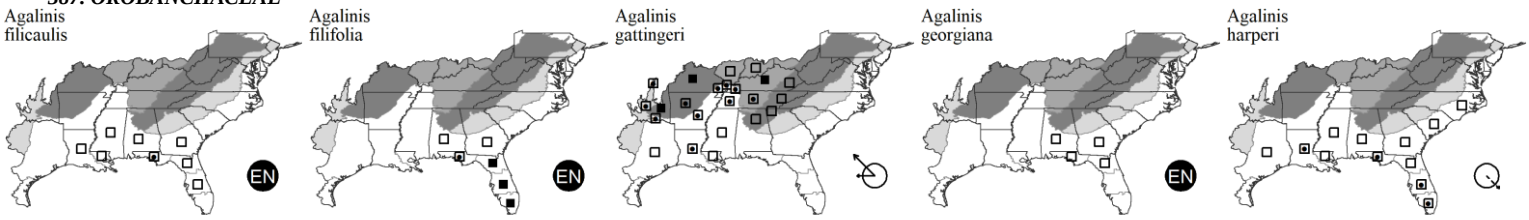
Agalinis filifolia (Nuttall) Rafinesque. SEMINOLE AGALINIS. **Hab:** Longleaf pine sandhills, Florida scrub, coastal scrub. **Dist:** S. GA (east to Liberty County) south to s. FL, west to sw. AL (Baldwin County) (Sorrie & LeBlond 2008). **Phen:** Jun-Nov. **Syn:** = Fl7, FNA17, K1, K3, K4, S, WH3; = *Gerardia filifolia* Nuttall – Pennell (1935). NatureServe G4? (Apparently Secure).

Agalinis gattingeri (Small) Small ex Britton. GATTINGER'S AGALINIS, MIDWESTERN AGALINIS. **Hab:** Barrens, glades, outcrops, woodlands. **Dist:** ON, MN, and NE south to AL, MS, LA, and TX. **Phen:** Aug-Oct. **Syn:** = Ar, FNA17, Il, K1, K3, K4, Mi, NcTx, S, Tn, Tx; = *Gerardia gattingeri* Small – G, Pennell (1935). NatureServe G4 (Apparently Secure).

Agalinis georgiana (C.L. Boynton) Pennell. GEORGIA AGALINIS, BOYNTON'S AGALINIS. **Hab:** Mesic to wet pine savannas, bogs. **Dist:** S. GA (Crisp, Dooly, Lowndes, Thomas, and Worth counties) south to w. Panhandle FL (Carter, Baker & Morris 2009). **Comm:** {not yet keyed}. **Syn:** = Fl7, FNA17, K3, K4, S, WH3; = *Gerardia georgiana* C.L. Boynton – Pennell (1935); < *Agalinis fasciculata* (Elliott) Rafinesque – K1.

Agalinis harperi Pennell. HARPER'S AGALINIS. **Hab:** Wet pinelands, interdune swales. **Dist:** E. NC south to s. FL, west to e. TX; n. Bahamas. **Phen:** Aug-Oct. **Tax:** See Hays (1998a) who has established the nomenclatural priority of *A. harperi*. **Comm:** Reported for SC (Kartesz 1999) and for NC and SC (Canne-Hilliker & Hays in FNA17) {investigate}. **Syn:** = Bah, Fl7, FNA17, K3, K4, WH3, Hays (1998a); = *Agalinis pinetorum* Pennell – K1; = *Gerardia harperi* (Pennell in Small) Pennell – Pennell (1935); > *Agalinis harperi* Pennell – S; > *Agalinis pinetorum* Pennell – S.

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated



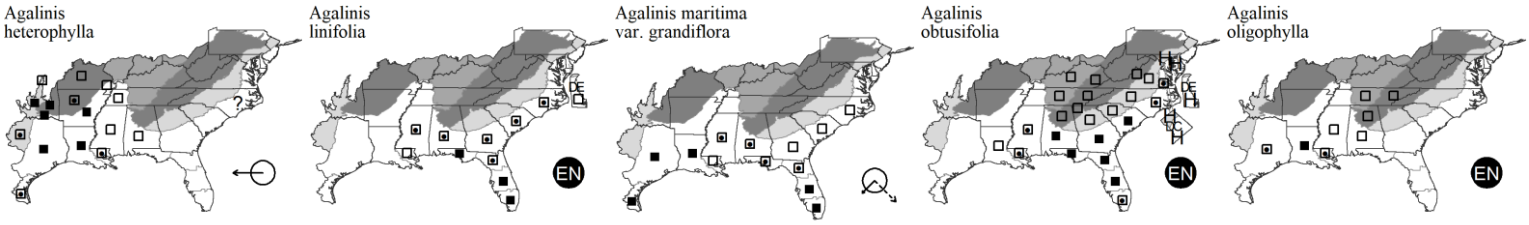
Agalinis heterophylla (Nuttall) Small. PRAIRIE AGALINIS. **Hab:** Mesic prairies, streamsides, ditches, roadsides. **Dist:** GA west to s. MO, AR, e. OK, and e. TX (reported for NC in FNA17). **Phen:** (Jun-) Aug-mid Oct. **Syn:** = FNA17, G, GrPl, K1, K3, K4, NcTx, Tn, Tx. NatureServe G4G5 (Apparently Secure).

Agalinis linifolia (Nuttall) Britton. **Hab:** Coastal Plain depression ponds, cypress savannas, wet pine savannas. **Dist:** Se. NC south to s. FL, west to e. LA; disjunct in e. DE (reports for MD and VA are in error). **Phen:** Aug-early Oct; Sep-Oct. **Syn:** = C, Fl7, FNA17, GW2, K1, K3, K4, RAB, S, WH3; = *Gerardia linifolia* Nuttall – F, G, Pennell (1935). NatureServe G4? (Apparently Secure).

Agalinis maritima (Rafinesque) Rafinesque *var.* ***grandiflora*** (Bentham) Shinners. SOUTHERN SALTMARSH AGALINIS. **Hab:** Tidal marshes. **Dist:** E. NC (or allegedly also se. VA, but with no known documentation) south to s. FL, west to s. TX and TAM; West Indies; Yucatan. **Phen:** Apr-Sep; Aug-Oct. **Syn:** = Fl7, FNA17, K1, K3, K4, S, Tx; = *Gerardia maritima* ssp. *grandiflora* (Bentham) Pennell – Pennell (1935); = *Gerardia maritima* Rafinesque var. *grandiflora* Bentham – F; < *Agalinis maritima* – Bah, C, GW2, RAB, WH3; < *Gerardia maritima* – G. NatureServe G5TNR (Not Yet Ranked).

Agalinis obtusifolia Rafinesque. **Hab:** Pine savannas, wet pine flatwoods, sandhill seeps, bogs, Black Belt prairies. **Dist:** DE south to s. FL, west to e. LA, and in the interior north to KY and TN. **Phen:** Sep-Oct; Oct-Nov. **Syn:** = FNA17, GW2, K3, K4, RAB, Tn, Va, W, Sorrie (2017b) in Weakley et al (2017); = *Gerardia obtusifolia* (Rafinesque) Pennell – F, G, Pennell (1935); < *Agalinis obtusifolia* Rafinesque – C, Fl7, K1, WH3. NatureServe G4 (Apparently Secure).

Agalinis oligophylla Pennell. **Hab:** Moist to dry longleaf pine savannas, chalk outcrops, seepage bogs, moist to wet barrens and meadows. **Dist:** Sc. TN (Coffee and Warren counties) (as *A. pseudaphylla*) (Chester, Wofford, & Kral 1997), c. and s. AL, west through s. MS to w. LA. **Phen:** Late Sep-mid Nov. **Syn:** = FNA17, K1, K3, K4, S, Tn, Tx; > *Gerardia pseudaphylla* (Pennell) Pennell – Pennell (1935).



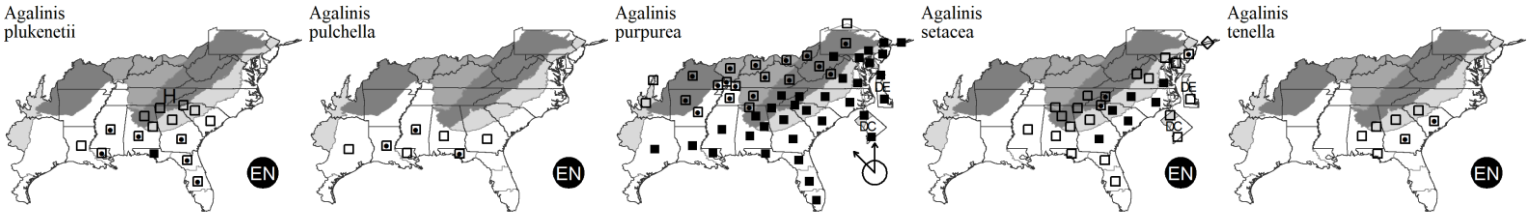
Agalinis plukenetii (Elliott) Rafinesque. PLUKENET'S AGALINIS. **Hab:** Longleaf pine sandhills, other dry forests. **Dist:** SC south to c. peninsular FL, west to wc. LA, and northward in the interior to extreme se. TN (Polk County) (Chester, Wofford, & Kral 1997). **Phen:** Late Sep-early Nov. **Syn:** = Fl7, FNA17, K1, K3, K4, S, Tn, WH3; = *Gerardia plukenetii* Elliott – Pennell (1935). NatureServe G3G5 (Apparently Secure).

Agalinis pulchella Pennell. BEAUTIFUL AGALINIS. **Hab:** Pine savannas and longleaf pine sandhills. **Dist:** S. GA west to e. TX. **Phen:** Sep-early Oct. **Syn:** = Fl7, FNA17, K1, K3, K4, S, Tx, WH3; = *Gerardia pulchella* Pennell – Pennell (1935). NatureServe G4G5 (Apparently Secure).

Agalinis purpurea (Linnaeus) Pennell. COMMON AGALINIS. **Hab:** Woodlands, wet meadows, roadsides, in a wide variety of open habitats. **Dist:** NS west to MN, south to s. FL and e. TX. **Phen:** Aug-Nov; Sep-Dec. **Syn:** = Ar, Fl7, GrPl, Il, K1, K3, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3; = *Agalinis purpurea* ssp. *purpurea* – Mi; = *Agalinis purpurea* var. *purpurea* – FNA17, K4; = *Gerardia purpurea* Linnaeus – F, Pennell (1935); = *Gerardia purpurea* var. *purpurea* – G; < *Agalinis purpurea* (Linnaeus) Pennell – GW2; < *Agalinis purpurea* var. *purpurea* – C.

Agalinis setacea (J.F. Gmelin) Rafinesque. THREADLEAF AGALINIS. **Hab:** Longleaf pine sandhills, Florida scrub, other dry forests and openings. **Dist:** NY (Long Island) south to ne. FL, c. peninsular FL, and AL. **Phen:** Aug-Oct; Oct-Nov. **Syn:** = C, Fl7, FNA17, K1, K3, K4, NY, RAB, S, Tn, Va, W, WH3, Sorrie (2017b) in Weakley et al (2017); < *Agalinis obtusifolia* Rafinesque – Fl7; > *Gerardia setacea* J.F. Gmelin – F, G, Pennell (1935); > *Gerardia stenophylla* (Pennell) Pennell – Pennell (1935).

Agalinis tenella Pennell. DELICATE AGALINIS. **Hab:** Longleaf pine sandhills, other dry woodlands. **Dist:** SC south to n. FL, west to AL; allegedly disjunct in Amelia County, VA. Not believed to be present in NC or VA, contrary to reports (Sorrie in Weakley et al. 2017). **Phen:** Sep-Oct; Oct-Nov. **Syn:** = FNA17, K3, K4, RAB, S, Sorrie (2017b) in Weakley et al (2017); = *Gerardia tenella* (Pennell) Pennell – Pennell (1935); < *Agalinis obtusifolia* Rafinesque – Fl7, K1, WH3.

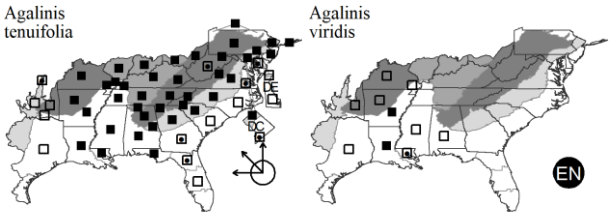


Agalinis tenuifolia (Vahl) Rafinesque. SLENDERLEAF AGALINIS. **Hab:** Wooded slopes, savannas, granitic outcrops, roadsides, other dry habitats. **Dist:** ME, ON, MI, and MO, south to FL and LA. **Phen:** Aug-Oct; Sep-Nov. **Syn:** = Ar, C, Fl7, FNA17, Il, K3, K4, Mi, NY, Pa, RAB, Tn, W, Sorrie (2017b) in Weakley et al (2017); > *Agalinis besseyana* Britton – Il; > *Agalinis tenuifolia* var. *leucanthera* – K1, NcTx, S, Tx; > *Agalinis tenuifolia* var. *macrophylla* – GrPl, K1, NE, S; > *Agalinis tenuifolia* var. *parviflora* – GrPl, NE; > *Agalinis tenuifolia* var. *polyphylla* – K1, S; > *Agalinis tenuifolia* (Vahl) Rafinesque var. *tenuifolia* – K1, NE,

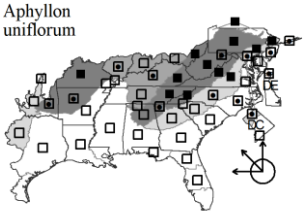
Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

S, Va; > *Gerardia tenuifolia* Vahl ssp. *macrophylla* (Bentham) Pennell – Pennell (1935); > *Gerardia tenuifolia* Vahl ssp. *polyphylla* (Small) Pennell – Pennell (1935); > *Gerardia tenuifolia* Vahl var. *tenuifolia* – F, G.

Agalinis viridis (Small) Pennell. GREEN AGALINIS. **Hab:** Moist prairies, chalk prairies of the Black Belt, bottomlands. **Dist:** W. AL, MS, and e. LA west to MO, e. OK, AR, LA, and e. TX. **Phen:** Aug-Oct. **Syn:** = Ar, FNA17, GrPl, K3, K4, Tx. NatureServe G4? (Apparently Secure).



Aphyllon Mitchell 1769 (CANCER-ROOT)



A small genus of perhaps 3-7 species, holoparasitic herbs, of the New World. References: Collins, Colwell, & Yatskievych (2019c) in FNA17 (2019); Musselman (1982); Schneeweiss (2013); Schneider (2016).

Aphyllon uniflorum (Linnaeus) Torrey & A. Gray. GHOSTPIPE, CANCER-ROOT, ONE-FLOWERED BROOMRAPE. **Hab:** In a wide diversity of forests. **Dist:** NL (Newfoundland) west to AK and BC, south to FL and TX. **Phen:** Apr-Jun. **Tax:** *Aphyllon uniflorum* var. *occidentale* Greene is western, distributed from SK and BC south to w. TX, CA, and Mexico. Schneider et al. (2016) showed that var. *occidentale* differs genetically and in host from eastern var. *uniflora*; it should be accorded specific rank. **Syn:** = Fl7; = *Orobanche uniflora* ssp. *uniflora* – FNA17; = *Orobanche uniflora* var. *uniflora* – C; = *Thalesia uniflora* (Linnaeus) Britton – S; < *Aphyllon uniflorum* (Linnaeus) Torrey & A. Gray – Schneider (2016); < *Orobanche uniflora* Linnaeus – Ar, F, G, GrPl, Il, K1, K3, Mi, NE, NY, Pa, RAB, Tn, Tx, Va, W, WH3, Musselman (1982).

Aureolaria Rafinesque 1836 (OAK-LEECH, FALSE-FOXGLOVE)

A genus of about 10 species, hemiparasitic herbs, of e. North America and Mexico. References: Morawetz (2019) in FNA17 (2019); Pennell (1935).

1 Calyx lobe margins crenate or pinnatifid; plant pubescent (especially on the calyx, corolla, capsule, and lower stem) with glandular hairs; annual; seeds 0.8-1.0 mm long, not winged.
..... ***Aureolaria pectinata***
1 Calyx lobe margins entire; plant glabrous or pubescent with nonglandular hairs; perennial; seeds 1.3-2.7 mm long, winged.
3 Capsules densely pubescent; inflorescence, pedicels, and/or calyx pubescent with dingy, nonglandular hairs; pedicels 1-3 mm at anthesis; flowering May-Jul .....
..... ***Aureolaria virginica***
3 Capsule glabrous; inflorescence, pedicels, and calyx glabrous (or pubescent with white nonglandular hairs); pedicels 1-25 mm long at anthesis; flowering Aug-Oct.
7 Inflorescence, pedicels, and calyx pubescent (at least sparsely so); pedicels slender, ca. 0.5 mm in diameter ..... ***Aureolaria patula***
7 Inflorescence, pedicels and calyx glabrous; pedicels stout, ca. 1 mm in diameter.
8 Lower leaves entire to serrate (or with only a few shallow lobes at the base of the leaf); pedicels 1-8 mm long at anthesis, straight; corolla 3.0-4.0 cm long; capsule 10-15 mm long; stem not glaucous ..... ***Aureolaria levigata***
8 Lower leaves pinnately lobed, the lobes themselves usually serrate, the sinuses extending over half of the distance to the midrib; pedicels 4-25 mm long at anthesis, upwardly curved; corolla 3.5-6 cm long; capsule 12-20 mm long; stem slightly to strongly glaucous.
..... ***Aureolaria flava***

Aureolaria flava (Linnaeus) Farwell. SMOOTH OAK-LEECH. **Hab:** Oak forests and woodlands, hemiparasitic on *Quercus* subgenus *Quercus*. **Dist:** ME west to MN, south to GA, c. peninsular FL, AL, and e. LA. **Phen:** Aug-Sep; Sep-Oct. **Tax:** The various named varieties or subspecies need additional study; the variation seems too clinal to be practically recognized taxonomically. **Syn:** = Ar, Fl7, Mi, NY, RAB, Tn, Va, W, WH3; < *Aureolaria flava* (Linnaeus) Farwell – FNA17; > *Aureolaria flava* ssp. *flava* – S; >< *Aureolaria flava* ssp. *flava* – S; > *Aureolaria flava* ssp. *macrantha* Pennell – Pennell (1935); > *Aureolaria flava* ssp. *reticulata* (Rafinesque) Pennell – S, Pennell (1935); > *Aureolaria flava* ssp. *typica* – Pennell (1935); >< *Aureolaria flava* var. *flava* – C, G, K1, K3, K4, NE, Pa; > *Aureolaria flava* (Linnaeus) Farwell var. *macrantha* Pennell – C, G, Il, K1, K3, K4, Pa, Tx; > *Gerardia flava* Linnaeus var. *flava* – F; > *Gerardia flava* Linnaeus var. *macrantha* (Pennell) Fernald – F; > *Gerardia flava* Linnaeus var. *reticulata* (Rafinesque) Cory – F.

Aureolaria levigata (Rafinesque) Rafinesque. APPALACHIAN OAK-LEECH. **Hab:** Oak forests and woodlands. **Dist:** PA west to s. OH, south to SC and GA, primarily a Central and Southern Appalachian endemic, but extending into adjacent provinces, and, rarely, even the Coastal Plain. **Phen:** Aug-Sep; Sep-Oct. **Tax:** The spelling '*levigata*' was used by Rafinesque in the basionym, *Gerardia levigata*. There is no basis for its 'correction' to '*laevigata*' under provisions of the ICNafp (Shenzhen version). **Syn:** = FNA17; = *Aureolaria laevigata* – C, G, K1, K4, Pa, RAB, S, Tn, Va, W, Pennell (1935), orthographic variant; = *Gerardia laevigata* Rafinesque – F. NatureServe G5 (Secure).

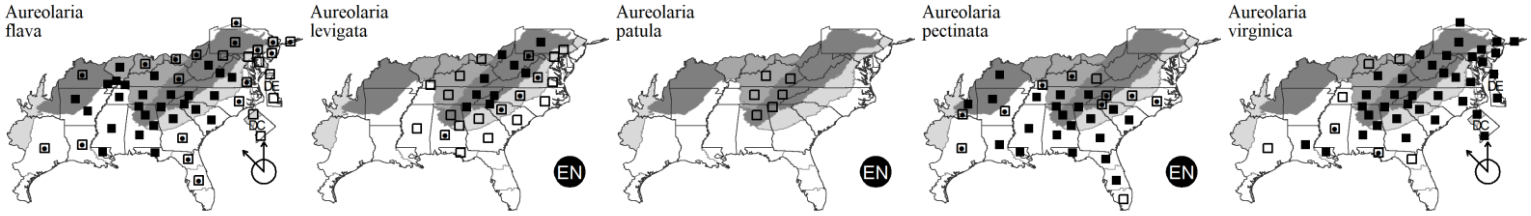
Aureolaria patula (Chapman) Pennell. CUMBERLAND OAK-LEECH. **Hab:** Calcareous ledges, and bluffs, rich alluvial forests. **Dist:** C. KY south through TN to nw. GA, and approaching w. NC and sw. VA. **Phen:** Aug-Oct; Sep-Oct. **Syn:** = C, FNA17, G, K1, K4, S, Tn, Pennell (1935). NatureServe G3 (Vulnerable).

Aureolaria pectinata (Nuttall) Pennell. SOUTHERN OAK-LEECH. **Hab:** Turkey oak sandhills, Florida scrub, other dry oak forests and woodlands, barrens. **Dist:** NC south to s. FL, west to LA, inland north to MO, e. OK, and e. TX. **Phen:** May-Sep; Sep-Oct. **Tax:** Related to *A. pedicularia*, but much more southerly in distribution. **Syn:** = Ar, Fl7, FNA17, K1, K3, K4, RAB, Tn, Tx, WH3; = *Aureolaria pedicularia* (Linnaeus) Rafinesque var. *pectinata* (Nuttall) Gleason – C, G; = *Gerardia pectinata* (Nuttall) Bentham – F; > *Aureolaria pectinata* ssp. *eurycarpa* (Pennell) Pennell – S, Pennell (1935); > *Aureolaria*

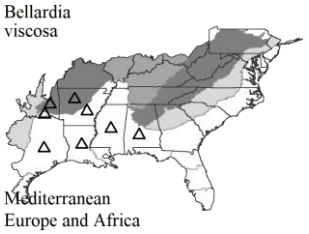
Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

pectinata ssp. *pectinata* – S; > *Aureolaria pectinata* ssp. *transcedens* (Pennell) Pennell – S, Pennell (1935); > *Aureolaria pectinata* ssp. *typica* – Pennell (1935); < *Aureolaria pedicularia* (Linnaeus) Rafinesque ex Pennell – W.

Aureolaria virginica (Linnaeus) Pennell. DOWNY OAK-LEECH, VIRGINIA OAK-LEECH. **Hab:** Oak forests and woodlands, hemiparasitic on *Quercus* subgenus *Quercus*. **Dist:** MA west to MI, south to ne. FL, Panhandle FL, and AL and west on the Coastal Plain through MS, and LA to e. TX. **Phen:** May-Jul; Aug-Sep. **Tax:** Taxa previously recognized (see synonymy) need modern review. **Syn:** = C, Fl7, FNA17, G, K1, K3, K4, Mi, NE, NY, Pa, RAB, Tn, Va, W, WH3; = *Gerardia virginica* (Linnaeus) Britton, Sterns, & Poggenburg – F; > *Aureolaria dispersa* (Small) Pennell – Tx; > *Aureolaria microcarpa* Pennell – S, Pennell (1935); > *Aureolaria virginica* (Linnaeus) Pennell – S, Pennell (1935).



Bellardia Allioni 1785 (LINESEED)



A genus of 2 species, hemiparasitic annual herbs, of Mediterranean Europe. References: Uribe-Convers & Tank (2016); Zacharias (2019) in FNA17 (2019).

* ***Bellardia viscosa*** (Linnaeus) Fischer & C.A. Meyer. YELLOW GLANDWEED. **Hab:** Wet roadside ditches. **Dist:** Native of Europe. Reported for Baldwin County, AL (Barger et al. 2019). **Phen:** May. **Syn:** = FNA17, Uribe-Convers & Tank (2016); = *Parentucellia viscosa* (Linnaeus) Caruel – Ar, K3, K4, Tx. NatureServe GNR (Not Yet Ranked).

Buchnera Linnaeus 1753 (BLUEHEARTS)

Contributed by Bruce A. Sorrie

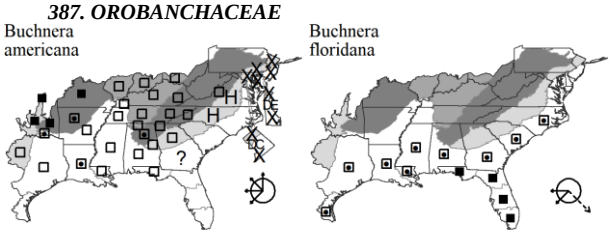
A genus of about 100 species, hemiparasitic biennial and perennial herbs, of tropical and warm temperate regions of the Old and New Worlds. The taxonomy of this genus is poorly understood. The plants are root hemi-parasites, apparently not particular about the host species. References: Pennell (1935); Philcox (1965); Sorrie (2019b) in FNA17 (2019).

Identification Notes: Lower leaves are broadest, mid and upper leaves narrowest, often markedly so; the key refers to lower leaves. Leaf teeth are usually few in number and vary in development, from crenate to 2-3 mm long and sharply pointed. The former condition is normal for *B. floridana*, the latter for *B. americana*. Calyx length is ca. 0.5 mm longer in fruit than in flower. The foliage turns black on drying.

1 Leaves lanceolate to narrowly ovate, tapering to a point; veins of lower stem leaves consisting of 3 major and 2 minor ones (narrow leaves may only have 3 total veins); leaf teeth usually well developed, rarely absent, usually 2-3 mm long; calyx (6.0-) 6.5-8.0 mm long; corolla lobes 5.0-7.0 mm long; [primarily of moderate to high pH soils in southern Great Plains, ranging to southern margin of the Great Lakes and eastward to the mid Atlantic seaboard, especially in mafic or calcareous glades and prairies, sometimes in more acid sites]**.....*Buchnera americana***
1 Leaves narrowly oblanceolate to lanceolate, rounded at tip; veins of lower stem leaves consisting of 1 major and 2 minor ones (narrow leaves may only have 1 vein); leaf teeth usually crenate but may be absent, < 2 mm long; calyx (4.0-) 4.5-5.5 mm long; corolla lobes 4.0-5.0 mm long; [primarily of low pH soils on the southern Atlantic and Gulf Coastal Plain, sometimes in calcareous sites (especially in FL)]**.....*Buchnera floridana***

Buchnera americana Linnaeus. PRAIRIE BLUEHEARTS, AMERICAN BLUEHEARTS, PLAINS BLUEHEARTS. **Hab:** Dry (seasonally moist) rocky, gravelly, or clayey soil of limestone glades, glades over mafic rock (such as diabase, gabbro, etc.), sand prairies, wet meadows, sandy roadsides. **Dist:** NY and s. ON west to MI, IL, MO, and s. KS, south to c. NC, GA, Panhandle FL, TX, and n. Mexico. **Phen:** Jun-Sep; Aug-Oct. **Comm:** *B. americana* has apparently declined very greatly in our area, probably owing to fire suppression in its habitats. **ID Notes:** In addition to the key characters given, *B. americana* is overall a larger and more robust plant than *B. floridana*, though both are quite variable in size, depending on the conditions in which they grow. **Syn:** = Ar, C, F, FNA17, G, GrPl, GW2, Il, K3, Mi, NY, Pa, RAB, S, Tn, Tx, Va, W, Pennell (1935), Philcox (1965); < *Buchnera americana* Linnaeus – Fl7, K1, NcTx, WH3. NatureServe G5? (Secure).

Buchnera floridana Gandoger. SAVANNA BLUEHEARTS, FLORIDA BLUEHEARTS. **Hab:** Pine savannas, flatwoods, seepage bogs, sandy roadsides. **Dist:** Se. NC south to s. FL, west to TX; West Indies; scattered localities in s. Mexico and Central America. **Phen:** Apr-Oct; May-Nov. **Tax:** Previous attributions of *B. longifolia* Kunth (including *B. elongata* Small) to southeastern states (notably FL, AL, GA, and MS) are based on misidentifications of material which is actually *B. floridana*. Taxonomic complexities remain in the FL Peninsula, and need additional study. **Syn:** = Bah, FNA17, GW2, K3, RAB, Tx, Pennell (1935), Philcox (1965); < *Buchnera americana* Linnaeus – Fl7, NcTx, WH3; >< *Buchnera americana* Linnaeus – K1; > *Buchnera breviflora* Pennell – S; > *Buchnera elongata* Swartz – S; > *Buchnera floridana* Gandoger – S; > *Buchnera longifolia* Swartz – K1.



Castilleja Mutis ex Linnaeus f. 1782 (PAINTBRUSH)

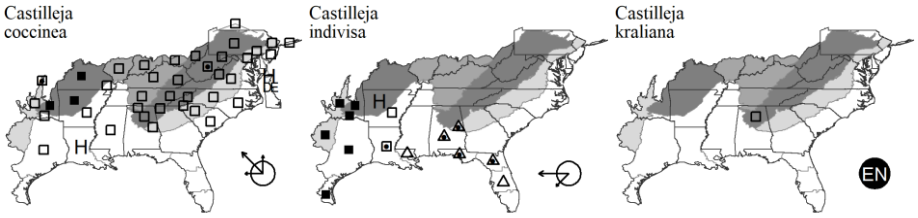
A genus of about 200 species, annual, perennial, or biennial hemiparasitic herbs, primarily of w. North America, with a few species also in e. North America, Eurasia, Central America, and Andean South America. References: Allison & Stevens (2001); Egger et al (2019) in FNA17 (2019); Nesom & Egger (2014); Pennell (1935); Singhurst et al (2020).

5 Leaves and bracts deeply (3-) 5-9-lobed; corolla tube 15-18 mm long ..... ***Castilleja coccinea***
5 Leaves and bracts shallowly 0 (-5)-lobed; corolla tube 2-11 mm long.
6 Basal rosettes of leaves present; bract tips yellow or light orange; [endemic in dolomite glades in c. AL] ..... ***Castilleja kraliana***
6 Basal rosettes absent; bract tips pink to red (or white or yellow); [native west of the Mississippi River, and introduced in disturbed habitats eastwards]. ..... ***Castilleja indivisa***

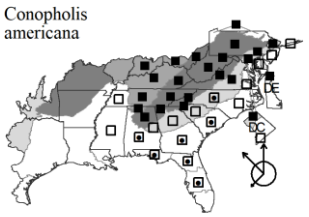
Castilleja coccinea (Linnaeus) Sprengel. EASTERN PAINTBRUSH. **Hab:** Woodlands, fens, barrens, rock outcrops, prairies, hay meadows, wet pastures, grassy openings, usually over mafic rocks. **Dist:** ME, NY, and MN south to SC, n. GA, n. AL, c. MS, w. LA, and OK. **Phen:** (Jan-) Apr-Jun; May-Aug. **Syn:** = Ar, C, F, FNA17, G, GrPl, GW2, Il, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Va, W, Nesom & Egger (2014), Pennell (1935). NatureServe G5 (Secure).

Castilleja indivisa Engelmann. TEXAS PAINTBRUSH. **Hab:** Prairies, sandy or silty woodlands, eastwards adventive in dry, disturbed areas, such as roadsides. **Dist:** AR and OK south to w. LA and TX and Mexico (AGU and CHH). **Phen:** Mar-May. **Tax:** See Nesom & Egger (2014) for a detailed discussion of this species and *C. coccinea*. **Syn:** = Ar, Fl7, FNA17, K3, K4, NcTx, Tx, WH3, Nesom & Egger (2014), Pennell (1935). NatureServe G5 (Secure).

Castilleja kraliana J.R. Allison. CAHABA PAINTBRUSH. **Hab:** Dolomitic Ketona glades. **Dist:** Endemic to dolomitic Ketona glades in Bibb County, c. AL (Allison & Stevens 2001). **Phen:** Mar-Apr. **Syn:** = FNA17, K3, K4, Allison & Stevens (2001). NatureServe G2 (Imperiled).



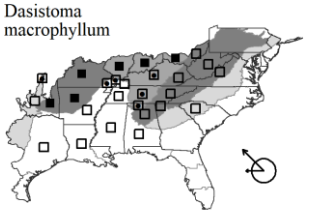
Conopholis Wallroth 1825 (BEARCORN, "SQUAWROOT")



A genus of 3 species, herbs parasitic on *Quercus* section *Lobatae* (red oaks) of e. North America and sw. North America south to Central America. Rodrigues, Colwell, & Stefanović (2011) and Rodrigues et al. (2013) determined that a division of the genus into 3 species best reflects genetic differentiation, the other 2 being *C. alpina* Liebmann, ranging from AZ, NM, and TX south to s. Mexico, and *C. panamensis* Woodson of Costa Rica and Panama. References: Collins, Colwell, & Yatskievych (2019a) in FNA17 (2019); Haynes (1971); Rodrigues et al (2013); Rodrigues, Colwell, & Stefanović (2011); Thieret (1971).

Conopholis americana (Linnaeus) Wallroth. BEARCORN, OAKDROPS, SQUAWROOT. **Hab:** Rich, moist forests, under and hemiparasitic on *Quercus* species. **Dist:** NS west to WI and south to c. peninsular FL, AL, and TN; disjunct in se. Mexico (Chiapas, Oaxaca, and Puebla). **Phen:** Mar-Jun. **Comm:** Haynes (1971) discusses the nature of the parasitism. *Conopholis* apparently germinates near an oak root, forms a parasitic connection to the root, resulting in the formation of a gall consisting of both *Quercus* and *Conopholis* tissue. The gall can be up to 25 cm in diameter, and lasts for many years, repeatedly sending up flowering shoots. It is believed that the gall exists underground for some years prior to first flowering. **Syn:** = C, F, Fl7, FNA17, G, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Va, W, WH3, WV, Haynes (1971), Rodrigues et al (2013), Rodrigues, Colwell, & Stefanović (2011), Thieret (1971). NatureServe G5 (Secure).

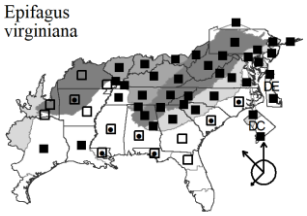
Dasistoma Rafinesque 1819 (MULLEIN FOXGLOVE)



A monotypic genus, an annual or perennial hemiparasitic herb, endemic to se. North America. The genus is sometimes spelled *'Dasystoma*,' a later orthographic variant. The genus is neuter (because ending in "-stoma"). References: Freeman (2019h) in FNA17 (2019); Pennell (1935).

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable

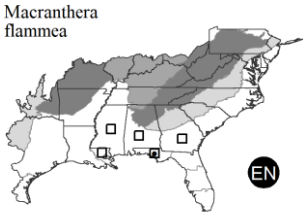
Dasistoma macrophyllum (Nuttall) Rafinesque. MULLEIN FOXGLOVE. **Hab:** Xeric to dry-mesic woodlands and bluffs, riverbanks, streambanks, over limestone or diabase. **Dist:** WV, OH, s. WI, sw. WI, IA, and e. NE, south to sw. VA (Lee County; Wieboldt et al. 1998), nc. SC, nw. GA, sc. AL, sc. MS, nw. LA, and nc. TX. **Phen:** Jun-Sep. **Syn:** = FNA17, K4; = *Dasistoma macrophylla* – Ar, C, G, GrPl, Il, K1, K3, Mi, NcTx, RAB, S, Tn, Tx, Va, Pennell (1935), orthographic variant; = *Seymeria macrophylla* Nuttall – F, GW2, WV. NatureServe G4 (Apparently Secure).



Epifagus Nuttall 1818 (BEECHDROPS)

A monotypic genus, a holoparasitic herb on the roots of *Fagus*, of e. North America. References: Collins, Colwell, & Yatskievych (2019b) in FNA17 (2019); Thieret (1971).

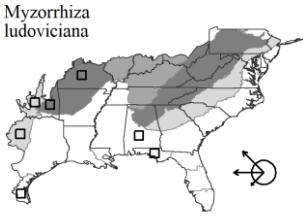
Epifagus virginiana (Linnaeus) W.P.C. Barton. BEECHDROPS. **Hab:** Moist to rather dry forests under and parasitic on *Fagus grandifolia*. **Dist:** NS west to WI, south to ne. FL, Panhandle FL, and LA; disjunct in the mountains of e. Mexico (TAM). **Phen:** Aug-Nov. **Syn:** = C, F, Fl7, FNA17, G, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, Tn, Tx, Va, W, WH3, WV, Thieret (1971); = *Leptamnium virginianum* (Linnaeus) Rafinesque – S. NatureServe G5 (Secure).



Macranthera Nuttall ex Bentham 1836 (FLAMEFLOWER)

A monotypic genus, a biennial or perennial hemiparasitic herb, of se. North America. References: Pennell (1935); Sorrie (2019c) in FNA17 (2019).

Macranthera flammea (Bartram) Pennell. FLAMEFLOWER, HUMMINGBIRD-FLOWER. **Hab:** Pitcherplant bogs, bayheads., blackwater creekbanks. **Dist:** Nearly restricted to the East Gulf Coastal Plain (e. GA and FL Panhandle west to se. LA), but ranging east to the Atlantic Coastal Plain of e. GA (Bullock County), within a county of the SC border. **Phen:** Jul-Oct. **Syn:** = Fl7, FNA17, GW2, K1, K3, K4, S, WH3, Pennell (1935). NatureServe G3 (Vulnerable).



Myzorrhiza Philippi 1858 (AMERICAN BROOMRAPE)

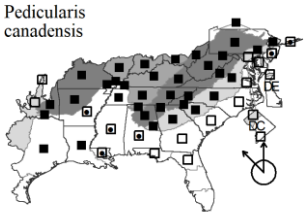
A genus of 25-30 species, perennial holoparasitic herbs, of the New World. *Myzorrhiza* is sometimes included in a broadly circumscribed *Aphyllon* or an even more broadly circumscribed *Orobanche*. References: Collins, Colwell, & Yatskievych (2009); Collins, Colwell, & Yatskievych (2019c) in FNA17 (2019); Musselman (1982); Schneeweiss (2013); Schneider (2016); Weakley (2017b) in Weakley et al (2017).

Myzorrhiza ludoviciana (Nuttall) Rydberg. PRAIRIE BROOMRAPE. **Hab:** Deep sands, pastures, upland areas, and glades, parasitic on perennial composites such as *Grindelia*, *Artemisia*, and *Heterotheca*. **Dist:** SK and BC south to MO, w. TX, AZ, and n. Mexico. **Phen:** Apr-Aug. **Comm:** Reports of this species further east are apparently based on the more recently named "*Orobanche riparia*" = *Myzorrhiza species 1*. **Syn:** = *Aphyllon ludovicianum* (Nuttall) A. Gray – K4; = *Orobanche ludoviciana* Nuttall – FNA17, Il, Collins, Colwell, & Yatskievych (2009); *Aphyllon ludovicianum* (Nuttall) A. Gray – Schneider (2016); < *Orobanche ludoviciana* Nuttall – F, G, GrPl, Tx, Musselman (1982); < *Orobanche ludoviciana* ssp. *ludoviciana* – K1, K3; < *Orobanche ludoviciana* var. *ludoviciana* – C.

Pedicularis Linnaeus 1753 (WOOD-BETONY, LOUSEWORT)

A genus of 400-600 species, hemiparasitic perennial herbs, of temperate and boreal regions of c. and e. Asia, Europe, w. North America, e. North America, and Andean South America. References: Pennell (1935); Robart (2019) in FNA17 (2019).

Pedicularis canadensis Linnaeus. EASTERN LOUSEWORT, WOOD-BETONY. **Hab:** Moist to dry forests and woodlands, streambanks, prairies. **Dist:** ME, QC, and MB south to ne. FL, FL Panhandle, and e. TX. **Phen:** (Mar-) Apr-May; May-Jul. **Tax:** Robart in FNA (2019) includes Rocky Mountain plants treated by others as *P. fluviatilis* A.A. Heller or at infraspecific rank under *P. canadensis* as a taxonomically indistinguished part of *P. canadensis*; we provisionally retain this taxon as separate at species rank. Var. *dobbsii* Fernald, alleged to differ in having nearly solitary flowering stems and stoloniform basal offsets, may warrant additional study. **Comm:** *P. canadensis* is variable in corolla color, with yellow, red, or red and yellow bicolored flowers. **Syn:** = Ar, C, Fl7, G, GW2, K3, K4, Mi, NcTx, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV, Pennell (1935); < *Pedicularis canadensis* Linnaeus – FNA17, GrPl; > *Pedicularis canadensis* ssp. *canadensis* – K1, NE; > *Pedicularis canadensis* var. *canadensis* – F, Il; > *Pedicularis canadensis* var. *dobbsii* Fernald – F, Il.



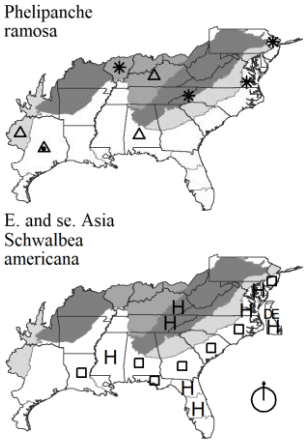
Phelipanche Pomel 1874 (BRANCHED BROOMRAPE)

A genus of about 50 species, holoparasitic herbs, of Eurasia (mainly Mediterranean Europe). References: Collins, Colwell, & Yatskievych (2019c) in FNA17 (2019); Musselman (1982); Schneeweiss (2013).

* ***Phelipanche ramosa*** (Linnaeus) Pomel. BRANCHING BROOMRAPE, HEMP BROOMRAPE. **Hab:** Disturbed areas. **Dist:** Native of Asia. **Phen:** Feb-Apr; Jul-Sep. **Tax:** As discussed by Musselman (1984), the identity of the sole NC record (collected in 1884) is somewhat presumptive, and the precise location uncertain. **Comm:** An infestation of this serious weed was discovered in 2007 at a car wash in urban Norfolk, VA (Musselman &

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Bolin 2008). Reported for AL (Diamond (2016). **Syn:** = K3, K4; = *Orobanche ramosa* Linnaeus – C, F, FNA17, G, Il, K1, Va. NatureServe GNR (Not Yet Ranked).



Schwalbea Linnaeus 1753 (CHAFFSEED)

The genus is monotypic, a perennial hemiparasitic herb, of se. North America. References: Pennell (1935); Sorrie (2019a) in FNA17 (2019); Ward (2012a).

Schwalbea americana Linnaeus. CHAFFSEED. **Hab:** Pine savannas, sandhill-pocosin ecotones (in the uphill portions), mesic loamy-soil slopes or swales in sandhill longleaf pine woodlands, fire-maintained interior woodlands and barrens. **Dist:** Formerly rather widespread in e. North America, primarily in the Coastal Plain, from e. MA, south to c. peninsular FL and west to TX, and disjunct in the Cumberland Mountains of KY and TN. The species is now limited to a few scattered sites in MA, NJ, NC, SC, GA, FL, AL, and LA, a small portion of its former distribution. It appears to require high fire frequency, especially during the growing season, perhaps related to its establishment ecology. The tiny seeds are hyaline-winged. **Phen:** (Late Apr-) May-Jun; Aug. **Tax:** Ward (2012a) defended the recognition of two varieties, albeit without much detail or discussion. **Syn:** = C, F, Fl7, FNA17, G, GW2, K1, K3, NE, NY, RAB, Tn, Tx, Va, WH3; > *Schwalbea americana* Linnaeus – Pennell (1935); > *Schwalbea americana* var. *americana* – K4, Ward (2012a); > *Schwalbea americana* var. *australis* (Pennell) Reveal & C.R. Broome – K4, Ward (2012a); > *Schwalbea australis* Pennell – S, Pennell (1935). NatureServe G2 (Imperiled); USESA E.

Seymeria Pursh 1814 (SEYMERIA, BLACKSENNA)

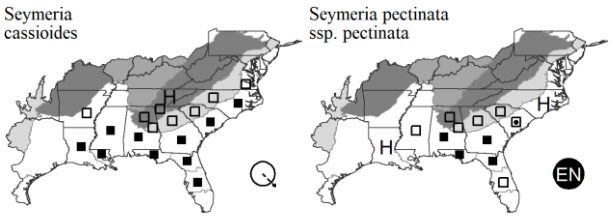
A genus of about 25 species, annual hemiparasitic herbs, of s. North America (including Mexico). References: Pennell (1935); Randle (2019c) in FNA17 (2019).

1 Corolla glabrous on its outer surface; leaf segments linear, < 0.5 mm wide; stem glabrous or puberulent; seeds wingless (though with ridges) ..... ***Seymeria cassioides***

1 Corolla pubescent on its outer surface; leaf segments lanceolate, 1-2 mm wide; stem pubescent; seeds 3-4-winged. ..... ***Seymeria pectinata ssp. pectinata***

Seymeria cassioides (J.F. Gmelin) Blake. SENNA SEYMERIA, YAUPON BLACKSENNA. **Hab:** Dry to moist pinelands, wet pine savannas, longleaf pine sandhills, other dry woodlands, an obligate hemiparasite on *Pinus* spp. **Dist:** Se. VA south to c. peninsular FL, west to LA; disjunct in nc. AL and se. TN (Chester, Wofford, & Kral 1997; Tennessee Flora Committee 2015); n. Bahamas. **Phen:** Aug-Oct. **Syn:** = Ar, Bah, C, F, Fl7, FNA17, G, GW2, K1, K3, K4, RAB, Tx, Va, WH3, Pennell (1935); = *Afzelia cassioides* J.F. Gmelin – S. NatureServe G5 (Secure).

Seymeria pectinata Pursh *ssp*. ***pectinata***. COMB SEYMERIA, COMBLEAF BLACKSENNA. **Hab:** Dry pinelands, longleaf pine sandhills, dry to moist pine flatwoods. **Dist:** Ssp. *pectinata* ranges from se. NC south to n. peninsular FL, west to s. MS, a Southeastern Coastal Plain endemic. **Phen:** Jul-Oct. **Syn:** = FNA17, K1, K3, K4; = *Afzelia pectinata* (Pursh) Kuntze ssp. *pectinata* – S; = *Seymeria pectinata* ssp. *typica* – Pennell (1935); < *Seymeria pectinata* – Fl7, RAB, WH3. NatureServe G4G5TNR (Not Yet Ranked).



392. AQUIFOLIACEAE Berchtold & J. Presl 1825 (HOLLY FAMILY) [in AQUIFOLIALES]

A monogeneric family of about 600 (or more) species, nearly cosmopolitan. References: Loizeau et al (2016) in Kadereit & Bittrich (2016).

Ilex Linnaeus 1753 (HOLLY, WINTERBERRY, GALLBERRY)

A genus of 400-500 species, mostly trees and shrubs, cosmopolitan and widespread in tropical and temperate areas, especially Asia and America. The genus *Nemopanthus* is clearly best subsumed into *Ilex*. References: Godfrey (1988); Krakow (1989); Powell et al (2000); Whittemore [(in prep); Wunderlin & Poppleton (1977).

Identification Notes: Some of our species can be superficially similar to various shrubs and trees of the Rosaceae, in their alternate toothed leaves borne on spur shoots.

1 Leaves coriaceous, evergreen.
2 Leaves with a well-developed apical spine (and usually also marginal spines) 2-6 mm long.

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

3 Flowers in 1-few-flowered axillary cymes, on growth of the same year; upper leaf surfaces somewhat shiny to matte; marginal leaf spines (when present) in the plane of the leaf or mostly declined < 30 degrees from that plane; [native trees of a wide variety of habitats].
..... ***Ilex opaca***

3 Flowers in axillary clusters, on growth of the previous year; upper leaf surfaces very shiny; marginal leaf spines (when present) often strongly oriented below or above the plane of the leaf; [exotic shrubs or small trees usually in suburban or urban areas]
5 Lateral leaf margin spines either 0 or usually > 5 ..... ***Ilex aquifolium***
5 Lateral leaf margin spines usually 0, 2, or 4..... ***Ilex cornuta***

2 Leaves with margins either entire, crenate, serrate, or with marginal spinose prickles < 2 mm long (the apex sometimes mucronate, but not stiff and spinose).
6 Leaves crenate from base to apex, 0.5-4.5 cm long; calyx and corolla 4-lobed.
..... ***Ilex vomitoria***

6 Leaves entire, crenate (if so, only beyond the midpoint), serrate, or with marginal spinose prickles, 2-10 cm long; calyx and corolla 4-lobed or 5-9-lobed.
8 Fruits black; calyx and corolla 5-9-lobed; leaves crenate near the tip or with a few marginal spinose prickles, or entire, with dark punctate dots beneath.
9 Leaves 1.5-3× as long as wide, generally about 2-3 cm wide; leaf margins either entire or with a few, irregularly spaced, marginal spinose prickles that diverge from the margin ..... ***Ilex coriacea***
9 Leaves 3-4× as long as wide, generally about 1 cm wide (almost never > 2 cm wide); leaf margins crenate in the apical 1/2 to 1/3 (almost never entire) .
..... ***Ilex glabra***
8 Fruits red, yellow, or black; calyx and corolla 4-lobed; leaves entire (or with a few spinose serrations), lacking dark punctate dots beneath.
11 Leaves oblanceolate, oblong, or elliptic, 3-12 cm long, (8-) 15-40 mm wide, 2-4× as long as wide; petioles (3-) 5-15 mm long; leaf apex acute, obtuse, or rounded; branchlets strongly ascending, most of them forming an angle of < 45 degrees to the branch ..... ***Ilex cassine***
11 Leaves lanceolate to narrowly oblong, 2-4 cm long, 3-8 mm wide, 3-7× as long as wide; petioles 1-3 (-5) mm long; leaf apex acute to acuminate; branchlets ascending to spreading, most of them forming angles greater than 45 degrees to the branch, and often at right angles .....
..... ***Ilex myrtifolia***

1 Leaves membranous, deciduous.
13 Leaves oblanceolate or obovate, broadest above the middle (to near the middle), 8-30 (-45) mm wide, narrowly cuneate basally, mostly 2-3× as long as wide.
14 Pedicels of fruits and pistillate flowers 2-6 mm long; pedicels of staminate flowers (2-) 4-8 (-16) mm long; leaves mostly gray green, often revolute, especially toward the base; pubescence of the lower leaf surface tomentose, primarily on or near the midrib; leaf margins rarely ciliate.
..... ***Ilex decidua***
14 Pedicels of fruits and pistillate flowers (5.5-) 10-30 mm long; pedicels of staminate flowers (10-) 15-25 mm long; leaves rarely revolute; pubescence of the lower leaf surface strigose, distributed on the surface; leaf margins often ciliate.
..... ***Ilex longipes***

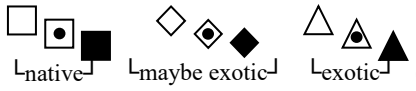
13 Leaves elliptic or ovate, broadest near the middle, (10-) 20-55 mm wide, rounded to broadly cuneate basally, mostly 1-2.5× as long as wide.
17 Veins on undersurface of leaf blades reticulate, defining areoles; fruit surface dull; fruiting pedicels 6-14 mm long (averaging about 10 mm); [of blackwater floodplains and clay-based Carolina bays of the Coastal Plain] ..... ***Ilex amelanchier***
17 Veins on undersurface of leaf blades obscure, not defining areoles; fruit surface shiny; fruiting pedicels either (8-) 10-30 mm long or 2-9 mm long (averaging either < 6 mm or > 15 mm long); [collectively of various habitats, widespread in our area].
19 Nutlets (5-) 6-8 per fruit, smooth on the (curved) back; staminate flower clusters on peduncles 2-6 mm long; pistillate flowers with entire corolla lobes; flowers mostly in axils of leaves on normal shoots; petiole nearly terete in cross-section (or very shallowly channeled on the upper surface).
..... ***Ilex verticillata***
19 Nutlets 4-5 per fruit, with striate ridges on the (curved) back; staminate flower clusters sessile or very short-peduncled (0-2 mm long); pistillate flowers with ciliate corolla lobes; flowers mostly in axils of leaves on lateral short-shoots; petiole with U-shaped channel on its upper side, with white appressed trichomes in the channel.
21 Leaves 2-9 (-10.5) cm long, elliptic to broadly ovate, often nearly round, the apex abruptly to gradually acuminate, the marginal teeth usually inconspicuous; petioles of mature leaves usually < 1 cm long; fruits 5-9 mm in diameter; plant a shrub to 6 m tall; [of the Coastal Plain, Piedmont, and Mountains] ..... ***Ilex ambigua***
21 Leaves 6-16 cm long (the largest, at least, > 8 cm long), narrowly to broadly ovate, the apex long acuminate to attenuate, the marginal teeth rather coarse; petioles of mature leaves usually > 1 cm long; fruits 9-12 mm in diameter; plant a shrub or small tree to 10 m tall; [of the Mountains and upper Piedmont] ..... ***Ilex montana***

Ilex ambigua (Michaux) Torrey. CAROLINA HOLLY. **Hab:** Sandy upland forests, dry slope forests, rarely in pocosin ecotones in the fall-line sandhills region. **Dist:** Ne. NC, se. TN, n. AR, and se. OK south to c. peninsular FL, s. MS, and se. TX; disjunct in the Sierra Madre Oriental and Chiapas, Mexico. **Phen:** Apr-Jun; Aug-Sep. **Tax:** The various taxa that have been distinguished in this complex may have some merit, though a detailed study by Krakow (1989) did not show a clear basis for their recognition. *Ilex buswellii* Small, strictly of xeric habitats (longleaf pine sandhills, Florida scrub) of the Coastal Plain from se. NC southward, has the larger leaves on the plant 2-3.5 (-4) cm long and 0.7-1.7 (-2.5) cm wide. *Ilex ambigua* (*sensu stricto*) is distributed in the Coastal Plain, Piedmont and low Mountains, and has the larger leaves on a plant 3-9 (-10.5) cm long and 1.7-6 cm wide. *Ilex beadlei* of the low Mountains and Piedmont has the larger leaves on a plant 7-9 (-10.5) cm long and 2-6 cm wide. **Syn:** = Ar, Fl7, K3, K4, Krakow (1989); = *Ilex ambigua* var. *ambigua* – RAB, Tn, W, Godfrey (1988); > *Ilex ambigua* (Michaux) Torrey – S, Tx; > *Ilex ambigua* var. *ambigua* – WH3; >< *Ilex ambigua* var. *monticola* (A. Gray) Wunderlin & Poppleton – WH3, Godfrey (1988), misapplied; > *Ilex beadlei* W.W. Ashe – Pa, S; > *Ilex buswellii* Small – S; > *Ilex montana* var. *beadlei* (W.W. Ashe) Fernald – G; > *Ilex montana* var. *mollis* (A. Gray) Britton – C, F, Tx.

Ilex amelanchier M.A. Curtis ex Chapman. SARVIS HOLLY. **Hab:** Banks of blackwater creeks and rivers, clay-based Carolina bays, other pine flatwoods ponds with seasonally flooded hydrology. **Dist:** A Southeastern Coastal Plain endemic: se. NC south to the FL Panhandle and west to se. LA (reports from se. VA appear to be based on confusion of material); disjunct in w. LA (Vernon Parish). **Phen:** Apr-May; Oct-Nov (-Apr). **ID Notes:** The fruits are sometimes persistent until the following spring; the species is perhaps most conspicuous in the winter, when the dull red fruits can be easily seen. **Syn:** = C, F, Fl7, G, GW2, K3, K4, RAB, S, WH3, Godfrey (1988), Krakow (1989). NatureServe G4 (Apparently Secure).

* ***Ilex aquifolium*** Linnaeus. ENGLISH HOLLY, CHRISTMAS HOLLY. **Hab:** Disturbed areas, perhaps only persistent from cultivation. **Dist:** Native of Europe. **Phen:** Mar-Jun. **Syn:** = K3, K4, NE. NatureServe G5 (Secure).

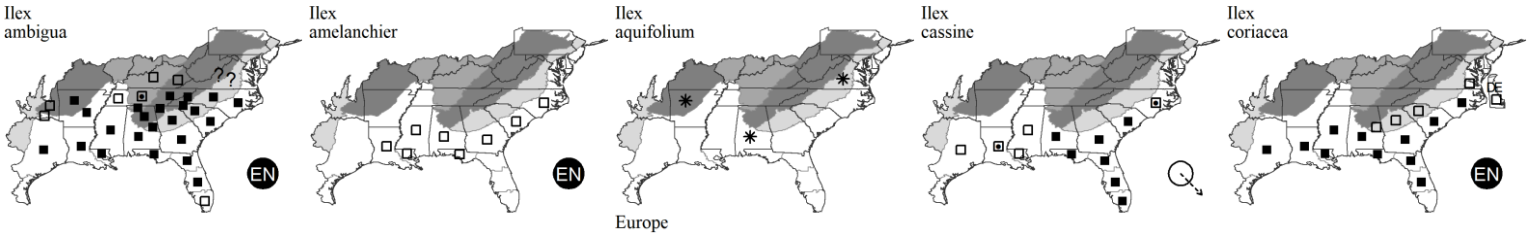
Ilex cassine Linnaeus. DAHOON, CASSENA. **Hab:** Blackwater stream swamps, pocosins, nearly always in very acid peaty or sandy sites. **Dist:** Primarily a Southeastern Coastal Plain endemic: se. NC south to s. FL and west to se. TX; Bahamas, Cuba (González-Gutiérrez 2007), and Mexico. **Phen:** May-Jun; Oct-Nov. **Tax:** *I. cassine* is variable in leaf shape, sometimes approaching *I. myrtifolia*. Some populations in our area show intergradation with or poor differentiation from *I. myrtifolia*, lending some credibility to their treatment as varieties. **Syn:** = Bah, GW2, S, Godfrey (1988); = *Ilex cassine* var. *cassine* – Fl7, RAB, WH3; > *Ilex cassine* var. *cassine* – K3, K4; > *Ilex cassine* var. *latifolia* Aiton – K3, K4, Tx.

Key to Map Symbology:  ←rare ←uncommon ←common (see introduction for more)

* : waif EN : endemic H : historic

N : no P : planted ? : questionable X : extirpated

Ilex coriacea (Pursh) Chapman. BIG GALLBERRY, SWEET GALLBERRY. **Hab:** Pocosins, more restricted to wet, peaty sites than *I. glabra*. **Dist:** A Southeastern Coastal Plain endemic: se. VA south to c. peninsular FL and west to e. TX; slightly disjunct in s. DE. **Phen:** Apr-May; Late Jul-Oct. **Syn:** = C, F, Fl7, G, GW2, K3, K4, RAB, S, Tx, Va, WH3, Godfrey (1988). NatureServe G5 (Secure).



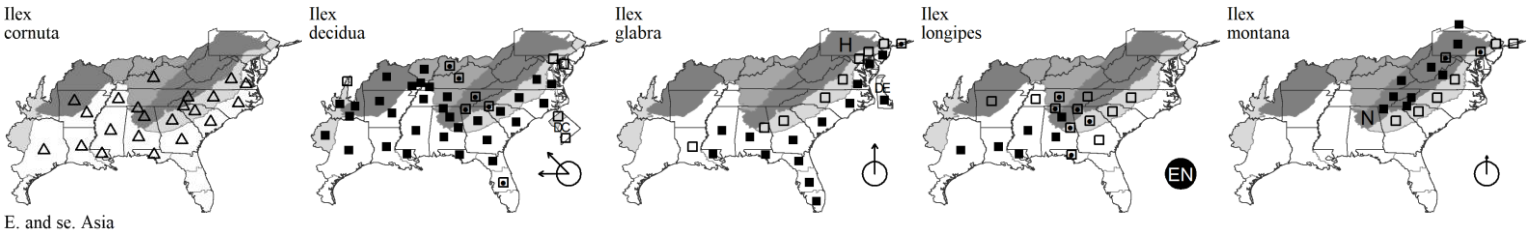
* ***Ilex cornuta*** Lindley & Paxton. CHINESE HOLLY, BURFORD HOLLY. **Hab:** Escaped into forests in (primarily) suburban and urban areas, but certain to become more ubiquitous and increasingly in natural areas. **Dist:** Native of China. Escaped from suburban plantings in AL, NC, KY (Clark et al. 2005) and elsewhere. To be expected throughout the Flora region. **Syn:** = Ar, K3, K4; = n/a – RAB. NatureServe GNR (Not Yet Ranked).

Ilex decidua Walter. POSSUM-HAW. **Hab:** Floodplain forests, less commonly on mesic (or even dry), upland slopes. **Dist:** MD south to Panhandle FL (western peninsula), west to TX on the Coastal Plain, extending also to adjacent provinces (the Piedmont and rarely Mountains in our area), and extending north in the interior to c. TN, w. KY, s. IL, c. MO, se. KS, and e. OK; also disjunct (as an unnamed variety) in the Sierra Madre Oriental of e. Mexico. **Phen:** Mar-May; Sep-Oct. **Tax:** The Mexican material was recognized by Krakow (1989) at the varietal level, but has not been formally named; it is known from a single collection from Nuevo León, Mexico. **Syn:** = S; = *Ilex decidua* Walter var. *decidua* – Tn, Va, Krakow (1989); < *Ilex decidua* Walter – Ar, C, F, G, GrPl, GW2, Il, K3, K4, Mo2, NcTx, Tx, WH3; < *Ilex decidua* Walter var. *decidua* – RAB; > *Ilex decidua* Walter var. *decidua* – Godfrey (1988), also including I. cuthbertii.

Ilex glabra (Linnaeus) A. Gray. LITTLE GALLBERRY, INKBERRY. **Hab:** Savannas, pine flatwoods, pocosin margins, swamps, primarily in wetlands, but extending upslope even into sandhills, with a clay lens or spodic horizon below to maintain additional moisture. **Dist:** NS and ME south to s. FL, west to e. LA and barely w. LA (Pointe Coupee Parish). **Phen:** May-Jun; Sep-Nov. **Syn:** = C, F, Fl7, G, GW2, K3, K4, NE, NY, Pa, RAB, S, Tx, Va, WH3, Godfrey (1988). NatureServe G5 (Secure).

Ilex longipes Chapman ex Trelease. GEORGIA HOLLY, CHAPMAN'S HOLLY. **Hab:** Upland forests. **Dist:** Sc. NC, sc. TN (Chester, Wofford, & Kral 1997), and wc. AR south to Panhandle FL, s. MS, and se. TX. **Phen:** Apr-May; Sep-Oct. **Syn:** = Ar, Fl7, GW2, K3, K4, S, WH3; = *Ilex decidua* var. *longipes* (Chapman ex Trelease) H.E. Ahles – Tn, Godfrey (1988); = *Ilex longipes* Chapman var. *longipes* – Krakow (1989); < *Ilex decidua* var. *longipes* (Chapman ex Trelease) H.E. Ahles – RAB; < *Ilex longipes* Chapman ex Trelease – F, G; > *Ilex longipes* Chapman var. *hirsuta* Lundell – Tx; > *Ilex longipes* Chapman var. *longipes* – Tx.

Ilex montana Torrey & A. Gray ex A. Gray. MOUNTAIN HOLLY. **Hab:** Mesic forests, rarely bogs or bog edges. **Dist:** W. MA and w. NY south to n. GA (reports from n. AL seem to be based on misidentifications), essentially an Appalachian endemic. The range of this species is sometimes stated or shown as broader, extending into the Coastal Plain in our area, and as far south as n. FL, LA, and e. TX, but these reports are based on misidentifications, primarily of the "*beadlei*" component of *I. ambigua*. **Phen:** Apr-Jun; Aug-Sep. **Syn:** = K3, K4, NE, NY, Pa, Va, WV, Krakow (1989); = *Ilex ambigua* var. *montana* (Torrey & A. Gray ex A. Gray) H.E. Ahles – RAB, Tn; = *Ilex ambigua* var. *monticola* (A. Gray) Wunderlin & Poppleton – W; = *Ilex montana* var. *montana* – C, F, G; = *Ilex monticola* A. Gray – S.

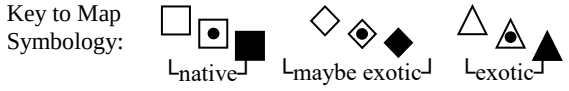


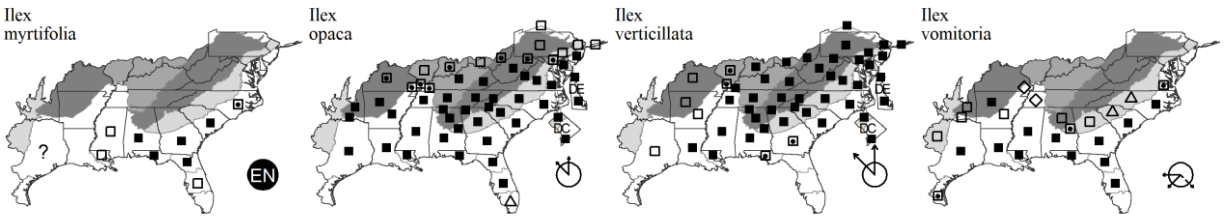
Ilex myrtifolia Walter. MYRTLE HOLLY. **Hab:** Limesink (doline) ponds, pocosins, wet pine savannas. **Dist:** A Southeastern Coastal Plain endemic: se. NC south to n. peninsular FL and west to e. LA (and possibly se. TX?). **Phen:** May-Jun; Oct-Nov. **Comm:** See *I. cassine* for comments about these two taxa. **Syn:** = GW2, K3, K4, S, Tx, Godfrey (1988); = *Ilex cassine* var. *myrtifolia* (Walter) Sargent – Fl7, RAB, WH3. NatureServe G5? (Secure).

Ilex opaca Aiton. AMERICAN HOLLY, CHRISTMAS HOLLY. **Hab:** In a wide variety of forests, ranging from xeric to wetland. **Dist:** MA (? NS and ME), IL, MO, and OK south to c. peninsular FL (apparently naturalized only in s. FL) and TX. **Phen:** Apr-Jun; Sep-Oct. **Comm:** This and *I. krugiana* of s. Florida are our only species of *Ilex* that become medium to large trees. **Syn:** = S, Tx; = *Ilex opaca* var. *opaca* – Ar, Fl7, GW2, K3, K4, Mo2, NE, NY, Va, WH3, Godfrey (1988); < *Ilex opaca* Aiton – C, F, G, Il, Mi, NcTx, Pa, RAB, Tn, W, WV. NatureServe G5T5 (Secure).

Ilex verticillata (Linnaeus) A. Gray. WINTERBERRY, "BLACK ALDER". **Hab:** Bogs, pocosins, swampy forests. **Dist:** NL (Newfoundland) west to MN, south to Panhandle FL and se. TX. **Phen:** Apr-Jun; Sep-Nov. **Syn:** = Ar, Fl7, GW2, Il, K3, K4, Mi, NE, NY, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV, Godfrey (1988); > *Ilex verticillata* var. *padifolia* (Willdenow) Torrey & A. Gray ex S. Watson – C, F, G, Mo2; > *Ilex verticillata* var. *verticillata* – C, F, G.

Ilex vomitoria Aiton. YAUPON. **Hab:** Maritime forests, other dry sandy forests. **Dist:** Widespread in the Southeastern United States, primarily on the Coastal Plain, from e. VA (from Northampton County south) south to c. peninsular FL and west to se. TX; Cuba; Mexico (CHP). **Phen:** Mar-May; Oct-Nov. **Tax:** *I. vomitoria* from the Deep South often has much smaller leaves than plants in the Atlantic Coastal Plain. The Chiapas populations have been accorded variety status as var. *chiapensis* Sharp; they may warrant specific rank or alternatively be nothing more than a pubescent form. **Comm:** In NC and VA, yaupon is nearly restricted to maritime habitats, on the barrier islands and in a narrow band on the mainland, in forests with substantial maritime influence, but is more general southwards in GA, FL, and the Gulf coast. *I. vomitoria* is increasingly popular as an ornamental shrub, and is persistent or establishing inland in areas outside its native distribution, especially in suburban woodlands. The tea produced from its leaves is increasingly appreciated. **Syn:** = Ar, C, F, Fl7, G, GW2, K3, K4, NcTx, RAB, S, Tx, Va, WH3, Godfrey (1988); > *Ilex vomitoria* var. *vomitoria* – Mo2. NatureServe G5 (Secure).



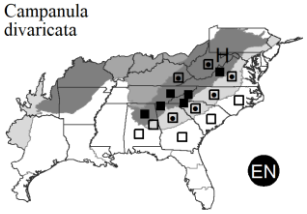


394. CAMPANULACEAE A.L. de Jussieu 1789 (BELLFLOWER FAMILY) [in ASTERALES]

A family of about 80-82 genera and 2000-2400 species, mostly herbs, cosmopolitan. There is controversy about the circumscription of the family, specifically whether subfamily Lobelioideae should be recognized at the family level. Recent phylogenetic studies of the Campanuloideae also suggest that substantial rearrangements of generic boundaries will be needed (Crowl et al. 2014). References: Crowl et al (2014); Eddie et al (2003); Lammers in Kadereit & Jeffrey (2007); Mansion et al (2012); Morin (2020); Rosatti (1986); Shulkina, Gaskin, & Eddie (2003); Yoo et al (2018).

1 Corollas bilaterally symmetrical (zygomorphic); carpels 2; [subfamily *Lobelioideae*]..... ***Lobelia***
1 Corollas radially symmetrical (actinomorphic); carpels (2-) 3-5; [subfamily *Campanuloideae*].
2 Capsule dehiscent apically; flowers solitary or in very diffuse panicles (*Platycodon*, *Wahlenbergia*), or in compact involucrate umbels (*Jasione*); [aliens, generally in weedy or disturbed situations].
..... ***Wahlenbergia***
2 Capsule dehiscent laterally (the pores nearly apical in some *Campanula*); flowers in spikes, racemes, or panicles; [mostly native species of various habitats (some of them weedy)].
5 Inflorescence spicate, the flowers sessile, mostly in the axils of well-developed leaves; corollas rotate and style straight.
..... ***Triodanis***
5 Inflorescence racemose or paniculate, the flowers pedicelled, sometimes axillary to well-developed leaves; corollas campanulate, funnelform, or rotate, with a straight or curved style
7 Corolla campanulate.
..... ***Campanula***
7 Corolla rotate.
..... ***Campanulastrum americanum***

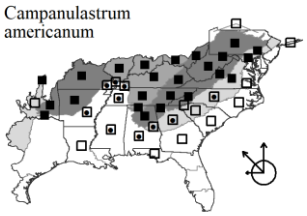
Campanula Linnaeus 1753 (BELLFLOWER)



A genus of about 300-425 species, herbs (rarely shrubby), north temperate, most diverse in s. Europe. The appropriate circumscription remains uncertain and controversial; evidence in recent decades makes clear that species traditionally treated in *Campanula* (or sometimes in segregates usually not recognized) are more closely related to other genera in Campanuloideae (such as *Triodanis*, *Legousia*, *Phyteuma*, etc.). The option to expand *Campanula* to include those genera exists and is advocated by Roquest et al. (2008). Alternatively, divergent groups of '*Campanula*' can be segregated into monophyletic genera. We here follow Park et al. (2006) and especially (for our region) Morin (2020) in recognizing distinctive and evolutionarily long-separated clades in eastern North America at generic rank. Most of the remaining taxa treated here in *Campanula* will also be removed from that genus (they are in the rapunculoid clades), but the best way to do so is not yet clear. *Campanula latifolia* is the type of the genus *Campanula*. References: Lammers in Kadereit & Jeffrey (2007); Morin (2020); Park et al (2006); Roquet et al (2008); Rosatti (1986); Shetler & Morin (1986); Shetler (1982); Shulkina, Gaskin, & Eddie (2003); Sutherland & Galloway (2018); Wilson et al (2020).

1 Corolla rotate.
..... ***Campanulastrum americanum***
1 Corolla campanulate.
..... ***Campanula divaricata***

Campanula divaricata Michaux. SOUTHERN HAREBELL, APPALACHIAN BELLFLOWER. **Hab:** Rock outcrops, cliffs, rocky summits, talus, up to at least 1850m. **Dist:** A broad endemic of the Southern and Central Appalachians: MD and KY south to AL and GA. **Phen:** Jul-Oct; Sep-Dec. **Syn:** = C, F, G, K1, K3, K4, NE, RAB, Tn, Va, W, Rosatti (1986); = *Campanula flexuosa* Michaux – S. NatureServe G4 (Apparently Secure).



Campanulastrum Small 1903 (AMERICAN-BELLFLOWER)

A monotypic genus, an annual or biennial herb, of e. and c. North America. Shetler & Morin (1986) stated that "Small's view [segregating *Campanula americana* into the monotypic genus *Campanulastrum*] appears to have increasing justification from palynological, cytological, and now seed evidence". *Campanulastrum* was also supported as a genus by Shulkina, Gaskin, & Eddie (2003), but combined into *Campanula* by Lammers in Kadereit & Jeffrey (2007) and Roquet et al. (2008). Molecular and morphological evidence shows *Campanulastrum* as

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

more closely related to *Triodanis* and *Legousia* than to *Campanula* s.s., and so needs recognition at genus rank if the course followed in this flora is to be taken (recognizing monophyletic segregate genera, as opposed to expanding *Campanula* further) (see Morin 2020). References: Crowl et al (2014); Mansion et al (2012); Morin (2020); Rosatti (1986); Shulkina, Gaskin, & Eddie (2003).

Campanulastrum americanum (Linnaeus) Small. TALL BELLFLOWER. **Hab:** Moist to fairly dry forests, especially over mafic or calcareous rocks. **Dist:** NY, ON, MN, and SD, south to Panhandle FL, LA, and OK. **Phen:** Late Jun-Sep; Aug-Oct. **Syn:** = K1, K3, K4, Mi, S, Morin (2020); = *Campanula americana* Linnaeus – Ar, C, F, Fl7, G, GrPl, Mo2, Pa, RAB, Tn, Va, W, WH3, Rosatti (1986); > *Campanulastrum americanum* var. *americanum* – Il; > *Campanulastrum americanum* var. *illinoense* (Fresenius) Mohlenbrock – Il. NatureServe G5 (Secure).

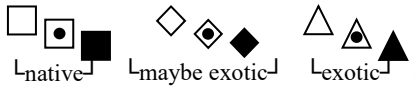
Lobelia Linnaeus 1753 (LOBELIA)

Contributed by D.D. Spaulding, T.W. Barger, and B.A. Sorrie

A genus of over 400 species, herbs, shrubs, trees, cosmopolitan. References: Bowden (1982); Lammers in Kadereit & Jeffrey (2007); McVaugh (1936a); McVaugh (1940a) in Woodson & Schery (1940); Pittman & Sorrie (2020); Rosatti (1986); Spaulding & Barger (2016); Spaulding, Barger, & Horne (2016); Thompson & Lammers (1997).

Identification Notes: Vegetative *Lobelia* can be recognized by their milky sap, and the alternate leaves with obscure, whitish, callus-tipped, and often irregular or divergent teeth.

1 Corolla bright red (faded in dried specimens) or very rarely white, 30-45 mm long; filament-tube (17-) 19-33 (-37) mm long ..... ***Lobelia cardinalis var. cardinalis***
1 Corolla blue, purple, or white, 10-33 mm long; filament-tube 2-15 mm long.
  3 Larger leaves in a basal rosette, linear to linear-oblanceolate; [of wetlands, often growing in shallow to deeper water].
    5 Sinuses of calyx segments with small auricles (best seen on new flowers, often lost on old flowers and fruits); pedicels with very small bracteoles at the base (near the slender, leaf-like bract); corolla (12-) avg. 15-16 (-20) mm long; filament tube (6-) 7-9 (-11) mm long; corolla tube not fenestrate (lacking lateral slits, but older flowers may be torn); larger leaves 10-30 cm long; plants (5-) 8-10 (-15) dm tall ..... ***Lobelia floridana***
    5 Sinuses of calyx segments not auriculate; pedicels lacking bracteoles; corolla (10-) avg. 12-13 (-16) mm long; filament tube 3-4.5 mm long; corolla tube fenestrate (with lateral slits near the base between the calyx lobes); larger leaves 5-15 cm long; plants (4-) 5-6 (-13) dm tall ..... ***Lobelia paludosa***
  3 Larger leaves cauline; [collectively widespread and in a range of habitats].
    8 Flowers smaller, 8-14 mm long (measured from base of calyx); filament tube smaller, 2.5-5 mm long; corolla usually not fenestrate (except sometimes in *L. flaccidifolia*).
      9 Stem leaves very narrow, most less than 5 mm wide (lowest leaves may be broader).
        10 Leaves subulate-filiform (narrowly linear), < 1 mm wide (leaves often deciduous); calyx glabrous; pedicels lacking bracteoles (but bracts present); stems often spongy-thickened toward the base; rhizomes present (the plants therefore forming clones, though the stems often spaced as much as a meter apart) ..... ***Lobelia boykinii***
        10 Leaves linear to linear-oblanceolate, 1-4 mm wide; calyx glabrous or pubescent; pedicel with bracteoles (as well as larger bract); stems not spongy-thickened; rhizomes absent. ..... ***Lobelia nuttallii***
      9 Stem leaves broader, the largest more than 10 mm wide.
        15 Stems long hirsute; fruiting capsules strongly inflated; lower flowers with ovate-leafy bracts; inflorescence usually much branched ..... ***Lobelia inflata***
        15 Stems glabrous or short-pubescent (base sometimes densely pubescent); fruiting capsules not inflated; flowers with smaller bracts; inflorescence branched or unbranched.
          16 Bracteoles conspicuous (somewhat foliaceous) and borne just below the middle of the pedicel (well above larger bract); calyx lobes toothed (some segments may be remotely toothed); flowers 14-20 mm long (measured from base of calyx) ..... ***Lobelia flaccidifolia***
          16 Bracteoles inconspicuous and borne at the base of the pedicel (adjacent to larger bract); calyx lobes mostly entire, rarely with a few teeth, though sometimes ciliate (ignore the leafy bract at the base of pedicel); flowers <15 mm long.
            17 Upper stem leaves oblong or obovate with narrowed bases; leaf margins often entire with tiny glandular teeth or occasionally undulate, crenulate to shallowly dentate; base of stem usually densely puberulent; plants rarely branched (if branched, then from lower two nodes, unless injured or late in season after main inflorescence has fruited); inflorescence spike-like with flowers 7-12 mm long that are borne on all sides; flowering mostly Jun-Aug ..... ***Lobelia spicata***
            17 Upper stem leaves short-ovate with broad, rounded bases (often partially clasping stem); leaf margins usually irregularly toothed with rounded teeth; plants often branched from lower and upper nodes (occasionally unbranched); inflorescence a raceme with flowers 10-15 mm long that are often borne partly on one side (partially secund); flowering mostly May-Jun. ..... ***Lobelia appendiculata***
    8 Flowers relatively large, the corolla (including the hypanthium) 18-33 mm long, fenestrate (with a slit or window on each side of the tube near the base) (or often not fenestrate in *L. flaccidifolia*).
      19 Leaves mostly < 3 cm long and very numerous, usually > 20 (leaves also < 7 mm wide); leaf margins prominently denticulate and apex rounded; sinuses of calyx with distinct auricles that overlap and often completely cover the calyx tube (hypanthium); calyx lobes pectinately toothed ..... ***Lobelia brevifolia***
      19 Leaves 4-15 cm and not as numerous, usually < 20; leaf margins variously toothed or entire and tips acute or rounded; sinuses of calyx with or without auricles; calyx lobes toothed or entire.
        20 Stem leaves linear, lanceolate or oblanceolate (< 1.5 cm wide); lower lip of corolla either densely pubescent (on the upper portion near the opening of throat) or glabrous (glabrescent in the tube) (in *L. species 1*); calyx segments usually toothed (occasionally entire).
          21 Pedicel with two conspicuous bracteoles borne above the base of pedicel (they are linear, somewhat foliaceous, and have acute tips); calyx tube short-pubescent or glabrous (pedicel short-pubescent or glabrous); corolla tube usually not fenestrate (lacking lateral slits); lower leaves usually < 7 mm long, with blunt or acute tips; upper stem leaves usually not strongly denticulate (but gland-tipped teeth are usually present); internodes not geniculate or only slightly so; plants often drying a lighter green ..... ***Lobelia flaccidifolia***

Key to Map Symbology: 

* : waif
EN : endemic
H : historic
N : no
P : planted
? : questionable
X : extirpated

21 Pedicel with inconspicuous bracteoles borne at base and often hidden by bract (bracteoles are oval to oblong with blunt tips and look similar to glandular teeth of bract, except a little smaller); calyx tube either pustular (with wart-like bumps), long-hirsute, or glabrous (the pedicel short to long hirsute or glabrous); corolla tube fenestrate; lower leaves often > 7 mm long, often with sharp tips (but not always); upper stem leaves prominently denticulate (margins with numerous sharp, gland-tipped teeth); internodes often geniculate (zigzag); plants often drying darker. ..... ***Lobelia glandulosa***

20 Stem leaves ovate, elliptic, obovate, oblong or lanceolate and corolla lip glabrous, or corolla lip pubescent basally, but leaves > 1.5 cm wide; calyx lobes toothed or entire.

23 Underside of corolla longitudinally striped with white (looks pinstriped with narrow blue/violet lines with broader white stripes); bracteoles borne above the middle of pedicels just below calyx tube (bracteoles are much smaller than leafy bract that is found at base of the petiole); calyx lobes entire and usually with some long, chaffy hairs on the margins; sinuses of calyx with small to large auricles; filament tube 12-15 mm long..... ***Lobelia siphilitica***

23 Undersurface of corolla not noticeably striped with white; bracteoles located below middle of pedicels, often near base of leafy bract; calyx lobes toothed or entire and margins glabrous or ciliate with sharp-pointed hairs; sinuses of calyx lobes with or without auricles; filament tube 6-11 mm long.

24 Calyx lobes distinctly toothed (leafy bract at base of pedicel also toothed).

25 Sinuses of calyx with prominent drooping auricles (resembling elongated ear lobes); calyx tube (hypanthium) typically densely long-hirsute (occasionally glabrous); stems densely pubescent, sparsely pubescent or sometimes almost glabrous..... ***Lobelia rogersii***

25 Sinuses of calyx lacking auricles or with very small and inconspicuous ones; calyx tube long-hirsute, smooth or glabrous with a warty texture (the bumps are often dark green to whitish); stems sparsely pubescent to glabrous. ..... ***Lobelia georgiana***

24 Calyx lobes mostly entire or with a few lobes that are sparingly toothed (ignore leafy bract at the base of pedicel, which is often glandular-toothed).

27 Auricles very large and conspicuous, covering almost half of calyx tube (resembling drooping ear lobes); lower corolla lip sometimes puberulent on the inside..... ***Lobelia rogersii***

27 Auricles absent or smaller, less than 1/4 length of calyx tube; lower lip of corolla mostly glabrous on the inside.

28 Stems usually densely pubescent throughout (also within inflorescence) with short or long hairs, but occasionally sparsely pubescent to almost glabrous; calyx lobes lanceolate and mostly erect, typically not flexuous or widely spreading; margins of calyx lobes often ciliate, occasionally smooth; calyx tube densely hirsute, sparsely hirsute to glabrous; auricles present or absent; corolla often pubescent on the outside, rarely glabrous. ..... ***Lobelia puberula***

28 Stems sparsely pubescent to glabrous, usually more hairy at the base and mostly glabrous within inflorescence (with only a few scattered hairs); calyx lobes linear or lanceolate and often spreading or flexuous (especially the tip, which are sometimes twisted); margins of calyx lobes glabrous (lacking cilia); calyx tube smooth to warty in texture, rarely sparsely hirsute; auricles absent to almost obsolete; corolla mostly glabrous on the outside.

30 Some calyx segments usually with slender, flexuous teeth (a few lobes occasionally not toothed or only remotely toothed near base, so check several flowers); leaves usually thick with a parchmentlike texture and often with a bluish to gray-green sheen when dried (typically strongly glaucous underneath); uppermost leaves distinctly sender-toothed with callus or gland-tipped teeth ..... ***Lobelia georgiana***

30 All calyx segments entire, not toothed (ignore leafy bract at the base of pedicel, which is often glandular-toothed); leaves thick or thin, whitish to greenish underneath; uppermost leaves entire or toothed (with or without callus or gland-tipped teeth). ..... ***Lobelia amoena***

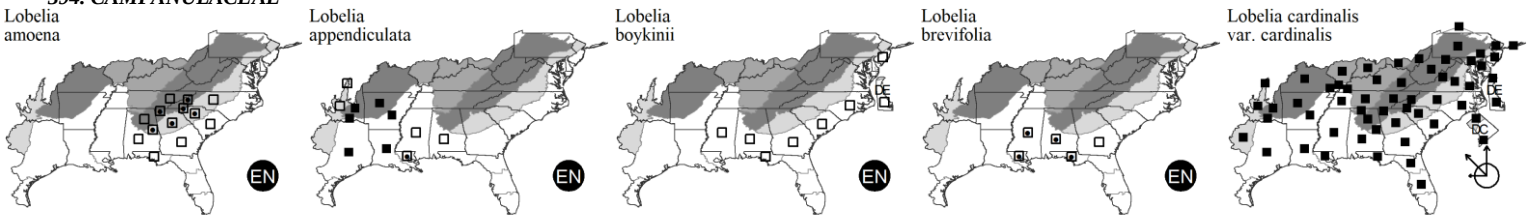
Lobelia amoena Michaux. SOUTHERN LOBELIA. **Hab:** Marshes, streambanks, seeps, floodplain forests. **Dist:** W. NC and e. TN south through w. SC to c. GA and ec. AL; disjunct in FL Panhandle and Coastal Plain of GA and SC. **Phen:** Late Jul-Oct. **Syn:** = C, Fl7, GW2, Il, K4, RAB, S, Tn, McVaugh (1936a), Spaulding & Barger (2016); = *Lobelia amoena* var. *amoena* – K1, K3, WH3; < *Lobelia amoena* Michaux – W. NatureServe G4?TNR (Not Yet Ranked).

Lobelia appendiculata A.L.P.P. de Candolle. PALE LOBELIA. **Hab:** Pinelands, prairies, roadsides, usually in mesic or dry soils. **Dist:** AR and se. KS south to LA and TX; disjunct east of the Mississippi in c. AL, MS, and e. LA. **Phen:** May-Jun. **Syn:** = Ar, GW2, K3, K4, NcTx, S, Tx, McVaugh (1936a), Spaulding & Barger (2016); = *Lobelia appendiculata* Alphonse de Candolle var. *appendiculata* – K1. NatureServe G4G5TNR (Not Yet Ranked).

Lobelia boykinii Torrey & A. Gray ex A.L.P.P. de Candolle. BOYKIN'S LOBELIA. **Hab:** Cypress ponds and depression meadows. **Dist:** NJ and DE south to w. Panhandle FL, s. AL, and s. MS (Sorrie & Leonard 1999). **Phen:** May-Jul (-Aug). **Comm:** See McAvoy & Wilson (2014) for an account of its rediscovery in DE after a 100 year gap and details on its biology. **Syn:** = C, F, Fl7, G, GW2, K1, K3, K4, RAB, S, WH3, McVaugh (1936a), Spaulding & Barger (2016). NatureServe G2G3 (Imperiled).

Lobelia brevifolia Nuttall ex A.L.P.P. de Candolle. SHORTLEAF LOBELIA. **Hab:** Pine savannas, pine flatwoods, and bogs. **Dist:** Endemic to the East Gulf Coastal Plain of c. and w. Panhandle FL, west through s. AL and s. MS to e. LA (Florida Parishes). **Phen:** Jul-Nov. **Syn:** = Fl7, GW2, K1, K3, K4, S, WH3, McVaugh (1936a), Spaulding & Barger (2016). NatureServe G4G5 (Apparently Secure).

Lobelia cardinalis Linnaeus *var*. ***cardinalis***. CARDINAL FLOWER. **Hab:** Streambanks, riverbanks, marshes, swamp forests. **Dist:** NB, QC, ON, MN, CO, UT, and s. CA south to c. peninsular FL, TX, and south through Mexico and Central America to Colombia. **Phen:** (May-) Jul-Oct. **Tax:** See Thompson & Lammers (1997). **Syn:** = C; = *Lobelia cardinalis* Linnaeus – S, McVaugh (1936a); = *Lobelia cardinalis* ssp. *cardinalis* – GW2, Tx, Tx; < *Lobelia cardinalis* Linnaeus – Ar, F, Fl7, G, Il, K1, K3, K4, Mi, Mo2, NcTx, NE, Pa, RAB, Tn, Va, W, WH3, WV, Spaulding & Barger (2016); > *Lobelia cardinalis* ssp. *cardinalis* var. *cardinalis* – Bowden (1982); > *Lobelia cardinalis* Linnaeus ssp. *cardinalis* var. *meridionalis* Bowden – Bowden (1982).



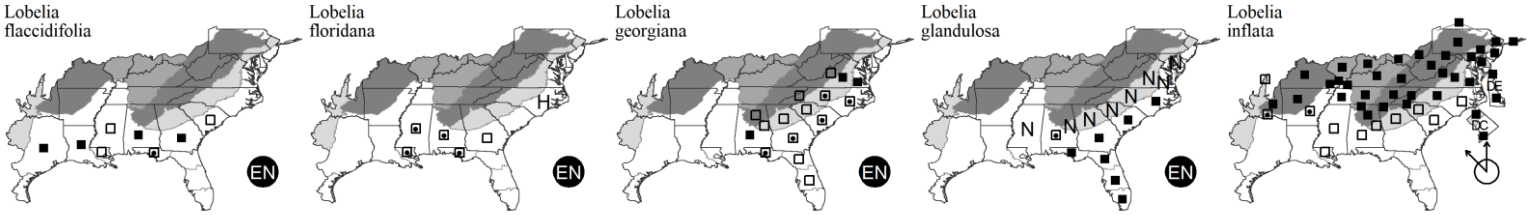
Lobelia flaccidifolia Small. **Hab:** Depression ponds, swampy woods along rivers and streams. **Dist:** C. SC and E. GA south into Panhandle FL, west to sw. AL (and presumably s. MS); disjunct in sw. LA and e. TX. **Phen:** (Apr-) Jun-Sep. **Syn:** = Fl7, GW2, K1, K3, K4, S, Tx, WH3, Spaulding & Barger (2016); > *Lobelia halei* Small – McVaugh (1936a). NatureServe G5 (Secure).

Lobelia floridana Chapman. FLORIDA LOBELIA. **Hab:** Wet pine savannas and flatwoods, depression ponds. **Dist:** S. GA (Jones & Coile 1988) and Panhandle FL west to LA; disjunct in se. NC (historically). McVaugh (1936) reports this species for Wilmington, New Hanover County, NC, based on a collection by MacFarlane in 1909 (PENN). The specimen is correctly identified and there is a written account of MacFarlane visiting the site on the label in 1909, so the record is plausible. **Syn:** = Fl7, GW2, K1, K3, K4, S, Tx, WH3, McVaugh (1936a), Spaulding & Barger (2016). NatureServe G5 (Secure).

Lobelia georgiana McVaugh. **Hab:** Swamps, floodplain forests, wet places. **Dist:** E. VA to Panhandle FL, inland to w. NC and e. TN. **Phen:** Aug-Oct. **Comm:** Very close to *L. elongata* and inhabiting apparently the same habitats; additional taxonomic work is desirable. See McVaugh (1940) for an explanation of the need to replace the name *L. glandulifera* with *L. georgiana*. **Syn:** = C, F, Fl7, G, GW2, K4, Va, Spaulding & Barger (2016); = *Lobelia amoena* Michaux var. *glandulifera* A. Gray – K1, K3, WH3; = *Lobelia glandulifera* (A. Gray) Small – S, McVaugh (1936a); < *Lobelia amoena* Michaux – W; < *Lobelia elongata* Small – RAB.

Lobelia glandulosa Walter. **Hab:** Seepage slopes, pitcherplant bogs, streamhead margins, pine savannas, pine flatwoods, margins of beaver ponds. **Dist:** E. NC (or se. VA?) to s. FL, west to s. AL. **Phen:** Sep-Dec. **Comm:** Prior reports from the Piedmont are erroneous, most referring to *L. elongata* and *L. georgiana*. **Syn:** = C, F, G, GW2, K1, K3, K4, RAB, S, W, WH3, McVaugh (1936a), Spaulding & Barger (2016). NatureServe G4G5 (Apparently Secure).

Lobelia inflata Linnaeus. INDIAN-TOBACCO. **Hab:** Fields, meadows, gardens, open woodlands, disturbed areas. **Dist:** PE west to MN, south to GA, AL, se. MS, e. LA, s. AR, and se. OK. **Phen:** Jul-Nov. **Syn:** = Ar, C, F, G, GrPl, GW2, Il, K1, K3, K4, Mi, Mo2, NE, Pa, RAB, S, Tn, Va, W, McVaugh (1936a), Spaulding & Barger (2016); > *Lobelia inflata* var. *inflata* – WV; > *Lobelia inflata* var. *simplex* (Rafinesque) Millspaugh – WV. NatureServe G5 (Secure).



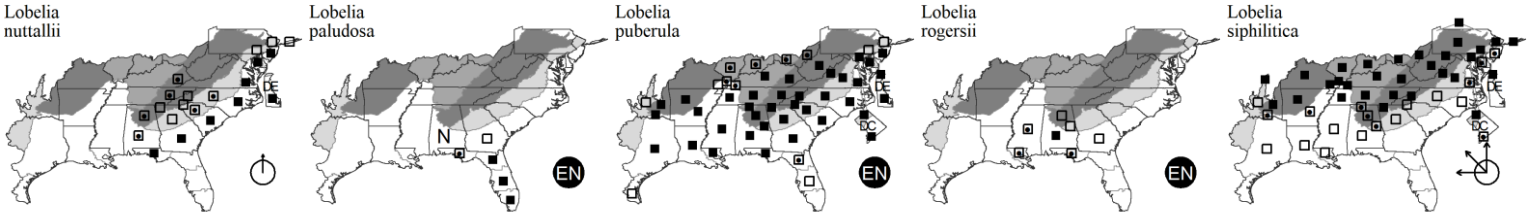
Lobelia nuttallii Roemer & J.A. Schultes. NUTTALL'S LOBELIA. **Hab:** Pine flatwoods, bogs, pine savannas. **Dist:** NY (Long Island) south to FL Panhandle on the Coastal Plain; less commonly disjunct inland to w. NC, w. SC, KY, and TN. **Phen:** May-Nov. **Syn:** = C, F, Fl7, G, GW2, K1, K3, K4, Pa, RAB, S, Tn, Va, W, WH3, McVaugh (1936a), Spaulding & Barger (2016). NatureServe G4G5 (Apparently Secure).

Lobelia paludosa Nuttall. WHITE LOBELIA. **Hab:** Wet pine flatwoods, pine savannas, ditches, dune swales. **Dist:** Se. GA (Jones & Coile 1988) and FL Panhandle south to s. FL. **Phen:** (Feb-) Mar-May. **Syn:** = Fl2, GW2, K1, K3, K4, S, WH3, McVaugh (1936a), Spaulding & Barger (2016). NatureServe G4G5 (Apparently Secure).

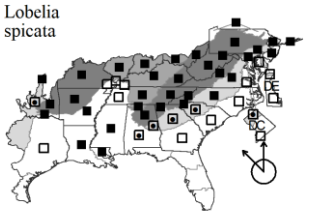
Lobelia puberula Michaux. DOWNY LOBELIA, PURPLE DEWDROP. **Hab:** Forests, openings. **Dist:** NJ, se. PA, s. OH,s. IN, s. IL, se. MO, AR, and OK, south to c. peninsular FL and s. TX. **Phen:** Jul-Oct. **Tax:** A number of varieties are sometimes recognized; see references. **Syn:** = Ar, C, Fl7, G, GW2, K4, Mo2, NcTx, Pa, RAB, S, Tn, Tx, Va, W, WH3, McVaugh (1936a), Spaulding & Barger (2016); = *Lobelia puberula* var. *puberula* – Spaulding & Barger (2016); > *Lobelia puberula* – McVaugh (1936a); > *Lobelia puberula* – McVaugh (1936a); > *Lobelia puberula* var. *mineolana* – K1; > *Lobelia puberula* var. *pauciflora* Bush – K3; > *Lobelia puberula* var. *puberula* – F, K1, K3; > *Lobelia puberula* var. *simulans* – F, Il, K1.

Lobelia rogersii Bowden. MCVAUGH'S LOBELIA. **Hab:** Bogs, wet pine savannas. **Dist:** Endemic to the Gulf Coastal Plain of GA west to e. LA, rarely inland in adjacent provinces of AL. **Syn:** = Fl7, K4, Spaulding & Barger (2016); = *Lobelia* ×*rogersii* Bowden – K3.

Lobelia siphilitica Linnaeus. GREAT BLUE LOBELIA. **Hab:** Bottomlands, moist forests, ditches, wet meadows, streambanks. **Dist:** ME, ON, MN, and WY, south to GA, AL, MS, AR, and TX. **Phen:** Late Jul-Oct. **Syn:** = Ar, K3, K4, Mi, Mo2, Pa, RAB, S, Tn, W, Spaulding & Barger (2016); > *Lobelia siphilitica* var. *ludoviciana* – C, F, G, GrPl, GW2, Il, K1, NcTx, Tx, McVaugh (1936a); > *Lobelia siphilitica* var. *siphilitica* – C, F, G, GrPl, GW2, Il, K1, NE, Va, McVaugh (1936a).



Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



Lobelia spicata Lamarck. PALE SPIKED LOBELIA, BALESPIKE LOBELIA, HIGHBELIA. **Hab:** Meadows, woodlands, disturbed areas. **Dist:** NS west to AB, south to GA, AL, MS, LA, OK, and MT. **Phen:** Late May-Aug. **Syn:** = Ar, GrPl, GW2, K3, K4, Mi, RAB, Tx, W; = *Lobelia spicata* var. *originalis* – McVaugh (1936a); > *Lobelia bracteata* Small – S; > *Lobelia leptostachys* A.L.P.P. de Candolle – S; > *Lobelia spicata* Lamarck – S; > *Lobelia spicata* var. *campanulata* – F, G, K1, NE, WV, McVaugh (1936a); > *Lobelia spicata* var. *hirtella* – Il, NE; > *Lobelia spicata* var. *leptostachya* – Il, misspelling; > *Lobelia spicata* var. *leptostachys* – C, F, G, K1, Mo2, Pa, Tn, Va, WV, McVaugh (1936a); > *Lobelia spicata* var. *scaposa* – C, F, G, K1, Pa, Va, WV, McVaugh (1936a); > *Lobelia spicata* var. *spicata* – C, F, G, Il, K1, Mo2, NE, Pa, Pa, Va, WV.

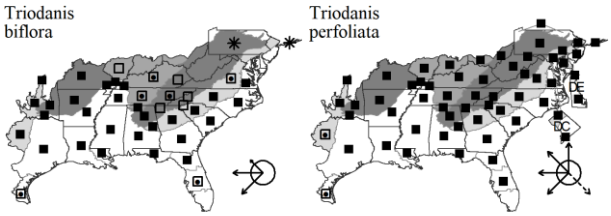
Triodanis Rafinesque 1838 (VENUS'S LOOKING-GLASS)

A genus of 6-8 species, annual herbs, of America. References: Lammers in Kadereit & Jeffrey (2007); McVaugh (1945); McVaugh (1948).

2 Pores at or very near the apex of the capsule; seeds smooth and highly polished; open (chasmogamous) corolla usually 1 (the terminal), the others usually closed (cleistogamous)..... ***Triodanis biflora***
2 Pores well below the apex of the capsule (usually 1-1.5 mm below), usually about midway between apex and base; seeds muriculate or smooth and lustrous; open (chasmogamous) corollas usually several..... ***Triodanis perfoliata***

Triodanis biflora (Ruiz & Pavón) Greene. SOUTHERN VENUS'S LOOKING-GLASS. **Hab:** Roadsides, gardens, glades, disturbed areas. **Dist:** E. VA, KY, KS, AZ, and OR, south c. peninsular FL and Mexico; South America. **Phen:** Apr-Jun. **Syn:** = C, Fl7, GrPl, Il, K1, Mo2, Tx, Va, WH3, McVaugh (1945), Rosatti (1986); = *Specularia biflora* (Ruiz & Pavón) Fischer & C.A. Meyer – F, G, RAB; = *Triodanis perfoliata* (Linnaeus) Nieuwland ssp. *biflora* (Ruiz & Pavón) Lammers – Ar, K3, K4; = *Triodanis perfoliata* var. *biflora* (Ruiz & Pavón) Bradley – NcTx, Pa, Tn, W. NatureServe G5T5 (Secure).

Triodanis perfoliata (Linnaeus) Nieuwland. **Hab:** Roadsides, gardens, glades, dry forests, disturbed areas. **Dist:** ME and BC south to c. peninsular FL and Mexico; West Indies; Ecuador. **Phen:** Apr-Jul. **Syn:** = C, Fl7, GrPl, Il, K1, Mi, Mo2, Tx, Va, WH3, McVaugh (1945), Rosatti (1986); = *Specularia perfoliata* (Linnaeus) A.L.P.P. de Candolle – F, G, RAB, WV; = *Triodanis perfoliata* ssp. *perfoliata* – Ar, K3, K4; = *Triodanis perfoliata* var. *perfoliata* – NcTx, Pa, Tn, W.



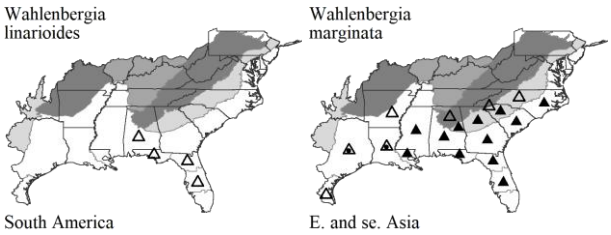
Wahlenbergia Schrader ex Roth 1821 (WAHLENBERGIA)

A genus of ca. 260 species, annual and perennial herbs, and shrubs, of southern South America, southern Africa, e. Asia, and Oceania. *Wahlenbergia* and relatives are of controversial circumscription; see Cupido, Prebble, & Eddie (2013) for details. References: Cupido, Prebble, & Eddie (2013); Lammers in Kadereit & Jeffrey (2007); Rosatti (1986).

1 Hypanthium narrowly obconic to nearly cylindric, 3.5-4.5 mm long at anthesis, lengthening to as much as 12 mm in fruit; fruit opening by 2 terminal pores; perennial..... ***Wahlenbergia linarioides***
1 Hypanthium ellipsoid or ovoid, 1.5-3 mm long at anthesis, lengthening to as much as 7.5 mm in fruit; fruit opening by 3 terminal pores; annual..... ***Wahlenbergia marginata***

* ***Wahlenbergia linarioides*** (Lamarck) A.L.P.P. de Candolle. TUFFYBELLS. **Hab:** Disturbed areas. **Dist:** Native of s. South America. **Syn:** = Fl7, K1, K3, K4, WH3, Rosatti (1986). NatureServe GNR (Not Yet Ranked).

* ***Wahlenbergia marginata*** (Thunberg) A.L.P.P. de Candolle. **Hab:** Soils (especially sandy) along roadsides and in fields. **Dist:** Native of e. Asia and Oceania. Apparently only relatively recently introduced in se. United States, the earliest recorded date 1937 in Alachua County, FL (Rosatti 1986), but now quite common on sandy roadsides. **Phen:** Feb-Dec. **Syn:** = Ar, Fl7, K1, K3, K4, RAB, WH3, Rosatti (1986). NatureServe G4? (Apparently Secure).



Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

400. MENYANTHACEAE Dumortier 1829 (BUCKBEAN FAMILY) [in ASTERALES]

A family of about 5 genera and 40 species, wetland herbs, of cosmopolitan distribution. References: Wood (1983a).

Nymphoides Séguier 1754 (FLOATING HEART)

A genus of about 20 species, aquatic herbs, cosmopolitan. References: Burks (2002); Middleton et al (2018); Ornduff (1969); Tippery et al (2018); Tippery, Les, & Peredo (2015); Wood (1983a).

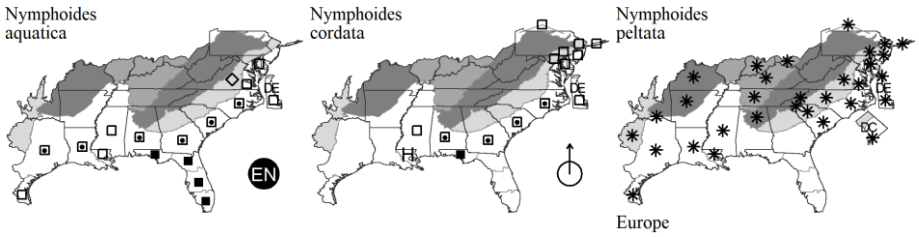
Identification Notes: As the scientific name implies, the leaves of *Nymphoides* bear a superficial resemblance to those of *Nymphaea*. The leaves of *Nymphoides* are more cordate, the two basal lobes more rounded, rather than having a rather sharp corner or angle. *Nymphoides cordata* has much smaller leaves than *Nymphaea*, while the thickly pebbled texturing of *Nymphoides aquatica* is very unlike the glossy smoothness of *Nymphaea*.

1 Floating stems usually with multiple leaves; capsules 12-25 mm long; flowers yellow..... ***Nymphoides peltata***
1 Floating stems with single leaves; capsules 3-14 mm long; flowers white or yellow.
  5 Leaves 5-15 cm wide, roughly pebbled below, thick in texture; stems 1.3-2.5 mm in diameter a few cm below the inflorescence, with conspicuous red spots; tuberous roots of floating clusters stout, blunt-tipped; seeds conspicuously papillate; capsule 10-14 mm long..... ***Nymphoides aquatica***
  5 Leaves 3-7 cm wide, smooth below, thin in texture; stems 0.6-0.9 mm in diameter a few cm below the inflorescence, rarely spotted with red; tuberous roots of floating clusters slender, with pointed tips; seeds smooth (rarely papillate); capsule 4-5 mm long..... ***Nymphoides cordata***

Nymphoides aquatica (Walter ex J.F. Gmelin) Kuntze. BIG FLOATING HEART, BANANA FLOATING HEART. **Hab:** Limesink ponds (dolines), other acidic and nutrient-poor water-filled depressions, sluggish streams, beaverponds, primarily in the Outer and Middle Coastal Plain. **Dist:** A Southeastern Coastal Plain endemic: NJ south to FL and west to TX. **Phen:** Late Apr-Sep. **Tax:** A tetraploid species (2n=36) (Tippery et al. 2018). **Syn:** = C, F, Fl7, GW2, K1, K3, K4, RAB, Tx, Va, WH3, Middleton et al (2018), Wood (1983a); = *Nymphoides aquaticum* – G, S, orthographic variant. NatureServe G5 (Secure).

Nymphoides cordata (Elliott) Fernald. LITTLE FLOATING HEART. **Hab:** Upland depression ponds, sluggish streams, beaverponds, primarily in the fall-line Sandhills. **Dist:** NL (Newfoundland) and ON south MD; disjunct in the Coastal Plain of NC and SC; disjunct from sw. GA and Panhandle FL west to e. LA. **Phen:** Apr-Aug. **Tax:** A tetraploid species (2n=36) (Tippery et al. 2018). **Syn:** = C, F, Fl7, GW2, K1, K3, K4, NE, Pa, RAB, WH3, Middleton et al (2018), Wood (1983a); = *Nymphoides cordatum* – G, orthographic variant; ? *Nymphoides lacunosum* (Ventenat) Kuntze – S, misapplied. NatureServe G5 (Secure).

* ***Nymphoides peltata*** (S.G. Gmelin) Kuntze. YELLOW FLOATING HEART. **Hab:** Ponds. **Dist:** Native of Europe. This European native is sparingly naturalized in e. North America; it is sold for cultivation in water gardens, and will likely become more widely naturalized. **Phen:** May-Sep. **Tax:** A hexaploid species (2n=54) (Tippery et al. 2018). **Syn:** = Ar, C, F, Fl7, GW2, Il, K1, K3, K4, NcTx, NE, Pa, Tx, Va; = *Nymphoides peltatum* – G, orthographic variant. NatureServe G5 (Secure).



402. CALYCERACEAE R. Brown ex Richard 1820 (CALYCERA FAMILY) [in ASTERALES]

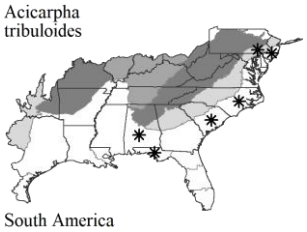
A family of 8 genera and ca. 46 species, perennial and annual herbs, endemic to s. South America. References: Hellwig in Kadereit & Jeffrey (2007); Pozner, Johnson, & Denham (2021).

Acicarpha A.L. de Jussieu 1803

A genus of 3-5 species, of subequatorial South America. References: DeVore (1991); Hellwig in Kadereit & Jeffrey (2007).

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

402. CALYCERACEAE



* ***Acicarpha tribuloides*** A.L. de Jussieu. MADAM GORGON. **Hab:** On ship's ballast near old port-cities; probably no longer present. **Dist:** Native of South America (Brazil, Uruguay, Paraguay, and Argentina). The NC and SC records were both collected by Gerald McCarthy in 1888; though the localities are not specified, the likely sites (based on his itinerary and what is known of the species) are Wilmington (New Hanover County, NC) and Charleston (Charleston County, SC). Reports of *Calycera balsamitifolia* A. Richard (Kartesz 2015), or of *C. sympaganthera* (Ruiz & Pavon) Kuntze (Kartesz 2020) as occurring in NJ and PA are based on misidentified specimens of *Acicarpha tribuloides*. **Phen:** May-Aug. **Comm:** DeVore (1991) discusses ballast plants and the apparent failure of *Acicarpha* to naturalize in North America. This species has not been collected in our area (or North America) since 1888; it is here treated for historical interest and to increase the likelihood that it will be relocated, if it is indeed actually naturalized. Reports of *Calycera* as a ballast waif in NJ and PA are based on misidentified specimens of *Acicarpha tribuloides*. **Syn:** = Fl7, K1, K3, K4, S, WH3, DeVore (1991). NatureServe GNR (Not Yet Ranked).

403. ASTERACEAE Martinov 1820 (ASTER FAMILY) [in ASTERALES]

A family of about 1500-1700 genera and 25,000-35,000 species, herbs, shrubs, trees, and lianas, cosmopolitan in distribution. References: Barkley, Brouillet, & Strother (2006) in FNA19 (2006a); SE1.

Identification Notes: {define liguliflorous, discoid, disciform, radiant, and radiate heads; define various pappus characters. define calyculus. define palea and phyllary}

1 Plant a shrub or liana (woody vine), definitely with woody growth well above ground level ..... ***Key A***
1 Plant an annual, biennial, or perennial, lacking woody growth above ground level.
  2 Leaves opposite or whorled, at least on the lower stem nodes (the leaves higher on the stem sometimes alternate).
    3 Heads discoid or disciform ..... ***Key B***
    3 Heads radiate ..... ***Key C***
  2 Leaves either alternate (not opposite even at lower nodes of the stem) or basal only (the heads on scapiform stems).
    6 Heads liguliflorous (composed of ligulate florets); sap usually milky ..... ***Key D***
    6 Heads discoid, disciform, radiant, or radiate; sap usually clear.
      7 Heads discoid, disciform, or radiant.
        8 Leaves spiny-margined, phyllaries usually spine-tipped; disk flowers pink (rarely blue or yellow) ..... ***Key E***
        8 Leaves not spiny-margined; phyllaries spine-tipped or not; disk flowers variously colored (including pink) ..... ***Key F***
      7 Heads radiate ..... ***Key G***

Key A - woody composites (shrubs and lianas)

1 Leaves strictly alternate; [tribe *Astereae*].
  2 Heads discoid; dioecious shrubs to 5 m tall; [widespread in our area] ..... ***Baccharis***
  2 Heads radiate (most or all on a plant); bisexual shrub to 1 m tall or scrambling liana; [of se. NC southward, native in the Coastal Plain only].
    3 Leaves with clasping base, with a midvein and lateral veins and tertiary reticulation; rays pink or rose; sprawling viny shrub to 4 m tall; [of wet habitats of SC (or se. NC) southward, also cultivated] ..... ***Ampelaster***
    3 Leaves with a cuneate base, with a midvein and otherwise minutely pebbled; rays yellow; intricately branched shrub to 1 m tall, with persistent sterile shoots with evergreen leaves and annual flowering shoots (the entire shoot and leaves deciduous); [of xeric sandy barrens, of se. NC southward] ..... ***Chrysoma***
1 Leaves opposite, at least on the lower stem nodes (the leaves higher on the stem sometimes alternate); [tribe *Heliantheae*].
  4 Heads radiate, ray florets yellow; disc florets yellow; leaves strictly opposite or in part alternate.
    5 Leaves obovate to oblanceolate, unlobed; leaves strictly opposite; [of tidally inundated salt and brackish marshes of the outer Coastal Plain]; [tribe *Heliantheae*; subtribe *Ecliptinae*] ..... ***Borrichia***
    5 Leaves rhombic or pentagonal, unlobed or more often 3-5-lobed; leaves in part alternate; [of disturbed, suburban areas of FL peninsula]; [tribe *Heliantheae*; subtribe *Helianthinae*] ..... ***Tithonia***
  4 Heads discoid or disciform, ray florets lacking; disc florets pink, purple, or whitish; leaves opposite, but usually at least in part alternate higher on the stem; [collectively of various habitats, Coastal Plain and inland].
    ..... ***Iva***

Key B - herbaceous composites with opposite or whorled leaves and discoid or disciform heads (lacking ray florets)

1 Pappus present, of 5-60 barbellate bristles; receptable naked (without paleae or well-developed bristles); [tribe *Heliantheae*; subtribe *Eupatoriae*].
  2 Plant a twining herb, phyllaries and disk florets 4 per head ..... ***Mikania***
  2 Plant stiffly erect to weakly spreading but never twining, phyllaries and disk florets usually > 4 per head.
    3 Leaves in whorls of 3-7, > 2 cm wide ..... ***Eutrochium***
    3 Leaves opposite, rarely alternate or whorled, if whorled, < 2 cm wide.
      4 Achenes (and ovaries) 8-10-ribbed; outer phyllaries longitudinally striate ..... ***Brickellia***
      4 Achenes (and ovaries) (3-) 4-5-ribbed; outer phyllaries not noticeably longitudinally striate.
        5 Heads pink to blue.
          6 Phyllaries in 4-6+ series, deciduous ..... ***Chromolaena***
          6 Phyllaries in 2-4 series, persistent (or deciduous in *Praxelis*).
            7 Heads pink (rarely bluish); receptacles flat; florets 18-25 per head ..... ***Fleischmannia***
            7 Heads blue; receptacles conic; florets 25-70 per head.
              ..... ***Conoclinium***

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5 Heads white to cream or, rarely, pale lilac.
9 Florets 3-7 per head ..... ***Eupatorium***
9 Florets at least 9 per head.
10 Phyllaries not strongly imbricate, with the principal ones subequal and sub-biseriate; petioles 0.5-10 cm ..... ***Ageratina***
10 Phyllaries clearly imbricate, in 3+ series; some species epetiolate ..... ***Eupatorium***

1 Pappus absent, or of scales, setae, or awns; receptacle either naked, or with paleae or well-developed bristles.
11 Leaves whorled, linear, < 2 mm wide; head solitary; [aquatic herb growing in shallow stagnant water] ..... ***Sclerolepis***
11 Leaves opposite (or alternate in part), broader in shape and > 5 mm wide; heads typically not solitary; [terrestrial or wetland plants].
12 Receptacle naked.
13 Pappus of 4-10 scales; heads white, pink, or blue. ..... ***Ageratum***
13 Pappus none, or of a few bristles or irregular coroniform lobes; heads green to yellow.
15 Heads bright yellow, closely aggregated into corymbiform arrays of flat-topped to dome-shaped glomerules ..... ***Flaveria***
15 Heads greenish or greenish yellow, borne in spiciform, racemiform, or paniculiform arrays. ..... ***Iva***
12 Receptable with paleae or well-developed bristles.
17 Heads small, less than 1 cm in diameter at anthesis (the female heads enlarging in *Xanthium*); disc florets dull white or suffused with green or purple; florets mainly unisexual (either in the same heads and then males central and females peripheral, or in separate female and male heads); female florets 0-8 per head; [tribe *Heliantheae*; subtribe *Ambrosiinae*]
18 Heads unisexual; cypselas shed within an indurated bur or "nut" with hooked or straight spines developed from the phyllaries and/or paleae.
19 Involucre of the female heads with tubercles or straight spines developing from the phyllaries; burs 1-8 mm long ..... ***Ambrosia***
19 Involucre of the female heads with hooked spines developing from the phyllaries/paleae; burs 10-35 mm long ..... ***Xanthium***
18 Heads bisexual, with functionally male and female flowers in the same head; cypselas shed individually, not enclosed. ..... ***Iva***
17 Heads larger, mostly > 1 cm in diameter at anthesis; disc florets conspicuously white, yellow, pale yellow, or purple; florets mainly bisexual; female florets > 12 per head (except 2-8 in *Polymnia*).
21 Disc flowers maroon-purple; leaves mainly basal ..... ***Helianthus radula***
21 Disc flowers white, pale yellow, or bright yellow; leaves mainly or strictly cauline.
22 Disc flowers bright yellow.
23 Involucre of phyllaries not subtended by a calyculus ..... ***Acmella***
23 Involucre of phyllaries subtended by a calyculus of bracts obviously different in color, texture, and shape than the phyllaries ..... ***Bidens***
22 Disc flowers bright white or pale yellow.
24 Disc flowers bright white; leaves unlobed or with 2 basal lobes ..... ***Melanthera***
24 Disc flowers creamy or pale yellow; leaves prominently pinnately lobed, with 5-many lobes ..... ***Polymnia***

Key C - herbaceous composites with opposite leaves and radiate heads

1 Involucre of phyllaries subtended by a calyculus of bracts obviously different in color, texture, and shape than the phyllaries; [tribe *Heliantheae*; subtribe *Coreopsidinae*].
2 Phyllaries connate for at least ¼ their length; [MS westwards in our area] ..... ***Thelesperma***
2 Phyllaries distinct; [collectively widespread in our area].
3 Cypselas beaked, not strongly flattened, 7-30 mm long, with 1 groove per face; leaves highly dissected ..... ***Cosmos***
3 Cypselas beakless, more or less strongly flattened and also often winged, 1.2-16 mm long, with 0 or 2 grooves per face; leaves simple to highly dissected.
4 Cypselas 2.5-16 mm long, usually not winged; pappus awns (if present) usually retrorsely barbed ..... ***Bidens***
4 Cypselas 1.2-8 mm long, usually winged; pappus awns (if present) barbless or antrorsely barbed ..... ***Coreopsis***

1 Involucre of phyllaries not subtended by a calyculus (or subtended by a calyculus of narrowly linear segments bearing oil glands in *Dyssodia* and *Thymophylla*).
5 Ray florets white, pink, or purple (rarely pale yellow or lavender).
6 Ray flower persistent on the achene and becoming papery and bleached ..... ***Zinnia***
6 Ray flower articulate from the achene and falling.
7 Pappus of a minute crown; disk florets white or whitish ..... ***Eclipta***
7 Pappus either lacking, or of numerous scales, or of retrorsely barbed awns; disk florets yellow.
8 Annual of disturbed habitats; leaves usually < 1 dm long; phyllaries < 5 mm long ..... ***Galinsoga***
8 Perennial of native habitats; leaves > 1 dm long; phyllaries > 6 mm long ..... ***Polymnia***
5 Rays predominantly yellow, orange, or red (sometimes with some brown, maroon, or purple coloration as well).
9 Receptacle naked, epaleate.
10 Leaves and phyllaries with large, scattered, embedded oil glands, translucent in living plants, usually golden-brown or blackish in herbarium specimens), making the plants strongly aromatic; annual plants, decumbent and much branched from the base (except *Tagetes*, annual and generally erect and sparingly branched); [tribe *Heliantheae*; subtribe *Pectidinae*].
11 Leaves unlobed, entire (though with marginal setae) ..... ***Pectis***
11 Leaves pinnately lobed, the margins also often serrate.
12 Pinnate leaf segments lanceolate, 3-10 mm wide; calyculus absent ..... ***Tagetes***
12 Pinnate leaf segments linear, 1-3 mm wide; calyculus present, subtending the involucre, of linear bracts. ..... ***Thymophylla***
10 Leaves and phyllaries lacking embedded oil glands, though smaller punctate glands sometimes present; perennial or annual plants, upright and little or moderately branched below the inflorescence.
14 Phyllaries 6 (-9), in 1 series; disc florets 1-15 ..... ***Flaveria***
14 Phyllaries 12-26, in 2-3 series; disc florets 20-150.
15 Pappus of 5-6 aristate scales; [exotic, rare waif in our area] ..... ***Hymenoxys***
15 Pappus of barbellate bristles (or absent); [native, collectively fairly widespread in our area].
16 Phyllaries 12-18; rays usually 8-16; leaves mainly basal or basally disposed (a few pairs low on the stem); [on various, usually acid substrates, in the Coastal Plain and Piedmont from NJ and PA south to n. and Panhandle FL] ..... ***Arnica***

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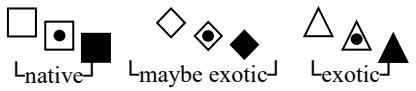
16 Phyllaries broadly ovate, squarrose, in several imbricate series; rays usually 8; leaves cauline; [on calcareous substrates in n. AL] ..... ***Jamesianthus alabamensis***

9 Receptacle paleate, with paleae, bristles, or scales.
17 Disk florets functionally staminate ("sterile", not producing cypselas), the style undivided, their ovaries much smaller than those of the ray flowers (which are functionally pistillate).
18 Inner phyllaries prickly with straight or uncinate prickles, and each enveloping a cypsela and swelling into a bur-like structure..... ***Acanthospermum***
18 Inner phyllaries unarmed, not becoming bur-like (though those of *Melampodium* do invest the fruit).
19 Outer phyllaries orbicular, connate 1/4 - 1/3 of their lengths; [alien, rare] ***Melampodium***
19 Outer phyllaries orbicular to narrower, not connate; [native, collectively widespread in our area].
20 Slender, small plants, the stems to 5 dm long, often trailing; pappus persistent, forming a crown ***Chrysogonum***
20 Taller, robust plants, the stems usually 5-40 cm long at maturity, erect; pappus absent or of 2 awns.
21 Cypselas strongly flattened, borne in 2-3 series from the 2-3 series of ray florets ***Silphium***
21 Cypselas thick, not flattened, borne in 1 series from the 1 series of ray florets ***Smallanthus***
17 Disk florets functionally bisexual ("fertile", producing cypselas), the style divided, their ovaries as large as, or larger than, those of the ray florets (which may be either functionally pistillate or completely neuter).
22 Ray corolla persistent on the achene and becoming papery and bleached.
23 Plant a perennial; cypselas subterete, 4-5 mm long ***Heliopsis***
23 Plant an annual; cypselas 3-angled or flattened, 6-10 mm long ***Zinnia***
22 Ray corolla articulate from the achene and falling after flowering.
25 Paleae flattened, not notably clasping the cypsela; cypsela usually notably flattened in the same plane as the phyllaries and the paleae, i.e. at a right angle to the radii of the head; heads small, the receptacle 3-8 mm in diameter. ***Calyptocarpus vialis***
25 Paleae conduplicate (V-shaped in cross section), the 2 sides of the V partially clasping the cypsela; cypsela either subterete, multi-angled in ×-section, or flattened parallel to the radii of the head; heads mostly larger.
27 Phyllaries apparently 4 (the 4 outer foliaceous phyllaries forming a quadrangle which hides the much smaller and narrower inner phyllaries) ..... ***Tetragonotheca***
27 Phyllaries not as above (5 or more phyllaries readily visible).
28 Cypselas (of at least the disk florets) strongly flattened and generally also winged.
29 Cypselas 1-2.5 mm long; herb to 2 dm tall (erect or creeping) ***Acmella***
29 Cypselas 3-7 mm long; herb to 1-40 dm tall (erect) ***Verbesina***
28 Cypselas subterete, quadrangular, variously angled, or diamond-shaped in ×-section, not winged.
30 Ray florets pistillate ("fertile").
31 Erect herb; leaves entire or with a few teeth; peduncles < 3 cm long ***Pascalia glauca***
31 Creeping herb; leaves serrate and also mostly 3-lobed; peduncles 3-10 cm long ***Sphagneticola trilobata***
30 Ray florets completely neuter.
32 Leaves linear, lanceolate, or ovate, almost always some leaves on a plant > 7 mm wide; plants from crowns, some species with thickened vertical storage roots (only *H. tuberosus* producing horizontal tubers); [collectively widespread in our area] ..... ***Helianthus***
32 Leaves linear, 0.5-7 mm wide; plants from slender horizontal tubers; [of Coastal Plain of FL and s. AL] ***Phoebanthus***

Key D - herbaceous composites with leaves alternate or basal, liguliflorous heads (composed of ligulate florets), and sap usually milky

1 Cypselas (at least of the inner florets of the head) beaked.
2 Heads solitary and terminal at the end of a stem unbranched to its base.
3 Leaves basal and cauline, grasslike (untoothed and unlobed); stem leafy ***Tragopogon***
3 Leaves basal only, variously toothed to pinnately lobed; stem scapiform (leafless). ***Taraxacum***
2 Heads several per stem, in various corymbiform, umbelliform, spiciform, or paniculiform arrays (rarely solitary and terminal in the smallest and most depauperate individuals in a population.
6 Achenes distinctly flattened ***Lactuca***
6 Achenes terete or prismatic.
7 Pappus of plumose bristles, at least the inner series; plant an annual or biennial. ***Hypochaeris***
7 Pappus of simple capillary bristles; plant an annual, biennial, or perennial.
9 Beak of the cypsela with a ring of soft white reflexed hairs at the summit (just below the pappus) ***Pyrrhopappus***
9 Beak of the cypsela lacking a ring of hairs as described. ***Crepis***

1 Cypselas beakless.
12 Leaves basally disposed (stem leaves few or none, if present generally smaller in size than the basal leaves, which are persistent into flowering and fruiting); corollas yellow, orange, or red.
13 Pappus absent or of both scales and barbellulate bristles ***Krigia***
13 Pappus of bristles only (these barbellulate or plumose).
15 Leaves with entire margins; plants perennials, either from long to short rhizomes or from a short caudex with fibrous roots ***Hieracium***
15 Leaves coarsely toothed or pinnately lobed; plants annuals, from a taproot.
16 Involucre 5-12 mm high; achenes usually > 2.5 mm long; pappus bristles distinct, 3-7 mm long ***Crepis***
16 Involucre 3-5 mm high; achenes 1.5-2.5 mm long; pappus bristles basally connate, 2.5-3.5 mm long ***Youngia***
12 Leaves basal and cauline (plant often beginning with a basal rosette, but by flowering bearing well-developed stem leaves about as large as the basal leaves, the basal rosette often withering prior to flowering and fruiting); corollas yellow, orange, red, blue, pink, white, or lavender.
17 Pappus absent or of scales.

Key to Map Symbology: 

18 Corollas pale blue (rarely pink or white)..... ***Cichorium***
18 Corollas yellow (rarely orange).
20 Stem winged and spiny; leaves spiny-margined; receptacle with paleae ..... ***Scolymus***
20 Stem not winged or spiny; leaves not spiny-margined; receptable lacking paleae.
..... ***Krigia***
17 Pappus of numerous smooth, barbellate, or plumose bristles.
22 Cypselas more or less strongly flattened.
23 Pappus of 30-45+ bristles, these at least partly plumose..... ***Picris***
23 Pappus of simple capillary bristles only ..... ***Sonchus***
22 Cypselas terete or prismatic, slightly or not at all flattened.
24 Corollas pink, purple, lavender, white, or creamy-yellow.
25 Leaves linear, entire, < 3 mm wide, or reduced to scales; cypselas 11-14 mm long; [of the Coastal Plain of GA and se. AL south to s. FL].....
..... ***Lygodesmia***
25 Leaves broader, of various shapes, usually hastate, irregularly lobed, and/or serrate; cypselas 3.5-10 mm long; [collectively widespread in our area, south to n. FL]..... ***Nabalus***
24 Corollas bright yellow, orange, or red.
26 Plants taprooted annuals and biennials (rarely perennials); pappus bristles white and soft in texture..... ***Crepis***
26 Plants fibrous-rooted perennials; pappus bristles white, light to medium tan, or sordid, stiff.
..... ***Hieracium***

Key E - herbaceous composites with leaves spiny, leaves alternate or basal, and heads discoid

2 Stem winged, the wings armed with spines.
3 Pappus of plumose bristles..... ***Cirsium arvense***
3 Pappus of barbellulate bristles.
4 Cypselas borne on the surface of the receptacle, intermixed with setiform scales; foliage glabrous or more loosely and sparsely pubescent..... ***Carduus***
4 Cypselas borne in the pits of the naked honeycombed receptacle; foliage densely white-tomentose..... ***Onopordum***
2 Stem not winged.
5 Leaves green with white mottles ..... ***Silybum***
5 Leaves green.
6 Disk flowers pink (rarely white) ..... ***Cirsium***
6 Disk flowers yellow.
7 Pappus of numerous plumose bristles..... ***Cirsium***
7 Pappus absent or of scales or barbellulate bristles.
8 Cypselas 4-angled; receptacles bearing subulate scales..... ***Carthamus***
8 Cypselas terete, 20-ribbed; receptacles bearing flattened bristles..... ***Centaurea benedicta***

Key F - herbaceous composites with leaves not spiny, alternate or basal, heads disciform or discoid (or rarely radiant)

1 Flowers pink, lavender, or purplish; phyllary appendages scarious and spineless, decurrent along the phyllary margin nearly to the phyllary base.....
..... ***Centaurea***
1 Flowers blue; phyllary appendages not or only slightly decurrent along the phyllary margins..... ***Cyanus***

Key from FOV - for editing and augmentation:

1 Receptacles with paleae or bristles.
2 Pappus lacking or of scales or awns.
3 Pappus lacking.
4 Involucre of dentate or fimbriate phyllaries..... ***Centaurea***
4 Involucre of the pistillate heads a bur with hooked prickles ..... ***Xanthium***
3 Pappus present.
5 Phyllaries dentate or fimbriate..... ***Centaurea***
5 Phyllaries entire..... ***Marshallia***
2 Pappus of bristles.
6 Phyllaries fimbriate, dentate, or spiny; leaves often prickly or spiny..... ***Centaurea***
6 Phyllaries entire, leaves not prickly or spiny.
8 Phyllaries hooked at tip; heads forming burs at maturity..... ***Arctium***
8 Phyllaries not hooked at tip; heads not forming burs at maturity.
9 Heads larger, the involucre 6-15 mm high, with 15-40 phyllaries; leaves with conspicuous (at least at 10× magnification) resin dots.....
..... ***Carphephorus***
9 Heads small, the involucre 3.5-6 mm high, with 5-12 phyllaries; leaves without shining punctate glands (except punctate-glandular in *Litrisa*, of the FL peninsula).
..... ***Trilisa***
1 Receptacles naked.
11 Pappus lacking or of scales or awns.
12 Disk florets blue or purple.
13 Heads few-flowered, aggregated into secondary heads with leafy bracts..... ***Elephantopus***
13 Heads many-flowered, not aggregated into secondary heads..... ***Vernonia***
12 Disk florets yellow to yellowish green or reddish to reddish brown.
14 Cypselas winged and spined; heads sessile in the branch forks ..... ***Soliva***

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14 Cypselas not winged and spined; heads not sessile in the branch forks.
15 Inflorescence elongate, paniculiform, spiciform, or racemiform ..... ***Artemisia***
15 Inflorescence a flat-topped corymb, or heads solitary.
16 Receptacle strongly convex and pointed; plants pineapple-scented ..... ***Matricaria***
16 Receptacle flat to convex; plants scented, but not of pineapple ..... ***Tanacetum***
11 Pappus of capillary bristles.
17 Heads yellow.
18 Perennial; leaves remotely toothed to entire; [of shale barrens] ..... ***Packera***
18 Annual; leaves irregularly toothed to pinnatifid; [weed of disturbed soil] ..... ***Senecio***
17 Heads white, whitish, pink, purple, red,
19 Florets all perfect.
21 Phyllaries in essentially one series; leaves palmately veined, ovate to reniform ..... ***Arnoglossum***
21 Phyllaries in several series; leaves variously veined, linear to broadly ovate.
22 Heads white or whitish; [of uplands] ..... ***Brickellia***
22 Heads pink to red or violet to deep purple or, rarely, white; [of uplands or wetlands].
23 Pappus bristles of one length ..... ***Liatris***
23 Pappus double with inner bristles long and the outer very short ..... ***Vernonia***
19 Some or all florets pistillate.
24 Leaves not white-woolly.
25 Phyllaries in essentially one series; fresh plants not strongly scented ..... ***Erechtites***
25 Phyllaries in several series; fresh plants with a strong, aromatic fragrance ..... ***Pluchea***
24 Leaves white woolly, at least beneath.
26 Plants dioecious.
..... ***Antennaria***
26 Plants not dioecious.
28 Blooming Mar-Jul; pappus bristles united at base ..... ***Gamochaeta***
28 Blooming mostly Jul-Nov; pappus bristles distinct.
..... ***Pseudognaphalium***

Key G - Herbaceous composites with the leaves alternate or basal and the heads radiate

1 Ray florets yellow to orange.
2 Receptacles chaffy.
3 Disk florets sterile with style undivided ..... ***Silphium***
3 Disk florets fertile with style bifurcate.
4 Leaves decurrent down the stem; cypselas strongly flattened and often winged ..... ***Verbesina***
4 Leaves not decurrent; cypselas moderately compressed, not winged.
5 Receptacular bracts connate to form a honeycomb-like structure in which the flowers are set; pappus of 7-12 scales ..... ***Balduina***
5 Receptacular bracts not fused; pappus of awns or a fused crown.
6 Receptacles flat ..... ***Helianthus***
6 Receptacles conical or columnar ..... ***Rudbeckia***
2 Receptacles naked, rarely with bristles.
7 Pappus of scales or a crown.
8 Heads small, with disk < 5 mm wide and ray florets < 5 mm long ..... ***Amphiachyris***
8 Heads larger, with disk > 5 mm wide and ray florets > 5 mm long ..... ***Helenium***
7 Pappus of bristles, sometimes also with shorter outer scales.
9 Phyllaries in one series.
..... ***Packera***
9 Phyllary in 2+ series.
11 Pappus double.
12 Ray florets without pappus ..... ***Heterotheca***
12 Ray florets with pappus (similar to that of disk florets).
13 Leaves pinnately veined, usually broader and not grasslike ..... ***Chrysopsis***
13 Leaves parallel-veined, linear and grasslike ..... ***Pityopsis***
11 Pappus simple.
15 Plants taprooted [of dry Coastal Plain sands from se. VA southwards] ..... ***Croptilon***
15 Plants not taprooted [widespread].
16 Inflorescences flat-topped corymbs; leaves resinous-punctate, narrow, entire, sessile or subsessile ..... ***Euthamia***
16 Inflorescences rarely flat-topped; leaves not resinous-punctate, usually not linear, often toothed and petiolate ..... ***Solidago***
1 Ray florets white or whitish to pink or purple.
17 Receptacles chaffy.
18 Phyllaries dry, scarious-margined.
19 Ray florets 1–5 mm long; heads small in corymbiform arrays ..... ***Achillea***
19 Ray florets > 5 mm long; heads large, terminating the branches ..... ***Anthemis***
18 Phyllaries herbaceous, not scarious on margins.
20 Ray florets < 2.5 mm long; disk florets sterile, with an undivided style ..... ***Parthenium***
20 Ray florets > 5 mm long; disk florets fertile, with a divided style.
21 Ray florets pink or light purple, > 15 mm long; heads single ..... ***Echinacea***
21 Ray florets white, 5–10 mm long; heads 20-100 in a compound corymb ..... ***Verbesina***
17 Receptacles naked.
22 Pappus lacking.
23 Leaves basal; mature plants < 2 dm tall ..... ***Bellis perennis***

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23 Leaves on stem; mature plants > 2 dm tall ..... ***Leucanthemum***
22 Pappus present.
24 Taprooted annuals; ray florets 1–7 mm long.
25 Leaves and stems not fleshy, rarely glabrous; cypselas < 1.4 mm long ..... ***Erigeron***
25 Leaves and stems fleshy, mostly glabrous; cypselas > 1.4 mm long ..... ***Symphyotrichum***
24 Not taprooted and mostly perennials; ray florets > 3 mm long.
26 Ray florets usually > 60; blooming Apr-Oct ..... ***Erigeron***
26 Ray florets rarely > 60; blooming late May-Nov.
27 Receptacles hemispheric to conic; pappus often with 2-4 awns ..... ***Boltonia***
27 Receptacles flat to slightly convex; pappus lacking awns.
28 At least the basal and lower leaves both petiolate and cordate/subcordate at base.
29 Often colonial; inflorescence corymbiform, flat-topped or rounded; outer phyllaries > 1 mm broad ..... ***Eurybia***
29 Not colonial; inflorescence paniculiform, often elongate; outer phyllaries < 1 mm broad ..... ***Symphyotrichum***
28 Basal and lower leaves not both petiolate and cordate/subcordate at base.
30 Leaves sessile and auriculate or cordate-clasping ..... ***Symphyotrichum***
30 Leaves petiolate or epetiolate but not auriculate or cordate-clasping.
31 Cypselas glandular; pappus double ..... ***Oclemena***
31 Cypselas not glandular; pappus single or double or in four series.
32 Leaves silvery-silky on both sides (at least when young), entire ..... ***Symphyotrichum***
32 Leaves not silvery-silky, entire or toothed.
33 Pappus double, with inner bristles distinctly longer than outer bristles.
34 Leaves not rigid, veiny, lanceolate to elliptic or ovate, > 6 mm wide ..... ***Doellingeria***
34 Leaves rigid, 1-nerved, linear to linear-spatulate, < 5 mm wide ..... ***Ionactis linariifolia***
33 Pappus simple with all bristles often about the same length.
35 Ray florets white, few (usually 3–8); cypselas densely silky ..... ***Sericocarpus***
35 Ray florets white to pink or blue or purple, more numerous (usually 8–30); cypselas glabrous to pubescent but not densely silky.
36 Ray florets white; involucres < 6 mm long; phyllaries < 1 mm wide ..... ***Symphyotrichum***
36 Ray florets white or pink to blue or purple; involucres 7–12 mm long; phyllaries usually > 1 mm wide.
37 Phyllaries glandular ..... ***Eurybia***
37 Phyllaries not glandular.
38 Phyllaries long-attenuate or loose and spreading ..... ***Symphyotrichum***
38 Phyllaries appressed, not long-attenuate.
39 Plants coarse-hairy; lowest leaves > 5 cm wide ..... ***Aster***
39 Plants glabrous to hairy; lowest leaves < 3 cm wide ..... ***Eurybia***

Acanthospermum Schrank 1820 (PARAGUAY BUR)

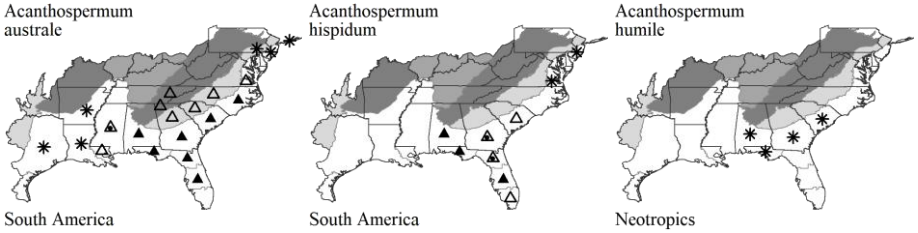
A genus of about 6 species, herbs, of tropical America. References: SE1; Strother (2006kk) in FNA20 (2006b).

1 Stems prostrate and rooting at the nodes; bur 7-9 mm long, slightly compressed, strongly 5-7-ribbed ..... ***Acanthospermum australe***
1 Stems erect; bur 2-6 mm long, obviously compressed, obscurely ribbed or 3-ribbed.
2 Leaves (2-) 4-12 (-15) cm long, sessile or subsessile; bur with prickles on all surfaces ..... ***Acanthospermum hispidum***
2 Leaves 1-3 (-4.5) cm long, petiolate, the petiole 4-18 mm long; bur unarmed or nearly so on the side faces, the prickles along the ribs and around the tip ..... ***Acanthospermum humile***

* ***Acanthospermum australe*** (Loefling) Kuntze. PARAGUAY BUR, SHEEP BUR, PARAGUAY STARBUR. **Hab:** Disturbed areas. **Dist:** Native of South America. **Phen:** (Mar-) May-Nov. **Syn:** = Ar, C, F, Fl7, FNA21, G, K1, K3, K4, NY, RAB, S, SE1, Tx, Va, WH3. NatureServe G5 (Secure).

* ***Acanthospermum hispidum*** A.P. de Candolle. HISPID STARBUR. **Hab:** Disturbed areas, soybean and peanut fields, gardens. **Dist:** Native of n. South America. First reported from SC by Hill & Horn (1997). **Phen:** Jul-Nov. **Syn:** = Fl7, FNA21, K1, K3, K4, NY, S, SE1, WH3. NatureServe G5 (Secure).

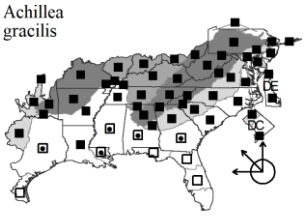
* ***Acanthospermum humile*** (Swartz) A.P. de Candolle. LOW STARBUR. **Hab:** Disturbed areas. **Dist:** Native of the West Indies. Reported for SC by Nelson (2003). **Syn:** = Bah, Fl7, FNA21, K1, K3, K4, S, SE1, WH3. NatureServe GNR (Not Yet Ranked).



Achillea Linnaeus 1753 (YARROW, MILFOIL, THOUSAND-LEAF)

A genus of about 115 species, herbs, primarily Eurasian. References: Arriagada & Miller (1997); SE1; Guo et al (2005); Guo, Ehrendorfer, & Samuel (2004); Ramsey, Robertson, & Husband (2008); Trock (2006) in FNA19 (2006a).

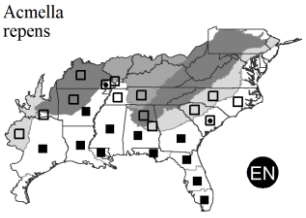
Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



Achillea gracilis Rafinesque. EASTERN YARROW, EASTERN THOUSANDLEAF. **Hab:** Grassy balds, meadows, pastures, roadsides, disturbed areas. **Dist:** Widespread in e. North America. **Phen:** Apr-Nov. **Tax:** The *Achillea millefolium* aggregate is a taxonomically very complex entity, with races of different ploidies, and both introduced and native genotypes in e. North America. Ramsey, Robertson & Husband (2008) recommended treating native North American races as *A. borealis*; most eastern North American populations represent native North American races, most closely allied to e. Asian taxa, with only a few collections of European races from near old port cities (Ramsey, pers. comm.; Ramsey 2011; Levin 2011). Later work suggests that *A. borealis* should be narrowly applied to a western North American entity, and that the oldest name available for native eastern North American *Achillea* is *A. gracilis*, a course followed here. **Syn:** = *Achillea lanulosa* Nuttall – F, Arriagada & Miller (1997); = *Achillea millefolium* ssp. *lanulosa* (Nuttall) Piper – C, G, GrPl, W; = *Achillea millefolium* var. *occidentalis* A.P. de Candolle – K1; < *Achillea borealis* Bongard – Ramsey, Robertson, & Husband (2008); < *Achillea millefolium* Linnaeus – Ar, Fl7, FNA19, K4, Mi, NcTx, NY, Oh3, Pa, RAB, SE1, Tn, Va, WH3; < *Achillea millefolium* ssp. *lanulosa* (Nuttall) Piper – NE; > *Achillea millefolium* var. *lanulosa* (Nuttall) Piper – Il; >< *Achillea millefolium* var. *millefolium* – Il.

Acmella L.C. Richard ex C.H. Persoon 1807 (SPOTFLOWER)

A genus of about 30 species, herbs, primarily of tropical distribution. References: SE1; Jansen (1985); Strother (2006uu) in FNA21 (2006c).



Acmella repens (Walter) L.C. Richard in Persoon. CREEPING SPOTFLOWER. **Hab:** Floating vegetation mats, roadsides, streambanks, other moist, open, habitats. **Dist:** Se. NC south to s. FL, west to e. TX, north in the Mississippi Embayment to w. TN and s. MO. **Phen:** Jul-Dec. **Tax:** Jansen (1985) treats this as var. *repens* of *A. oppositifolia*, the typic var. *oppositifolia* widely distributed from c. Mexico south through Central America into n. South America, stating that var. *repens* "can be easily separated from var. *oppositifolia* by its lanceolate, acuminate phyllaries and short double hairs on the achene margins". Jansen also states that "four factors have caused extreme difficulties in delimiting taxa at the specific and infraspecific level within this group: very close morphological similarity; polyploidy; hybridization, especially between different ploidy levels; and asexual reproduction". In his more statistical taxonomic analyses, his var. *repens* (tetraploid, and the only taxon out of 39 native to North America) separates rather well from *A. oppositifolia* (diploid, tetraploid, and hexaploid). Given the morphological distinctiveness and substantial allopatry of the two taxa, I prefer not to associate this taxon as a variety of the complex *A. oppositifolia*. **Syn:** = Ar, FNA21, Il, K3, K4, Tn; = *Acmella oppositifolia* (Lamarck) R.K. Jansen var. *repens* (Walter) R.K. Jansen – Fl7, K1, NcTx, WH3, Jansen (1985); = *Spilanthes americana* (Mutis ex Linnaeus f.) Hieronymus var. *repens* (Walter) A.H. Moore – F, RAB, Tx; < *Spilanthes americana* – C, G, GW2, S, SE1. NatureServe G5T5 (Secure).

Ageratina Spach 1847 (MILK-POISON, WHITE SNAKEROOT)

A genus of about 250-290 species, American. The separation of *Ageratina* from *Eupatorium* is clearly warranted, on morphological, karyological, and molecular grounds. References: Clewell & Wooten (1971); SE1; Lamont (2018); Nesom (2006mm) in FNA21 (2006c).

2 Leaves subcoriaceous in texture; leaves crenate or crenate-serrate; leaf blades 3-7 (-10) cm long, 2-5 cm wide; [primarily of xeric or submesic sites]. ..... ***Ageratina aromatica***

2 Leaves membranaceous in texture; leaves serrate or coarsely dentate; leaf blades 6-18 cm long, 3-12 cm wide (at least the larger on a given plant usually more 8 cm long); [primarily of mesic sites].

5 Phyllaries mostly 3-5 mm long, acute (to obtuse); heads with (9-) 12-25 flowers; leaves deltoid to ovate (the base generally broadly cuneate); heads arranged in open corymbs; [widespread in our region] ..... ***Ageratina altissima***

5 Phyllaries mostly 5-7 mm long, cuspidate-acuminate; heads with (15-) 20-34 flowers; leaves generally deltoid (the base generally subcordate or truncate); heads arranged in dense corymbs; [of moderate to high elevation forests and openings, in the Mountains and upper Piedmont] ..... ***Ageratina roanensis***

Ageratina altissima (Linnaeus) R.M. King & H. Robinson. COMMON WHITE SNAKEROOT, COMMON MILK-POISON. **Hab:** Moist forests, such as cove forests. **Dist:** QC west to se. ND, south to Panhandle FL and c. TX. **Phen:** Late Jul-Nov. **Tax:** Var. *angustata* (A. Gray) Clewell & Wooten is sometimes recognized, and ranges from IL and e. KS south to LA and c. TX. **Comm:** This species has been shown to be the cause of the "milk sickness" of pioneer days; the plants contain a poison which is transmissible to humans through cow milk. **Syn:** = K4, Lamont (2018); = *Ageratina altissima* var. *altissima* – Ar, FNA21, K1, K3, NE, NY, Pa, Tn, Va; = *Eupatorium rugosum* Houttuyn var. *rugosum* – C, SE1; = *Eupatorium urticifolium* Reichard – S; < *Ageratina altissima* (Linnaeus) R.M. King & H. Robinson – Fl7, Mi, WH3; >< *Ageratina altissima* var. *altissima* – Clewell & Wooten (1971); > *Ageratina altissima* var. *angustata* (A. Gray) Blake – Clewell & Wooten (1971); < *Eupatorium rugosum* Houttuyn – G, GrPl, NcTx, Oh3, RAB, Tx, W; > *Eupatorium rugosum* var. *chlorolepis* Fernald – F; > *Eupatorium rugosum* Houttuyn var. *rugosum* – F; > *Eupatorium rugosum* var. *tomentellum* (B.L. Robinson) Blake – F.

Ageratina aromatica (Linnaeus) Spach. SMALL-LEAVED WHITE SNAKEROOT, WILD-HOARHOUND. **Hab:** Woodlands and forests, usually xeric, and often fire-maintained, sandhills, also woodland edges. **Dist:** MA, NY, and OH, south to ne. FL, Panhandle FL, and e. LA (Florida parishes). **Phen:** Late Aug-Oct. **Tax:** Two varieties have been delineated, both of them occurring in our area. Var. *incisa* (A. Gray) C.F. Reed is described as differing from var. *aromatica* in having the leaves cuneate (vs. truncate to rounded), acuminate (vs. acute), sharply toothed (vs. bluntly toothed, thin in texture (vs. thick), and the petioles slender and 0.5-2 cm long (vs. less slender and 0.1-1.5 cm). It is supposed to be Southeastern in range, from se. VA south to FL, on the Coastal Plain. The validity of this variety needs further assessment. **Syn:** = Fl7, FNA21, K3, K4, NE, NY, Pa, Tn, Va, WH3, Clewell & Wooten (1971); = *Eupatorium aromaticum* Linnaeus – C, G, Oh3, RAB, SE1, W; > *Ageratina aromatica* var. *aromatica* – K1; > *Ageratina aromatica* var. *incisa* (Gray) C.F. Reed – K1; > *Eupatorium aromaticum* Linnaeus – S; > *Eupatorium aromaticum* var. *aromaticum* – F; > *Eupatorium aromaticum* var. *incisum* A. Gray – F; > *Eupatorium latidens* Small – S.

Ageratina roanensis (Small) E.E. Lamont. APPALACHIAN WHITE SNAKEROOT, APPALACHIAN MILK-POISON. **Hab:** Moist forests, often abundant at high elevations. **Dist:** Endemic to moderate to high elevations of the Southern Appalachians, from w. VA south to w. SC, n. GA, e. TN, e. KY, and possibly ne. AL. **Phen:** Aug-Oct. **Syn:** = K4, Lamont (2018); = *Ageratina altissima* King & H.E. Robinson var. *roanensis* (Small) Clewell & Wooten – FNA21,

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

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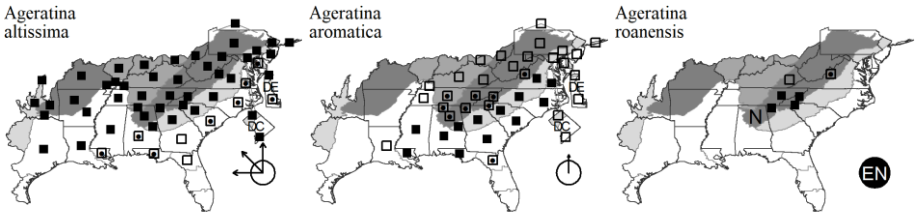
K1, K3, Tn, Va, Clewell & Wooten (1971); = *Eupatorium roanensis* Small – S; = *Eupatorium rugosum* var. *roanense* (Small) Fernald – C, F, SE1; < *Eupatorium rugosum* Houttuyn – G, RAB, W. NatureServe G5T3T4 (Vulnerable).



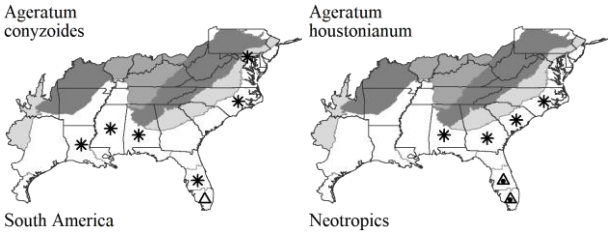
Ageratum Linnaeus 1753 (AGERATUM, FLOSSFLOWER, PUSSYFOOT)

A genus of about 44 species, herbs, of tropical America. References: SE1; Nesom (2006ff) in FNA21 (2006c).

2 Peduncles with short and long non-glandular hairs; phyllaries glabrous to sparsely pubescent with non-glandular hairs..... ***Ageratum conyzoides***
2 Peduncles with short and long hairs, many of them glandular; phyllaries stipitate-glandular and sparsely pubescent with non-glandular hairs ..... ***Ageratum houstonianum***

* ***Ageratum conyzoides*** Linnaeus. AGERATUM, TROPICAL WHITEWEED, GOATBUSH. **Hab:** Disturbed areas. **Dist:** Apparently native of South America. Recently relocated in AL (Diamond 2015). **Phen:** Jul-Aug. **Syn:** = Fl7, FNA21, Il, K1, K3, NE, S, SE1, SFla, WH3; > *Ageratum conyzoides* ssp. *conyzoides* – Bah; > *Ageratum conyzoides* ssp. *latifolium* (Cavanilles) Johnson – Bah. NatureServe G5 (Secure).

* ***Ageratum houstonianum*** P. Miller. AGERATUM. **Hab:** Wet, disturbed areas. **Dist:** Apparently native of se. Mexico and Central America. Reported for AL by Diamond (2014). **Phen:** Jul-Aug. **Syn:** = Fl7, FNA21, K1, K3, NE, NY, S, SE1, WH3. NatureServe GNR (Not Yet Ranked).



Ambrosia Linnaeus 1753 (RAGWEED)

A genus of about 43 species, herbs, cosmopolitan. References: SE1; McMillan & Prevost (2022); Strother (2006dd) in FNA20 (2006b).

1 Leaves either undivided, with 2 lateral teeth, or palmately 3-5-lobed.
  2 Leaves sessile to clasping, 2-7 cm long, undivided or with teeth at base or rarely lobed.
    ..... ***Ambrosia bidentata***
  2 Leaves petiolate, 7-30 cm long, (1-) 3 (-5) lobed.
    ..... ***Ambrosia trifida var. trifida***
1 Leaves 1- to 3-pinnatifid.
  6 Annual, with fibrous roots; fruiting involucre (bur) with short, sharp spines 0.1-0.5 mm long
    ..... ***Ambrosia artemisiifolia***
  6 Perennial, with deep-seated, creeping roots; fruiting involucre (bur) **either** with spines (0.1-) 0.4-1.0 mm long **or** with 'spines' reduced to mere bumps.
    ..... ***Ambrosia psilostachya***

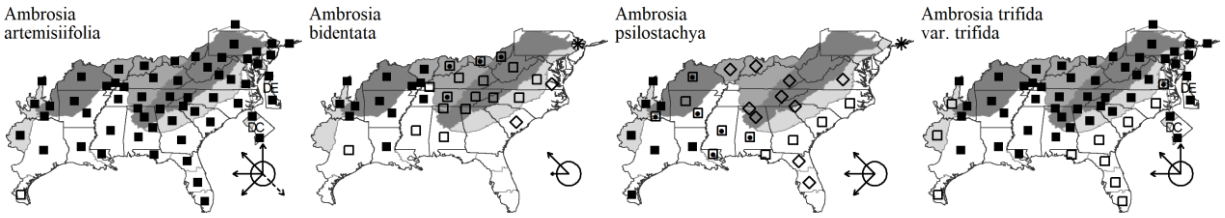
Ambrosia artemisiifolia Linnaeus. COMMON RAGWEED, HOGWEED. **Hab:** Roadsides, gardens, disturbed soils, thin soils on rock outcrops. **Dist:** NL (Newfoundland), NU, and BC south to FL, TX, CA and southward. **Phen:** Jul-Nov. **Syn:** = Ar, Bah, C, Fl7, FNA21, G, GrPl, Il, K3, K4, Mi, NcTx, NE, NY, Oh3, Pa, RAB, SE1, Tn, Tx, Va, WH3, McMillan & Prevost (2022); > *Ambrosia artemisiifolia* Linnaeus var. *artemisiifolia* – F, K1, K2; > *Ambrosia artemisiifolia* Linnaeus var. *elatior* (Linnaeus) Descourtils – F, K1, K2; > *Ambrosia artemisiifolia* Linnaeus var. *paniculata* (Michaux) Blank – F, K1, K2; > *Ambrosia elatior* Linnaeus – S; > *Ambrosia glandulosa* Scheele – S; > *Ambrosia monophylla* (Walter) Rydberg – S.

Ambrosia bidentata Michaux. LANCELEAF RAGWEED. **Hab:** Barrens, prairies, mafic woodlands. **Dist:** S. OH, c. IN, c. IL, and s. IA south to SC (Bradley et al. [in prep.]), nw. GA, n. AL, c. LA and c. TX. Scattered occurrences in other areas probably represent introductions. **Phen:** Jul-Nov. **Syn:** = Ar, C, FNA21, G, GrPl, Il, K3, K4, NcTx, NE, Oh3, RAB, S, SE1, Tn, Tx, Va, McMillan & Prevost (2022). NatureServe G5 (Secure).

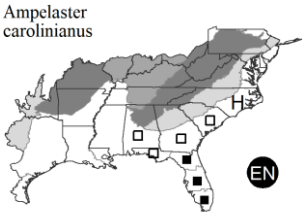
Ambrosia psilostachya A.P. de Candolle. PERENNIAL RAGWEED. **Hab:** Prairies and disturbed areas; eastwards in the Carolinas in loamy sandy soil of flats and slight depressions in periodically burned longleaf pine uplands, also in disturbed areas. **Dist:** MI west to MT, south to LA and NM; also scattered along eastern seaboard states (ME, NH, NY, NC, SC, GA, FL, VA), where perhaps some of the distribution is adventive. Apparently first collected in VA in 2000. **Phen:** Jul-Nov. **Tax:** The native plants of loamy longleaf pine sandhills may be distinct; the name *A. rugelii* likely applies. **Syn:** = Ar, C, Fl7, FNA21, G, GrPl, Il, K3, K4, Mi, NcTx, NE, NY, Oh3, Pa, SE1, Tx, McMillan & Prevost (2022); = *Ambrosia pilostachya* – WH3, misspelling; = *Ambrosia rugelii* Rydberg – S; > *Ambrosia psilostachya* A.P. de Candolle – RAB; > *Ambrosia psilostachya* var. *coronopifolia* (Torrey & Gray) Farwell – F; > *Ambrosia psilostachya* var. *psilostachya* – F; > *Ambrosia rugelii* Rydberg – RAB. NatureServe G5 (Secure).

Key to Map Symbology: □ native; ◇ maybe exotic; △ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Ambrosia trifida Linnaeus *var*. ***trifida***. GIANT RAGWEED. **Hab:** Floodplains, moist pastures, disturbed ground. **Dist:** NS and BC south to n. peninsular FL, Panhandle FL, TX, and CA. **Phen:** Jul-Nov. **Tax:** The distinction between var. *trifida* and var. *texana* (or at the specific rank *A. trifida* and *A. aptera*) warrants additional study. **Syn:** = C, F, G, GrPl, Il, NE; = *Ambrosia trifida* Linnaeus – S; < *Ambrosia trifida* Linnaeus – Fl7, FNA21, K3, K4, Mi, Mo2, NY, Oh3, Pa, RAB, SE1, Tn, Va, WH3, McMillan & Prevost (2022).



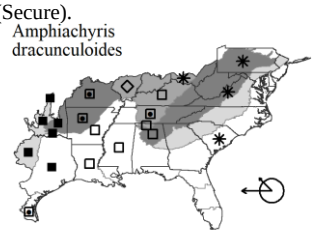
Ampelaster Nesom 1995 (CLIMBING-ASTER)



A monotypic genus, a vining shrub, of se. North America. References: SE1; Nesom (1994a); Nesom (2000b); Semple & Brouillet (1980a); Semple (2006f) in FNA20 (2006b).

Ampelaster carolinianus (Walter) Nesom. CLIMBING ASTER. **Hab:** Swamps, thickets, marshes, streambanks, freshwater tidal marshes and swamps. **Dist:** Se. NC south to s. FL, west to s. AL. Reported for s. AL (H. Horne, pers. comm. 2017). **Phen:** Late Sep-Dec. **Comm:** Grown horticulturally, and may be found outside of native distribution and habitats (as in upland, suburban settings). **Syn:** = FNA20, K1, K3, Nesom (1994a); = *Aster carolinianus* Walter – GW2, RAB, S, SE1; = *Lasallea caroliniana* (Walter) Semple & Brouillet – Semple & Brouillet (1980a); = *Symphyotrichum carolinianum* (Walter) Wunderlin & B.F. Hansen – Fl7, WH3. NatureServe G5 (Secure).

Amphiachyris (A.P. de Candolle) Nuttall 1840 (BROOMWEED)



A genus of 2 species, herbs, of sc. North America. References: SE1; Nesom (2000b); Nesom (2006z) in FNA20 (2006b).

Amphiachyris dracunculoides (A.P. de Candolle) Nuttall. PRAIRIE BROOMWEED, BROOM SNAKEROOT. **Hab:** Limestone glades, disturbed areas over calcareous rocks; also rarely eastwards as a wool-combing mill waif (Nesom 2004d). **Dist:** This species is relatively common and weedy in cedar glade habitats in the Nashville Basin of c. TN, where apparently native (Chester, Wofford, & Kral 1997). **Phen:** Jul-Oct. **Syn:** = Ar, FNA20, Il, K1, K3, K4, NY, S, Tn, Va; = *Gutierrezia dracunculoides* (A.P. de Candolle) Blake – F, G, GrPl, NcTx, Oh3, SE1; = *Xanthocephalum dracunculoides* (A.P. de Candolle) Shinners – Tx. NatureServe G4G5 (Apparently Secure).

Antennaria Gaertner 1791 (PUSSYTOES)

A genus of about 70 species, herbs, of temperate and subtropical areas. Of our species, *A. neglecta*, *A. solitaria*, *A. virginica*, and *A. plantaginifolia* are sexual diploids. *A. parlinii* is of multiple hybrid origin, includes sexual and asexual populations, and is derived from *A. plantaginifolia*, *A. solitaria*, and *A. racemosa*. *A. howellii* is strictly asexual, and is derived from *A. plantaginifolia*, *A. racemosa*, *A. virginica*, and *A. neglecta* (Bayer 1985). For reasons discussed in Bayer & Stebbins (1982) and parallel to those applied in this work to allopolyploid taxa in *Eupatorium*, the treatment of Bayer (1985) and Bayer & Stebbins (1993, 1982) is preferable to Cronquist's treatments, used in most of the floras covering or approaching our area. Much remains to be learned about the relative habitats and distributions of the various taxa in our area. References: Arriagada (1998); Bayer & Stebbins (1982); Bayer & Stebbins (1987); Bayer & Stebbins (1993); Bayer (1984); Bayer (1985); Bayer (2006) in FNA19 (2006a); SE1.

1 Flowering stalks with 1 head ..... ***Antennaria solitaria***
1 Flowering stalks with 2 or more heads.
  3 Pistillate involucres 5-7 mm high; pistillate corollas 3-4 mm high; staminate corollas 2-3.5 mm high; basal leaves tomentose on the upper surface; young stolons mostly ascending; staminate and pistillate plants equally common ..... ***Antennaria plantaginifolia***
  3 Pistillate involucres 7-10 mm high; pistillate corollas 4-7 mm high; staminate corollas 3.5-5 mm high; basal leaves tomentose or glabrous on the upper surface; young stolons mostly decumbent; sexual and apomictic populations present.
    4 Basal leaves tomentose on the upper surface (becoming glabrate in age); summit of young cauline stem usually glandless ..... ***Antennaria parlinii ssp. fallax***
    4 Basal leaves glabrous or nearly so on the upper surface (even when young); summit of young cauline stem usually with purple glandular hairs ..... ***Antennaria parlinii ssp. parlinii***

Antennaria parlinii Fernald *ssp.* ***fallax*** (Greene) Bayer & Stebbins. BIG-HEAD PUSSYTOES. **Hab:** Dry woodlands. **Dist:** NS west to MN, south to GA, AL, MS, LA, and TX. **Phen:** Late Mar-Jun. **Syn:** = Ar, FNA19, GrPl, Il, K1, K3, Mi, NcTx, NE, NY, Oh3, Tn, Va, Arriagada (1998), Bayer & Stebbins (1993); = *Antennaria fallax* Greene var. *calophylla* (Greene) Fernald – F; = *Antennaria plantaginifolia* (Linnaeus) Richardson var. *ambigens* (Greene) Cronquist – C, G, RAB, SE1; > *Antennaria calophylla* Greene – S; > *Antennaria fallax* Greene – S, Tx; < *Antennaria parlinii* – K4, Pa, W. NatureServe G5T5 (Secure).

Antennaria parlinii Fernald *ssp.* ***parlinii***. PARLIN'S PUSSYTOES. **Hab:** Woodlands, roadbanks. **Dist:** NS west to SK, south to GA, AL, MS, LA, and TX. **Phen:** Late Mar-Jun. **Syn:** = Ar, FNA19, GrPl, Il, K1, K3, Mi, NE, NY, Oh3, Va, Arriagada (1998), Bayer & Stebbins (1993); = *Antennaria plantaginifolia* (Linnaeus) Richardson var. *arnoglossa* (Greene) Cronquist – G, RAB, SE1; = *Antennaria plantaginifolia* var. *parlinii* (Fernald) Cronquist – C; <

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

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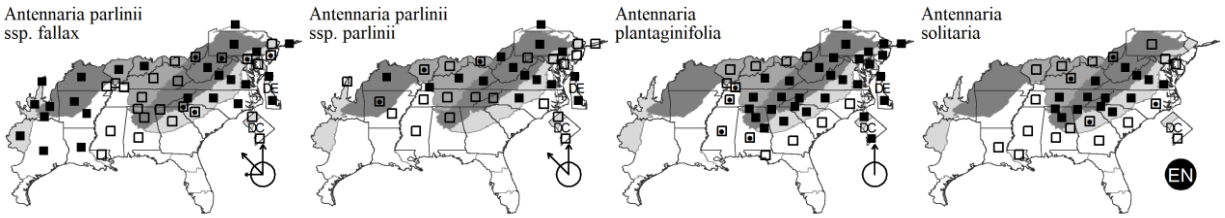
Antennaria parlinii – K4, Pa, W; > *Antennaria parlinii* var. *arnoglossa* (Greene) Fernald – F; > *Antennaria parlinii* Fernald var. *parlinii* – F. NatureServe G5T5? (Secure).

Antennaria plantaginifolia (Linnaeus) Hooker. PLANTAIN PUSSYTOES. **Hab:** Dry woodlands, roadside banks, cemeteries, pastures. **Dist:** NS west to SK, south to FL, AL, MS, AR, and OK. **Phen:** Late Mar-early May. **Comm:** *A. plantaginifolia* is a sexual diploid ancestor of the *A. howellii* complex (FNA). **Syn:** = Ar, Fl7, FNA19, Il, K1, K3, K4, NE, NY, Pa, Tn, Va, W, WH3, Arriagada (1998), Bayer & Stebbins (1993); = *Antennaria plantaginifolia* var. *plantaginifolia* – C, G, RAB, SE1; > *Antennaria caroliniana* Rydberg – S; > *Antennaria plantaginifolia* (Linnaeus) Hooker – S, S; > *Antennaria plantaginifolia* var. *petiolata* (Fernald) Heller – F; > *Antennaria plantaginifolia* var. *plantaginifolia* – F. NatureServe G5 (Secure).

Antennaria solitaria Rydberg. SOUTHERN SINGLE-HEAD PUSSYTOES. **Hab:** Forests and woodlands, often mesic and/or shaded. **Dist:** VA, WV, sw. PA, s. OH, and s. IN south to GA, LA, and OK. **Phen:** Late Mar-May. **Tax:** *A. solitaria* is a sexual diploid ancestor of the *A. parlinii* complex (Bayer 2006). **Syn:** = C, F, FNA19, G, Il, K1, K3, K4, Oh3, Pa, RAB, S, SE1, Tn, Va, W, Arriagada (1998), Bayer & Stebbins (1993). NatureServe G5 (Secure).



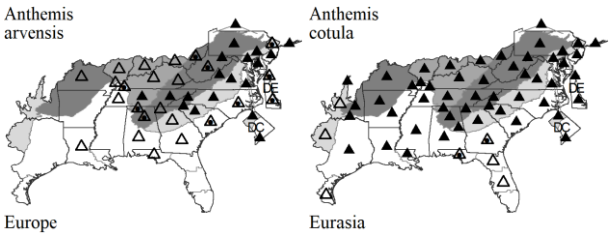
Anthemis Linnaeus 1753 (CHAMOMILE)

A genus of about 175-210 species, herbs, mainly Eurasian. References: Arriagada & Miller (1997); SE1; Watson (2006e) in FNA19 (2006a).

2 Rays sterile and usually neutral; receptacle chaffy only toward the middle ..... ***Anthemis cotula***
2 Rays pistillate and fertile; receptacle chaffy throughout.
..... ***Anthemis arvensis***

* ***Anthemis arvensis*** Linnaeus. CORN CHAMOMILE. **Hab:** Roadsides, disturbed areas. **Dist:** Native of Europe. **Phen:** Late Apr-Jul. **Tax:** Var. *agrestis* differs from var. *arvensis* in having chaff shorter than the disk flowers; if recognized, both varieties apparently occur in our area. **Syn:** = C, Fl7, FNA19, G, K3, K4, Mi, NE, NY, Oh3, Pa, RAB, S, SE1, Tn, Va, W, WH3, Arriagada & Miller (1997); > *Anthemis arvensis* var. *agrestis* (Wallroth) A.P. de Candolle – F, GrPl, Il, K1; > *Anthemis arvensis* var. *arvensis* – F, K1.

* ***Anthemis cotula*** Linnaeus. MAYWEED, STINKING CHAMOMILE, MAYWEED, DOG-FENNEL, CHIGGER-WEED. **Hab:** Roadsides, disturbed areas. **Dist:** Native of Eurasia. **Phen:** May-Jul (-Sep). **Syn:** = Ar, C, F, Fl7, FNA19, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Oh3, Pa, RAB, SE1, Tn, Va, W, WH3, Arriagada & Miller (1997); = *Maruta cotula* (Linnaeus) A.P. de Candolle – S. NatureServe G5 (Secure).



Arctium Linnaeus 1753 (BURDOCK)

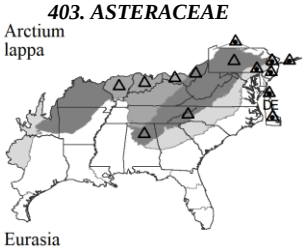
A genus of about 11 species (though circumscription remains uncertain), herbs, of the temperate Old World. References: SE1; Duistermaat (1996); Keil (2006h) in FNA19 (2006a).

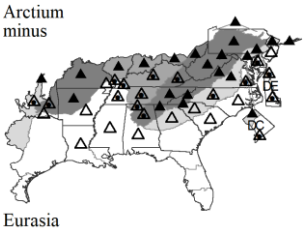
2 Petiole of the basal leaves solid; heads in the upper part of the inflorescence on peduncles > 2.5 cm long; heads corymbosely arranged on the main branches .....
..... ***Arctium lappa***
2 Petiole of the basal leaves hollow (at least toward its base); heads in the upper party of the inflorescence on peduncles < 2 cm long; heads racemosely arranged on the main branches.
..... ***Arctium minus***

* ***Arctium lappa*** Linnaeus. GREAT BURDOCK. **Hab:** Fields and roadsides. **Dist:** Native of Eurasia. **Phen:** Jul-Nov. **Syn:** = C, F, FNA19, G, GrPl, Il, K1, K3, K4, Mi, NE, Oh3, Pa, RAB, SE1, Duistermaat (1996).

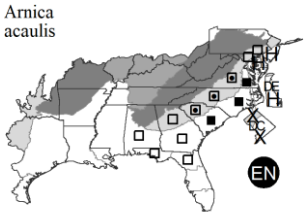
* ***Arctium minus*** (Hill) Bernhardi. COMMON BURDOCK. **Hab:** Pastures, barnyards, roadsides, other disturbed areas. **Dist:** Native of Eurasia. **Phen:** Late Jun-Nov. **Syn:** = Ar, C, F, FNA19, GrPl, Il, K1, K3, K4, Mi, NE, Oh3, Pa, RAB, S, SE1, Va, W, Duistermaat (1996); < *Arctium minus* (Hill) Bernhardi – G.

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated





Arnica Linnaeus 1753 (ARNICA)



A genus of about 29-32 species, perennial herbs, north temperate, boreal, and arctic. References: SE1; Wolf (2006) in FNA21 (2006c).

Arnica acaulis (Walter) Britton, Sterns, & Poggenburg. LEOPARD'S-BANE, SOUTHEASTERN ARNICA. **Hab:** Longleaf pine savannas, longleaf pine sandhills, clayey or sandy oak and oak-pine woodlands, powerline rights-of-way, roadbanks. **Dist:** DE (historical) and se. PA and MD (where on serpentine) south to Panhandle FL, on the Coastal Plain and lower Piedmont (rarely upper Piedmont, as in w. SC in the Blue Ridge Escarpment region). **Phen:** Late Mar-Jun. **Syn:** = C, F, Fl7, FNA21, G, GW2, K1, K3, K4, Pa, RAB, S, SE1, Va, WH3. NatureServe G4 (Apparently Secure).

Arnoglossum Rafinesque 1817 (INDIAN-PLANTAIN)

A genus of about 8 species, herbs, of e. North America. References: Anderson (1998); Anderson (2006a) in FNA20 (2006b); Barkley (1999); SE1; Harper (1905a); Kral & Godfrey (1958); Pippen (1978); Robinson (1974); Ward (2004c).

1 Larger leaves palmately veined, cordate at the base, either strongly toothed or lobed.
  2 Leaves glaucous beneath; stem glaucous and terete (or slightly striate) ..... ***Arnoglossum atriplicifolium***
  2 Leaves green beneath; stem green and conspicuously grooved ..... ***Arnoglossum reniforme***
1 Larger leaves parallel-veined (the primary veins parallel and converging toward the leaf apex), lanceolate to elliptic-lanceolate, cuneate at the base, entire to remotely toothed (usually fewer than 10 teeth per leaf).
  3 Phyllaries not wing-keeled; stem terete.
    4 Basal and lower cauline leaves linear to lanceolate, green to slightly glaucous beneath; plants 0.5-2.5 m tall; [usually of pine savannas, se. NC south to s. FL, west to e. TX] ..... ***Arnoglossum ovatum var. lanceolatum***
    4 Basal and lower cauline leaves ovate to ovate-lanceolate, glaucous beneath; plants 1.5-2.5 m tall; [usually of shaded, moist to bottomland habitats, e. GA west to e. LA] ..... ***Arnoglossum ovatum var. ovatum***
  3 Phyllaries wing-keeled; stem strongly angled or sulcate.
    5 Basal and low-cauline leaves truncate or subcordate at the base; larger leaves irregularly angulate-lobed or toothed, often somewhat hastate at the base; corolla usually pale lavender ..... ***Arnoglossum diversifolium***
    5 Basal and low-cauline leaves cuneate at the base; larger leaves entire, crenate, sinuate, but not lobed or hastate; corolla creamy yellow (or greenish or tinged with pink).
      8 Involucres (9.5-) 10-12 (-14) mm high; corollas 8-10 (-11.5) mm long; leaves usually with 7-9 main parallel veins; mid-stem leaves petiolate, with rounded bases) ..... ***Arnoglossum plantagineum***
      8 Involucres (8-) 9.5-10 (-12) mm high; corollas 6-8 (-9.5) mm long; leaves usually with 3-5 main parallel veins; mid-stem leaves sessile, with broadly cuneate bases ..... ***Arnoglossum sulcatum***

Arnoglossum atriplicifolium (Linnaeus) H. Robinson. PALE INDIAN-PLANTAIN. **Hab:** Mesic forests, open woodlands and woodland edges, clearings, prairies, meadows. **Dist:** NY, MN, and NE south to Panhandle FL and LA (attribution to MA is in error, A.Haines, pers.comm.). **Phen:** Jun-Oct. **Syn:** = Ar, Fl7, FNA20, Il, K1, K3, K4, Mi, Mo2, NY, Pa, Tn, Va, WH3, Anderson (1998), Barkley (1999); = *Cacalia atriplicifolia* Linnaeus – C, F, G, GrPl, Oh3, RAB, SE1, W, Pippen (1978); = *Mesadenia atriplicifolia* (Linnaeus) Rafinesque – S. NatureServe G4G5 (Apparently Secure).

Arnoglossum diversifolium (Torrey & A. Gray) H. Robinson. VARIABLE-LEAF INDIAN-PLANTAIN. **Hab:** Calcareous swamps, calcareous hydric hammocks. **Dist:** Sw. GA and Panhandle FL, west to s. AL; disjunct in nw. peninsular FL. **Phen:** (Late Feb-) May-Aug; Jul-Sep. **Syn:** = Fl7, FNA20, GW2, K1, K3, K4, WH3, Anderson (1998), Barkley (1999); = *Cacalia diversifolia* Torrey & A. Gray – SE1, Kral & Godfrey (1958), Pippen (1978); = *Mesadenia diversifolia* (Torrey & A. Gray) Greene – S. NatureServe G2 (Imperiled).

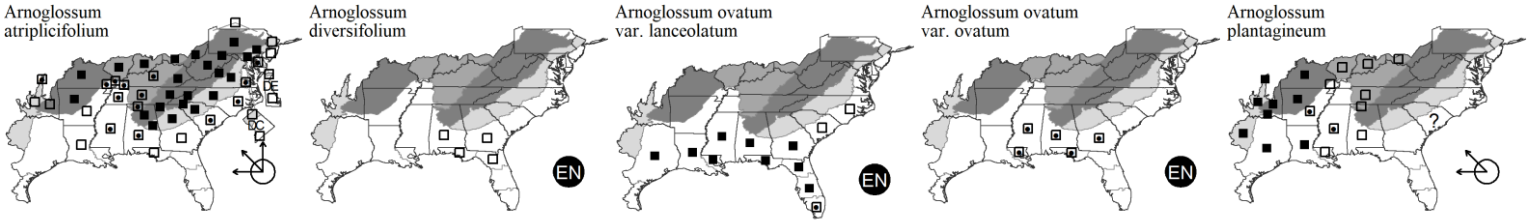
Arnoglossum ovatum (Walter) H. Robinson *var*. ***lanceolatum*** (Nuttall) D.B. Ward. SAVANNA INDIAN-PLANTAIN. **Hab:** Wet pine savannas, especially over coquina limestone ("marl"). **Dist:** Se. NC to s. FL, west to e. TX. **Phen:** Late Jul-Oct. **Syn:** = Ward (2004c); = *Cacalia lanceolata* Nuttall – RAB; = *Cacalia lanceolata* var. *lanceolata* – Kral & Godfrey (1958); = *Mesadenia lanceolata* (Nuttall) Rafinesque – S; < *Arnoglossum ovatum* – Fl7, FNA20, GW2, K1, K3, K4, WH3, Anderson (1998), Barkley (1999); < *Cacalia ovata* Walter – SE1, Pippen (1978); > *Mesadenia lanceolata* var. *lanceolata* – Harper (1905a); > *Mesadenia lanceolata* var. *virescens* Harper – Harper (1905a). NatureServe G4G5TNR (Not Yet Ranked).

Arnoglossum ovatum (Walter) H. Robinson *var*. ***ovatum***. BROADLEAF INDIAN-PLANTAIN. **Hab:** Bottomlands, bay forests, moist or wet forests. **Dist:** E. GA west to e. LA. **Phen:** Late Jul-Oct. **Tax:** The division of *A. ovatum* into two taxa (species or, as done here, varieties) needs additional study. **Syn:** = Ward (2004c); = *Cacalia lanceolata* Nuttall var. *elliottii* (Shinners) Kral & Godfrey – Kral & Godfrey (1958); < *Arnoglossum ovatum* – Fl7, FNA20, GW2, K1, K3, K4, WH3, Anderson (1998), Barkley (1999); < *Cacalia ovata* Walter – SE1, Pippen (1978); > *Mesadenia elliottii* R.M. Harper – S; > *Mesadenia maxima* R.M. Harper – S.

Arnoglossum plantagineum Rafinesque. WESTERN INDIAN-PLANTAIN. **Hab:** Prairies, wet calcareous glades, marshes, bogs. **Dist:** MI, s. WI, s. MN, and ne. SD south to OH, Nashville Basin of c. TN (Chester, Wofford, & Kral 1997), AL, MS, LA, and c. TX; also reported for sc. SC, in the unpublished flora of the Savannah River Site by Batson, Angerman, and Jones (a record considered questionable without additional documentation).

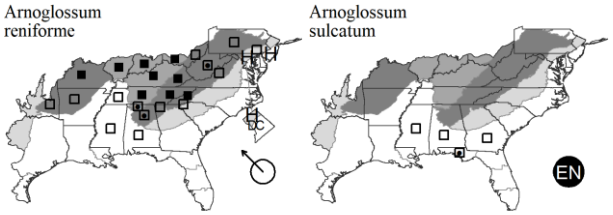
Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Phen: Jun-Aug. **Syn:** = Ar, FNA20, Il, K1, K3, K4, Mi, NcTx, Tn, Anderson (1998), Barkley (1999); = *Cacalia plantaginea* (Rafinesque) Shinners – GrPl, Oh3, SE1, Pippen (1978); = *Cacalia tuberosa* Nuttall – G; = *Mesadenia tuberosa* (Nuttall) Britton – S. NatureServe G4G5 (Apparently Secure).



Arnoglossum reniforme (Hooker) H. Robinson. GREAT INDIAN-PLANTAIN. **Hab:** Cove forests, floodplains, other mesic forests. **Dist:** PA and MN, south to SC (Gaddy 2014), GA, MS, and OK. **Phen:** Jun-Oct. **ID Notes:** The very large, reniform leaves (sometimes up to 75 cm across) are conspicuous in rich cove forests. **Syn:** = Ar, FNA20, Il, K2, K3, K4, Pa, Tn, Va, Anderson (1998), Barkley (1999); = *Cacalia muhlenbergii* (Schultz 'Bipontinus') Fernald – C, F, G, Oh3, RAB, SE1, W, Harper (1905a), Pippen (1978); = *Mesadenia reniformis* (Hooker) Rafinesque – S.

Arnoglossum sulcatum (Fernald) H. Robinson. GROOVED-STEM INDIAN-PLANTAIN. **Hab:** Bottomland forests. **Dist:** Sw. GA and Panhandle FL west to s. AL. **Syn:** = Fl7, FNA20, GW2, K1, K3, K4, WH3, Anderson (1998), Barkley (1999); = *Cacalia sulcata* Fernald – SE1, Kral & Godfrey (1958), Pippen (1978); = *Mesadenia sulcata* (Fernald) Harper – S. NatureServe G3 (Vulnerable).



Artemisia Linnaeus 1753 (WORMWOOD, MUGWORT, SAGE)

If defined (as here) to include the segregate genus *Seriphidium*, a genus of about 500 species, shrubs and herbs, north temperate, boreal, and arctic. References: Arriagada & Miller (1997); Björk (2021); SE1; Ling Yeou-Ruenn (1995); Schultz (2006) in FNA19 (2006a).

5 Leaves green, essentially glabrous on the lower surface; annuals or biennials from a taproot; plants lacking nonflowering shoots. ..... ***Artemisia annua***

5 Leaves tomentose on the lower surface, densely so in many species; perennials from a branched rhizome or woody caudex; plants with nonflowering shoots.

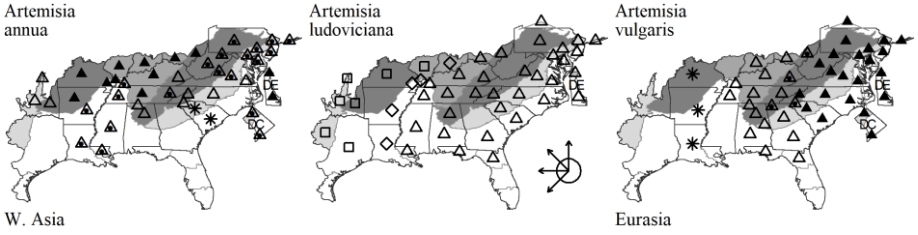
10 Leaves 2-pinnatifid; leaves with 1-2 stipule-like lobes at the base ..... ***Artemisia vulgaris***

10 Leaves entire to 1-pinnatifid; leaves lacking stipule-like lobes at the base. ..... ***Artemisia ludoviciana***

* ***Artemisia annua*** Linnaeus. SWEET ANNIE, SWEET WORMWOOD, SWEET SAGEWORT, ANNUAL MUGWORT. **Hab:** Barnyards, roadsides, disturbed areas, waste areas around wool-combing mills (Nesom 2004d). **Dist:** Native of Asia and e. Europe. **Phen:** Aug-Nov. **Syn:** = Ar, C, F, FNA19, G, GrPl, GrPl, Il, K1, K3, K4, Mi, Mo2, NE, NY, Oh3, Pa, S, SE1, Tn, Va, Arriagada & Miller (1997), Ling Yeou-Ruenn (1995). NatureServe GNR (Not Yet Ranked).

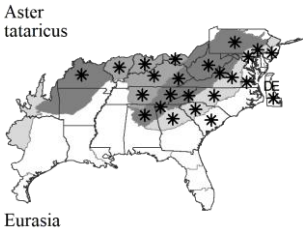
Artemisia ludoviciana Nuttall. WHITE SAGE, WHITE SAGEWORT, PRAIRIE SAGE, WESTERN MUGWORT. **Hab:** Prairies, roadsides, fencerows, eastwards in disturbed areas. **Dist:** MI west to AK, south as a native to IL, AR, TX, NM, AZ, CA, Mexico. **Phen:** Late Aug-Nov. **Syn:** = Fl7, Pa, Va, WH3; = *Artemisia ludoviciana* ssp. *ludoviciana* – Ar, FNA19, K1, K3, K4, Mi, NE; = *Artemisia ludoviciana* var. *ludoviciana* – C, G, GrPl, SE1; > *Artemisia ludoviciana* Nuttall – RAB, Ling Yeou-Ruenn (1995); > *Artemisia ludoviciana* ssp. *ludoviciana* – NY; > *Artemisia ludoviciana* Nuttall var. *gnaphalodes* (Nuttall) Torrey & A. Gray – F, Il, Oh3; > *Artemisia ludoviciana* var. *ludoviciana* – F, Il, Mo2, Oh3; > *Artemisia serrata* – NY.

* ***Artemisia vulgaris*** Linnaeus. COMMON MUGWORT, FELON HERB. **Hab:** Roadsides, pastures, fencerows, disturbed areas. **Dist:** Native of Eurasia. **Phen:** Jul-Nov. **Syn:** = Ar, C, Fl7, FNA19, K3, K4, Mi, Mo2, NY, Oh3, Pa, RAB, S, SE1, Tn, Va, WH3, Arriagada & Miller (1997), Ling Yeou-Ruenn (1995); > *Artemisia vulgaris* var. *glabra* Ledebour – Il; > *Artemisia vulgaris* var. *latiloba* Ledebour – Il; > *Artemisia vulgaris* var. *vulgaris* – F, Il, K1, NE.



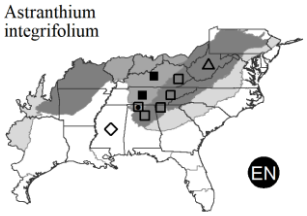
Key to Map Symbology: □⊙■ └native┘ ◇◈◆ └maybe exotic┘ △◬▲ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated

Aster Linnaeus 1753 (ASTER)



It is now abundantly clear that the traditional, broad circumscription of *Aster*, as a genus of some 250 species of North America and Eurasia, is untenable. All of our native asters have affinities elsewhere than with Old World *Aster*; most are now placed in *Symphyotrichum* and *Eurybia*, with fewer species in *Ampelaster*, *Doellingeria*, *Ionactis*, *Oclemena*, and *Sericocarpus*. These changes will undoubtedly cause uproar. It may be worth noting for those that consider the dissolution of *Aster* as radical, that most of the segregate genera were recognized in the 19th century, and many have been widely recognized for much of the time since. For instance, *Sericocarpus* and *Doellingeria* were both segregated from *Aster* in the early 1830's, and were frequently recognized as distinct, including by Small (1903, 1913, 1933); *Sericocarpus* was in fact usually regarded as a good genus until sunk by Cronquist. References: Brouillet & Semple (1981); Brouillet (2006d) in FNA20 (2006b); SE1; Jones & Young (1983); Jones (1980a); Jones (1980b); Jones (1984); Jones (1992); Lamboy (1992); Nesom (1993a); Nesom (1993b); Nesom (1994a); Nesom (1994a); Nesom (1994b); Nesom (1997a); Nesom (2000b); Noyes & Rieseberg (1999); Reveal & Keener (1981); Semple & Brouillet (1980a); Semple & Brouillet (1980b); Semple, Chmielewski, & Lane (1989); Semple, Heard, & Xiang (1996); Semple, Heard, & Xiang (1996); Xiang & Semple (1996).

* ***Aster tataricus*** Linnaeus f. TARTARIAN ASTER. **Hab:** Commonly cultivated, rarely persisting or spreading short distances from plantings. **Dist:** Native of Eurasia. **Phen:** Sep-Nov. **Syn:** = C, FNA20, G, Il, K1, K3, K4, Mi, Oh3, Pa, RAB, SE1, Tn, Va, W, Nesom (1994a). NatureServe GNR (Not Yet Ranked).



Astranthium Nuttall 1840 (WESTERN-DAISY)

A genus of about 11 species, herbs, of sc. North America and Mexico. References: SE1; DeJong (1965); Nesom (2000b); Nesom (2006x) in FNA20 (2006b); Nesom (2015e).

Identification Notes: The lamina (plural: laminae) is the strap-shaped abaxial lip of the (typically 3-lobed) ray floret corollas. It is homologous with the abaxial lip of a bilabiate or pseudobilabiate corolla, in which it is typically oriented away from the center of the head.

Astranthium integrifolium (Michaux) Nuttall. EASTERN WESTERN-DAISY. **Hab:** Limestone glades, barrens, rocky woodlands, roadsides. **Dist:** Nc. KY south through c. TN to nw. GA and ne. AL (primarily in the Interior Low Plateau); disjunct in c. MS (where possibly native) and also disjunct in nc. WV, where presumably introduced. **Tax:** The related *A. ciliatum* (Rafinesque) Nesom of the Ozarkian region and Texas has sometimes been treated as a variety, subspecies, or unnamed component of *A. integrifolium*, but see Nesom (2005a) for rationale for recognition at the specific rank, which renders *A. integrifolium* endemic east of the Mississippi River. **Syn:** = FNA20, K3, K4, Tn, Nesom (2015e); = *Astranthium integrifolium* ssp. *integrifolium* – K1, DeJong (1965); = *Astranthium integrifolium* var. *integrifolium* – C; < *Astranthium integrifolium* (Michaux) Nuttall – F, G, SE1, W. NatureServe G5TNR (Not Yet Ranked).

Baccharis Linnaeus 1753 (SILVERLING, HIGH-TIDE BUSH, MULLET BUSH, GROUNDSEL TREE, BACCHARIS)

A genus of about 350-450 species, shrubs, perennial herbs, and trees, of tropical, subtropical, and warm temperate America. References: SE1; Franck et al (2021); Nesom (2000b); Sundberg & Bogler (2006) in FNA20 (2006b).

3 Leaves 1-2 (-5) mm wide; stems glabrous.
..... ***Baccharis angustifolia***

3 Leaves (3-) 5-40 mm wide; stems glabrous to minutely pubescent or scurfy.

5 Heads grouped in sessile clusters of 1-4 heads, each cluster subtended by a normally sized or slightly reduced leaf; heads sessile; bracts (leaves) subtending head clusters usually broadly obovate or spatulate (L:W 1.5-3×) and also usually toothed; leaf glands on leaf undersurface only, small and inconspicuous under magnification..... ***Baccharis glomeruliflora***

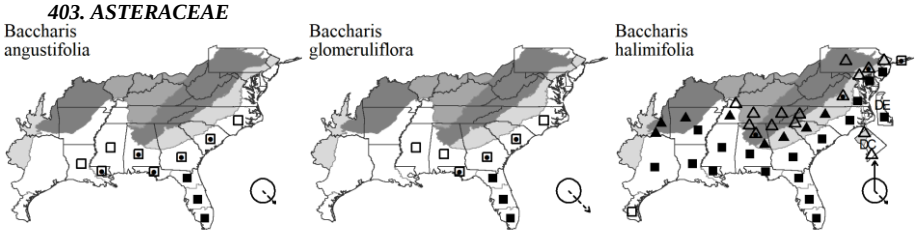
5 Heads in paniculiform or umbelliform arrays of 10 to very many heads, the arrays including some reduced bracts subtending branches or head clusters, but with terminal groupings of heads mostly of 10+ heads above the last bract; heads pedunculate (sessile); bracts in the inflorescence mainly untoothed and narrower than leaves below the inflorescence, lanceolate to narrowly elliptical, 3-7× as long as wide (except spatulate and 1-2× in *Baccharis dioica*); leaf glands on both upper and lower faces, large and usually conspicuous under magnification (less so in older specimens) (except finer and less conspicuous in *Baccharis salicina*).
..... ***Baccharis halimifolia***

Baccharis angustifolia Michaux. FALSE-WILLOW. **Hab:** Interdune swales, wet hammocks, marsh edges. **Dist:** Ne. NC south to s. FL, west to LA; Bahamas. **Phen:** Sep-Oct. **Tax:** Some plants with broader leaves and rare teeth seem to represent hybrids with *Baccharis halimifolia*. **Syn:** = Bah, Fl7, FNA20, GW2, K1, K3, K4, RAB, S, SE1, WH3, Franck et al (2021). NatureServe G4 (Apparently Secure).

Baccharis glomeruliflora Persoon. **Hab:** Wet hammocks, marsh edges, interdune swales. **Dist:** Se. NC south to s. FL, west to MS; West Indies. **Phen:** Oct-Nov. **Syn:** = Bah, Fl7, FNA20, GW2, K1, K3, K4, RAB, S, SE1, WH3, Franck et al (2021). NatureServe G4 (Apparently Secure).

Baccharis halimifolia Linnaeus. SILVERLING, HIGH-TIDE BUSH, MULLET BUSH, GROUNDSEL TREE, MANGLIER, SEA-MYRTLE, CONSUMPTION-WEED. **Hab:** Fresh and brackish marshes, marsh borders, hammocks, moist abused land, roadsides, ditches, old fields, and a wide variety of disturbed areas. **Dist:** Se. MA south to s. FL, west to TX, AR, and OK; West Indies. **Phen:** Aug-Oct. **Comm:** *B. halimifolia* is becoming increasingly common inland, and can be an especially aggressive invader in sunny sites after silvicultural disturbance. **Syn:** = Ar, Bah, C, F, Fl7, FNA20, G, GW2, K1, K3, K4, NcTx, NE, NY, Pa, RAB, S, SE1, Tn, Tx, Va, WH3, Franck et al (2021). NatureServe G5 (Secure).

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



Balduina Nuttall 1818 (HONEYCOMB-HEAD, BALDUINA)

A genus of 3 species, herbs, of se. North America. References: SE1; Keener (2006) in FNA21 (2006c); Parker & Jones (1975).

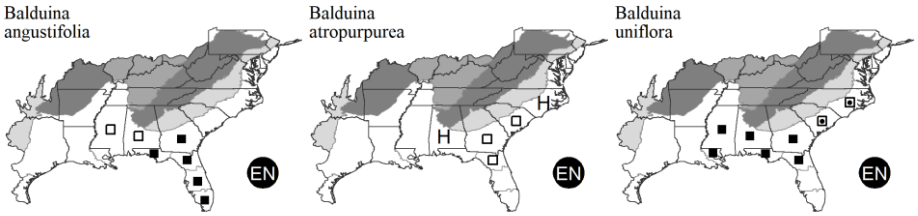
Identification Notes: The common name alludes to the honeycomb-like texture of the receptacle, made up of connected receptacular bractlets which surround the achenes. This condition is diagnostic of the genus, and can be seen even when the plant is in flower by stripping the flowers from the receptacle. Superficially, the perennial species resemble some *Helenium* (particularly *H. pinnatifidum* and *H. vernale*), but these bloom months earlier. The punctate leaves are very distinctive.

1 Plant an annual or biennial; cauline leaves numerous, linear, 0.5-1.9 mm wide; outer involucral bracts 0.6-1.7 mm wide, lanceolate, acuminate; disk 6-15 mm wide; pappus scales obovate-orbicular, 0.3-0.6 mm long ..... ***Balduina angustifolia***
1 Plant a perennial; cauline leaves few, linear-spatulate, 2-7 mm wide; outer involucral bracts 1.7-3.1 mm wide, ovate, acute; disk (10-) 15-25 mm wide; pappus scales lanceolate, 1.1-2.1 mm long.
  2 Disk corollas purple; basal leaves linear-spatulate, (7-) avg. 14 (-32) cm long, about 20× as long as wide; cauline leaves 3.8-6.2 cm long; outer phyllaries 2.9-5.4 mm long; inner phyllaries 4.5-7.6 mm long; ray flower ligules 2.3-4.7 mm wide at apex ..... ***Balduina atropurpurea***
  2 Disk corollas yellow to reddish-orange; basal leaves spatulate, (5-) avg. 7.5 (-10.5) cm long; about 8× as long as wide; cauline leaves 2.7-4.3 cm long; outer phyllaries 4-7.2 mm long; inner phyllaries 5.1-11 mm long; ray flower ligules 3.2-8.6 mm wide at apex ..... ***Balduina uniflora***

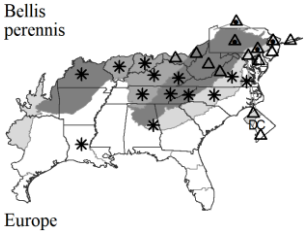
Balduina angustifolia (Pursh) B.L. Robinson. SANDHILL HONEYCOMB-HEAD, SANDHILL BALDUINA. **Hab:** Longleaf pine sandhills, pine rocklands, and other dry, sandy soils. **Dist:** GA south to s. FL, west to s. MS; it should be sought in s. SC. **Phen:** Sep-Dec. **Syn:** = Fl7, FNA21, K1, K3, K4, SE1, WH3, Parker & Jones (1975); = *Actinospermum angustifolium* (Pursh) Torrey & A. Gray – S. NatureServe G5 (Secure).

Balduina atropurpurea R.M. Harper. BOG HONEYCOMB-HEAD, PURPLE HONEYCOMB-HEAD, PURPLE BALDUINA. **Hab:** Peaty seepage bogs and wet pine savannas. **Dist:** A southeastern Coastal Plain endemic, very rare and disjunct in se. NC and nc. SC, primarily in ne. to sc. GA and ne. FL. **Phen:** Late Aug-early Nov; Oct-Dec. **Syn:** = Fl7, FNA21, GW2, K1, K3, K4, RAB, SE1, WH3, Parker & Jones (1975); = *Endorima atropurpurea* (R.M. Harper) Small – S. NatureServe G2 (Imperiled).

Balduina uniflora Nuttall. SAVANNA HONEYCOMB-HEAD, YELLOW BALDUINA. **Hab:** Wet pine savannas and pine flatwoods. **Dist:** A southeastern Coastal Plain endemic: se. NC and immediately adjacent ne. SC (apparently absent from much of SC), and from extreme s. SC south to ne. FL, FL Panhandle, and west to e. LA. **Phen:** Late Jul-Sep. **Syn:** = Fl7, FNA21, GW2, K1, K3, K4, RAB, SE1, WH3, Parker & Jones (1975); = *Endorima uniflora* (Nuttall) Barnhart ex Small – S. NatureServe G4 (Apparently Secure).



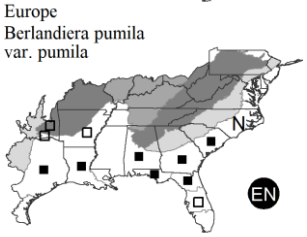
Bellis Linnaeus 1753 (ENGLISH DAISY)



A genus of about 8 species, herbs, of Europe. References: Brouillet (2006e) in FNA20 (2006b); SE1; Nesom (2000b).

* ***Bellis perennis*** Linnaeus. ENGLISH DAISY. **Hab:** Lawns, grassy roadsides. **Dist:** Native of Europe. **Phen:** Mar-Nov. **Syn:** = C, F, FNA20, G, GrPl, Il, K1, K3, K4, Mi, NE, NY, Oh3, Pa, RAB, SE1, Va. NatureServe GNR (Not Yet Ranked).

Berlandiera A.P. de Candolle 1836 (GREEN-EYES)



A genus of 4-5 species, perennial herbs and subshrubs, of s. North America and Mexico. References: SE1; Nesom & Turner (1998); Pinkava (2006) in FNA21 (2006c).

Berlandiera pumila (Michaux) Nuttall *var. **pumila***. EASTERN GREEN-EYES. **Hab:** Longleaf pine sandhills, disturbed sandy areas. **Dist:** Nc. SC south to n. peninsular FL, west to s. AL; sw. AR and w. LA to c. TX. **Phen:** Late May-Nov. **Syn:** = Ar, K1, Nesom & Turner (1998); = *Berlandiera pumila* – FNA21, K3, K4, Tx; < *Berlandiera pumila* – Fl7, NcTx, RAB, S, SE1, WH3. NatureServe G4G5TNR (Not Yet Ranked).

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more)

* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable

X : extirpated

Bidens Linnaeus 1753 (BEGGAR-TICKS, BUR-MARIGOLD)

A genus of about 240 species, herbs, cosmopolitan. Recent molecular studies suggest that the relationship between *Bidens* and *Coreopsis* is complex, and that changes in taxonomy will be needed to more accurately reflect relationships (Kim et al. 1999; Crawford & Mort 2005). References: Ballard (1986); SE1; Lipscomb & Smith (1977); Sherff & Alexander (1955); Strother & Weedon (2006) in FNA21 (2006c).

Identification Notes: The involucre of phyllaries is subtended by an additional series of bracteal structures, the calyculus.

2 Inner cypselas more-or-less equally 4-angled, thickest near the middle and equally tapered to both ends; ray florets white, pink, or pale yellowish (or absent).
  3 Leaves 2-3× dissected, primary lobes > 20, the ultimate segments rounded to acute, 2-10 mm wide; ray florets pale yellowish ..... ***Bidens bipinnata***
  3 Leaves mostly once-pinnate, primary lobes 3-7, the ultimate segments serrate and acute, 8-50 mm wide; ray florets white or absent. ..... ***Bidens alba var. radiata***
2 Inner cypselas flattened (if 4-angled, the alternating angles acute and obtuse), thickest toward the tip; ray florets yellow or orange (or absent).
  5 Most leaves simple, the margins dentate to serrate or incised (with 3-7 lobes).
    6 Leaves (except sometimes the lower) sessile; heads usually nodding, at least in age.
      7 Rays absent, or present and 2-15 (-18) mm long; pales (receptacular bracts) with tan or yellow tips; outer cypselas (3-) 5-6+ mm long, inner cypselas 4-8 mm long (the margins ± thickened or winged); pappus of (2-) 4 awns (1-) 2-4 mm long ..... ***Bidens cernua***
      7 Rays present, (10-) 15-25 (-30) mm long; pales (receptacular bracts) with orange or red tips; outer cypselas 6-8 mm, inner cypselas 8-10 mm (margins not notably thickened or winged); pappus of 2-4 awns 3-5 mm long ..... ***Bidens laevis***
    6 Leaves with a distinct petiole 1-4 cm long (this sometimes winged); heads erect.
      8 Rays 12-25+ mm long; cypselas 2.5-4.5 mm long, the margins not barbed or ciliate ..... ***Bidens mitis***
      8 Rays absent or 2-5 (-12) mm long; cypselas (3-) 6-13 mm long, the margins sometimes barbed or ciliate.
        11 Cypselas ± flattened, sometimes weakly 3 (-4)-angled and 3 (-4)-awned, the faces usually smooth, seldom notably tuberculate; disc corollas 4-lobed, light yellow; anthers usually pale ..... ***Bidens comosa***
        11 Cypselas (at least inner) usually ± 4-angled and 4-awned, the faces usually strigose or tuberculate; disc corollas 5-lobed, orange-yellow; anthers usually blackish ..... ***Bidens connata***
  5 Most leaves either 1-pinnately compound, the 3-5 (-7) leaflets petiolulate, or -1-2× pinnately lobed.
    12 Ray florets 0, or rays 1-3, the laminae 2-3.5 mm long.
      13 Calyculus bractlets (3-) 4 (-5), seldom ciliate; disc florets usually 10-20 ..... ***Bidens discoidea***
      13 Calyculus bractlets 5-21, usually ciliate; disc florets 20-150.
        14 Calyculus bractlets (5-) 8 (-10); leaves usually 3 (-5)-foliolate ..... ***Bidens frondosa***
        14 Calyculus bractlets 10-16 (-21); leaves usually laciniate or pinnatisect ..... ***Bidens vulgata***
    12 Ray florets (5-) 8-13, the laminae 10-30 mm long.
      15 Cypselas 2.5-4× as long as wide ..... ***Bidens trichosperma***
      15 Cypselas 1.5-2 (-2.5)× as long as wide.
        16 Cypselas 2.5-5 mm long, the margins not winged, barbed, or ciliate ..... ***Bidens mitis***
        16 Cypselas (4-) 5-8 mm long, the margins usually barbed or ciliate, and often also corky-winged.
          17 Calyculus bractlets 8-12 (-16), these (4-) 5-7 (-12) mm long; calyculus bractlets glabrous or fine-pubescent on the lower surface ..... ***Bidens aristosa***
          17 Calyculus bractlets 12-21, these (6-) 8-12 (20) mm long; calyculus bractlets usually coarsely short-pubescent on the lower surface ..... ***Bidens polylepis***

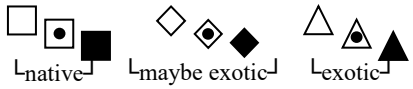
* ***Bidens alba*** (Linnaeus) A.P. de Candolle *var*. ***radiata*** (Schultz 'Bipontinus') Ballard ex T.E. Melchert. ROMERILLO. **Hab:** Disturbed areas. **Dist:** Adventive from the New World tropics. Reported for Clarksville, Montgomery County, TN (Kraft 2016). **Syn:** = Bah, K1, Ballard (1986); = *Bidens pilosa* Linnaeus var. *radiata* Schultz 'Bipontinus' – Sherff & Alexander (1955); < *Bidens alba* – Ar, Fl7, Il, NE, WH3; < *Bidens pilosa* Linnaeus – FNA21, K3, K4, RAB, S, SE1.

Bidens aristosa (Michaux) Britton. MIDWESTERN TICKSEED-SUNFLOWER, OZARK TICKSEED-SUNFLOWER. **Hab:** Marshes, wet meadows, ditches, bogs. **Dist:** DE, MD, IL, and MO south to GA, AL, FL (?), and TX (and adventive farther north); the pre-Columbian distribution is uncertain, and portions of the eastern range of the species may be only from, expansion from a more midwestern distribution. **Phen:** Aug-Oct (-Nov). **Syn:** = C, FNA21, G, GW2, Mi, NE, NY, Oh3, Pa, RAB, SE1, Tn, Va, W; < *Bidens aristosa* (Michaux) Britton – Ar, K1, K3, K4, NcTx; > *Bidens aristosa* var. *aristosa* – F, Il, S, Sherff & Alexander (1955); > *Bidens aristosa* var. *fritcheyi* Fernald – F, Il, Sherff & Alexander (1955); > *Bidens aristosa* var. *mutica* (A. Gray) Gattinger – F, Il, S, Sherff & Alexander (1955). NatureServe G5 (Secure).

Bidens bipinnata Linnaeus. SPANISH NEEDLES. **Hab:** Floodplains, disturbed areas, gardens, fields, roadsides, ditches. **Dist:** MA, NY, ON, IA, NE, and AZ south to c. FL and Mexico; e. Asia. **Phen:** Jul-Oct. **Syn:** = Ar, C, F, Fl7, FNA21, G, GrPl, Il, K1, K3, K4, NcTx, NY, Oh3, Pa, RAB, S, SE1, Tn, Va, W, WH3; > *Bidens bipinnata* var. *bipinnata* – Sherff & Alexander (1955). NatureServe G5 (Secure).

Bidens cernua Linnaeus. NODDING BUR-MARIGOLD. **Hab:** Marshes, wet meadows, bogs, ditches. **Dist:** Circumboreal, south in North America to GA, AL, LA, NM, AZ, and CA. **Phen:** Aug-Oct. **Syn:** = Ar, C, FNA21, G, GrPl, GW2, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, SE1, Tn, Va, W; < *Bidens cernua* Linnaeus – Oh3; > *Bidens cernua* var. *cernua* – F, Sherff & Alexander (1955); > *Bidens cernua* var. *elliptica* Wiegand – F; > *Bidens cernua* var. *integra* Wiegand – F.

Bidens comosa (A. Gray) Wiegand. STRAWSTEM BEGGAR-TICKS. **Hab:** Marshes, bogs, wet meadows, disturbed areas. **Dist:** NL (Newfoundland) and BC south to GA, TX, and CA. **Phen:** Aug-Oct. **Tax:** Closely related to, and sometimes included in, the Eurasian *B. tripartita*. **Syn:** = GrPl, Il, Mi, Va; = *Bidens tripartita* ssp. *comosa* (A. Gray) A. Haines – NE; < *Bidens comosa* (A. Gray) Wiegand – C, F, G, S; < *Bidens tripartita* Linnaeus – FNA21, K1, K3, K4, K4, Oh3, Pa, RAB, Tn. NatureServe G5T5 (Secure).

Key to Map Symbology: 
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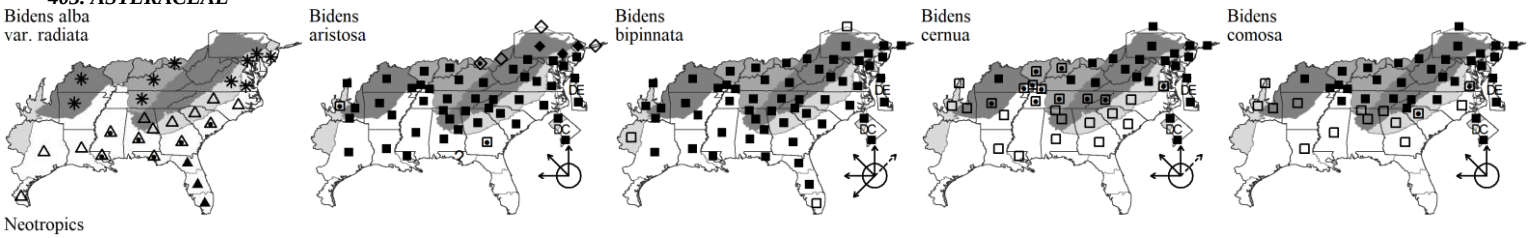


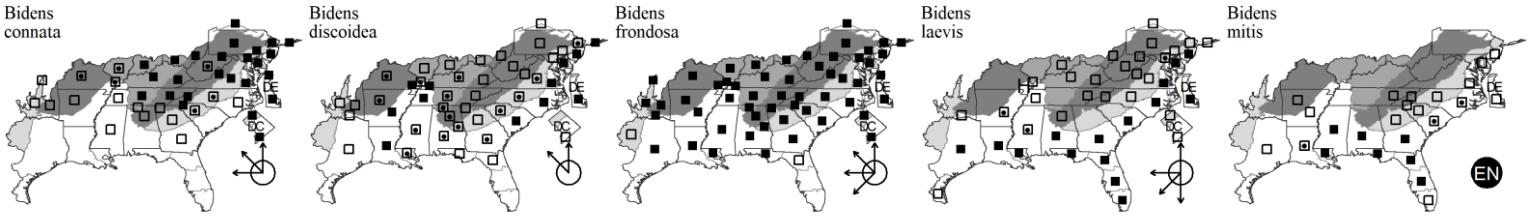
Bidens connata Muhlenberg. PURPLESTEM BEGGAR-TICKS. **Hab:** Marshes, bogs, wet meadows, disturbed areas. **Dist:** QC, ON, and ND south to GA, AL, and KS. **Phen:** Aug-Oct. **Syn:** = C, FNA21, G, Il, K1, Mi, NE, NY, Pa, S, Va; > *Bidens connata* var. *anomala* Farwell – F, Sherff & Alexander (1955); > *Bidens connata* var. *connata* – F, Sherff & Alexander (1955); > *Bidens connata* var. *fallax* (Warnstorf) Sherff – F, Sherff & Alexander (1955); > *Bidens connata* var. *petiolata* (Nuttall) Farwell – F, GrPl, Sherff & Alexander (1955); < *Bidens tripartita* Linnaeus – K3, RAB.

Bidens discoidea (Torrey & A. Gray) Britton. FEW-BRACTED BEGGAR-TICKS. **Hab:** Floodplain forests, marshes. **Dist:** NS and MN south to ne. FL, Panhandle FL, and TX. **Phen:** Late Aug-Nov. **Syn:** = Ar, C, F, Fl7, FNA21, G, GW2, Il, K1, K3, K4, Mi, NE, NY, Oh3, Pa, RAB, S, SE1, Tn, Va, W, WH3, Sherff & Alexander (1955). NatureServe G5 (Secure).

Bidens frondosa Linnaeus. DEVIL'S BEGGAR-TICKS. **Hab:** Fields, pastures, wet meadows, swamp forests, ditches. **Dist:** Nova Scotia and AK south to FL, TX, CA, and southward. **Phen:** Jun-Oct. **Syn:** = Ar, C, Fl7, FNA21, G, GrPl, GW2, Il, K1, K3, K4, Mi, NcTx, NE, NY, NY, Oh3, Pa, RAB, S, SE1, Tn, Va, W, WH3; > *Bidens frondosa* var. *anomala* Porter – Sherff & Alexander (1955); > *Bidens frondosa* var. *frondosa* – F, Sherff & Alexander (1955). NatureServe G5 (Secure).

Bidens laevis (Linnaeus) Britton, Sterns, & Poggenburg. SHOWY BUR-MARIGOLD. **Hab:** Marshes, stream banks, ditches. **Dist:** ME, NY, IN, MO, NV, and CA southward. **Phen:** Aug-Nov. **Syn:** = Ar, C, F, Fl7, FNA21, G, GW2, Il, K1, K3, K4, NcTx, NE, NY, Pa, RAB, SE1, Tn, Va, W, WH3, Sherff & Alexander (1955); < *Bidens cernua* Linnaeus – Oh3; > *Bidens laevis* (Linnaeus) Britton, Sterns, & Poggenburg – S; > *Bidens nashii* Small – S.

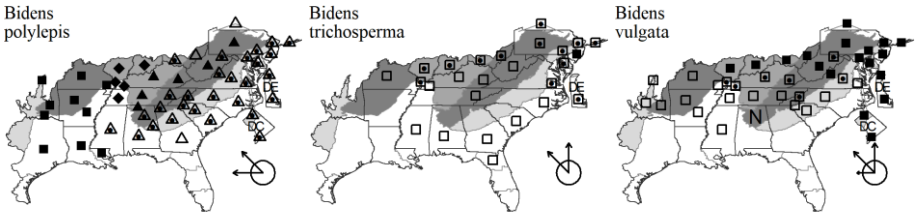
Bidens mitis (Michaux) Sherff. COASTAL PLAIN TICKSEED-SUNFLOWER. **Hab:** Brackish marshes, fresh marshes, bogs (inland). **Dist:** NJ south to FL, west to TX, primarily Coastal Plain, rare and scattered inland. **Phen:** Jul-Oct. **Syn:** = C, F, Fl7, FNA21, G, GW2, K1, K3, K4, RAB, SE1, W, WH3, Sherff & Alexander (1955); > *Bidens mitis* var. *leptophylla* (Nuttall) Small – S; > *Bidens mitis* var. *mitis* – S. NatureServe G4? (Apparently Secure).



Bidens polylepis Blake. MIDWESTERN TICKSEED-SUNFLOWER. **Hab:** Marshes, wet meadows, ditches, bogs. **Dist:** DE, MD, IL, and MO south to GA, AL, FL (?), and TX (and adventive farther north); the pre-Columbian distribution is uncertain, and portions of the eastern range of the species may be only from, expansion from a more midwestern distribution. **Phen:** Aug-Oct (-Nov). **Syn:** = C, FNA21, G, GrPl, GW2, Mi, NE, NY, Oh3, Pa, RAB, S, SE1, Tn, Va, W; < *Bidens aristosa* (Michaux) Britton – Ar, K1, K3, K4, NcTx; > *Bidens polylepis* Blake var. *polylepis* – F, Sherff & Alexander (1955); > *Bidens polylepis* Blake var. *retrorsa* Sherff – F, Sherff & Alexander (1955).

Bidens trichosperma (Michaux) Britton. NORTHERN TICKSEED-SUNFLOWER. **Hab:** Tidal marshes, other marshes. **Dist:** QC, MN, and SD south to ne. FL, GA, LA, and NE. **Phen:** Aug-Oct. **Syn:** = Fl7, FNA21, K3, K4, Mi, NE, Pa, Va, WH3; = *Bidens coronata* (Linnaeus) Britton – C, G, GrPl, GW2, K1, Oh3, RAB, S, SE1, name invalid; = *Bidens trichosperma* var. *trichosperma* – Il; > *Bidens coronata* var. *brachyodonta* Fernald – F; > *Bidens coronata* var. *coronata* – F, Sherff & Alexander (1955); > *Bidens coronata* var. *trichosperma* (Michaux) Fernald – F. NatureServe G5? (Secure).

Bidens vulgata Greene. TALL BEGGAR-TICKS. **Hab:** Fields, marshes, wet places. **Dist:** QC and BC south to GA, LA, and CA. **Phen:** Aug-Oct. **Syn:** = Ar, C, FNA21, G, GrPl, GW2, Il, K1, K3, K4, Mi, NE, NY, Oh3, Pa, RAB, S, SE1, Tn, Va, W; > *Bidens vulgata* var. *vulgata* – F, Sherff & Alexander (1955). NatureServe G5 (Secure).



Bigelowia A.P. de Candolle 1836 (RAYLESS-GOLDENROD)

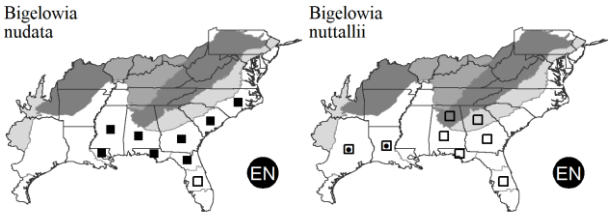
A genus of 3 species, herbs, of se. North America. References: Anderson (1970); SE1; Nesom (2000b); Nesom (2006v) in FNA21 (2006c); Nesom (2020f); Shinners (1971b).

1 Basal leaves many, 1-2 mm wide; plants strongly rhizomatous and colonial; [of dry clayey or rocky places] ..... ***Bigelowia nuttallii***
1 Basal leaves few to many, 2-14 mm wide; plants cespitose, or weakly rhizomatous; [of wet to mesic pine savannas and flatwoods]. ..... ***Bigelowia nudata***

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Bigelowia nudata (Michaux) A.P. de Candolle. RAYLESS-GOLDENROD. **Hab:** Pine savannas, pine flatwoods, pocosin edges. **Dist:** E. NC south to n. FL and west to e. LA. **Phen:** Aug-Oct. **Syn:** = Nesom (2020f); = *Bigelowia nudata* ssp. *nudata* – Fl7, GW2, K1, K3, K4, WH3, Anderson (1970); = *Bigelowia nudata* (Michaux) A.P. de Candolle var. *nudata* – FNA20, SE1, Shinners (1971b); < *Chondrophora nudata* (Michaux) Britton – RAB, S. NatureServe G5T4T5 (Apparently Secure).

Bigelowia nuttallii (Michaux) A.P. de Candolle. GLADE RAYLESS-GOLDENROD, WEST GULF COASTAL PLAIN RAYLESS-GOLDENROD. **Hab:** Prairies, sandstone glades, granite flatrocks, Altamaha Grit glades, and roadbanks. **Dist:** W. LA west to e. TX; disjunct eastward in Mountains of ne. AL, Piedmont of c. GA, and Coastal Plain of s. AL, ec. GA (Jones & Coile 1988, Bridges & Orzell 1989), Panhandle FL (Washington County), and wc. peninsular FL (Pinellas County). **Phen:** Sep-Oct. **Syn:** = Fl7, FNA20, GW2, K1, K3, K4, NcTx, SE1, WH3, Anderson (1970); = *Bigelowia virgata* (Nuttall) A.P. de Candolle – Tx; = *Chondrophora virgata* (Nuttall) Greene – S, misapplied. NatureServe G3G4 (Vulnerable).



Boltonia L'Héritier 1789 (DOLL'S-DAISY)

Contributed by John F. Townsend and Alan S. Weakley

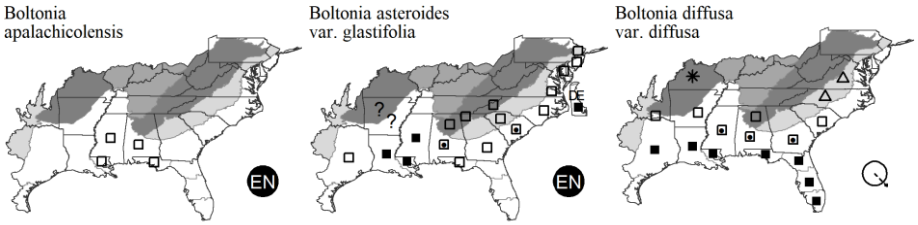
A genus of about 6-7 species, herbs, of e. and c. North America. References: Anderson (1987); SE1; Karaman-Castro & Urbatsch (2006) in FNA20 (2006b); Morgan (1966); Nesom (2000b); Sorrie & LeBlond (2008); Townsend & Karaman-Castro (2006); Townsend (2013).

6 Inflorescence subulate-bracteate.
..... ***Boltonia diffusa var. diffusa***
6 Inflorescence more or less leafy-bracteate.
8 Inflorescence diffusely branched, heads relatively numerous, phyllaries (0.2-) 0.3-0.4 (-0.5) mm wide, (1.3-) 1.4-1.8 (-2.1) mm long, pappus awns 0.3-0.8 mm long ..... ***Boltonia apalachicolensis***
8 Inflorescence with loosely ascending branches, heads relatively few, phyllaries (0.5-) 0.7-0.9 (-1.1) mm wide, (1.5-) 2.1-2.4 (-3.5) mm long, pappus awns (0.2-) 0.8-1.1(-1.3) mm long.
..... ***Boltonia asteroides var. glastifolia***

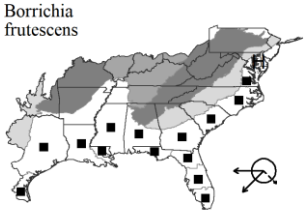
Boltonia apalachicolensis L.C. Anderson. APALACHICOLA DOLL'S-DAISY. **Hab:** Floodplain forests. **Dist:** Panhandle FL, s. MS, west to LA. **Phen:** Aug-Oct. **Syn:** = Fl7, FNA20, K1, K3, K4, WH3; < *Boltonia sp.* – GW2. NatureServe G2Q (Imperiled).

Boltonia asteroides (Linnaeus) L'Héritier *var.* ***glastifolia*** (Hill) Fernald. EASTERN DOLL'S-DAISY. **Hab:** Marshes, ditches. **Dist:** NJ south to Panhandle FL, west to MS, LA, and e. TX, mostly on the Coastal Plain, but with a few disjunct occurrences inland, such as Henderson County, NC. **Phen:** Aug-Oct. **Syn:** = F, K3, K4, Va, Townsend (2013); < *Boltonia asteroides* – Fl7, RAB, W, WH3; < *Boltonia asteroides* (Linnaeus) L'Héritier var. *asteroides* – Ar, C, FNA20, G, K1, NY, SE1, Anderson (1987), Morgan (1966), Townsend & Karaman-Castro (2006); < *Boltonia sp.* – GW2.

Boltonia diffusa Elliott *var.* ***diffusa***. SOUTHERN DOLL'S-DAISY. **Hab:** Clay-based Carolina bays, roadsides, powerline rights-of-way, and other artificially open areas. **Dist:** Se. SC south to s. FL, west to e. TX, inland in the interior to c. TN, s. IL, s. MO, AR, and se. OK; disjunct in the Bahamas (Mangrove Cay of Andros Island). **Phen:** Aug-Oct. **Comm:** See Sorrie & LeBlond (2008) for comments on distribution and nativity. **Syn:** = Ar, F, FNA20, Il, K1, Va, Morgan (1966); < *Boltonia caroliniana* (Walter) Fernald – RAB; < *Boltonia diffusa* – C, Fl7, G, K3, K4, NcTx, SE1, Tx, WH3, Anderson (1987); < *Boltonia sp.* – GW2.



Borrichia Adanson 1763 (SEASIDE OXEYE)

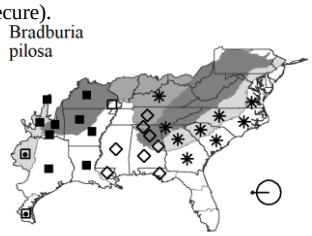


A genus of 2 species, shrubs, of se. United States, Gulf coast of Mexico, and West Indies. References: SE1; Semple (1978); Semple (2006g) in FNA21 (2006c); Ward (2012a).

Borrichia frutescens (Linnaeus) A.P. de Candolle. SILVER SEASIDE OXEYE. **Hab:** Salt and brackish marshes. **Dist:** E. MD and e. VA south to s. FL, west to TX and Mexico (Gulf Coast to the Yucatan peninsula); Bahamas

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

(Grand Bahama); Bermuda. **Phen:** Jan-Dec. **ID Notes:** This species often forms nearly pure, clonal stands of many hectares, conspicuous from the fleshy, gray leaves. **Syn:** = Bah, C, F, Fl7, FNA21, G, K1, K3, RAB, S, SE1, Tx, Va, WH3, Semple (1978). NatureServe G5 (Secure).



Bradburia Torrey & A. Gray 1842 (GOLDEN-ASTER)

A genus of 2 species, annual herbs, native to sc. North America. References: SE1; Harms (1974); Nesom (1991); Nesom (2000b); Semple & Chinnappa (1984); Semple (1981); Semple (1996); Semple (2006b) in FNA20 (2006b).

Bradburia pilosa (Nuttall) Semple. SOFT GOLDENASTER. **Hab:** Barrens, prairies, glades, savannas, roadsides, disturbed areas. **Dist:** S. MO and se. KS, south to w. LA and e. TX; populations east of the Mississippi River are questionably native. See Anderson (2007) for FL record. **Phen:** (May-) Jun-Oct. **Syn:** = Ar, Fl7, FNA20, K3, K4, Mo2, Tn, WH3, Semple (1996); = *Chrysopsis pilosa* Nuttall – F, G, GrPl, NcTx, SE1, Nesom (1991), Semple (1981); = *Heterotheca pilosa* (Nuttall) Shinners – Tx, Harms (1974); < *Heterotheca gossypina* (Michaux) Shinners – RAB.

Brickellia Elliott 1823 (FALSE-BONESET, BRICKELL-BUSH)

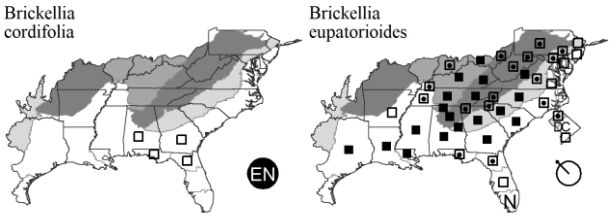
A genus of about 100-110 species, herbs and shrubs, primarily of sw. North America and Mexico south into Central America. *Kuhnia* should be included within a broadly circumscribed *Brickellia* (Schilling et al. 2015; King & Robinson 1987; Shinners 1971). In a molecular analysis (Schilling et al. 2015), *B. cordifolia* is basalmost in a clade that makes up *Brickellia* s.s., while *B. eupatorioides* is in a clade that corresponds to the formerly recognized *Kuhnia*. References: SE1; Schilling et al (2015); Scott (2006) in FNA21 (2006c); Shinners (1946); Shinners (1971a); Turner (1989).

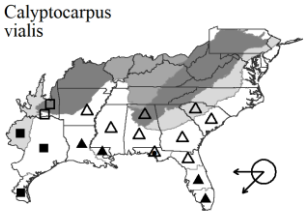
2 Leaves rounded to cordate at base; lower stem leaf blades 1-2.5× as long as wide; petioles 10-70 mm long; flowers 20-40 (-70) per head; [section *Brickellia*] ..... ***Brickellia cordifolia***

2 Leaves cuneate at base; lower stem leaf blades 2-8× as long as wide; petioles 0-10 mm long; flowers 6-35 per head; [collectively widespread in our area]. ..... ***Brickellia eupatorioides***

Brickellia cordifolia Elliott. FLYR'S BRICKELLIA, FLYR'S FALSE-BONESET. **Hab:** Mesic pine-hardwood or oak-hickory woods of upland hammocks. **Dist:** Sw. GA (Jones & Coile 1988; Carter, Baker, & Morris 2009) and AL south to Panhandle FL and n. peninsular FL. **Phen:** Late Aug-late Oct. **Syn:** = Fl7, FNA21, K1, K3, K4, SE1, WH3; = *Coleosanthus cordifolius* (Elliott) Kuntze – S. NatureServe G3 (Vulnerable).

Brickellia eupatorioides. EASTERN KUHNIA. **Hab:** Dry slopes, longleaf pine sandhills (especially in loamy sites), shale barrens, dry woodlands, thickets. **Dist:** NJ west to IN, south to c. peninsular FL and se. TX. **Phen:** Jun-Oct. **Tax:** In addition to var. *eupatorioides*, *B. eupatorioides* includes several other varieties, of more western distribution. Var. *texana* (Shinners) Shinners [= var. *ozarkana* (Shinners) Shinners] has the outer phyllaries prolonged into setae, nearly or fully as long as the inner phyllaries, and should be considered a possibility for our area, in dry open habitats with prairie or midwestern affinities; it is known from as far eastward as AR, MO, and s. IL. **Syn:** = *Brickellia eupatorioides* (Linnaeus) Shinners var. *eupatorioides* – Ar, FNA21, K1, K3, K4, Mo2, NcTx, Va, Shinners (1971a), Turner (1989); = *Kuhnia eupatorioides* var. *eupatorioides* – C, F, G, SE1, Tx, Tx; = *Kuhnia eupatorioides* var. *pyramidalis* Rafinesque – Shinners (1946); < *Brickellia eupatorioides* – Fl7, Pa, Tn, WH3; < *Kuhnia eupatorioides* Linnaeus – Oh3, RAB, S, W; >< *Kuhnia eupatorioides* var. *eupatorioides* – SE1; >< *Kuhnia eupatorioides* var. *gracilis* Torrey & A. Gray – SE1. NatureServe G5T5 (Secure).





Calyptocarpus Lessing 1832 (STRAGGLER-DAISY, LAWNFLOWER)

A genus of 2-3 species, herbs, of sw. North America south to Central America. References: SE1; Lange, Bradley, & Sadle [(in prep); Sherff & Alexander (1955); Strother (2006vv) in FNA21 (2006c).

Calyptocarpus vialis Lessing. STRAGGLER-DAISY, LAWNFLOWER, HORSE-HERB, HIERBA DEL CABALLO. **Hab:** Disturbed areas, roadsides, lawns, flower-beds. **Dist:** Native of s. TX and Mexico. Nesom (2011d) discusses the native distribution of *C. vialis* and concludes that it was originally native to s. TX and Mexico. **Phen:** Jan-Dec. **Syn:** = Ar, Bah, Fl7, FNA21, Il, K1, K3, K4, NcTx, S, SE1, Tx, WH3, Sherff & Alexander (1955). NatureServe G5 (Secure).

Carduus Linnaeus 1753 (PLUMELESS THISTLE)

A genus of about 90 species, herbs, of temperate Old World. References: SE1; Keil (2006e) in FNA19 (2006a).

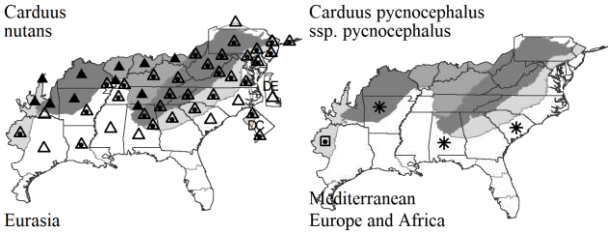
1 Phyllaries 2-8 mm wide; heads mostly nodding (declined at least slightly from the vertical) ..... ***Carduus nutans***

1 Phyllaries 1-2 mm wide; heads erect. ..... ***Carduus pycnocephalus ssp. pycnocephalus***

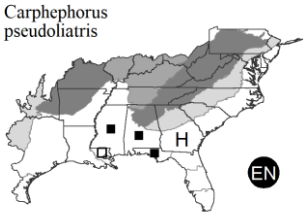
Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

* ***Carduus nutans*** Linnaeus. NODDING THISTLE, MUSK THISTLE. **Hab:** Fields, roadsides, disturbed areas. **Dist:** Native of Eurasia. **Phen:** Late May-Nov. **Tax:** *C. nutans* in its native range in Eurasia consists of a complex of taxa variously treated at specific, subspecific, and varietal rank; the application of these taxa to North American material is problematic and unresolved (see Keil 2006e in FNA for discussion). **Syn:** = Ar, C, F, FNA19, G, Il, K3, K4, Mi, NE, NY, Oh3, Pa, RAB, SE1, Tn, Va, W; > *Carduus nutans* Linnaeus ssp. *leiophyllus* (Petrovic) Stojanov & Stefanoff – GrPl; > *Carduus nutans* ssp. *macrocephalus* (Desfontaines) Nyman – GrPl, NcTx; > *Carduus nutans* Linnaeus ssp. *macrolepis* (Petermann) Kazmi – K1.

Carduus pycnocephalus Linnaeus *ssp*. ***pycnocephalus***. ITALIAN PLUMELESS-THISTLE. **Hab:** In waste areas around wool-combing mill, ballast waif. **Dist:** Native of n. Africa and w. Asia. Scattered occurrences in e. North America, including old ballast collections (FNA). Reported for SC by Nesom (2004d). **Syn:** = Ar, FNA19, NY; < *Carduus pycnocephalus* – K3, K4. NatureServe GNR (Not Yet Ranked).



Carphephorus Cassini 1816



A genus of 4 species, herbs, endemic to the Southeastern Coastal Plain of North America. The merger of *Trilisa* and *Litrisa* into *Carphephorus* has been questioned (Schmidt & Schilling 2000) and Schilling (2011) provides evidence that both *Trilisa* and *Litrisa* should be maintained as separate genera. Schilling (2011b) states that "*Carphephorus s.s.* remains enigmatic, and not only do the features that appear to be diagnostic for the genus appear to be plesiomorphies (elongate rootstocks; cymose capitulescences; larger heads; and notched tips of the anther appendages), there is no evidence from the molecular results that it represents a monophyletic entity. One potential resolution would be to recognize as distinct genera *C. corymbosus*, *C. pseudoliatris*, and *C. bellidifolius* + *C. tomentosus*. A second and perhaps better approach would be to combine *Carphephorus s.s.* (e.g. excluding *Trilisa* and *Litrisa*) and *Liatris* into a single genus." The only species of this complex not occurring in our area is *Litrisa carnosa* Small (of c. peninsular FL). References: Correa & Wilbur (1969); SE1; DeLaney, Bissett, & Weidenhamer (1999); Nesom (2006hh) in FNA21 (2006c); Orzell & Bridges (2002); Schilling (2011b).

1 Heads small, the involucre 3.5-6 mm high, with 5-12 phyllaries; leaves without shining punctate glands (except punctate-glandular in *Litrisa carnosa*, of the FL peninsula).
  3 Stem glabrous; peduncles glabrous; inflorescence corymbiform ..... ***Trilisa odoratissima***
  3 Stem conspicuously spreading-hirsute; peduncles stipitate-glandular; inflorescence thyrsoid-paniculate ..... ***Trilisa paniculata***
1 Heads larger, the involucre 6-15 mm high, with 15-40 phyllaries; leaves with conspicuous (at least at 10× magnification) resin dots. ..... ***Carphephorus pseudoliatris***

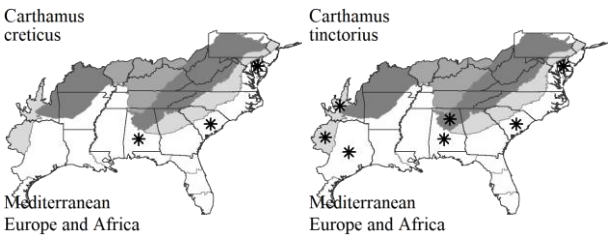
Carphephorus pseudoliatris Cassini. LAVENDER LADY. **Hab:** Pineland seepage bogs and wet pine savannas. **Dist:** Sw. GA and FL Panhandle west to e. LA, and East Gulf Coastal Plain endemic. **Syn:** = Fl7, FNA21, GW2, K1, K3, K4, S, WH3, Correa & Wilbur (1969), DeLaney, Bissett, & Weidenhamer (1999), Schilling (2011b); = *Carphephorus pseudo-liatris* – SE1, orthographic variant. NatureServe G4G5 (Apparently Secure).

Carthamus Linnaeus 1753 (DISTAFF-THISTLE)

A genus of 14 species, annual and perennial herbs, of the Mediterranean region. Closely related to *Centaurea*, and perhaps to be included there. References: Keil (2006k) in FNA19 (2006a).

* ***Carthamus creticus*** Linnaeus. SMOOTH DISTAFF-THISTLE. **Hab:** Waste area around wool-combing mill, ballast, other disturbed areas. **Dist:** Native of s. Europe and n. Africa. Reported by Nesom (2004d) for SC, as *C. baeticus*. **Syn:** = FNA19, K4; ? *Carthamus lanatus* Linnaeus ssp. *baeticus* (Boissier & Reuter) Nyman – K1, K3. NatureServe GNRTNR (Not Yet Ranked).

* ***Carthamus tinctorius*** Linnaeus. SAFFLOWER. **Hab:** Under bird feeders as a waif, also an old ballast waif. **Dist:** Native of the e. Mediterranean region. **Phen:** Jun-Aug. **Syn:** = FNA19, GrPl, K3, K4, Mi, NcTx, NE, NY. NatureServe GNR (Not Yet Ranked).



Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more)

* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable

X : extirpated

Centaurea Linnaeus 1753 (STAR-THISTLE, KNAPWEED)

A genus of about 500 species, herbs, native of Eurasia and n. Africa. *Cyanus* is better separated at the generic level (Greuter 2003). References: Boršić et al (2011); SE1; Greuter (2003b); Greuter et al (2000); Keil & Ochsmann (2006) in FNA19 (2006a).

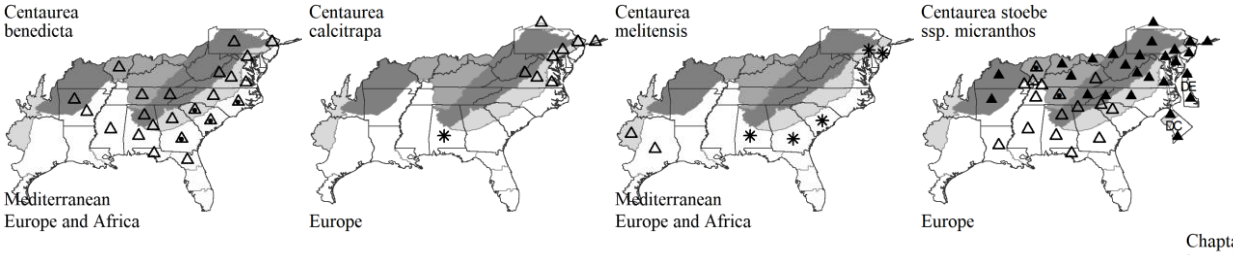
1 Phyllaries evidently spine-tipped.
  2 Leaf bases not decurrent on the stem, the stem merely angled; pappus absent; corollas pink-purple.
    ..... ***Centaurea calcitrapa***
  2 Leaf bases decurrent on the stem as wings (only shortly so in *C. benedicta*); pappus present in at least the central flowers in the head; corollas yellow.
    4 Heads sessile, closely subtended and partially concealed by large foliar bracts ..... ***Centaurea benedicta***
    4 Heads obviously pedunculate, lacking large foliar bracts subtending the head.
      ..... ***Centaurea melitensis***
1 Phyllaries not spine-tipped.
  6 Plant an annual; flowers pale to medium blue, flowering Apr-Jun ..... ***Cyanus***
  6 Plant a perennial; flowers pink to purple, flowering Jun-Oct.
    ..... ***Centaurea stoebe ssp. micranthos***

* ***Centaurea benedicta*** (Linnaeus) Linnaeus. BLESSED-THISTLE. **Hab:** Fields, roadsides, disturbed areas. **Dist:** Native of Mediterranean Europe. **Phen:** Late Mar-Jun. **Syn:** = Ar, Fl7, FNA19, Il, K3, K4, NE, NY, RAB, Tn, Va, WH3; = *Cnicus benedictus* Linnaeus – C, F, G, K1, S, SE1, W. NatureServe GNR (Not Yet Ranked).

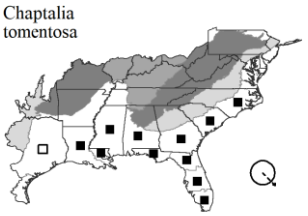
* ***Centaurea calcitrapa*** Linnaeus. PURPLE STAR-THISTLE, CALTROPS. **Hab:** Roadsides, disturbed areas. **Dist:** Native of Europe. **Phen:** May-Sep. **Syn:** = C, F, FNA19, G, K1, K3, K4, NE, NY, Pa, S, SE1. NatureServe GNR (Not Yet Ranked).

* ***Centaurea melitensis*** Linnaeus. MALTESE STAR-THISTLE. **Hab:** Roadsides, disturbed areas, eastwards as a ballast and mill waif (waste areas near wool-combing mills, ballast near old seaports). **Dist:** Native of Mediterranean Europe. **Phen:** Jun-Sep. **Syn:** = C, F, FNA19, G, Il, K1, K3, K4, NcTx, NE, S, SE1. NatureServe GNR (Not Yet Ranked).

* ***Centaurea stoebe*** Linnaeus *ssp. micranthos* (S.G. Gmelin ex Gugler) Hayek. SPOTTED KNAPWEED, BUSHY KNAPWEED. **Hab:** Roadsides, disturbed areas. **Dist:** Native of Europe. **Phen:** Late Jun-Nov. **Tax:** Complications about typification make the appropriate name to apply to the tetraploid entity unclear. **Syn:** = Ar, Fl7, FNA19, K3, Mi, NE, NY, Pa, Tn, Va, WH3; = *Centaurea biebersteinii* A.P. de Candolle – K1; = *Centaurea maculosa* Lamarck – C, F, G, GrPl, Oh3, RAB, SE1, W, misapplied; = *Centaurea stoebe* Linnaeus ssp. *australis* (Pancic & A. Kern.) Greuter – K4; > *Centaurea biebersteinii* A.P. de Candolle – Il; > *Centaurea stoebe* Linnaeus ssp. *micranthos* (S.G. Gmelin ex Gugler) Hayek – Il. NatureServe GNR (Not Yet Ranked).



Chaptalia Ventenat 1802 (SUNBONNETS)

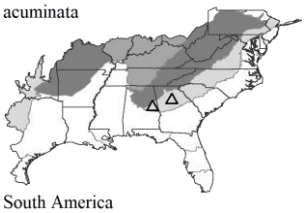


A genus of about 60 species, herbs, of warm temperate, subtropical, and tropical America. The remainder of the genus is distributed in the West Indies, Central America, and South America. References: SE1; Harms (2011); Nesom (1995a); Nesom (2006a) in FNA19 (2006a); Vuilleumier (1969).

Identification Notes: The basal leaves are distinctive, the undersurface permanently and tightly white floccose, the upper surface floccose when young but glabrate in age, and the margins with obscure denticulations.

Chaptalia tomentosa Ventenat. SUNBONNETS, PINELAND DAISY, NIGHT-NODDING BOG-DANDELION, WOOLLY SUNBONNETS. **Hab:** Pine savannas, sandhill seeps, pine flatwoods. **Dist:** E. NC south s. FL and west to e. TX; allegedly disjunct in Hispaniola (Acevedo-Rodríguez & Strong 2012). **Phen:** Dec (southwards)-May. **Syn:** = Fl7, FNA19, GW2, K1, K3, K4, RAB, S, SE1, WH3, WI, Harms (2011), Nesom (1995a), Vuilleumier (1969). NatureServe G5 (Secure).

Chevreulia Cassini 1817 (CHEVREULIA)



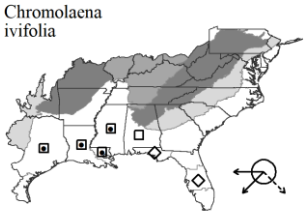
A genus of 6 species, perennial herbs, of southern South America (Hansen, Urbatsch, & Pruski 2019). References: Hansen, Urbatsch, & Pruski (2019).

* ***Chevreulia acuminata*** Lessing. **Hab:** Lawns, other mowed grassy areas. **Dist:** Native of South America.

Chromolaena A.P. de Candolle 1836

A genus of about 165 species, perennial herbs and shrubs, of s. North America, Central America, and South America. References: SE1; Nesom (2006ll) in FNA21 (2006c).

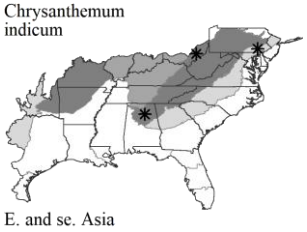
Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



Chromolaena ivifolia (Linnaeus) R.M. King & H. Robinson. IVY-LEAF THOROUGHWORT. **Hab:** Prairies and fields, disturbed areas. **Dist:** S. FL, Panhandle FL, s. AL, s. MS, TX; West Indies, Mexico, Central America, and South America (Woods, Diamond, & Searcy 2003; Kartesz 1999, Nesom in FNA 2006c). **Phen:** Aug-Nov. **Syn:** = Fl7, FNA21, K1, K3, K4, WH3; = *Eupatorium ivaefolium* – SE1, Tx, orthographic variant; = *Osmia ivaefolia* (Linnaeus) Schultz 'Bipontinus' – S.

Chrysanthemum Linnaeus 1753 (CHRYSANTHEMUM)

If circumscribed narrowly, a genus of 3 species, herbs, of n. Africa and Europe. References: Arriagada & Miller (1997); SE1.



* ***Chrysanthemum indicum*** Linnaeus. GARDEN CHRYSANTHEMUM. **Hab:** Cultivated as an ornamental, persistent or perhaps naturalized at widely scattered locations. **Dist:** Native of e. and se. Asia. **Phen:** Sep-Nov. **Syn:** = K3, K4; >< *Chrysanthemum morifolium* Ramatuelle – NE; >< *Dendranthema* ×*grandiflorum* (Ramatuelle) Kitamura – K1. NatureServe GNR (Not Yet Ranked).

Chrysogonum Linnaeus 1753 (GREEN-AND-GOLD)

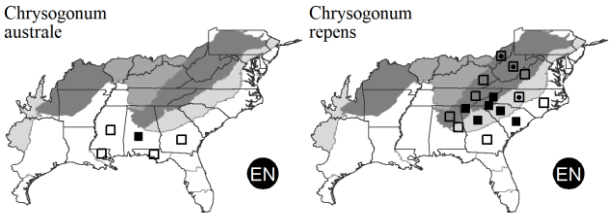
A genus of 3-4 species and 3-4 taxa, perennial herbs, of se. North America. Nesom (2020) elevated var. *brevistolon* to species rank. Schilling & Floden (2018) suggested "that patterns of differentiation within [*C. virginianum*] are complex and will require adjustment beyond simply elevating the varieties recognized by Nesom (2001) to species level" (Schilling & Floden 2018). References: SE1; Nesom (2001b); Nesom (2006ff) in FNA21 (2006c); Nesom (2020g); Schilling & Floden (2018).

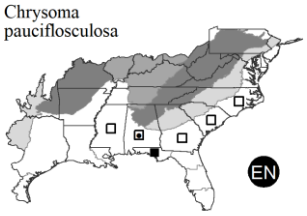
2 Earliest flowering stems leafless, mostly 2-10 cm high; later flowering stems leafy, 15-25 cm high; longest stolon internodes 2-6 cm long; [of ne. SC, sc. NC, nw. NC, sw. VA, ne. TN. and se. KY south to e. GA, c. GA, and ec. AL] ..... ***Chrysogonum repens***

2 Earliest flowering stems leafless, 2-10 cm high; later flowering stems leafless as well, 2-10 cm high; longest stolon internodes 12-60 cm long; [of sc. and sw. GA west to e. LA] ..... ***Chrysogonum australe***

Chrysogonum australe Alexander ex Small. GULF COAST GREEN-AND-GOLD. **Hab:** Moist to fairly dry woodlands and forests. **Dist:** FL Panhandle and sc. and sw. GA west to e. LA. **Phen:** Late Feb-early May. **Comm:** Genetic evidence suggests that this entity is better treated as a species than as a variety (Schilling & Floden 2018). **Syn:** = Nesom (2020g), Schilling & Floden (2018); = *Chrysogonum virginianum* Linnaeus var. *australe* (Alexander ex Small) H.E. Ahles – Fl7, FNA21, K3, K4, WH3, Nesom (2001b); < *Chrysogonum australe* Alexander ex Small – S; < *Chrysogonum virginianum* Linnaeus var. *australe* (Alexander ex Small) H.E. Ahles – RAB, SE1, W.

Chrysogonum repens (Cassini) Nesom. CAROLINA GREEN-AND-GOLD. **Hab:** Moist to fairly dry woodlands and forests. **Dist:** Ne. SC, sc. NC, nw. NC, sw. VA, ne. TN. and se. KY south to e. GA, c. GA, and ec. AL. **Phen:** Late Mar-early Jun. **Syn:** = *Chrysogonum virginianum* Linnaeus var. *brevistolon* Nesom – FNA21, K3, K4, Tn, Va, Nesom (2001b); < *Chrysogonum australe* Alexander ex Small – S; < *Chrysogonum repens* (Cassini) Nesom – Nesom (2020g); < *Chrysogonum virginianum* Linnaeus var. *australe* (Alexander ex Small) H.E. Ahles – RAB, SE1, W.





Chrysoma Nuttall 1834 (WOODY GOLDENROD)

A monotypic genus, a shrub, of se. North America. References: SE1; Nesom (2000b); Nesom (2006w) in FNA20 (2006b).

Chrysoma pauciflosculosa (Michaux) Greene. WOODY GOLDENROD. **Hab:** Coastal dunes, xeric sands of very barren, open, white-sand sandhills, fluvial dunes, and less commonly in driest habitats in the fall-line Sandhills. **Dist:** S. NC south to n. FL and west to s. MS. **Phen:** Late Jul-Oct. **ID Notes:** *Chrysoma* has a growth habit unlike any other shrub east of Texas, southwestern United States, and Mexico. From a trunk-like base, numerous branches ascend, forming a flat-topped shrub 3-5 dm tall. Each branch has a cluster of evergreen leaves restricted to its terminal few cm, the internodes very short (a few mm at most). In summer, some of the woody branches produce terminal, deciduous, flowering branches, which elongate rapidly, the leaves widely spaced, reaching a height of a meter or more. Following flowering and fruiting, the deciduous branches die back to the summit of the woody branches. The leaves are gray-green, rather thick-textured, and finely reticulate, the reticulations giving an appearance rather like anole skin. The midrib is prominent below, almost invisible on the upper surface. Godfrey (1988) has an excellent drawing and description of this distinctive shrub. **Syn:** = Fl7, FNA20, K1, K3, K4, S, SE1, WH3; = *Solidago pauciflosculosa* Michaux – RAB. NatureServe G4G5 (Apparently Secure).

Key to Map Symbology: □⊡■ └native┘ ◇◈◆ └maybe exotic┘ △◬▲ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated

Chrysopsis (Nuttall) Elliott 1823 (GOLDEN-ASTER)

A genus of about 12-15 species, herbs, of se. North America, Mexico, and the Bahamas. This remains a difficult and rather poorly understood group. The appropriate taxonomic status of many of the entities remains unclear; for the moment, I am recognizing a number of entities at the specific level, the appropriate nomenclatural combinations not already available in all cases. References: SE1; DeLaney, Wunderlin, & Semple (2003); Harms (1974); Nesom (2000b); Semple (1981); Semple (1996); Semple (2006c) in FNA20 (2006b); Ward (2012a).

1 Stem, leaves, and phyllaries sparsely to densely pubescent with spreading non-glandular hairs as well has having minutely glandular pubescence; annuals with taproots ..... ***Bradburia pilosa***
1 Stems, leaves, and phyllaries various but lacking spreading non-glandular hairs; biennials or perennials, either fibrous-rooted or with a mostly short and quickly disintegrating taproot.
2 Cypselas lacking translucent, yellow to reddish brown, longitudinal ridges; phyllaries moderately to densely glandular.
3 Upper leaf surfaces arachnoid; [widespread in our area, including in the Piedmont, Mountains, and Interior Low Plateau] ..... ***Chrysopsis mariana***
3 Upper leaf surfaces variously pubescent, but not arachnoid; [of the Coastal Plain only, and mainly FL (also AL, NC, and SC)].
5 Stems decumbent; heads 5-15 (-25) in corymbiform arrays; [of coastal dunes] ..... ***Chrysopsis godfreyi***
5 Stems erect; heads (18-) 30-80 in paniculiform arrays; [of inland habitats] ..... ***Chrysopsis lanuginosa***
2 Cypselas with 2-10 translucent, yellow to reddish brown, longitudinal ridges; phyllaries glabrous to densely pilose, and sometimes also stipitate-glandular.
11 Mid and upper stem leaves distinctly pilose-ciliate along the margins. ..... ***Chrysopsis hyssopifolia***
11 Mid and upper stem leaves not pilose-ciliate along the margins
13 Stems erect. ..... ***Chrysopsis linearifolia***
13 Stems decumbent. ..... ***Chrysopsis cruiseana***

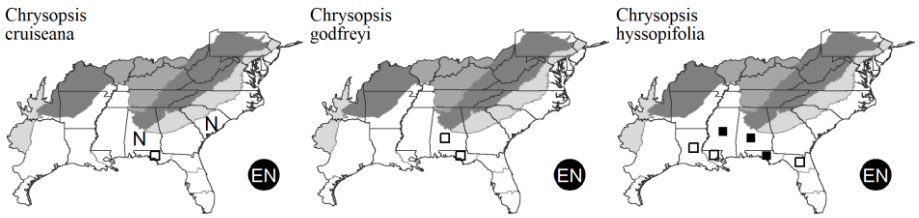
Chrysopsis cruiseana Dress. CRUISE'S GOLDENASTER. **Hab:** Coastal sand dunes. **Dist:** FL Panhandle. **Phen:** Oct-Dec. **Comm:** 2n chromosome number=18. **Syn:** = *Chrysopsis gossypina* (Michaux) Elliott ssp. *cruiseana* (Dress) Semple – Fl7, FNA20, K3, K4, WH3, Semple (1981). NatureServe G5T2 (Imperiled).

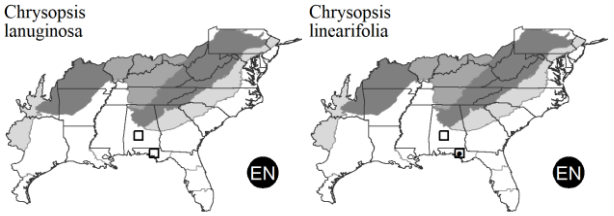
Chrysopsis godfreyi Semple. GODFREY'S GOLDENASTER. **Hab:** Coastal sand dunes. **Dist:** FL Panhandle and s. AL. **Phen:** Nov-Dec. **Comm:** Plants with densely stipitate-glandular, non-woolly upper stem leaves have been treated as forma *viridis* (Semple 1981). 2n chromosome number=10. **Syn:** = Fl7, FNA20, K3, K4, WH3, Semple (1981). NatureServe G2 (Imperiled).

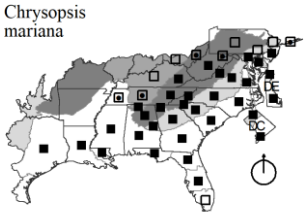
Chrysopsis hyssopifolia Nuttall. HYSSOPLEAF GOLDENASTER. **Hab:** Longleaf pine sandhills, Florida scrub, dry pine flatwoods, other dry sands. **Dist:** N. FL peninsula west to FL Panhandle, s. AL, s. MS, and se. LA. **Phen:** Oct-Dec. **Comm:** 2n chromosome number=18. **Syn:** = SE1; = *Chrysopsis gossypina* (Michaux) Elliott ssp. *hyssopifolia* (Nuttall) Semple – Fl7, FNA20, K3, K4, WH3, Semple (1981); = *Heterotheca hyssopifolia* (Nuttall) V.L. Harms – Harms (1974); > *Chrysopsis gigantea* Small – S; > *Chrysopsis hyssopifolia* Nuttall – S. NatureServe G5T3T5 (Apparently Secure).

Chrysopsis lanuginosa Small. LYNN HAVEN GOLDENASTER. **Hab:** Longleaf pine sandhills. **Dist:** Endemic to FL Panhandle and nearby s. AL (Diamond 2020). **Comm:** 2n chromosome number=18. **Syn:** = Fl7, FNA20, K3, K4, WH3; < *Chrysopsis scabrella* Torrey & A. Gray – SE1.

Chrysopsis linearifolia Semple. **Hab:** Florida scrub, longleaf pine sandhills. **Dist:** Endemic to FL Panhandle and s. AL. **Phen:** Sep-Nov (-Apr). **Comm:** 2n chromosome number=10. **Syn:** = *Chrysopsis linearifolia* ssp. *linearifolia* – Fl7, FNA20, K3, WH3; = *Chrysopsis linearifolia* Semple var. *linearifolia* – Ward (2012a). NatureServe G4?TNR (Not Yet Ranked).







Chrysopsis mariana (Linnaeus) Elliott. MARYLAND GOLDEN-ASTER. **Hab:** Longleaf pine sandhills, dry pine flatwoods, dry forests and woodlands, roadsides, other dry habitats. **Dist:** Se. NY and RI (Block Island) west to se. OH, c. KY, w. TN, south to c. peninsular FL and se. TX. **Phen:** Late Jun-Oct. **Tax:** As currently defined, *C. mariana* includes 2x (2n=8), 4x (2n=16), 6x (2n=24) and 8x (2n=32) races that have different distribution patterns that are allopatric or very nearly so (Semple & Chinnappa 1986). Diploids are found in the FL Panhandle and c. peninsula. Tetraploids are found only in ne. FL and the n. peninsula. Hexaploids range nearly throughout the non-FL portion of the species' distribution, in FL only in the nc. FL Panhandle. Octoploids are along the ne. coast of FL, on and near Merritts Island. **Syn:** = C, Fl7, FNA20, G, K3, K4, NE, NY, Oh3, Pa, S, SE1, Tn, Tx, Va, W, WH3, Semple (1981); = *Heterotheca mariana* (Linnaeus) Shinners – RAB, Harms (1974); > *Chrysopsis mariana* var. *macradenia* Fernald – F; > *Chrysopsis mariana* var. *mariana* – F. NatureServe G5 (Secure).

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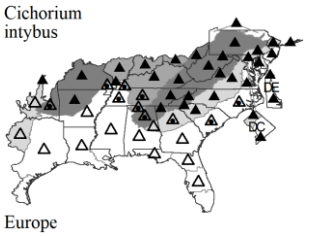
Cichorium Linnaeus 1753 (CHICORY)

A genus of 7 species, herbs, of Europe and n. Africa. References: SE1; Kiers et al (1999); Strother (2006n) in FNA19 (2006a).

* ***Cichorium intybus*** Linnaeus. CHICORY, SUCCORY, BLUE-SAILORS, WITLOOF. **Hab:** Roadsides, fencerows, vacant lots, disturbed areas. **Dist:** Native of Europe. See Anderson (2007) for FL record. **Phen:** Late May-Nov. **Comm:** The dried roasted root is used as a flavoring or substitute for coffee. **Syn:** = Ar, C, F, Fl7, FNA19, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NY, Oh3, Pa, RAB, S, SE1, Tn, Va, W, WH3, Kiers et al (1999). NatureServe GNR (Not Yet Ranked).



Cirsium P. Miller 1754 (THISTLE)

A genus of about 250 species, herbs, north temperate. References: SE1; Keil (2006f) in FNA19 (2006a); Nesom (2021i); Nesom (2022a).

Key adapted in part from Cronquist (1980); portions of key based on Keil (2006f).

1 Plant colonial from creeping rhizomes; heads 13-20 (-25) mm high; phyllaries all lacking spine tips, or the outermost tipped with spines < 1 mm long; plant perennial; [alien weeds, generally in altered habitats]..... ***Cirsium arvense***
1 Plant not colonial; heads 25-50 mm high (as small as 15-25 mm in *C. carolinianum, C. nuttallii, C. muticum,* and *C. virginianum*); phyllaries mostly spine-tipped, with at least some of the spines > 1 mm long (except sometimes mostly or entirely spine free in *C. muticum*); plant biennial (to weakly perennial); [native (except *C. vulgare*), in natural or some species also in disturbed habitats].
  2 Leaves decurrent onto the stem below, the decurrency extending as a wing at least several cm down the stem, and often to the leaf below; leaves scabrous-hispid above; phyllaries lacking a glutinous dorsal ridge; [alien weed] ..... ***Cirsium vulgare***
  2 Leaves not decurrent as a conspicuous wing, or the decurrency extending < 1 cm (sometimes more decurrent in *C. lecontei*); leaves not scabrous-hispid above; [native, sometimes in disturbed habitats].
    3 Phyllaries lacking spine tips (the outermost sometimes with a weak spine-tip to 0.5 mm long); leaves deeply lobed, to 55 cm long and 20 cm wide ..... ***Cirsium muticum***
    3 Phyllaries (at least the outer and middle) with well-developed spine-tips > 1 mm long; leaves lobed or merely toothed, generally < 30 cm long and < 10 cm wide (except in *C. altissimus*).
      4 Heads immediately subtended by several spiny-toothed leaves (appearing as a leafy involucre); flowers yellow, white, or purple.
        5 Involucres more-or-less densely tomentose; stems densely tomentose; [of the Coastal Plain and Piedmont]..... ***Cirsium horridulum var. horridulum***
        5 Involucres glabrous; stems glabrous or sparsely tomentose; [of the Coastal Plain].
          6 Leaves shallowly to deeply pinnatifid; main spines of the leaves 10-30 mm long; [of s. AL and Panhandle FL westward] ..... ***Cirsium horridulum var. megacanthum***
          6 Leaves spinose-dentate to shallowly pinnatifid; main spines mostly 5-10 mm long; [widespread in the Coastal Plain] ..... ***Cirsium horridulum var. vittatum***
      4 Heads pedunculate (rarely with 1 or 2 reduced leaves below); flowers pink, purple, lavender, or white.
        7 Lower surface of the leaves thinly and loosely white-tomentose beneath, this sloughing off in age, the green surface visible through the tomentum except on very small, young leaves.
          8 Heads 15-25 mm high; plants 5-35 dm tall, usually much branched and with numerous heads ..... ***Cirsium nuttallii***
          8 Heads 25-50 mm high; plants 2-10 dm tall, usually strict or few-branched and with 1 or a few heads. ..... ***Cirsium lecontei***
        7 Lower surface of the leaves densely white-tomentose beneath, this persistent and entirely obscuring the green surface.
          12 Heads 15-25 mm high; plants 4-20 dm tall; larger leaves 0.5-12 cm wide. ..... ***Cirsium carolinianum***
          12 Heads 25-45 mm high; plants 10-40 dm tall; larger leaves usually > 5 cm wide.
            18 Leaves toothed or shallowly lobed..... ***Cirsium altissimum***
            18 Leaves deeply pinnatifid..... ***Cirsium discolor***

Cirsium altissimum (Linnaeus) Sprengel. TALL THISTLE. **Hab:** Pastures, woodlands, thickets. **Dist:** MA west to ND, south to Panhandle FL (Jackson County) and e. TX. **Phen:** Sep-Nov. **Syn:** = Ar, C, F, Fl7, FNA19, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Oh3, Pa, S, SE1, Tn, Va, W, WH3; = *Carduus altissimus* Linnaeus – RAB. NatureServe G5 (Secure).

* ***Cirsium arvense*** (Linnaeus) Scopoli. CANADA THISTLE, FIELD THISTLE. **Hab:** Pastures, disturbed areas. **Dist:** Native of Europe. **Phen:** Jul-Nov. **Tax:** Two varieties are often recognized: var. *arvense*, with leaves shallowly undulate-lobed and with only a few fine marginal prickles, and var. *horridum*, with leaves strongly sinuate-pinnatifid and with numerous well-developed marginal prickles. **Syn:** = Ar, FNA19, GrPl, K1, K3, K4, Mi, NE, NY, Pa, S, Tn, Va, W; = *Carduus arvensis* (Linnaeus) Robson – RAB; > *Cirsium arvense* var. *arvense* – C, F, G, Il, Oh3, SE1; > *Cirsium arvense* (Linnaeus) Scopoli var. *horridum* Wimmer & Gräbner – C, G, Il, Oh3, SE1; > *Cirsium arvense* var. *mite* Wimmer & Gräbner – F.

Cirsium carolinianum (Walter) Fernald & Schubert. CAROLINA THISTLE, SPRING THISTLE, PRAIRIE THISTLE. **Hab:** Prairies, open woodlands over mafic, ultramafic, or calcareous rocks. **Dist:** N. VA west to s. OH and MO, south to w. SC, n. GA, AL, and TX. **Phen:** Apr-Jun (-Jul). **Comm:** In the eastern part of the Southeast, *C. carolinianum* seems to be restricted to prairies and woodlands (or maintained powerline or road rights-of-way) over circumneutral rocks and soils, in situations which were oak savannas or even prairies prior to fire suppression. **Syn:** = Ar, C, F, FNA19, G, Il, K1, K3, K4, Oh3, SE1, Tn, Va, W; = *Carduus carolinianus* Walter – RAB; > *Cirsium flaccidum* Small – S; > *Cirsium virginianum* (Linnaeus) Michaux – S, misapplied.

Cirsium discolor (Muhlenberg ex Willdenow) Sprengel. FIELD THISTLE. **Hab:** Pastures, woodlands, thickets. **Dist:** QC west to MB, south to NC, MS, LA, and KS. **Phen:** Aug-Nov. **Syn:** = Ar, C, F, FNA19, G, Il, K1, K3, K4, Mi, NE, NY, Oh3, Pa, S, SE1, Tn, Va, W; = *Carduus discolor* (Muhlenberg ex Willdenow) Nuttall – RAB. NatureServe G5 (Secure).

Cirsium horridulum Michaux *var*. ***horridulum***. COMMON YELLOW THISTLE, BULL THISTLE. **Hab:** Roadsides, woodlands, pine savannas. **Dist:** ME south to FL, west to TX, mostly on the Coastal Plain and adjacent provinces; also Mexico and Bahamas. **Phen:** Late Mar-early Jun. **Syn:** = C,

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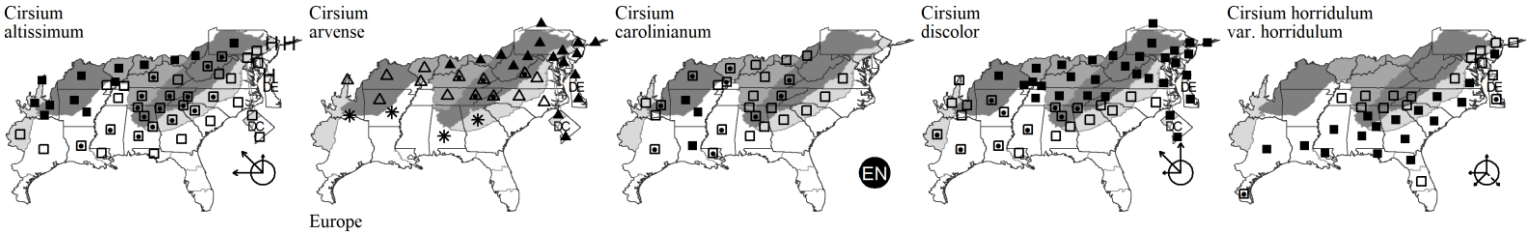
FNA19, K1, K3, K4, NE, NY, Pa, SE1, Va; = *Carduus spinosissimus* Walter – RAB; = *Cirsium horridulum* – Bah, S; < *Cirsium horridulum* – F, Fl7, G, NcTx, Tn, WH3; < *Cirsium horridulum* – GW2. NatureServe G5T5 (Secure).



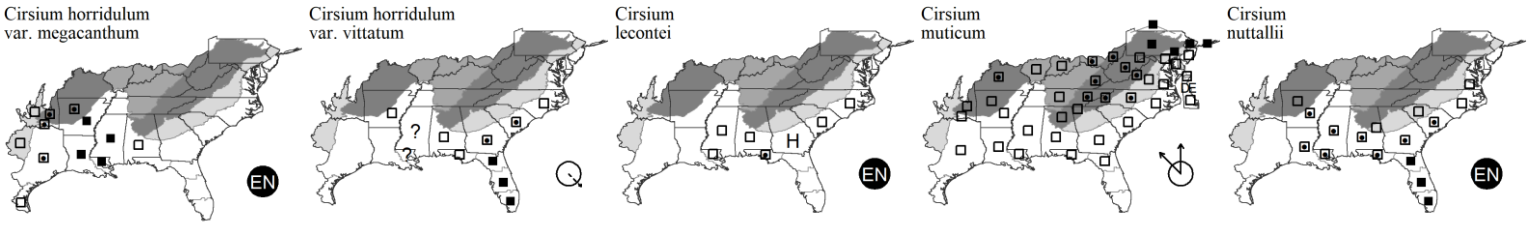
Cirsium horridulum Michaux *var*. ***megacanthum*** (Nuttall) D.J. Keil. BIGSPINE THISTLE. **Hab:** Moist ground. **Dist:** AL and Panhandle FL west to TX and OK. **Phen:** Mar-Jun. **Syn:** = Ar, FNA19, K3, K4; < *Cirsium horridulum* – Fl7, WH3; < *Cirsium horridulum* – GW2; < *Cirsium horridulum* Michaux var. *vittatum* (Small) R.W. Long – K1, SE1; > *Cirsium vittatum* Small – S.

Cirsium horridulum Michaux *var*. ***vittatum*** (Small) R.W. Long. SOUTHERN YELLOW THISTLE, PINELAND THISTLE. **Hab:** Wet pine savannas. **Dist:** Se. NC south to s. peninsular FL and Panhandle FL; Bahamas; West Indies. **Phen:** May-Jul. **Syn:** = Ar, FNA19, K4; = *Carduus smallii* (Britton) H.E. Ahles – RAB; = *Cirsium vittatum* Small – Bah; < *Cirsium horridulum* – Fl7, WH3; < *Cirsium horridulum* – GW2; < *Cirsium horridulum* Michaux var. *vittatum* (Small) R.W. Long – K1, K3, SE1; > *Cirsium smallii* Britton – S; > *Cirsium vittatum* Small – S.

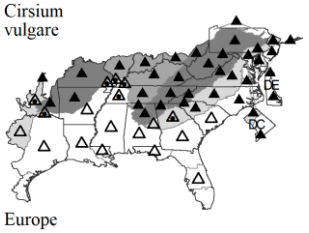
Cirsium lecontei Torrey & A. Gray. LECONTE'S THISTLE. **Hab:** Wet pine savannas, bogs. **Dist:** E. NC south to Panhandle FL, west to LA. **Phen:** Jun-Aug. **Syn:** = Fl7, FNA19, GW2, K1, K3, K4, S, SE1, WH3; = *Carduus lecontei* (Torrey & A. Gray) Pollard – RAB. NatureServe G3 (Vulnerable).

Cirsium muticum Michaux. SWAMP THISTLE. **Hab:** Swamps, wet thickets, woodlands, seepage slopes, wet prairies, meadows. **Dist:** NL (Newfoundland) west to SK, south to DE, NC, TN, and MO, and less commonly south to FL, AL (Diamond & Woods 2009), and TX. **Phen:** Aug-Nov. **Syn:** = Ar, C, Fl7, FNA19, G, GrPl, GW2, Il, K1, K3, K4, Mi, NE, NY, Oh3, Pa, S, SE1, Tn, Va, W, WH3; = *Carduus muticus* (Michaux) Persoon – RAB; > *Cirsium muticum* var. *muticum* – F. NatureServe G5 (Secure).

Cirsium nuttallii A.P. de Candolle. NUTTALL'S THISTLE, COASTAL TALL THISTLE. **Hab:** Longleaf pine savannas, roadsides, pastures, wet hammocks, dry hammocks, prairies. **Dist:** Se. VA south to s. FL, west to LA and AR. Reported for the first time from NC by Krings, Westbrooks, & Lloyd (2002). **Phen:** Jun-Aug. **Syn:** = C, F, Fl7, FNA19, G, GW2, K1, K3, K4, S, SE1, Va, WH3; = *Carduus nuttallii* (A.P. de Candolle) Pollard – RAB. NatureServe G5 (Secure).



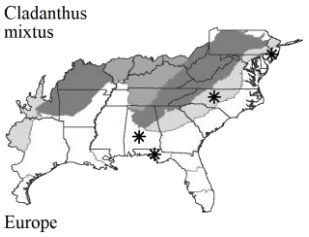
* ***Cirsium vulgare*** (Savi) Tenore. BULL THISTLE. **Hab:** Meadows, pastures, and disturbed areas. **Dist:** Native of Europe. **Phen:** Late Jun-Nov. **Syn:** = Ar, C, F, Fl7, FNA19, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Oh3, Pa, SE1, Tn, Va, W, WH3; < *Carduus lanceolatus* Linnaeus – RAB; < *Cirsium lanceolatum* (Linnaeus) Scopoli – S, misapplied. NatureServe GNR (Not Yet Ranked).



Cladanthus Cassini 1816

A genus of about 5 species, herbs, of the Mediterranean region. References: Watson (2006b) in FNA19 (2006a).

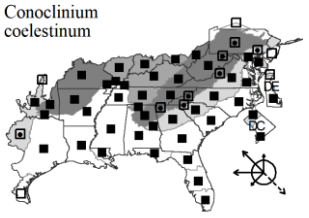
* ***Cladanthus mixtus*** (Linnaeus) Chevallier. MOROCCAN CHAMOMILE. **Hab:** Disturbed areas. **Dist:** Native of Mediterranean Europe and n. Africa. **Phen:** Jun. **Syn:** = Fl7, FNA19, K3, K4, NY, WH3; = *Anthemis mixta* Linnaeus – C, F, G, SE1; = *Ormenis mixta* (Linnaeus) Dumortier – S. NatureServe G5? (Secure).



Conoclinium A.P. de Candolle 1836 (MISTFLOWER)

A genus of 4 species, of e. and c. North America extending into Mexico. References: SE1; Medford, Poindexter, & Weakley (2020) in Weakley et al (2020); Patterson & Nesom (2006) in FNA21 (2006c); Schilling et al (2019b); Schmidt & Schilling (2000).

Conoclinium coelestinum (Linnaeus) A.P. de Candolle. MISTFLOWER, AGERATUM. **Hab:** Streambanks, moist to wet disturbed areas, especially ditches, probably more common than formerly. **Dist:** NJ west to IL, c. MO, se. KS, and OK, south to s. FL and c. TX; also in Cuba, and scattered farther north (as in NY, n. OH, and n. IN) probably as escapes from cultivation. **Phen:** Late Jul-Oct. **Tax:** See Wooten & Clewell (1971) for further discussion of this species. **Syn:** = Medford, Poindexter, & Weakley (2020) in Weakley et al (2020), Schilling et al (2019b); < *Conoclinium coelestinum* (Linnaeus) A.P. de Candolle – Ar, Fl7, FNA21, Il, K3, K4, Mi, NY, S, Tn, Va, WH3; < *Conoclinum coelestinum* – Pa, misspelling; < *Eupatorium coelestinum* Linnaeus – C, F, G, GrPl, NcTx, Oh3, RAB, SE1, Tx, W, WV.



Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Coreopsis Linnaeus 1753 (COREOPSIS, TICKSEED)

Contributed by Alan S. Weakley and Bruce A. Sorrie

A genus of about 30 species, herbs, of America (once unrelated groups are removed). Recent molecular studies suggest that the relationship between *Bidens* and *Coreopsis* (as traditionally circumscribed) is complex, and that changes in taxonomy will be needed to more accurately reflect relationships (Kim et al. 1999; Crawford & Mort 2005). Tadesse & Crawford (2014) have begun this process, removing from *Coreopsis* some unrelated groups into *Electra*, *Leptosyne*, and (perhaps) *Heterosperma*; two additional clades, traditionally treated in *Coreopsis* section *Pseudoagarista*, will likely be removed. It appears likely that the clade consisting of sections *Gyrophyllum* (*C. major, C. delphiniifolia, C. verticillata, and C. tripteris*) and *Silphidium* (*C. latifolia*) will also be removed. References: Allison & Stevens (2001); SE1; Schilling, Johnson, & Iacona (2015); Sherff & Alexander (1955); Smith (1976); Sorrie, LeBlond, & Weakley (2013); Strother (2006yy) in FNA21 (2006c); Tadesse & Crawford (2014).

Unkeyed taxa: *Coreopsis leavenworthii*

1 Disk flowers with 4 corolla lobes and 4 anthers; ray flowers usually apically 3-lobed.
  2 Leaves pinnately or bipinnately lobed into linear segments or narrowly lanceolate segments; [section *Calliopsis*] ..... ***Coreopsis tinctoria var. tinctoria***
  2 Leaves simple or with 1-2 auriculate lobes at the base; [section *Eublepharis*].
    3 All of the major cauline leaves opposite (except in *C. linifolia* the lowermost few leaves may be alternate). ..... ***Coreopsis linifolia***
    3 All of the major cauline leaves alternate.
      6 Ray flowers pink; leaves juncoid (linear-terete) ..... ***Coreopsis nudata***
      6 Ray flowers yellow; leaves with an expanded blade. ..... ***Coreopsis gladiata***
1 Disk flowers with 5 corolla lobes and 5 anthers; ray flowers apically entire, or with (2-) 4-5 teeth.
  11 All of the leaves simple or the plant with a mixture of simple leaves and leaves with 1-2 (-4) basal auricles or leaflets, these distinctly smaller than the terminal lobe or leaflet.
    13 Stems with (5-) 6-12 nodes between the first node > 1 cm above the basal leaves and the first head.
      14 Leaf blades (or terminal leaflets of compound leaves) narrowly oblanceolate, to 0.6 cm wide ..... ***Coreopsis pubescens var. debilis***
      14 Leaf blades (or terminal leaflets of compound leaves(elliptical to oblanceolate, 0.6-4 cm wide. ..... ***Coreopsis pubescens var. pubescens***
    13 Stems with 1-5 (-8) nodes between the first node > 1 cm above the basal leaves and the first head.
      16 Annual; rays yellow, with a red-brown or purple blaze or spotting near the base. ..... ***Coreopsis basalis***
      16 Perennial (cormose or rhizomatous at base, and sometimes also stoloniferous); rays completely yellow, lacking a red-brown or purple blaze or spotting near the base.
        18 Plants spreading by elongate stolons; leaf blades (or terminal leaflets) 1-2.2× as long as wide ..... ***Coreopsis auriculata***
        18 Plants lacking stolons; leaf blades (or terminal leaflets) > 3× as long as wide (basal leaves sometimes broader). ..... ***Coreopsis lanceolata***
  11 Most or all of the leaves deeply lobed or dissected into distinct leaflets or divisions, the leaflets or divisions 3-20 or more, if only 3, then the lateral leaflets nearly or fully as large and well-developed as the terminal.
    21 Leaves sessile or with a short subpetiolar base < 2 mm long, the initial division of the leaves palmate into 3 leaflets (these sometimes further divided), giving the 2 opposite leaves the superficial appearance of a whorl of 6 leaves; [section *Gyrophyllum*].
      22 Leaves palmately 3-foliolate (rarely the leaves, especially the upper, simple, or with lower leaves 3-foliolate with the middle leaflet 2- or 3-lobed), the total number of leaflets or divisions thus (1-) 3 (-5), the middle leaflet of median leaves (2-) 5-30 mm wide ..... ***Coreopsis major***
      22 Leaves palmately compound, the leaflets simple to lobed or pinnatifid, the total number of leaflets or divisions (3-) 5-25, the middle leaflet of median leaves 0.5-7 mm wide.
        24 Midstem internodes 8-12 (-16) mm long; ultimate leaf lobes 1.0-1.5 (-2.5+) mm wide ..... ***Coreopsis pulchra***
        24 Midstem internodes 15-40 (-60) mm long; ultimate leaf lobes 0.5-1.0 (-2.0) mm wide ..... ***Coreopsis verticillata***
    21 Leaves, at least the lower, distinctly petioled on petioles 5-50 mm or more long.
      25 Ray flowers not toothed terminally (or rarely with a few with inconspicuous and irregular teeth); mid-cauline leaves palmately 3-foliolate, the terminal leaflet sometimes again 3-5-foliolate (sometimes giving an appearance of a pinnately 5-7-foliolate leaf), the leaflets 6-35 mm wide, 3-15× as long as wide; [section *Gyrophyllum*] ..... ***Coreopsis tripteris***
      25 Ray flowers apically with (2-) 4-5 teeth; mid-cauline leaves pinnately 5-11-foliolate, the leaflets either 3-15 mm wide and about 1-3× as long as wide, or 0.5-2 mm wide and > 20× as long as wide; [section *Coreopsis*].
        26 Disk flowers reddish; ray flowers usually with a basal red mark; leaflets of mid-cauline leaves 1-15 mm wide and about 1-10× as long as wide ..... ***Coreopsis basalis***
        26 Disk flowers yellow; ray flowers yellow; leaflets of mid-cauline leaves 0.5-6 (-10) mm wide and > 10× as long as wide.
          28 Achene wings fimbriate; [of granitic outcrops of the Piedmont of GA and AL] ..... ***Coreopsis grandiflora var. saxicola***
          28 Achene wings entire; [collectively more widespread].
            29 Divisions of the midstem and upper cauline leaves with 1-3 divisions; plants reclining; flowering late Jun-Jul; [of dolomite glades in c. AL] ..... ***Coreopsis grandiflora var. inclinata***
            29 Divisions of the midstem and upper cauline leaves with > 5 divisions; plants erect; flowering May-late Jun; [of granite outcrops and disturbed areas].
              30 Larger divisions of midstem and upper stem leaves 2-6 (-10) mm wide ..... ***Coreopsis grandiflora var. grandiflora***
              30 Larger divisions of midstem and upper stem leaves 0.5-1.5 mm wide ..... ***Coreopsis grandiflora var. harveyana***

Coreopsis auriculata Linnaeus. LOBED COREOPSIS. **Hab:** Moist slopes and woodlands. **Dist:** C. and ne. VA, s. WV, and KY south to MS, AL, and GA. **Phen:** Apr-Jun. **Syn:** = C, F, FNA21, G, K1, K3, K4, RAB, S, SE1, Tn, Va, W, WV, Sherff & Alexander (1955), Smith (1976). NatureServe G5 (Secure).

Coreopsis basalis (A. Dietrich) Blake. TEXAS COREOPSIS. **Hab:** Sandy roadsides and fields. **Dist:** Probably native only west of the Mississippi River (s. AR and s. OK south to se. LA and s. TX), now distributed across the Coastal Plain from TX east to FL and north to NC. **Phen:** May-Jul.

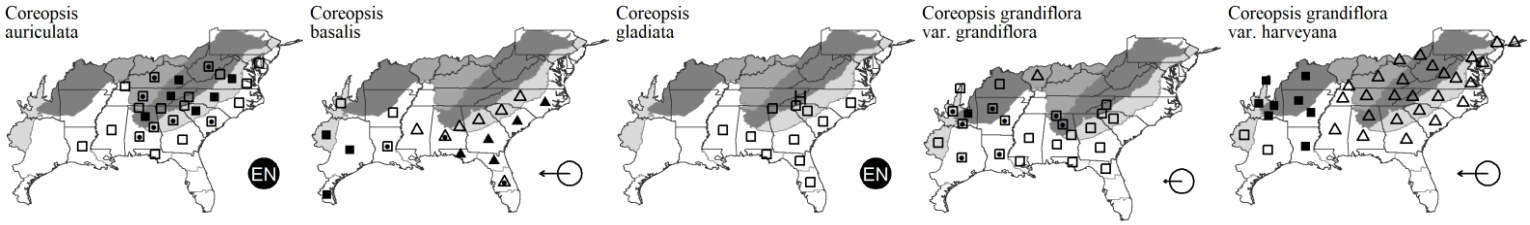
Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated

Tax: The '*wrightii*' entity probably warrants recognition at some rank. **Syn:** = NcTx, Smith (1976); = *Coreopsis basalis* var. *basalis* – Tx, Sherff & Alexander (1955); < *Coreopsis basalis* (A. Dietrich) Blake – Ar, C, F, Fl7, FNA21, G, Il, K1, K3, K4, NE, RAB, SE1, WH3.

Coreopsis gladiata Walter. SEEPAGE COREOPSIS. **Hab:** Wet pine savannas, wet pine flatwoods, sandhill seepage bogs, pitcher plant bogs, cataract bogs. **Dist:** Se. NC south to c. FL and west to s. MS; scattered inland as a disjunct in montane (and sometimes uppermost piedmontane) sw. NC, nw. SC, and n. GA. **Phen:** Mid-Aug-early Nov. **Comm:** See *C. palustris* and *C. linifolia* for further discussion of the taxonomy of this group of species. **Syn:** = K4, RAB, S, Smith (1976), Sorrie, LeBlond, & Weakley (2013); < *Coreopsis gladiata* Walter – Fl7, FNA21, GW2, K1, K3, WH3; > *Coreopsis gladiata* Walter – Sherff & Alexander (1955); < *Coreopsis gladiata* var. *gladiata* – C, G, SE1; ? *Coreopsis linifolia* Nuttall – W, misapplied; > *Coreopsis longifolia* Small var. *godfreyi* Sherff – Sherff & Alexander (1955); > *Coreopsis longifolia* Small var. *longifolia* – Sherff & Alexander (1955).

Coreopsis grandiflora Hogg ex Sweet *var. **grandiflora***. LARGE-FLOWERED COREOPSIS. **Hab:** In thin soils of rock outcrops, especially granitic flatrocks and granite domes. **Dist:** Var. *grandiflora* ranges from c. GA and w. SC west to e. TX and e. OK, very scattered in distribution; it differs from var. *harveyana* in having the leaf divisions 2-6 mm wide (vs. 0.5-2 mm wide). **Phen:** Late May-late Jun. **Syn:** = Ar, F, Il, K1, K3, Smith (1976); < *Coreopsis grandiflora* Hogg ex Sweet – Fl7, FNA21, G, Mi, Mo2, RAB, S, Tx, W, WH3; < *Coreopsis grandiflora* Hogg ex Sweet var. *grandiflora* – C, SE1; > *Coreopsis grandiflora* Hogg ex Sweet var. *grandiflora* – Sherff & Alexander (1955); > *Coreopsis grandiflora* var. *pilosa* Sherff – Sherff & Alexander (1955). NatureServe G5T4T5 (Apparently Secure).

Coreopsis grandiflora Hogg ex Sweet *var. **harveyana*** (A. Gray) Sherff. LARGE-FLOWERED COREOPSIS. **Hab:** Sandy woodlands, disturbed areas. **Dist:** Var. *harveyana* is the most abundant variety, probably originally endemic to AR, n. LA, ne. TX, OK, e. KS, and s. and c. MO, but now scattered eastward to IN, NC, and SC. **Phen:** Late May-late Jun. **Tax:** See Crawford & Smith (1984) for additional discussion of the varieties. **Syn:** = Ar, F, GrPl, Il, K1, K3, Va, Sherff & Alexander (1955), Smith (1976); < *Coreopsis grandiflora* Hogg ex Sweet – FNA21, G, Mi, Mo2, NE, NY, RAB, S, Tn, Tx, W, WH3, WV; < *Coreopsis grandiflora* Hogg ex Sweet var. *grandiflora* – C, SE1.



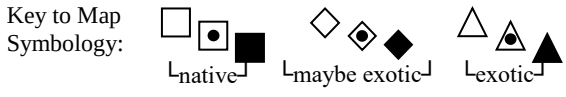
Coreopsis grandiflora Hogg ex Sweet *var. **inclinata*** J.R. Allison. KETONA TICKSEED, KETONA COREOPSIS. **Hab:** Dolomite glades. **Dist:** Endemic to dolomitic Ketona glades of c. AL (Allison & Stevens 2001). **Syn:** = K4, Allison & Stevens (2001); < *Coreopsis grandiflora* Hogg ex Sweet – FNA21. NatureServe G5T2 (Imperiled).

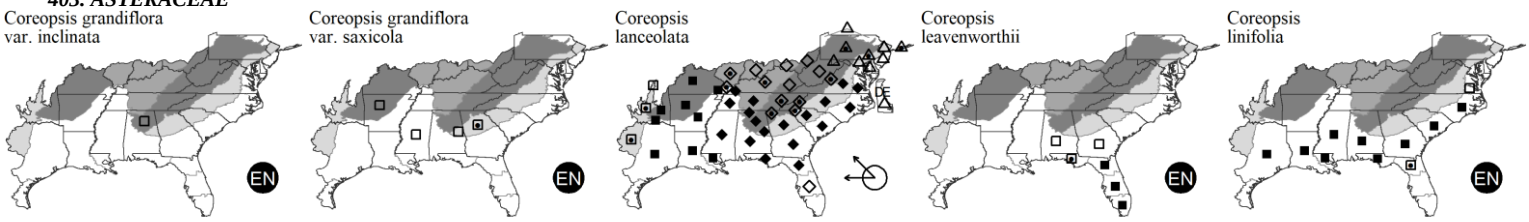
Coreopsis grandiflora Hogg ex Sweet *var. **saxicola*** (Alexander) E.B. Smith. STONE MOUNTAIN COREOPSIS. **Hab:** Granitic outcrops. **Dist:** C. GA, ec. AL, MS, and nc. AR. **Tax:** As interpreted by Smith (1976) and Cronquist (1980), this variety is endemic to granite outcrops in c. GA and ec. AL and to sandstone outcrops in nc. AR; the AR plants, differing in morphology, phenology, karyotype, and distribution, may well warrant separate status. **Syn:** = Ar, K1, K3, K4, SE1, Smith (1976); = *Coreopsis saxicola* Alexander – S; < *Coreopsis grandiflora* Hogg ex Sweet – FNA21; > *Coreopsis saxicola* var. *duncanii* Sherff – Sherff & Alexander (1955); > *Coreopsis saxicola* var. *saxicola* – Sherff & Alexander (1955). NatureServe G5T4? (Apparently Secure).

Coreopsis lanceolata Linnaeus. LONGSTALK COREOPSIS. **Hab:** Open sandy prairies; eastwards in disturbed areas. **Dist:** S. MA, MI and WI south to c. peninsular FL, e. TX, and NM. Often spread from cultivation, its original range obscure, but perhaps limited to the sc. United States. **Phen:** Apr-Jun. **Tax:** The distinction of *C. lanceolata* (=*C. lanceolata* var. *lanceolata*) from *C. crassifolia* (=*C. lanceolata* var. *villosa*) needs additional study. **Syn:** = Ar, C, Fl7, FNA21, GrPl, K1, K3, K4, Mi, NcTx, NE, NY, Oh3, Pa, RAB, SE1, Tn, Tx, Va, W, WH3, WV, Schilling, Johnson, & Iacona (2015), Smith (1976); > *Coreopsis crassifolia* Aiton – Il, S; > *Coreopsis heterogyna* Fernald – F; > *Coreopsis lanceolata* Linnaeus – Il, S; > *Coreopsis lanceolata* var. *lanceolata* – Sherff & Alexander (1955); > *Coreopsis lanceolata* var. *villosa* Michaux – F, G, Sherff & Alexander (1955).

Coreopsis leavenworthii Torrey & A. Gray. LEAVENWORTH'S TICKWEED. **Hab:** Wet pine flatwoods, adjacent ditches. **Dist:** S. GA and s. AL south to and s. FL. **Phen:** Jan-Dec. **Tax:** *C. lewtonii* warrants additional taxonomic consideration. **Syn:** = Fl7, FNA21, GW2, K1, K3, K4, WH3, Smith (1976); > *Coreopsis leavenworthii* Torrey & A. Gray – S; > *Coreopsis leavenworthii* var. *garberi* Sherff – Sherff & Alexander (1955); > *Coreopsis leavenworthii* var. *leavenworthii* – Sherff & Alexander (1955); > *Coreopsis lewtonii* Small – S. NatureServe G4G5 (Apparently Secure).

Coreopsis linifolia Nuttall. SAVANNA COREOPSIS. **Hab:** Pine savannas, sandhill seeps, sandhill-pocosin ecotones. **Dist:** Se. VA south to ne. and Panhandle FL, west to e. TX. **Phen:** Early Jul-late Oct. **Tax:** The proper taxonomic treatment of this taxon and its relatives remains unclear. Smith (1976) interpreted *C. linifolia* to range from se. VA south and west along the Coastal Plain to e. TX (with a few inland disjunctions) and to consist of two chromosome races, a diploid Gulf Coast race (w. FL to se. TX) and a tetraploid Atlantic Coast race (s. GA to se. VA), "not differing sufficiently morphologically to justify nomenclatural recognition." Fernald, however, named *C. oniscicarpa* (the tetraploid) based on morphologic characters. Given the existence of morphologic characters, the failure of Smith's attempted hybridizations of the two "races," his speculation that the tetraploid could be an allotetraploid (though likely an autotetraploid), and the allopatric ranges of the two races, specific recognition is plausible. Further study is needed. Cronquist (in C, G, SE) does not recognize *C. oniscicarpa* as distinct from *C. linifolia*, and reduces *C. linifolia* (*sensu lato*) to a variety of *C. gladiata*, also including *C. falcata* in the typic variety of *C. gladiata*. The abundant morphologic, phenologic, and ecologic differences between *C. gladiata*, *C. linifolia*, and *C. falcata* render such an approach undesirable. **ID Notes:** Basal rosettes of this species are abundant in wet savannas and can be distinguished readily by the distinctive leaves: very long-petiolate, about 1 cm across, the pinnate venation very neat (the main lateral veins straight and parallel to the other laterals on the same side of the leaf), with small dark dots when backlit, and very thick (ca. 1 mm) and stiff in texture. **Syn:** = GW2, K1, K3, K4, Tx, Va, WH3, Sherff & Alexander (1955), Smith (1976), Sorrie, LeBlond, & Weakley (2013); = *Coreopsis angustifolia* Aiton – RAB, possibly misapplied; = *Coreopsis gladiata* var. *linifolia* (Nuttall) Cronquist – C, G, SE1; < *Coreopsis gladiata* Walter – FNA21; > *Coreopsis oniscicarpa* Fernald var. *oniscicarpa* – F; > *Coreopsis oniscicarpa* var. *simulans* Fernald – F.





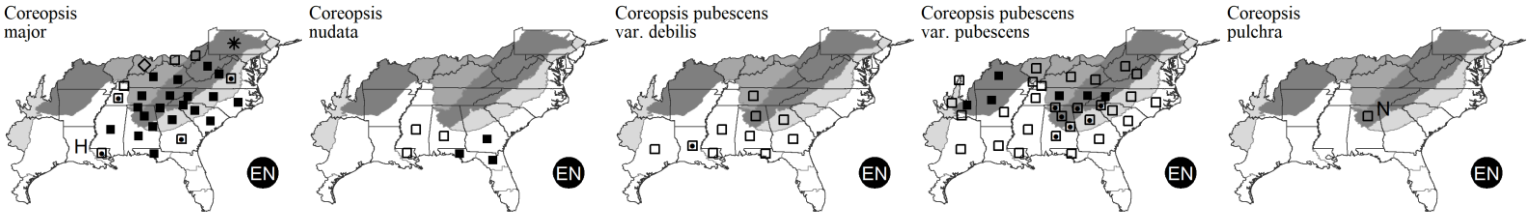
Coreopsis major Walter. WOODLAND COREOPSIS. **Hab:** Dry woodlands, dry and dry-mesic forests, longleaf pine sandhills, roadsides. **Dist:** W. VA, WV, s. OH, and KY south to GA, FL Panhandle, s. AL, s.MS, and se. LA; disjunct in w. LA. **Phen:** May-Jul. **Tax:** How to treat the "*Coreopsis major* complex" (here including *C. major*, *C. delphiniifolia*, and *C. verticillata*) remains unclear. The group apparently includes diploids and a variety of allopolyploids and autopolyploids (at various ploidies) variously derived from components of *C. major* and *C. verticillata*. Sometimes recognized in *C. major* are two varieties: var. *major* (with leaf blades rather densely short-pubescent, outer phyllaries rather densely short-pubescent, middle leaflet of median leaves 10-30 mm wide, and leaflets herbaceous) and var. *rigida* (with leaf blades slightly short-pubescent to glabrous, outer phyllaries slightly short-pubescent to glabrous, middle leaflet of median leaves 5-10 (-12) mm wide, leaflets subcoriaceous and stiff). Variation and poor correlation of these features as stated and the presence of significant and apparently variation in other features requires additional study before a satisfying taxonomy can be presented. **Syn:** = Fl7, FNA21, K1, K3, K4, NE, NY, Oh3, S, Tn, Va, WH3, Smith (1976); > *Coreopsis major* var. *major* – C, F, G, RAB, SE1, W, Sherff & Alexander (1955); > *Coreopsis major* var. *rigida* – C, F, SE1, Sherff & Alexander (1955); > *Coreopsis major* var. *stellata* (Nuttall) B.L. Robinson – F, G, RAB, WV, Sherff & Alexander (1955). NatureServe G5 (Secure).

Coreopsis nudata Nuttall. SWAMP COREOPSIS. **Hab:** Seasonally flooded pineland depressions, either herbaceous-dominated or under a canopy of *Taxodium ascendens*. **Dist:** E. GA (in close proximity to SC) south to ne. FL and Panhandle FL, west to e. LA. **Phen:** Mar-Apr. **ID Notes:** Immediately recognizable by its pink-rayed flowers and juncoid leaves. **Syn:** = Fl7, FNA21, GW2, K1, K3, K4, S, SE1, WH3, Sherff & Alexander (1955), Smith (1976), Sorrie, LeBlond, & Weakley (2013). NatureServe G3? (Vulnerable).

Coreopsis pubescens Elliott *var*. ***debilis*** (Sherff) E.B. Smith. **Hab:** Pine flatwoods, other habitats. **Dist:** C. TN south through AL and ne. MS to w. FL, s. AL, s. MS, and se. LA. **Syn:** = GW2, K1, K3, K4, Smith (1976); > *Coreopsis corninsularis* Sherff – Sherff & Alexander (1955); > *Coreopsis debilis* Sherff – Sherff & Alexander (1955); < *Coreopsis pubescens* – FNA21, S, SE1, Tn. NatureServe G5?TNR (Not Yet Ranked).

Coreopsis pubescens Elliott *var*. ***pubescens***. COMMON HAIRY COREOPSIS. **Hab:** Forests, woodlands, and rock outcrops. **Dist:** The species as a whole is largely centered in the Southern Appalachians and Ozarks-Ouachitas, with scattered outlying occurrences; var. *pubescens* has essentially the range of the species, from s. VA, s. KY, s. IL, and s. MO south to nw. FL, MS, and LA. **Phen:** Jul-Sep. **Syn:** = F, GW2, K1, K3, K4, Sherff & Alexander (1955), Smith (1976); < *Coreopsis pubescens* – Ar, C, FNA21, G, GrPl, Il, RAB, S, SE1, Va, W, WH3, WV. NatureServe G5?T4T5 (Apparently Secure).

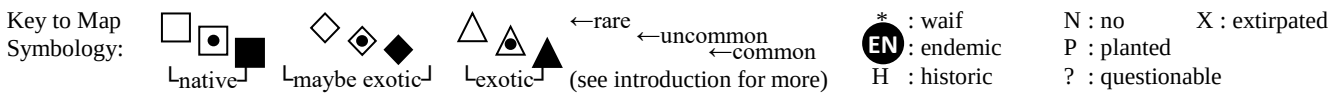
Coreopsis pulchra F.E. Boynton. LOOKOUT MOUNTAIN COREOPSIS. **Hab:** Sandstone outcrops and adjacent woodlands. **Dist:** Endemic to ne. AL (reports from GA are apparently unsubstantiated). **Phen:** Jun-Sep. **Syn:** = FNA21, K1, K3, K4, S, SE1, Sherff & Alexander (1955), Smith (1976). NatureServe G2 (Imperiled).



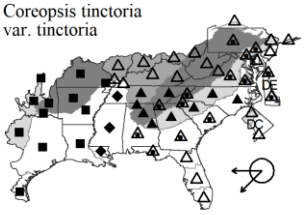
Coreopsis tinctoria Nuttall *var*. ***tinctoria***. CALLIOPSIS, PLAINS COREOPSIS. **Hab:** Roadsides and other disturbed places. **Dist:** Var. *tinctoria* was apparently widespread in the Great Plains and sc. United States, now distributed nearly throughout North America. **Phen:** May-Sep. **Syn:** = C, K1, K3, K4, NE, Va, Smith (1976); > *Coreopsis cardaminaefolia* (A.P. de Candolle) Torrey & A. Gray – Tx; > *Coreopsis cardaminefolia* (A.P. de Candolle) Torrey & A. Gray – RAB, S, Sherff & Alexander (1955); > *Coreopsis stenophylla* Boynton – Sherff & Alexander (1955); < *Coreopsis tinctoria* – Ar, Fl7, FNA21, G, GrPl, GW2, Mi, NcTx, NY, Oh3, Pa, SE1, Tn, Tx, W, WH3, WV; > *Coreopsis tinctoria* – RAB, S; > *Coreopsis tinctoria* Nuttall var. *tinctoria* – Sherff & Alexander (1955). NatureServe G5T5 (Secure).

Coreopsis tripteris Linnaeus. TALL COREOPSIS. **Hab:** Bottomland forests, riverside scours, other rich, moist woodlands and woodland borders, wet hammocks (FL), primarily over calcareous or mafic rocks or on nutrient-rich alluvium. **Dist:** MA, s. ON, and WI south to Panhandle FL and e. TX. **Phen:** Jul-early Sep. **Syn:** = Ar, C, Fl7, FNA21, G, GrPl, GW2, K1, K3, K4, Mi, NE, NY, Oh3, Pa, RAB, S, SE1, Tn, Tx, Va, W, WH3, WV, Smith (1976); > *Coreopsis tripteris* var. *deamii* Standley – F, Il; > *Coreopsis tripteris* var. *intercedens* Sherff – F, Il, Sherff & Alexander (1955); > *Coreopsis tripteris* var. *smithii* Sherff – F, Sherff & Alexander (1955); > *Coreopsis tripteris* var. *tripteris* – F, Il, Sherff & Alexander (1955). NatureServe G5 (Secure).

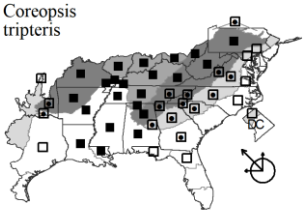
Coreopsis verticillata Linnaeus. THREADLEAF COREOPSIS. **Hab:** Dry sandy, rocky, or clayey woodlands and woodland borders; also a waif or persistent from horticultural use. **Dist:** Smith (1976) indicates that the species consists of two chromosome races, a diploid, ranging in the Piedmont and Mountains from c. SC and NC north to ne. WV, and s. MD, and an allotetraploid, limited to the Coastal Plain of ne. NC and se. VA. **Phen:** May-Jul. **Comm:** The finely-divided leaves are attractive and the plant is cultivated horticulturally; scattered occurrences outside the ranges indicated above are escapes from cultivation. **Syn:** = C, F, FNA21, G, K1, K3, K4, NE, RAB, S, SE1, Va, W, WV, Sherff & Alexander (1955), Smith (1976). NatureServe G5 (Secure).



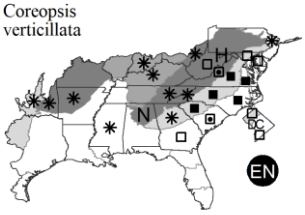
Coreopsis tinctoria var. tinctoria



Coreopsis tripteris



Coreopsis verticillata



Cosmos Cavanilles 1791 (COSMOS)

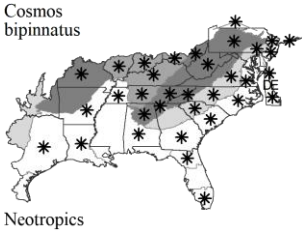
A genus of about 26 species, of tropical, subtropical, and warm temperate America. References: SE1; Kiger (2006) in FNA21 (2006c); Sherff & Alexander (1955).

1 Ultimate leaf segments < 1.5 mm wide; rays white, pink, purple, or lavender.
..... ***Cosmos bipinnatus***
1 Ultimate leaf segments (2-) 3-10 mm wide; rays either pink, white, or purple, or yellow to red-orange.
..... ***Cosmos sulphureus***

* ***Cosmos bipinnatus*** Cavanilles. COMMON COSMOS. **Hab:** Garden edges, roadsides, disturbed areas, commonly cultivated horticulturally, sometimes escaped. **Dist:** Native of Mexico. **Phen:** (May-) Aug-Nov. **Syn:** = Ar, C, F, Fl7, FNA21, G, Il, K1, K3, K4, Mi, NE, NY, Pa, RAB, S, SE1, Tn, WH3, WV; > *Cosmos bipinnatus* var. *bipinnatus* – Sherff & Alexander (1955). NatureServe GNR (Not Yet Ranked).

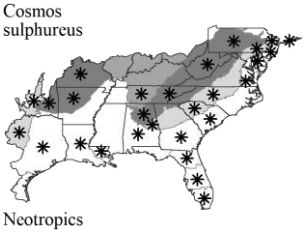
* ***Cosmos sulphureus*** Cavanilles. ORANGE COSMOS. **Hab:** Garden edges, roadsides, disturbed areas; commonly cultivated horticulturally, rarely escaped. **Dist:** Native of tropical America. **Phen:** Aug-Nov. **Syn:** = C, F, Fl7, FNA21, G, Il, K1, K3, K4, Mi, NE, NY, Pa, S, SE1, WH3; > *Cosmos sulphureus* var. *sulphureus* – Sherff & Alexander (1955). NatureServe GNR (Not Yet Ranked).

Cosmos bipinnatus



Neotropics

Cosmos sulphureus



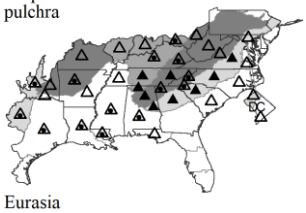
Neotropics

Crepis Linnaeus 1753 (HAWKSBEARD)

A genus of about 200 species, herbs, of the Northern Hemisphere, South America, and southern Africa. References: Bogler (2006a) in FNA19 (2006a); SE1.

* ***Crepis pulchra*** Linnaeus. SMALLFLOWER HAWKSBEARD. **Hab:** Roadsides, fields, disturbed areas. **Dist:** Native of Eurasia. **Phen:** Late Apr-Jul. **Syn:** = Ar, C, F, Fl7, FNA19, G, Il, K1, K3, K4, NcTx, Oh3, RAB, SE1, Tn, Va, W, WH3, WV. NatureServe GNR (Not Yet Ranked).

Crepis pulchra

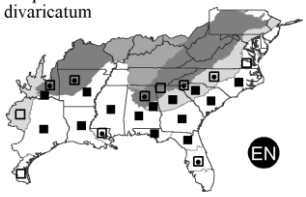


Eurasia

Croptilon Rafinesque 1837 (SCRATCH-DAISY)

A genus of 3 species, herbs, of s. North America. References: Tx; SE1; Nesom (2000b); Nesom (2006aa) in FNA20 (2006b); Smith (1981).

Croptilon divaricatum

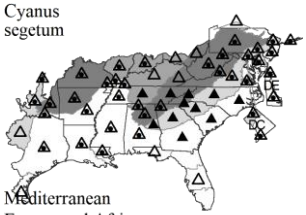


Croptilon divaricatum (Nuttall) Rafinesque. SCRATCH-DAISY. **Hab:** Sandy or otherwise dry soils of fields, roadsides, longleaf pine sandhill woodlands, and sand pine woodlands. **Dist:** Se. VA south to c. peninsular FL and west to c. TX, inland to n. GA, n. AL, se. OK and c. AR. **Phen:** Aug-Dec. **Syn:** = Ar, FNA20, K1, K3, K4, NcTx, Va, WH3; = *Haplopappus divaricatus* (Nuttall) A. Gray – C, F, G, RAB, SE1, W; = *Isopappus divaricatus* (Nuttall) Torrey & Gray – S; < *Croptilon divaricatum* (Nuttall) Rafinesque var. *divaricatum* – Tx. NatureServe G4G5 (Apparently Secure).

Cyanus P. Miller 1754 (CORNFLOWER, BACHELOR'S-BUTTONS)

A genus of about 30 species, herbs, native of Eurasia and n. Africa. *Cyanus* is better separated at the generic level (Greuter 2003). References: Boršić et al (2011); SE1; Greuter et al (2001); Keil & Ochsmann (2006) in FNA19 (2006a); Negaresh (2018).

Cyanus segetum



Mediterranean Europe and Africa

* ***Cyanus segetum*** Hill. CORNFLOWER, BACHELOR'S-BUTTONS. **Hab:** Roadsides, disturbed areas. **Dist:** Native of

Key to Map Symbology:

←rare ←uncommon ←common (see introduction for more)

* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable
X : extirpated

Mediterranean Europe. **Phen:** Apr-Sep. **Syn:** = K4; = *Centaurea cyanus* Linnaeus – Ar, C, F, Fl7, FNA19, G, GrPl, Il, K1, K3, Mi, NcTx, NE, NY, Oh3, Pa, RAB, S, SE1, Tn, Va, W, WH3. NatureServe GNR (Not Yet Ranked).

Diaperia Nuttall 1840 (DWARF CUDWEED)

A genus of 3 species, annual herbs, of c. United States and n. Mexico. References: Anderberg (1991); Arriagada (1998); SE1; Morefield (2006c) in FNA19 (2006a).

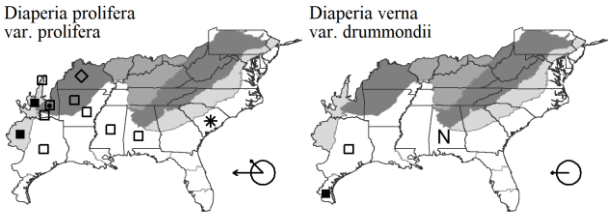
Key based in part on Morefield (2006c).

2 Heads ellipsoid to cylindrical, 3.5-4.5 mm high, 2-3× as high as wide; capitular leaves visible between and surpassing the heads; cypselas 0.9-1.2 mm long..... ***Diaperia prolifera var. prolifera***

2 Heads campanulate to spherical, 2-3.3 mm high, about 1× as high as wide; capitular leaves more-or-less hidden between and surpassed by the heads; cypselas 0.7-0.9 mm long. ***Diaperia verna var. drummondii***

Diaperia prolifera (Nuttall ex A.P. de Candolle) Nuttall *var*. ***prolifera***. COTTON-ROSE, BIGHEAD PYGMY-CUDWEED. **Hab:** Prairies, open clay or calcareous areas, disturbed areas; eastwards in waste areas around wool-combing mill. **Dist:** MO west to MT, south to LA and TX; disjunct eastward in the Black Belt prairies of AL and MS and also further eastward as an introduction (Nesom 2004d). **Phen:** May-Jun. **Syn:** = Ar, FNA19, GrPl, K3, K4; < *Evax prolifera* Nuttall ex A.P. de Candolle – K1, NcTx, SE1, Tx; < *Filago prolifera* (Nuttall ex A.P. de Candolle) Britton – Anderberg (1991), Arriagada (1998). NatureServe G5 (Secure).

Diaperia verna (Rafinesque) Morefield *var*. ***drummondii***. GULF COAST RABBIT-TOBACCO. **Hab:** Dunes, beaches, disturbed sandy soils. **Dist:** Se. and s. TX. **Phen:** Mid Feb-mid May. **Syn:** = FNA19, K4; = *Evax verna* Rafinesque var. *drummondii* (Torrey & A> Gray) Kartesz & Gandhi – K1; < *Evax verna* – Tx. NatureServe G5TNR (Not Yet Ranked).



Doellingeria Nees 1832 (FLAT-TOPPED ASTER)

A genus of about 3-4 species, perennial herbs, of e. North America. The separation of *Doellingeria* from *Aster* as a small, strictly North American group is clearly warranted, based on numerous studies, including Nesom (1993d), Brouillet et al. (2009), Noyes & Rieseberg (1999), and Nesom (2020a). The Asian species sometimes placed in *Doellingeria* are not closely related to American *Doellingeria* and have been separated into the genus *Cardiagyris* Nesom (Nesom 2020a). Allen et al. (2019) proposed combining western North American *Eucephalus* with *Doellingeria*. Given the conflicting phylogenetic data, the uncertain origin of *Eucephalus elegans*, and a 'whole evidence' synthetic approach based on molecular, morphological, and biogeographic data, we conservatively retain *Doellingeria* as a small genus endemic to eastern North America, following Nesom (2020a) and recent community consensus. References: Allen et al (2019); Brouillet et al (2009); SE1; Nesom (1993d); Nesom (2000b); Nesom (2020a); Semple & Chmielewski (2006) in FNA20 (2006b); Semple, Chmielewski, & Leeder (1991).

1 Inflorescence branches flexuous, bractless or with a few very small bracts; heads 3-40 (-67) per plant; cypselas glabrous; plants with stems solitary or several from a crown, to 11 dm tall; [plants of upland dry to submesic habitats, typically glades, barrens, and dry to dry-mesic woodlands] ..... ***Doellingeria infirma***

1 Inflorescence branches stiff, with numerous and well-developed bracts; heads (3-) 20-300+ per plant; cypselas glabrous to densely strigose; plants with stems scattered from creeping rhizomes (forming clonal patches), to 20 dm tall; [plants of wetland to mesic habitats, such as bogs, fens, seeps, wet meadows].

2 Disk flowers 4-13 (-20) per head; ray flowers 2-7 per head; leaves mostly (1.5-) 2-3 (-4)× as long as wide, stiff, revolute; midveins of the phyllaries enlarged and translucent towards the tip; cypselas sparsely to densely strigose; [of acid seepage in the Coastal Plain] ..... ***Doellingeria sericocarpoides***

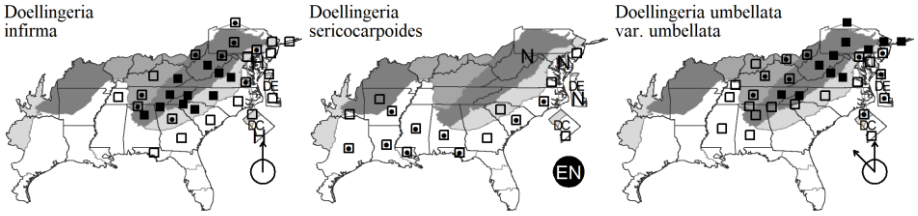
2 Disk flowers (5-) 11-26 (-50) per head; ray flowers (2-) 5-14 (-16) per head; leaves (2-) 3.5-5 (-8)× as long as wide, flexible, planar; midveins of the phyllaries not swollen towards the tip; cypselas glabrous to sparsely strigose; [widespread in our area] ..... ***Doellingeria umbellata var. umbellata***

Doellingeria infirma (Michaux) E. Greene. APPALACHIAN FLAT-TOPPED WHITE ASTER, CORNEL-LEAF FLAT-TOPPED ASTER. **Hab:** Woodland borders, dry or dry-mesic woodlands, glades. **Dist:** MA west to KY, south to SC, GA, Panhandle FL (Gadsden County), AL, and wc. TN. **Phen:** Late Jun-Sep. **Syn:** = Fl7, FNA20, K1, K3, K4, NE, NY, Pa, S, Tn, Va, WH3, Nesom (1993d); = *Aster infirmus* Michaux – C, G, Oh3, RAB, SE1, W, Semple, Chmielewski, & Leeder (1991). NatureServe G5 (Secure).

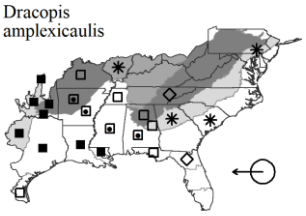
Doellingeria sericocarpoides Small. POCOSIN FLAT-TOPPED ASTER, SOUTHERN FLAT-TOPPED ASTER, SOUTHERN TALL FLAT-TOPPED ASTER. **Hab:** Peaty soils of sandhill ecotones and streamhead pocosins, other acidic seeps and swamps. **Dist:** S. NJ south to ne. FL and Panhandle FL, west to MS and se. LA; also in the West Gulf Coastal Plain of w. LA, AR, se. OK, and e. TX; disjunct in w. SC in the uppermost Piedmont in the Blue Ridge Escarpment region. **Phen:** Late Jul-Oct. **Tax:** This taxon is problematic in its current circumscription and is the subject of taxonomic studies. **Syn:** = Ar, Fl7, FNA20, K1, K3, K4, WH3, Nesom (1993d); = *Aster sericocarpoides* (Small) K. Schumann – SE1, Semple, Chmielewski, & Leeder (1991); = *Aster umbellatus* P. Miller var. *brevisquamus* Fernald – RAB; < *Aster umbellatus* P. Miller var. *latifolius* A. Gray – GW2, Tx; > *Doellingeria humilis* (Willdenow) Britton – S, misapplied; > *Doellingeria sericocarpoides* Small – S, by implication. NatureServe G3G5 (Apparently Secure).

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Doellingeria umbellata (P. Miller) Nees *var.* ***umbellata***. NORTHERN FLAT-TOPPED WHITE ASTER, NORTHERN TALL FLAT-TOPPED ASTER. **Hab:** Wet meadows, pastures, bogs, fens, marshes, stream floodplains, roadbanks, to at least 1900 m. **Dist:** NL (Newfoundland) west to MN, south to e. VA, w. NC, nw. SC (P. McMillan, pers.comm., 2002), n. GA, ne. AL, TN, and KY. **Phen:** Jul-Oct. **Comm:** The recognition or not of two at either varietal or specific rank remains unsettled; Mohlenbrock (2015) argues for species rank of *D. pubens* (A. Gray) Rydberg (north and west of our area). **Syn:** = FNA20, K1, K3, K4, Mi, Mo2, NE, NY; = *Aster umbellatus* var. *umbellatus* – Semple, Chmielewski, & Leeder (1991); = *Doellingeria umbellata* – Il; < *Aster umbellatus* P. Miller – C, G, Oh3, SE1, W; < *Aster umbellatus* var. *umbellatus* – GW2, RAB; < *Doellingeria umbellata* – Pa, S, Tn, Va, Nesom (1993d). NatureServe G5T5 (Secure).



Dracopis Cassini 1825 (CONEFLOWER)



A monotypic genus, an annual herb, of sc. and se. North America, perhaps better included in *Rudbeckia*. References: Urbatsch & Cox (2006a) in FNA21 (2006c).

Dracopis amplexicaulis (Vahl) Cassini. CLASPING CONEFLOWER. **Hab:** Prairies, calcareous bottomlands, dry open areas, disturbed areas, waste areas near wool-combing mill; introduced in part in our area. **Dist:** Native to prairie-like areas and calcareous bottomlands from GA (?) and AL west to KS and TX; reported for nc. GA (Jones & Coile 1988) and introduced in SC (Nesom 2004d). **Phen:** (May-) Jul-Sep. **Syn:** = GrPl, Il, K1, K3, K4, NcTx, SE1, Tx, WH3; = *Rudbeckia amplexicaulis* Vahl – Ar, F, FNA21. NatureServe G5 (Secure).

Echinacea Moench 1794 (PURPLE CONEFLOWER)

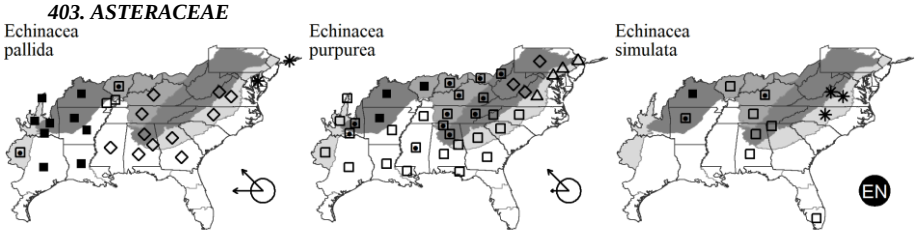
A genus of 7-9 species, herbs, endemic to e. and c. North America. There has been considerable medicinal use of extracts from many of the species, and collection of plants from the wild to meet the demand of the herbal trade has extirpated many populations, particularly in c. United States. Foster (1991) presents a lengthy and detailed discussion of medicinal uses of *Echinacea*, along with considerable information on the biology, conservation needs, taxonomy, and nomenclatural history of the genus. Binns, Baum, & Arnason (2002) provide no rationale for their approach of recognizing the same number of taxa as McGregor, but treating them as 4 species and 10 varieties; the entities seem to be distinct at the specific level. References: Baskin, Snyder, & Baskin (1993); Binns, Baum, & Arnason (2002); SE1; Foster (1991); Gaddy (1991); McGregor (1968); McKeown (1999); Urbatsch, Neubig, & Cox (2006) in FNA21 (2006c).

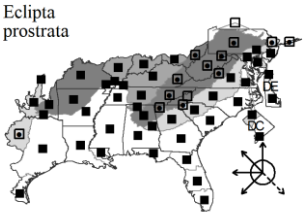
1 Leaves lanceolate to ovate, the larger (basal) leaves 3-10 (-15) cm wide and rounded to cordate at the base.
.....***Echinacea purpurea***
1 Leaves lanceolate to linear, the larger (basal) leaves 1-3 (-4) cm wide and cuneate to attenuate at the base.
9 Ray blades 3-4 mm wide, pink to purple; cypselae of the ray flowers glabrous; fresh pollen white (rarely light, lemon yellow).....***Echinacea pallida***
9 Ray blades 4-7 mm wide, rose, pink, or white; cypselae of the ray flowers hairy; fresh pollen pale to bright or deep yellow.....***Echinacea simulata***

Echinacea pallida (Nuttall) Nuttall. PALE PURPLE CONEFLOWER. **Hab:** Dry prairies, open dry woodlands, roadsides (introduced eastwards in our area). **Dist:** ON west to MI, WI, and ne. NE, south to IN, LA, and TX; disjunct eastward in TN, AL, GA, SC, NC, and VA (where probably but uncertainly native). **Phen:** May-Jul. **Tax:** Some at least of the eastern populations considered to be *E. pallida* are actually the closely related *E. simulata*; additional work is needed to disentangle the relative distributions of these two species in our area. **Syn:** = Ar, FNA21, GrPl, Il, K1, K4, Mi, Mo2, NcTx, NE, NY, RAB, Tn, Tx, Baskin, Snyder, & Baskin (1993), Foster (1991), McGregor (1968), McKeown (1999); = *Echinacea pallida* var. *pallida* – K3, Binns, Baum, & Arnason (2002); < *Echinacea pallida* (Nuttall) Nuttall – F, G, W; < *Echinacea pallida* var. *pallida* – C, SE1.

Echinacea purpurea (Linnaeus) Moench. EASTERN PURPLE CONEFLOWER. **Hab:** Open woodlands, roadsides, some of the occurrences persistent or spread from cultivation. **Dist:** OH, WI, and IA south to Panhandle FL and TX; introduced more broadly as in ne. United States and ON, the exact limits of the native distribution unclear. **Phen:** May-Oct. **Syn:** = Ar, C, F, Fl7, FNA21, GrPl, Il, K1, K3, K4, Mi, Mo2, NcTx, NE, NY, Pa, RAB, SE1, Tn, W, WH3, Binns, Baum, & Arnason (2002), Foster (1991), McGregor (1968), McKeown (1999); = *Echinacea purpurea* var. *purpurea* – G, Oh3; > *Echinacea purpurea* var. *arkansana* Steyermark – Tx. NatureServe G4 (Apparently Secure).

Echinacea simulata R.L. McGregor. PRAIRIE PURPLE CONEFLOWER, GLADE CONEFLOWER. **Hab:** Prairies, dry open woodlands, roadsides. **Dist:** IN, IL, and MO south to KY, TN, and n. AR; some of the more eastern disjunct populations previously considered to be *E. pallida* are actually *E. simulata*; additional work is needed to disentangle the relative distributions of these two species in our area. **Phen:** Jun-Jul. **Comm:** GA native populations (Floyd Co.) are *E. simulata*. **Syn:** = Ar, FNA21, Il, K1, K3, K4, Mo2, Tn, Baskin, Snyder, & Baskin (1993), Foster (1991), McGregor (1968), McKeown (1999); = *Echinacea pallida* (Nuttall) Nuttall var. *simulata* (McGregor) Binns, B.R. Baum, & Arnason – Binns, Baum, & Arnason (2002); < *Echinacea pallida* (Nuttall) Nuttall – F, G, W; < *Echinacea pallida* var. *pallida* – C, SE1.





Eclipta Linnaeus 1753

A genus of 4 species, herbs, of temperate, subtropical, and tropical regions. References: SE1; Strother (2006ss) in FNA21 (2006c).

Eclipta prostrata (Linnaeus) Linnaeus. ECLIPTA, PIE-PLANT, BOTONCILLO, BOTÓN BLANCO, CLAVEL DE POZO, YERBA DE TAGO. **Hab:** Moist or wet disturbed areas, ditches, shores, disturbed bottomlands. **Dist:** MA west to WI, south to s. FL and TX, and southward into the tropics. **Phen:** Jun-Nov. **Syn:** = Ar, C, Fl7, FNA21, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Pa, Tn, Va, WH3; = *Eclipta alba* (Linnaeus) Hasskarl – Bah, F, G, GW2, Oh3, RAB, SE1, Tx, W, WV; = *Verbesina alba* Linnaeus – S.

Elephantopus Linnaeus 1753 (ELEPHANT'S-FOOT)

A genus of about 12-30 species, of tropical, subtropical, and warm temperate regions. References: SE1; Jones (1982); Strother (2006b) in FNA19 (2006a).

Identification Notes: The acaulescent species are easily and often confused with *Vernonia acaulis*, especially when sterile. *Vernonia* has leaves scabrous above and sparsely pilose to glabrate beneath; *Elephantopus* has leaves sparely pilose above, densely pilose or tomentose below. *Vernonia* leaves tend to have a more acute apex, and the veins above are more strikingly differentiated in their color (white or pink) from the adjacent leaf tissue. When in flower, the presence of subtending foliose bracts below the compound glomerule of heads in *Elephantopus* (versus the absence of foliose bracts below the simple head in *Vernonia*) is diagnostic.

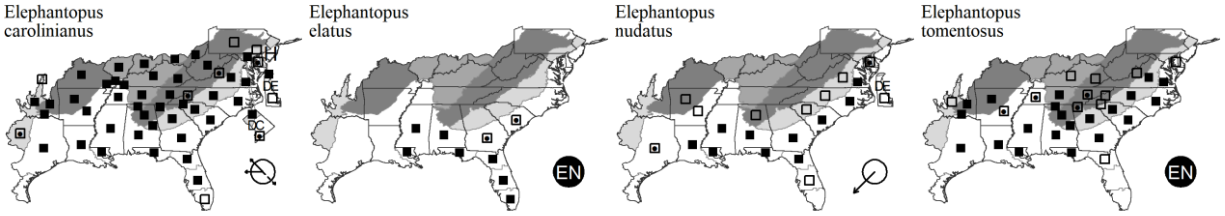
1 Leaves cauline, the stem with well-developed leaves over 10 cm long..... ***Elephantopus carolinianus***
1 Leaves basal, the stem scapose or with a few leaves much smaller than the basal, usually < 8 cm long.
  2 Longest phyllaries 10-13 mm long; pappus 6-8 mm long; basal leaves 5.5-10.5 cm wide, usually at least some on a plant > 7 cm wide; leaves pubescent on the midrib below with spreading or reflexed hairs; [of the Coastal Plain, Piedmont, and rarely the Mountains]..... ***Elephantopus tomentosus***
  2 Longest phyllaries 6-9 mm long; pappus 3-4.5 mm long; basal leaves 1.5-7.5 cm wide, rarely any on a plant > 7 cm wide; leaves pubescent on the midrib below with appressed or spreading hairs; [of the Coastal Plain, and rarely the lower Piedmont].
    3 Phyllaries densely villous with white hairs (0.3-) 0.5-1.0 mm long, the punctate glands obscured; cypselas 3-3.5 mm long; [of e. SC southward]..... ***Elephantopus elatus***
    3 Phyllaries punctate-glandular, also sparsely pubescent with hairs 0.05-0.3 (-0.5) mm long; cypselas 2.5-3.0 mm long; [widespread in our area]..... ***Elephantopus nudatus***

Elephantopus carolinianus Raeuschel. LEAFY ELEPHANT'S-FOOT. **Hab:** Mesic to dry forests and woodlands. **Dist:** NJ west to KS, south to s. FL and e. TX; West Indies. **Phen:** Aug-Nov. **Syn:** = Ar, C, F, Fl7, FNA19, G, GrPl, GW2, Il, K1, K3, K4, NcTx, Pa, RAB, S, SE1, Tn, Tx, Va, WH3, WV, Jones (1982). NatureServe G5 (Secure).

Elephantopus elatus Bertoloni. SOUTHERN ELEPHANT'S-FOOT. **Hab:** Pine flatwoods and longleaf pine sandhills. **Dist:** E. SC south to s. FL, west to se. LA, on the Coastal Plain. **Phen:** Late Aug-Sep. **Syn:** = Fl7, FNA19, K1, K3, K4, RAB, S, SE1, WH3, Jones (1982). NatureServe G5 (Secure).

Elephantopus nudatus A. Gray. COASTAL PLAIN ELEPHANT'S-FOOT. **Hab:** Woodlands and woodland borders, wet pine flatwoods, mesic pine flatwoods. **Dist:** DE south to n. peninsular FL, west to e. TX and AR, primarily on the Coastal Plain; south into n. South America. **Phen:** Late Jul-Sep. **Syn:** = Ar, C, F, Fl7, FNA19, G, GW2, K1, K3, K4, RAB, S, SE1, Tx, Va, WH3, Jones (1982). NatureServe G5 (Secure).

Elephantopus tomentosus Linnaeus. COMMON ELEPHANT'S-FOOT. **Hab:** Woodlands and woodland borders, usually fairly dry. **Dist:** MD south to Panhandle FL, west to e. TX, north in the interior to w. NC and KY. **Phen:** Aug-Nov. **Syn:** = Ar, C, F, Fl7, FNA19, G, K1, K3, K4, RAB, S, SE1, Tn, Tx, Va, WH3, Jones (1982). NatureServe G5 (Secure).



Emilia Cassini 1817 (TASSELFLOWER)

A genus of 50-100 species, of the Old World. References: Barkley (2006e) in FNA20 (2006b); SE1; Mapaya & Cron (2021).

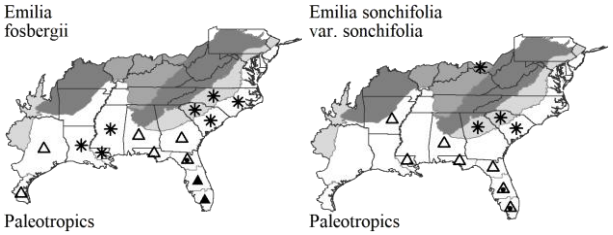
Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated

1 Leaves well-distributed along the stem, mostly sessile, with at most few and shallow lobes; corollas salmon or red-orange; involucre 1-2 (-3)× as high as wide; flowers exserted 2-5 mm beyond the involucre ..... ***Emilia fosbergii***

1 Leaves mostly on the lower portion of the stem, the larger lyrate-pinnatifid and petiolate; corollas lilac; involucre 3-4× as high as wide; flowers exserted < 2 mm beyond the involucre ..... ***Emilia sonchifolia var. sonchifolia***

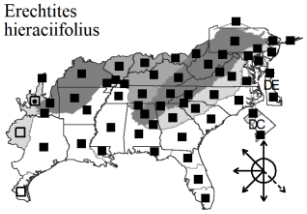
* ***Emilia fosbergii*** Nicolson. SALMON TASSELFLOWER, CUPID'S-SHAVING-BRUSH. **Hab:** Disturbed areas, flower beds, landscaping. **Dist:** Native of Old World tropics. Scattered as an introduction in FL, including the Panhandle; reported for Lowndes County, GA (Carter, Baker, & Morris 2009). Nelson & Kelly (1997) reported *E. sonchifolia*, but actually based on specimens of *E. fosbergii*. **Syn:** = Bah, Fl7, FNA20, K1, K3, K4, SE1, WH3. NatureServe GNR (Not Yet Ranked).

* ***Emilia sonchifolia*** (Linnaeus) A.P. de Candolle *var. **sonchifolia***. LILAC TASSELFLOWER. **Hab:** Disturbed areas. **Dist:** Native of the Old World tropics. It is unclear how well established *Emilia* is in the northern part of our area. See Anderson (2007) for FL Panhandle record. **Syn:** = FNA20, K1, K3, K4, Mapaya & Cron (2021); < *Emilia sonchifolia* – Fl7, S, SE1, WH3. NatureServe GNRTNR (Not Yet Ranked).



Erechtites Rafinesque 1817 (FIREWEED)

A genus of about 12-15 species, American and Australian. Barkley in FNA (2006a) points out that the genus name should be treated grammatically as masculine. References: Barkley (2006d) in FNA20 (2006b); SE1.



Erechtites hieraciifolius (Linnaeus) Rafinesque ex A.P. de Candolle. FIREWEED, AMERICAN BURNWEED. **Hab:** In disturbed soil in nearly all habitats except the extremely xeric, present in most parts of the modern (beat-up) landscape at least as seedlings, liable to turn up at the smallest disturbance (such as small tree-fall tip-up mounds or campfires, even in large natural areas), most abundant in areas extensively disturbed or scarified by timber-harvest, bulldozing, or severe fire. **Dist:** NL (Newfoundland) west to SK, south to s. FL and e. TX; West Indies; tropical America. **Phen:** Late Jul-Nov. **Comm:** Perhaps the only other species in our area as adept at appearing (seemingly from nowhere) at small soil disturbances in forests are *Phytolacca americana* and the moss *Atrichum angustatum* (Bridel) Bruch & Schimper. **Syn:** = Fl7, Mi, Tn, Va; = *Erechtites hieracifolia* var. *hieracifolia* – Bah, C, G, K1, SE1; = *Erechtites hieraciifolia* var. *hieraciifolia* – Pa; = *Erechtites hieraciifolius* var. *hieraciifolius* – Ar, FNA20, K4, NE, NY; < *Erechtites hieracifolia* – GrPl, GW2, Oh3, RAB, S, W, WV; > *Erechtites hieracifolia* var. *hieracifolia* – F, Il; > *Erechtites hieracifolia* var. *intermedia* Fernald – F, Il; > *Erechtites hieracifolia* var. *praealta* (Rafinesque) Fernald – F, Il; < *Erechtites hieraciifolia* – NcTx; < *Erechtites hieraciifolius* (Linnaeus) Rafinesque ex A.P. de Candolle – WH3; < *Senecio hieraciifolius* Linnaeus var. *hieracifolius* – K3. NatureServe G5T5 (Secure).

Erigeron Linnaeus 1753 (DAISY FLEABANE)

A genus of about 200 species, nearly cosmopolitan. Sections follow Nesom (2008b). Here circumscribed to include *Conyza*. References: Allison & Stevens (2001); SE1; Nesom (2006bb) in FNA20 (2006b); Nesom (2008b); Nesom (2008b); Nesom (2018a); Noyes, Gerling, & Vandervoort (2006); Poindexter, Keener, & Noyes (2017) in Weakley et al (2017); Poindexter, Keener, & Noyes (2018) in Weakley et al (2018a); Strother (2006cc) in FNA20 (2006b).

Unkeyed taxa: *Erigeron floribundus*

1 Ray flowers 0.2-1 mm long; plants annual from a taproot.
  2 Plants diffusely branched from the base and throughout; plants 1-2.5 (-3) dm tall ..... ***Erigeron divaricatus***
  2 Plants with a well-developed central axis, sparingly branched (unless on coastal dunes, mowed, or otherwise injured); plants 1-15 dm tall.
    3 Involucre 4-6 mm high, densely pubescent; pistillate flowers 20-150 (or more) per head.
      4 Cauline leaves characteristically linear to linear-oblanceolate; capitulescence corymbiform to racemiform, less commonly thyrsoid; fruiting receptacles (2-) 2.5-4 (-5) mm wide, not alveolate or sometimes the inner florets barely so; phyllaries linear-lanceolate, relatively thick and opaque, 0.3-0.5 mm wide, green to greenish brown with a narrow, orange-resinous midvein, hispid-hirsute with thick-based hairs, sometimes purple-tipped, inserted on a ring of fused tissue; pistillate florets ca. 40-150, in (2-) 3-6 series ..... ***Erigeron bonariensis***
      4 Cauline leaves characteristically narrowly lanceolate-elliptic to lanceolate or oblanceolate; capitulescence usually paniculate-thyrsoid; fruiting receptacles 1.5-2.5 mm wide, weakly but distinctly alveolate (lens), outer to inner florets; phyllaries narrowly ovate, relatively thin and translucent, 0.5-0.8 mm wide, central part yellow-brown with an inconspicuous midvein, loosely strigose with thin-based hairs, never purple-tipped, inserted at apex of peduncle; pistillate florets ca. 20-50, in 2-3 series ..... ***Erigeron sumatrensis***
    3 Involucre 3-4 mm high, glabrous or very sparsely pubescent; pistillate flowers mostly 25-45 per head.
      5 Stem coarsely spreading-hirsute; leaves ciliate, the larger generally with a few to many coarse teeth; phyllaries green-tipped or white-tipped ..... ***Erigeron canadensis***
      5 Stem glabrous or with widely scattered, appressed hairs; leaves with a few cilia toward the base, generally entire; phyllaries purple-tipped..... ***Erigeron pusillus***

1 Ray flowers 3-10 mm long; plants annual, biennial, or perennial.
  6 Stem leaves sessile; pappus of the pistillate (ray) flowers consisting only of a few short, slender scales, < 1 mm long (visible at 20× magnification); annual or perennial (rarely biennial); [section *Phalacroloma*].

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

7 Stem leaves many, mostly toothed, the larger > 1 cm wide; pubescence of the mid-stem long and spreading, of dense, flattened hairs; plants to 15 dm tall. ..... ***Erigeron annuus***

7 Stem leaves few, mostly entire, the larger usually < 1 cm wide; pubescence of the mid-stem usually short and appressed, of flattened hairs, mainly restricted to the lower stem (or entirely absent); plants to 8 dm tall.

8 Plants perennial, rhizomatous; [plants of shallow soil over calcareous rock].

9 Basal leaves oblanceolate to narrowly obovate or spatulate, (3.2-) 3.8-15 (-21) mm wide; cauline leaves glabrous, except along the midvein and the ciliate margins; [of limestone glades and barrens of c. TN, nw. GA, and n. AL]..... ***Erigeron allisonii***

9 Basal leaves linear-oblanceolate, 1-3.5 (-6) mm wide; cauline leaves sparsely to moderately strigillose; [of dolostone glades of c. AL (Bibb Co.)] ..... ***Erigeron dolomiticola***

8 Plants annual (rarely biennial), lacking rhizomes; [of various, often weedy, habitats] ..... ***Erigeron strigosus var. strigosus***

6 Stem leaves relatively large and clasping, or small and sessile (in *E. vernus*); pappus of the pistillate (ray) flowers of elongate capillary bristles (sometimes also with scales); plants biennial or perennial.

13 Stem leaves not clasping; basal leaves fleshy; rays 25-40, white, 0.5-1.3 mm wide; [of moist to wet habitats of the Coastal Plain]; [section *Erigeridium*] ..... ***Erigeron vernus***

13 Stem leaves clasping; basal leaves herbaceous; rays 50-400, pink, blue, purplish, or white, either 0.3-0.5 mm wide (in *E. philadelphicus* var. *philadelphicus, E. quercifolius,* and *E. tenuis*) or 0.8-1.2 mm wide (in *E. pulchellus* var. *pulchellus*); [of more general distribution and habitat].

14 Disk corollas 4-6 mm long; rays 50-100, 0.8-1.2 mm wide; plants clonal by rhizomes and stolons; [section *Pauciflori*]. ..... ***Erigeron pulchellus var. pulchellus***

14 Disk corollas 2.0-3.2 mm long; rays 60-400, 0.3-0.5 mm wide; plants solitary from a caudex.

16 Involucre 4-6 mm high; rays 150-400, white to deep pink, 5-10 mm long; [section *Quercifolium*]..... ***Erigeron philadelphicus var. philadelphicus***

16 Involucre 2.5-4 mm high; rays 60-250, blue-lavender (rarely white to pink), 2.5-5 (-6) mm long.

17 Pappus simple; stem spreading pubescent throughout (or appressed pubescent in the upper third only); rays 100-250; [section *Quercifolium*] ..... ***Erigeron quercifolius***

17 Pappus double, with short outer setae in addition to the long slender bristles; stem appressed pubescent in at least the upper half; rays 60-120; [section *Phalacroloma*]..... ***Erigeron tenuis***

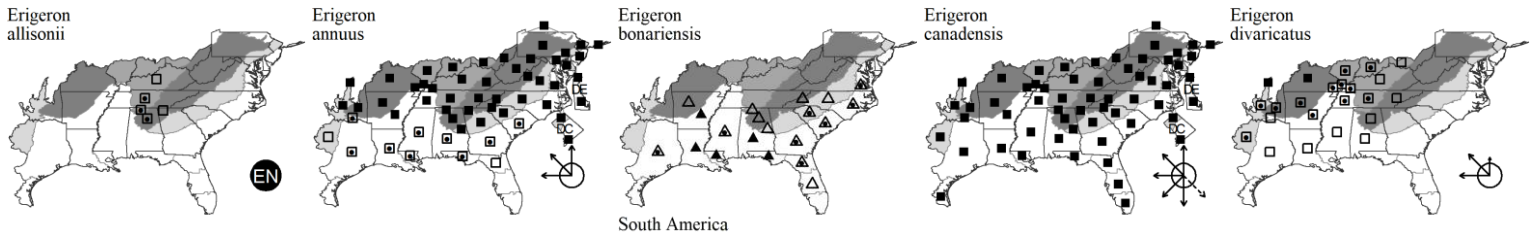
Erigeron allisonii D.B.Poindexter, B.R.Keener, & Noyes. CEDAR GLADE DAISY FLEABANE. **Hab:** Limestone glades. **Dist:** Central basin of TN (Allison & Stevens 2001), nw. GA (GANHP), n. AL, and swc. KY (Pennyroyal Plain, Warren County) (Brock 2020). **Phen:** (Apr-) May-Oct. **Tax:** See Poindexter, Keener, & Noyes (2017, 2018) for discussion of the rationale for elevating this diploid taxon to species rank. **Syn:** = K4, Poindexter, Keener, & Noyes (2018) in Weakley et al (2018a); = *Erigeron calcicola* (J.R. Allison) Poindexter, B.R. Keener, & Noyes – Poindexter, Keener, & Noyes (2017) in Weakley et al (2017); = *Erigeron strigosus* Muhlenberg ex Willdenow var. *calcicola* J.R. Allison – FNA20, Tn, Allison & Stevens (2001). NatureServe G5T3 (Vulnerable).

Erigeron annuus (Linnaeus) Persoon. ANNUAL FLEABANE. **Hab:** Roadsides, disturbed areas, gardens. **Dist:** NL (Newfoundland) west to MB, south to Panhandle FL and TX. **Phen:** May-Oct. **Syn:** = C, F, Fl7, FNA20, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, NY, Oh3, Pa, RAB, S, SE1, Tn, Tx, Va, W, WH3, WV; > *Erigeron annuus* var. *annuus* – G.

* ***Erigeron bonariensis*** Linnaeus. SOUTH AMERICAN HORSEWEED. **Hab:** Fields, disturbed areas. **Dist:** Apparently native of South America. Se. VA south into the tropics. **Phen:** Apr-Oct. **Syn:** = F, K3, K4, RAB; = *Conyza bonariensis* (Linnaeus) Cronquist – Ar, Bah, C, Fl7, FNA20, K2, SE1, Tx, Va, WH3; = *Conyza floribunda* Kunth – G, misapplied; > *Leptilon bonariense* (Linnaeus) Small – S; > *Leptilon linifolium* (Willdenow) Small – S.

Erigeron canadensis Linnaeus. COMMON HORSEWEED. **Hab:** Old fields, disturbed areas, roadsides, gardens. **Dist:** S. Canada south through nearly all of the United States to tropical America. **Phen:** Jun-Nov. **Syn:** = F; = *Conyza canadensis* (Linnaeus) Cronquist var. *canadensis* – C, G, GrPl, Mo2, NcTx, Oh3, Pa, SE1, Va, W; = *Erigeron canadensis* Linnaeus var. *canadensis* – NY, RAB; = *Leptilon canadense* (Linnaeus) Britton – S; < *Conyza canadensis* – Ar, Fl7, FNA20, Il, K2, Mi, NE, Tn, WH3; > *Conyza canadensis* (Linnaeus) Cronquist var. *canadensis* – Tx; > *Conyza canadensis* var. *glabrata* (A. Gray) Cronquist – GrPl, Tx; < *Erigeron canadensis* Linnaeus – K3, K4, WV.

Erigeron divaricatus Michaux. **Hab:** Lawns, roadsides, other weedy situations. **Dist:** OH west to MN, south to KY, ec. TN (Chester, Wofford, & Kral 1997), ne. AL, LA, and c. TX. **Phen:** Jun-Oct. **Syn:** = F, K3, K4; = *Conyza ramosissima* Cronquist – Ar, C, FNA20, G, GrPl, Il, K2, NcTx, Oh3, SE1, Tn, Tx; = *Leptilon divaricatum* (Michaux) Rafinesque – S. NatureServe G5 (Secure).



Erigeron dolomiticola (J.R. Allison) D.B. Poindexter, B.R. Keener, & Noyes. CAHABA DAISY FLEABANE. **Hab:** Calcareous Ketona glades. **Dist:** Endemic to Bibb County, AL (Allison & Stevens 2001). **Phen:** Late May-Oct. **Tax:** See Poindexter, Keener, & Noyes in Weakley et al. (2017) for discussion of the rationale for elevating this diploid taxon to species rank. **Syn:** = K4, Poindexter, Keener, & Noyes (2017) in Weakley et al (2017); = *Erigeron strigosus* Muhlenberg ex Willdenow var. *dolomiticola* J.R. Allison – FNA20, Allison & Stevens (2001). NatureServe G5T2? (Imperiled).

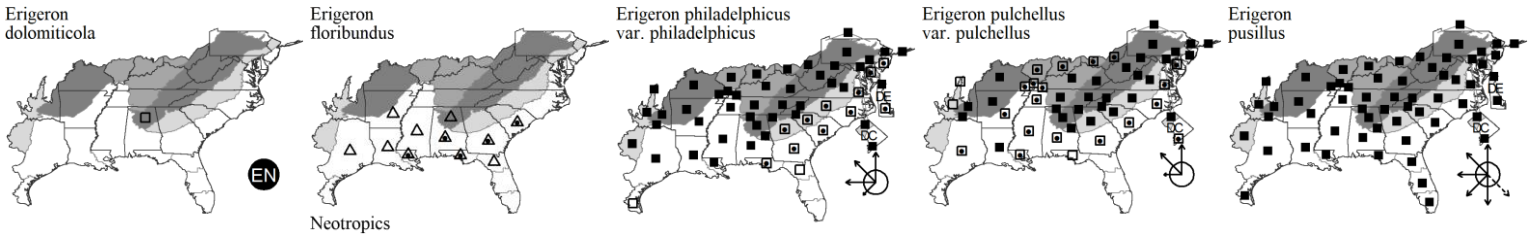
* ***Erigeron floribundus*** (Kunth) Schultz 'Bipontinus'. MANY-FLOWERED HORSEWEED. **Syn:** = *Conyza floribunda* Kunth – FNA20; = *Erigeron sumatrensis* Retzius – K3, K4.

Erigeron philadelphicus Linnaeus *var. **philadelphicus***. PHILADELPHIA-DAISY. **Hab:** Roadsides, meadows, disturbed areas. **Dist:** NL (Newfoundland) west to BC, south to n. FL, TX, NM, CA, and Mexico. **Phen:** Apr-Aug. **Tax:** Var. *scaturicola* Fernald, of bluffs along the James River in VA, seems to be merely an extreme form. Other varieties [var. *glaber* Henry and var. *provancheri* (Marie-Victorin & Rousseau) B. Boivin] may have more merit. **Syn:** = Ar, FNA20, K1, K3, K4, NE, NY, Pa, Va; < *Erigeron philadelphicus* – C, Fl7, G, GrPl, GW2, Il, Mi, NcTx, Oh3, RAB, S, SE1, Tn, W, WH3, WV; > *Erigeron philadelphicus* Linnaeus var. *philadelphicus* – F; > *Erigeron philadelphicus* var. *scaturicola* Fernald – F.

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Erigeron pulchellus Michaux *var*. ***pulchellus***. ROBIN'S-PLANTAIN. **Hab:** Moist slopes, coves, limestone bluffs, trail margins, roadbanks. **Dist:** ME west to MN, south to Panhandle FL (Jackson County), GA, and e. TX. **Phen:** Apr-early Jun. **Tax:** In addition to the widespread var. *pulchellus*, and the Alleghenian var. *brauniae*, *E. pulchellus* has an additional local variety, var. *tolsteadii* Cronquist, of se. MN. **Syn:** = Ar, C, F, FNA20, G, K1, K3, K4, NE, NY, Oh3, Pa, SE1, Va, WV; < *Erigeron pulchellus* – Fl7, GrPl, GW2, Il, Mi, RAB, S, Tn, Tx, W, WH3. NatureServe G5T5 (Secure).

Erigeron pusillus Nuttall. SOUTHERN HORSEWEED. **Hab:** Dunes, brackish marsh edges, coastal sand flats, sand prairies, old fields, disturbed areas, barrens and glades. **Dist:** Se. MA and CT west to s. IN, south to FL and TX, and south into tropical America. **Phen:** (May-) Jul-Dec. **Tax:** Cronquist (1980) considers this and *Erigeron canadensis* as "well-marked varieties". **Syn:** = F; = *Conyza canadensis* (Linnaeus) Cronquist var. *pusilla* (Nuttall) Cronquist – C, G, GrPl, Mo2, Pa, SE1, Tx, Va, W; = *Conyza canadensis* var. *pusillus* – Oh3; = *Erigeron canadensis* Linnaeus var. *pusillus* (Nuttall) B. Boivin – NY, RAB; = *Leptilon pusillum* (Nuttall) Britton – S; < *Conyza canadensis* – Ar, Fl7, FNA20, K2, Tn, WH3; > *Conyza canadensis* var. *glabrata* (A. Gray) Cronquist – NcTx; < *Erigeron canadensis* Linnaeus – K3, K4, NE.



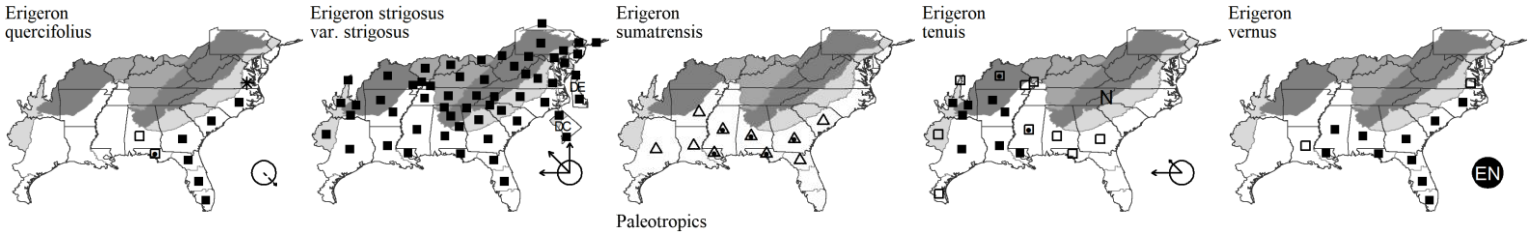
Erigeron quercifolius Lamarck. OAK-LEAVED FLEABANE. **Hab:** Sandy roadsides, disturbed areas. **Dist:** Se. VA south to s. FL, west to FL Panhandle; Bahamas. **Phen:** Apr-Jun. **Comm:** Nesom in FNA (2006b) pointed out that putative records from further west are based on misidentifications. **Syn:** = C, F, Fl7, FNA20, G, K1, K3, K4, RAB, S, SE1, Va, WH3. NatureServe G5 (Secure).

Erigeron strigosus Muhlenberg ex Willdenow *var*. ***strigosus***. COMMON ROUGH FLEABANE. **Hab:** Roadsides, disturbed areas; open woodlands. **Dist:** NS west to WA, south to c. peninsular FL and TX. **Phen:** Late Apr-Oct. **Syn:** = Ar, NE, Pa, Tn, Va, Noyes, Gerling, & Vandervoort (2006); = *Erigeron strigosus* Muhlenberg ex Willdenow – Mi; < *Erigeron ramosus* (Walter) Britton, Sterns, & Poggenburg – S; < *Erigeron strigosus* Muhlenberg ex Willdenow – Fl7, NY, Oh3, RAB, Tx, W, WH3, WV; > *Erigeron strigosus* var. *beyrichii* – C, F, G, GrPl, Il, K1, K3, NcTx, SE1, Allison & Stevens (2001); < *Erigeron strigosus* Muhlenberg ex Willdenow var. *strigosus* – FNA20, K1, K3, K4; > *Erigeron strigosus* Muhlenberg ex Willdenow var. *strigosus* – C, F, G, GrPl, Il, NcTx, SE1, Allison & Stevens (2001).

* ***Erigeron sumatrensis*** Retzius. **Hab:** Disturbed areas. **Dist:** Native of the Paleotropics. **Comm:** Nesom (pers.comm., March 2018). **Syn:** = *Conyza floribunda* Kunth – FNA20, K2; < *Erigeron sumatrensis* Retzius – K3.

Erigeron tenuis Torrey & A. Gray. MIDWESTERN FLEABANE. **Hab:** Prairies, open woodlands, other open habitats, disturbed areas. **Dist:** FL Panhandle (Okaloosa County) and AL west to se. KS, w. OK, and c. and s. TX. Reported for w. NC (Nesom 1980); but later discounted (Nesom in FNA 2006b). **Phen:** Mid Mar-Jun. **Syn:** = Ar, Fl7, FNA20, GrPl, Il, K1, K3, K4, NcTx, SE1, Tx, WH3. NatureServe G5 (Secure).

Erigeron vernus (Linnaeus) Torrey & A. Gray. WHITETOP FLEABANE. **Hab:** Wet pine savannas, seepages, interdunal swales. **Dist:** E. VA south to s. FL, west to e. LA; disjunct in w. LA (Allen Parish). **Phen:** Late Mar-Jun. **Syn:** = C, F, Fl7, FNA20, G, GW2, K1, K3, K4, RAB, S, SE1, Va, WH3. NatureServe G5 (Secure).



Eupatorium Linnaeus 1753 (EUPATORIUM, THOROUGHWORT, DOG-FENNEL)

A genus of about 40 species, herbs, of e. North America and Eurasia (after the exclusion of *Ageratina, Chromolaena, Conoclinium, Eutrochium, Fleischmannia*, and other genera). I have differed considerably from Cronquist's treatments, as for instance in SE, regarding the rank at which to recognize taxonomic entities in *Eupatorium*. In the Southeastern United States, *Eupatorium* is a reticulately evolved complex, including diploids, triploids, and tetraploids; derivatives of hybridization produce sterile pollen but in some cases reproduce vigorously via agamospermous production of seeds. In some cases, these entities form separate populations from their presumed parental species, with distinctive ranges and habitats and more-or-less distinctive morphology. Cronquist treats morphologically highly distinctive entities, such as *E. pinnatifidum*, as full species, while stating that they are "not long-persistent". He treats morphologically more subtle entities as varieties of one of the two presumed parental species, such as *E. album* var. *vaseyi* ("very probably derived by hybridization of *E. album* var. *album* and *E. sessilifolium*"). Other entities, difficult to distinguish morphologically from another species, he does not recognize, as for instance *E. saltuense*, included as a synonym under *E. altissimum* ("*E. saltuense* may reflect hybridization between *E. altissimum* and some other species such as *E. album*, or possibly between *E. hyssopifolium* and *E. album*"].
References: SE1; Cronquist (1985); Godfrey (1949); LeBlond et al (2007); Montgomery & Fairbrothers (1970); Schilling & Grubbs (2016); Schilling & Schilling (2015); Schilling (2011a); Schmidt & Schilling (2000); Siripun & Schilling (2006) in FNA21 (2006c); Siripun & Schilling (2006).

A species concept that stresses ecological, biological, and distributional independence seems preferable. When plants of a putative hybrid occur in substantial populations, reproducing independently of one or both alleged parents, and in geographically and/or ecologically distinctive situations they should be treated as a separate species. Only field observations and studies can provide the necessary information. I have seen no evidence that

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

E. ×*pinnatifidum* (though morphologically strikingly distinctive) occurs independent of its parents; thus I treat it as a hybrid (see below). *E. vaseyi* regularly occurs without one or both of its presumed parents, forms fertile achenes, occurs in large populations, and (in NC) is distributionally more limited than its presumed parents (Sullivan 1978). Biologically, it is best treated as an allopolyploid species; its treatment as a variety leads to conceptual and nomenclatural problems (reflected in the synonymy above

Unkeyed taxa: *Eupatorium* ×*pinnatifidum*

1 Leaves generally in whorls of 3-7 (very rarely all of them opposite), most of them > 2 cm wide; involucre 6.5-9 mm high, the flowers pale pink to purple..... ***Eutrochium***

1 Leaves generally opposite, sometimes in whorls of 3-4 (if so the leaves usually < 2 cm wide), or some of them alternate; involucre mostly 2-6 mm high, the flowers mostly white, rarely blue (rarely the involucre 6-11 mm high, then the flowers white).
- 2 Leaves pinnate or pinnatifid, divided into linear or capillary segments, 0-5 mm wide..... ***Key A***
- 2 Leaves simple or palmately 3 (-5)-lobed, the leaves or lobes generally over 5 mm wide.
  - 4 Leaves long-petiolate, the petioles of larger leaves > 10 mm long. ..... ***Eupatorium serotinum***
  - 4 Leaves sessile or short-petiolate, the petioles < 9 mm long.
    - 6 Florets (3-) 5 (-7) per head..... ***Key B***
    - 6 Florets 7-14 per head. ..... ***Eupatorium perfoliatum***

Key A - leaves pinnatifid or pinnate into linear or capillary segments (Dog-fennels)

1 Stem glabrous throughout, or short-pubescent in the lower portion only; inflorescence paniculate, the panicle branches recurved, the heads secundly arranged..... ***Eupatorium leptophyllum***

1 Stem pubescent throughout, generally conspicuously so; inflorescence paniculate, the branches not recurved, the heads not secund.
- 2 Leaves bright green, glabrous, sparsely glandular-punctate, segments of the basal leaves 1-1.5 mm wide, segments of the upper leaves 0.2-0.5 mm wide ..... ***Eupatorium capillifolium***
- 2 Leaves grayish-green, pubescent, densely glandular-punctate, segments of the basal leaves 2-5 mm wide, segments of the upper leaves 1-2.5 mm wide ..... ***Eupatorium compositifolium***

Key B - leaves simple, flowers usually 5 per head

1 Phyllaries acuminate to attenuate.
- 2 Larger leaves 0.2-1.3 cm wide; stems puberulent; involucre 3.5-7 mm high. ..... ***Eupatorium leucolepis***
- 2 Larger leaves 1.5-3 (-4) cm wide; stems villous to puberulent; involucre 8-11 mm high.
  - 4 Larger leaves < 6 cm long; leaves with few or no resin glands. ..... ***Eupatorium petaloideum***
  - 4 Larger leaves > 6 cm long (and usually > 8 cm long); leaves with sparse to abundant resin glands. ..... ***Eupatorium album***

1 Phyllaries acute to obtuse.
- 9 Leaf bases broadly cuneate, truncate, or subcordate, the leaves generally distinctly broadest near the base.
  - 10 Leaves (2.5-) 3-6 (-7)× as long as wide; plants glabrous below the inflorescence. ..... ***Eupatorium sessilifolium var. sessilifolium***
  - 10 Leaves 1-3 (-3.5)× as long as wide; plants pubescent below the inflorescence.
    - 13 Leaves averaging (1.5) 2-2.5× as long as wide, usually with a purple border (or not, in *E. species 1*); upper leaves and main inflorescence branches often alternate (opposite in *E. species 1*). ..... ***Eupatorium pilosum***
    - 13 Leaves averaging 1-2× as long as wide, usually lacking a purple border; upper leaves and main inflorescence branches usually all opposite.
      - 15 Leaf base broadly rounded, cordate-clasping; leaves very densely pubescent, the pubescence often harsh; larger leaves usually 4-10 cm long; principal pair of lateral veins diverging from the midrib 2-10 mm above the base of the leaf; toothing of leaf often irregular and coarse..... ***Eupatorium cordigerum***
      - 15 Leaf base cuneate, broadly cuneate, rounded, or cordate (but not clasping); leaves densely to sparsely pubescent; larger leaves usually 2-6 cm long; principal pair of lateral veins diverging at the base or 2-10 mm above the base of the leaf; toothing of leaf regular and relatively fine.
        - 16 Leaf blades mostly 1-1.5 (-1.7)× as long as wide, tending to be obtuse (the apex usually 90º or more), the teeth generally rounded (the 2 sides of each tooth usually distinctly convex-curved, the end of the tooth therefore rounded), the principal pair of lateral veins diverging directly from the base of the midrib..... ***Eupatorium rotundifolium***
        - 16 Leaf blades mostly (1.2-) 1.5-2× as long as wide, tending to be acute (the apex usually 90º or less), the teeth generally rather sharp (the 2 sides of each tooth straight to gently curved, the end of the tooth therefore triangular), the principal pair of lateral veins diverging 2-10 mm above the base of the midrib.
          - 17 Leaves broadly cuneate to broadly rounded, thin in texture, the pubescence rather soft and long (and also often sparse), the leaf blade not twisted at base, borne in a horizontal plane, up to 10 cm long and 6.5 cm wide; axillary fascicles lacking..... ***Eupatorium pubescens***
          - 17 Leaves cuneate to broadly cuneate, firm in texture, the pubescence rather harsh and short, the leaf blade twisted at the base, thus borne in a partially or fully vertical plane, up to 5.5 cm long and 3 cm wide; axillary fascicles regularly present ..... ***Eupatorium scabridum***
- 9 Leaf bases narrowly cuneate, the leaves generally broadest near the middle or toward the tip.
  - 18 Plants from conspicuously tuberous-thickened (ca. 1 cm in diameter) horizontal rhizomes; leaves deflexed, spreading, or ascending.
    - 19 Leaves 15-30 mm wide, spreading or ascending. ..... ***Eupatorium anomalum***
    - 19 Leaves 2-12 mm wide, deflexed to erect-ascending. ..... ***Eupatorium mohrii***
  - 18 Plants from crowns or caudices; leaves usually spreading or ascending (not deflexed).

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22 Plants generally with numerous branches from at or near the base, the axillary shoots of the lower internodes elongating; leaves 2-5 cm long, oblanceolate.
23 Leaves broadly oblanceolate, 5-15 mm wide, crenate or serrate in the upper half ..... ***Eupatorium glaucescens***
23 Leaves narrowly oblanceolate, 3-8 mm wide, entire or remotely serrate apically..... ***Eupatorium linearifolium***
22 Plants generally simple below the middle, the axillary shoots of the lower nodes not elongating (except in response to injury of the main stem); leaves 3-12 cm long, lanceolate or linear.
24 Leaves mostly 6-40× as long as wide, the larger ones usually < 10 mm wide, ranging from 1-12 mm wide, whorled or opposite (rarely alternate above).
25 Leaves linear to narrowly lanceolate, the principal leaves 2-7 cm long, 1-5 mm wide, 10-40× as long as wide, entire to obscurely toothed, the leaves mostly in whorls of 3 or 4 ..... ***Eupatorium hyssopifolium***
25 Leaves lanceolate, the principal leaves 5-12 cm long, 5-10 (-12) mm wide, 6-15× as long as wide, conspicuously and divergently toothed, the leaves mostly opposite or in whorls of 3..... ***Eupatorium torreyanum***
24 Leaves mostly 2.5-7× as long as wide, the larger ones > 10 mm wide, ranging from 8-30 mm wide, opposite, alternate, or whorled.
26 Involucre 2.5-4 mm high; leaves obtuse to acute, elliptic to elliptic-oblanceolate, the 2 main lateral veins separating from the midrib about 1 cm above the base; leaves commonly 3 per node..... ***Eupatorium semiserratum***
26 Involucre 4.5-7 mm high; leaves acute to attenuate-acuminate, lanceolate, the 2 main lateral veins separating from the midvein at the base; leaves rarely 3 per node.
27 Leaves 3-5 cm long, 5-13 mm wide; leaf surfaces generally glabrous; [of AL westward]..... ***Eupatorium lancifolium***
27 Leaves 5-12 cm long, 5-20 mm wide; leaf surfaces short or long puberulent; [widespread].
..... ***Eupatorium altissimum***

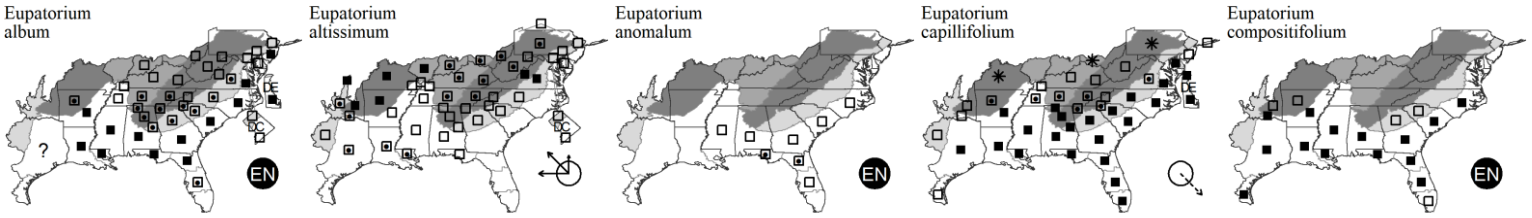
Eupatorium album Linnaeus. WHITE-BRACTED THOROUGHWORT. **Hab:** Dry woodlands. **Dist:** CT, NY, OH, and TN, south to FL and LA; disjunct in s. AR and n. LA (though many populations previously considered to be. *E. album* west of the Mississippi River are *E. sullivaniae*). **Phen:** Late Jun-Oct. **Tax:** *E. album* is a diploid/auto polyploid species and the most widespread member of the *Eupatorium album* complex, a group of species which have undergone extensive allopolyploid speciation. Many members of the complex have been treated as infrataxa under *E. album*, but are better separated as distinct species (Schilling 2011). Var. *glandulosum* is alleged to differ from var. *album* in having the involucre with copious dark glands (vs. glandless or nearly so). The distinction is dubious; variation seems essentially continuous in our area, with frequent intermediates, and there seems to be little correlation between morphology and habitat/range. **Syn:** = Fl7, K3, K4, Tn, Schilling (2011b); < *Eupatorium album* Linnaeus – Oh3, Pa, RAB, S, WH3; < *Eupatorium album* Linnaeus var. *album* – Ar, C, FNA21, K1, NE, SE1, Va, W, Cronquist (1985); > *Eupatorium album* Linnaeus var. *album* – F, G, WV; > *Eupatorium album* var. *glandulosum* (Michaux) A.P. de Candolle – F, G, WV.

Eupatorium altissimum Linnaeus. TALL THOROUGHWORT. **Hab:** Woodlands, old fields, woodland borders, and openings over mafic rocks (such as diabase) or calcareous rocks (such as limestone and calcareous sandstone). **Dist:** CT, NY, QC, MN, and NE, south to Panhandle FL and TX, primarily in the midwest, especially on limestone substrates, and uncommon east of the mountains. **Phen:** Late Aug-Nov. **Syn:** = F, G, GrPl, Il, K4, Mi, NcTx, NE, NY, Oh3, Pa, RAB, S, Tn, Tx, Va, W, WV; < *Eupatorium altissimum* Linnaeus – Ar, C, Fl7, FNA21, K1, K3, SE1, WH3. NatureServe G5 (Secure).

Eupatorium anomalum Nash. ANOMALOUS EUPATORIUM. **Hab:** Moist savannas, coastal plain pondshores, moist interdune swales. **Dist:** NC (?) south to ne. FL, west to s. AL. **Phen:** Aug-Oct. **Tax:** *E. anomalum* is believed to be a triploid and tetraploid, apomictic derivative of the hybrid *E. mohrii* × *rotundifolium*. E. SC south to c. peninsular FL and west to s. AL. Inasmuch as it is now a separate lineage (as evidenced by a distinct distribution, more-or-less recognizable morphology, and phenologic separation), treatment as a separate taxon seems warranted. **Syn:** = FNA21, GW2, K1, K3, K4, SE1, Va, Schilling & Grubbs (2016); = *Eupatorium* ×*anomalum* – Fl7, WH3; < *Eupatorium anomalum* Nash – S; < *Eupatorium recurvans* Small – RAB.

Eupatorium capillifolium (Lamarck) Small. COMMON DOG-FENNEL, YANKEEWEED, CYPRESSWEED. **Hab:** Disturbed soils, old fields, clearcuts. **Dist:** CT, PA, KY, MO, and OK south to s. FL and TX; Bahamas; Cuba. **Phen:** Sep-Nov. **Comm:** This species, like *E. compositifolium*, is an excellent indicator of soil disturbance. **Syn:** = Ar, Bah, C, F, Fl7, FNA21, G, GW2, Il, K1, K3, K4, NcTx, NY, S, SE1, Tn, Tx, Va, W, WH3, WV; = *Eupatorium capillifolium* var. *capillifolium* – RAB. NatureServe G5 (Secure).

Eupatorium compositifolium Walter. COASTAL DOG-FENNEL, YANKEEWEED. **Hab:** Longleaf pine sandhills, sandy disturbed areas, exposed riverbanks and drawdown zones. **Dist:** Ne. NC south to s. FL, west to se. OK and TX. **Phen:** Sep-Dec. **Comm:** This species, like *E. capillifolium*, is an excellent indicator of soil disturbance. **Syn:** = Ar, Fl7, FNA21, GW2, K1, K3, K4, RAB, S, SE1, Tx, W, WH3. NatureServe G5 (Secure).



Eupatorium cordigerum (Fernald) Fernald. CLASPING ROUNDLEAF EUPATORIUM. **Hab:** Woodlands. **Dist:** VA, NC, and SC west to AR and MS. **Phen:** Jul-Aug. **Comm:** This taxon is an apomictic, polyploid derivative of the hybrid *E. perfoliatum* × *rotundifolium*. **Syn:** = F, Va; = *Eupatorium* ×*cordigerum* (Fernald) Fernald – Ar, FNA21, K3, K4; = *Eupatorium rotundifolium* var. *cordigerum* Fernald – C, K1, SE1, Cronquist (1985); < *Eupatorium pubescens* Muhlenberg ex Willdenow – S; < *Eupatorium rotundifolium* Linnaeus – GW2; < *Eupatorium rotundifolium* Linnaeus ssp. *ovatum* (Bigelow) Montgomery & Fairbrothers – Montgomery & Fairbrothers (1970); < *Eupatorium rotundifolium* var. *ovatum* (Bigelow) Torrey – G, RAB; < *Eupatorium scabridum* Elliott – Tn.

Eupatorium glaucescens Elliott. WEDGELEAF EUPATORIUM, BROADLEAF BUSHY EUPATORIUM. **Hab:** Longleaf pine sandhills, dry sandy woodlands. **Dist:** Widespread in the Southeastern Coastal Plain, ranging from se. VA south to FL and west to MS. **Phen:** Late Jul-Oct. **Tax:** The name *E. cuneifolium* must be rejected on nomenclatural grounds (Gandhi & Thomas 1991). **Syn:** = K1; = *Eupatorium cuneifolium* Willdenow – S; < *Eupatorium cuneifolium* Willdenow – C, G, RAB, SE1; ? *Eupatorium cuneifolium* var. *cuneifolium* – F; < *Eupatorium glaucescens* Elliott – Tx; < *Eupatorium linearifolium* Walter – Fl7, FNA21, K3, K4, WH3.

Eupatorium hyssopifolium Linnaeus. HYSSOPLEAF EUPATORIUM. **Hab:** Roadbanks, pastures, fields, disturbed areas, dry woodlands. **Dist:** MA west to nc. KY, s.IL, se. MO, south to ne. FL and se. TX. **Phen:** Late Jul-Oct. **Syn:** = Il, K3, NE, NY, Tn, Va, Schilling (2011a); = *Eupatorium hyssopifolium* var. *hyssopifolium* – Ar, C, Fl7, FNA21, G, K3, Pa, SE1, W; < *Eupatorium hyssopifolium* Linnaeus – RAB, Tx, WV; > *Eupatorium hyssopifolium* var. *calcaratum* Fernald & Schubert – F, K1; > *Eupatorium hyssopifolium* var. *hyssopifolium* – F, K1; > *Eupatorium lecheifolium* Greene – S; > *Eupatorium sessilifolium* – S.

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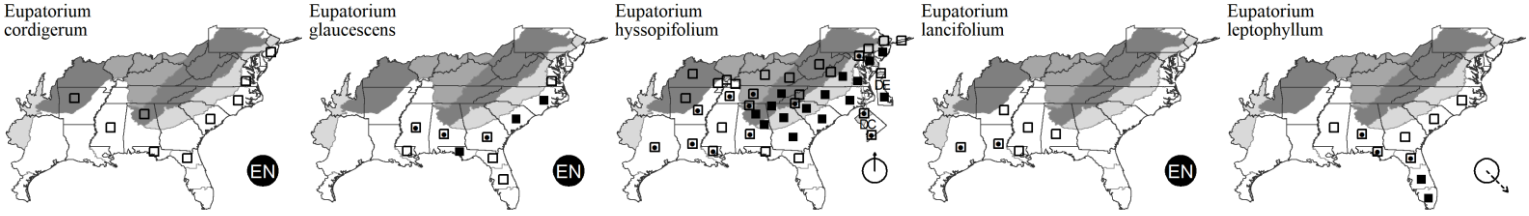
Eupatorium lancifolium (Torrey & A. Gray) Small. LANCELEAF EUPATORIUM. **Hab:** Prairies, open woodlands. **Dist:** AL west to s. AR and e. TX. **Syn:** = FNA21, GW2, K1, K3, K4, S, SE1, Schilling (2011b). NatureServe G3? (Vulnerable).

Eupatorium leptophyllum A.P. de Candolle. LIMESINK DOG-FENNEL. **Hab:** Limesink depression ponds (dolines) in the outer Coastal Plain and clay-based Carolina bays in the inner Coastal Plain. **Dist:** Se. NC south to FL and west to s. GA and s. AL; Bahamas; Cuba. **Phen:** Sep-Nov. **Syn:** = Bah, Fl7, FNA21, GW2, K1, K3, K4, S, SE1, WH3; = *Eupatorium capillifolium* var. *leptophyllum* (A.P. de Candolle) H.E. Ahles – RAB. NatureServe G4G5 (Apparently Secure).



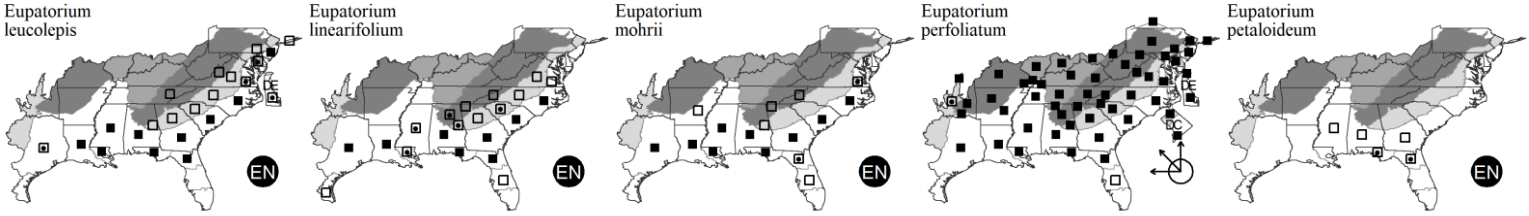
Eupatorium leucolepis (A.P. de Candolle) Torrey & A. Gray. SAVANNA EUPATORIUM, JUSTICEWEED. **Hab:** Pine savannas, seepage bogs, depression ponds. **Dist:** Primarily of the Southeastern Coastal Plain, ranging from NY south to n. peninsular FL, Panhandle FL, and west to LA; disjunct in Coffee County, TN (Chester, Wofford, & Kral 1997). **Phen:** Aug-Oct. **Comm:** This species is often confused with members of the *E. recurvans-mohrii-anomalum* complex. The following differences are useful: *E. leucolepis* has phyllaries acuminate to attenuate (vs. acute to obtuse), leaves of the uppermost nodes below the inflorescence opposite, or rarely the uppermost 1-2 nodes subopposite (vs. leaves of the uppermost 2-15 nodes below the inflorescence alternate), and leaves generally longitudinally folded (vs. generally planar). The plants formerly called *E. leucolepis* var. *novae-angliae* Fernald and endemic to freshwater pondshores in MA and RI apparently represent a distinct allopolyploid species, *E. novae-angliae* (Fernald) V.I. Sullivan ex A. Haines & Sorrie, and should not be treated as a variety of *E. leucolepis*. **Syn:** = K3, K4, NY, Tn, Tx, Va, LeBlond et al (2007); = *Eupatorium leucolepis* var. *leucolepis* – C, F, G; < *Eupatorium leucolepis* (A.P. de Candolle) Torrey & A. Gray – Fl7, GW2, Pa, RAB, S, SE1, W, WH3; < *Eupatorium leucolepis* var. *leucolepis* – FNA21, K1. NatureServe G5T5 (Secure).

Eupatorium linearifolium Walter. NARROWLEAF BUSHY EUPATORIUM, TWISTED EUPATORIUM. **Hab:** Longleaf pine sandhills. **Dist:** Se. VA south to FL and west to LA. **Phen:** Late Jul-Oct. **Comm:** The appropriate treatment of this taxon is unclear; it may be a derivative of the hybrid *E. cuneifolium* × *hyssopifolium*. **Syn:** = F, Va; = *Eupatorium hyssopifolium* var. *linearifolium* (Walter) Fernald – K1; = *Eupatorium tortifolium* Chapman – S; < *Eupatorium cuneifolium* Willdenow – C, G, RAB, SE1; < *Eupatorium linearifolium* Walter – Fl7, FNA21, K3, K4, Tx, WH3.

Eupatorium mohrii Greene. MOHR'S EUPATORIUM. **Hab:** Moist savannas, other wet habitats. **Dist:** Se. VA south to s. FL and west to TX. **Phen:** Aug-Oct. **Tax:** Like *E. anomalum*, *E. mohrii* is believed to be a triploid and tetraploid, apomictic derivative of the hybrid *E. recurvans* × *rotundifolium*; it is more widespread than *E. recurvans* sensu stricto. Inasmuch as it is now a separate lineage (as evidenced by a distinct distribution, more-or-less recognizable morphology, and phenologic separation), treatment as a separate taxon seems warranted. **Syn:** = GW2, Va; < *Eupatorium anomalum* Nash – S; < *Eupatorium mohrii* Greene – C, Fl7, FNA21, K1, K3, K4, SE1, W, WH3, Schilling & Grubbs (2016); < *Eupatorium recurvans* Small – F, G, RAB.

Eupatorium perfoliatum Linnaeus. BONESET. **Hab:** Marshes, swamps, bogs, wet pastures, and other wet habitats. **Dist:** NS west to MB, south to n. peninsular FL and TX. **Phen:** Aug-Oct. **Syn:** = Ar, Fl7, FNA21, GrPl, GW2, Il, K3, K4, Mi, NcTx, NE, NY, Oh3, Pa, RAB, Tn, Tx, Va, W, WH3, WV; = *Eupatorium perfoliatum* var. *perfoliatum* – C, F, G, K1, S, SE1; ? *Eupatorium cuneatum* Engelmann – S, (actually a hybrid). NatureServe G5T5 (Secure).

Eupatorium petaloideum Britton. SNOWY WHITE EUPATORIUM. **Hab:** Longleaf pine sandhills, Florida scrub, other dryish pinelands. **Dist:** GA south to FL, west to MS. **Syn:** = Fl7, FNA21, K3, K4, S, Schilling (2011b); < *Eupatorium album* Linnaeus – WH3; < *Eupatorium album* Linnaeus var. *album* – K1, SE1, Cronquist (1985).



Eupatorium pilosum Walter. RAGGED EUPATORIUM. **Hab:** Longleaf pine savannas, bogs, other wetlands, other moist areas, but also sometimes in surprisingly dry habitats, such as mesic and dry-mesic woodlands and woodland edges. **Dist:** MA south to c. peninsular FL, west to KY, c. TN, and MS; reports from w. LA need checking. **Phen:** Aug-Oct. **Tax:** *E. pilosum* is a species distinct from *E. rotundifolium*. There remains interesting morphologic and ecological variation included within this taxon needing careful study. **Syn:** = C, F, Fl7, FNA21, GW2, K1, K3, K4, NE, NY, Pa, RAB, Tn, Va, WH3, WV, Cronquist (1985), Montgomery & Fairbrothers (1970), Schilling & Schilling (2015); = *Eupatorium rotundifolium* var. *saundersii* (T.C. Porter) Cronquist – G, SE1, W; = *Eupatorium verbenaefolium* Reichard – S. NatureServe G5 (Secure).

Eupatorium ×pinnatifidum Elliott. **Hab:** Pine flatwoods, marshes. **Dist:** E. VA south to Panhandle FL. **Tax:** It is variously considered a species (as by S), a species of hybrid origin (as by SE), or a hybrid (as by GW and K). The parents are variously listed as *E. capillifolium* × *perfoliatum* (as by K) or *E. capillifolium* or *compositifolium* × *perfoliatum* (as by GW and SE). I have seen the plant in Pender County, NC, where it appears to be a first-generation hybrid, growing with *E. capillifolium* and *E. perfoliatum*. Until and unless additional evidence appears that it reproduces itself and exists in independent populations it should be treated as a hybrid rather than a species of hybrid origin. It is recognizable by its pinnatifid or bipinnatifid leaves (the segments broader than in the dog-fennels) and its corymbose-paniculate inflorescence. **Comm:** {not keyed}. **Syn:** = Ar, Fl7, FNA21, K1, K3, K4, Tn, WH3; = *Eupatorium pinnatifidum* Elliott – GW2, S, SE1.

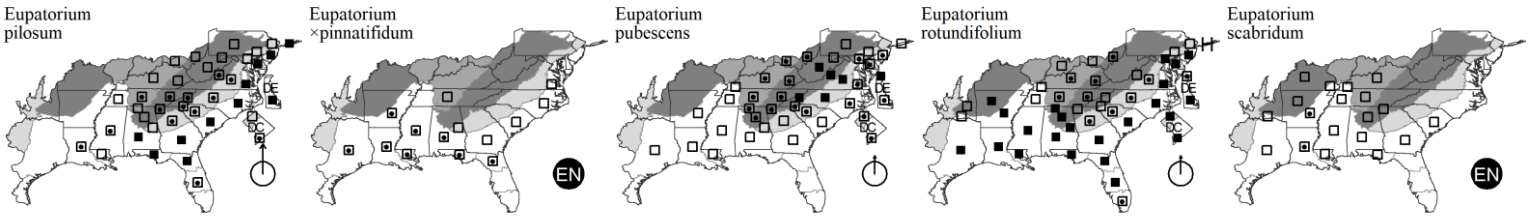
Eupatorium pubescens Muhlenberg ex Willdenow. INLAND ROUNDLEAF EUPATORIUM. **Hab:** Forests and woodlands, woodland edges, roadbanks. **Dist:** Primarily in the Appalachians and adjacent provinces, ranging from ME west to OH, south to n. GA, n. AL, AR and LA; the

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

distribution, abundance, and phenology of *E. pubescens* need additional study because of frequent lumping with *E. rotundifolium*. **Phen:** Jul-Sep. **Tax:** Where growing together, *E. pubescens* apparently flowers about a month earlier than *E. rotundifolium*. This taxon appears to be a stabilized polyploid complex originating from hybridization of *E. rotundifolium* and (perhaps) *E. sessilifolium*; in that it now functions as a more-or-less independent evolutionary lineage, with distinctive morphology, habitat, and distribution, it is here treated as a species. **Syn:** = F, NE, NY, Va, WV; = *Eupatorium rotundifolium* var. *ovatum* (Bigelow) Torrey – Ar, C, FNA21, G, K1, K3, K4, Oh3, Pa, SE1, W, Cronquist (1985); < *Eupatorium pubescens* Muhlenberg ex Willdenow – S, (also see E. cordigerum); < *Eupatorium rotundifolium* Linnaeus – GW2; < *Eupatorium rotundifolium* Linnaeus ssp. *ovatum* (Bigelow) Montgomery & Fairbrothers – Montgomery & Fairbrothers (1970); < *Eupatorium rotundifolium* var. *ovatum* (Bigelow) Torrey – RAB, (also see E. cordigerum). NatureServe G5T5 (Secure).

Eupatorium rotundifolium Linnaeus. COMMON ROUNDLEAF EUPATORIUM. **Hab:** Pine savannas, seepage bogs, moist to dry woodlands. **Dist:** MA, NY, IN, and OK south to s. FL and TX. **Phen:** Aug-Oct. **Syn:** = F, NE, NY, S, Tn, Va; = *Eupatorium rotundifolium* var. *rotundifolium* – Ar, C, FNA21, G, K1, K3, K4, Oh3, Pa, RAB, SE1, W, Cronquist (1985); < *Eupatorium rotundifolium* Linnaeus – Fl7, GW2, Tx, WH3; < *Eupatorium rotundifolium* Linnaeus ssp. *rotundifolium* – Montgomery & Fairbrothers (1970). NatureServe G5T5 (Secure).

Eupatorium scabridum Elliott. ROUGHLEAF EUPATORIUM. **Hab:** Pine savannas, wet pinelands, dry, gravelly oak savannas and probably oak-shortleaf pine savannas and open woodlands, powerlines, roadbanks (in grassland remnants). **Dist:** SC south to n. FL, west to AR, LA, and OK. **Phen:** Late Jul-Oct. **Tax:** This plant is believed to be an allopolyploid and apomictic derivative of the hybrid *E. rotundifolium* × *semiserratum*. In some areas it apparently consists only of short-lived diploids, but in others (according to Godfrey & Wooten [1981] especially in SC, AR and LA) to occur as populations of polyploid apomicts. It resembles *E. rotundifolium*, but has cuneate leaves with a less prominent pair of lateral veins, narrower leaves, and is more likely to have 3-whorled leaves (as *E. semiserratum* often does). **Syn:** = GW2, S; = *Eupatorium rotundifolium* var. *scabridum* (Elliott) A. Gray – Ar, FNA21, K1, K3, K4, SE1; < *Eupatorium rotundifolium* Linnaeus – Fl7, Tx, WH3; < *Eupatorium rotundifolium* Linnaeus ssp. *rotundifolium* – Montgomery & Fairbrothers (1970); < *Eupatorium scabridum* Elliott – Tn. NatureServe G5T3T5 (Apparently Secure).

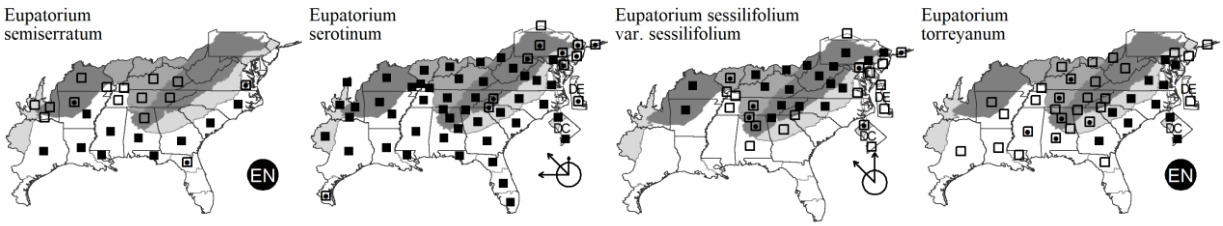


Eupatorium semiserratum A.P. de Candolle. **Hab:** Swamp forests, seepage bogs, savannas, clay-based Carolina bays, other wetlands. **Dist:** Se. VA south to ne. FL, Panhandle FL, west to TX and AR; disjunct in sc. TN. **Phen:** Late Jul-Oct. **ID Notes:** This species often has 3 leaves per node; most similar species rarely or never have whorled leaves. **Syn:** = Ar, C, Fl7, FNA21, G, GW2, K1, K3, K4, RAB, S, SE1, Tn, Va, WH3; = *Eupatorium cuneifolium* var. *semiserratum* (A.P. de Candolle) Fernald & Griscom – F; < *Eupatorium glaucescens* Elliott – Tx.

Eupatorium serotinum Michaux. LATE EUPATORIUM. **Hab:** Interdune swales, bottomland forests and openings, fields, open forests, powerline rights-of-way, tidal marshes, disturbed areas. **Dist:** MA, NY, MI, WI, MN, and NE south to s. FL, LA, and TX. This species was at one time apparently largely or strictly coastal in our area, but has spread inland rapidly along corridors of disturbance, somewhat similarly to *Baccharis halimifolia*. **Phen:** Late Aug-Oct. **Comm:** A weedy species that has expanded in abundance and range. **Syn:** = Ar, C, F, Fl7, FNA21, G, GrPl, GW2, Il, K1, K4, Mi, NE, NY, Oh3, Pa, RAB, S, SE1, Tn, Tx, Va, W, WH3, WV. NatureServe G5 (Secure).

Eupatorium sessilifolium Linnaeus *var.* ***sessilifolium***. SESSILE-LEAF EUPATORIUM. **Hab:** Open upland woodlands and woodland borders, especially calcareous or mafic. **Dist:** S. NH west to se. MN, south to n. GA, n. AL, n. MS, n. AR, and e. KS. **Phen:** Jul-Oct. **Tax:** Grubbs, Small, & Schilling (2009) discuss the genetics of *E. sessilifolium*; most of the species' distribution consists of agamospermous triploids, with sexual diploids only known from two disjunct areas of the southern Appalachians (w. VA, and w.NC-e. TN). There may be merit to the taxonomic recognition of the diploids and the triploids. **Syn:** = F, K1, Va, WV; < *Eupatorium sessilifolium* – Ar, C, FNA21, G, K3, K4, Mi, NE, NY, Oh3, Pa, S, SE1, Tn, W, Cronquist (1985), Montgomery & Fairbrothers (1970), Schilling (2011a), Siripun & Schilling (2006); < *Eupatorium sessilifolium* Linnaeus var. *sessilifolium* – RAB. NatureServe G5T5 (Secure).

Eupatorium torreyanum Short & R. Peter. TORREY'S EUPATORIUM. **Hab:** Dry woodlands, powerline rights-of-way, roadsides, marshes. **Dist:** NY south to n. peninsular FL, Panhandle FL, and west to OH, TN, and LA. **Phen:** Late Jul-Oct. **Tax:** Cronquist (1980) considers this taxon a "well-marked variety", "probably originated through hybridization between *E. hyssopifolium* and some other species, but now a stable entity". The other parent is postulated by Sullivan (1978) to be *E. semiserratum*. For reasons stated in the comments before the species accounts, the taxon is here treated as a species. **Syn:** = K4, NE, NY, S, Tn, Va; = *Eupatorium hyssopifolium* var. *laciniatum* Gray – Ar, C, F, Fl7, FNA21, G, K1, K3, Oh3, SE1, W, WH3; < *Eupatorium hyssopifolium* Linnaeus – RAB.



Eurybia (Cassini) Cassini 1820 (WOOD-ASTER)

A genus of about 23 species, perennial herbs, of North America. References: Brouillet (2006g) in FNA20 (2006b); SE1; Kral (1983a); Lamboy (1987); Lamboy (1988); Lamboy (1992); Nesom (1994b).

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

1 Basal and lower cauline leaves both distinctly petioled and with a cordate or subcordate blade; [subgenus *Eurybia*, section *Eurybia*].
  2 Outer phyllaries squarrose-reflexed; rhizomes short or absent, the plants not forming extensive clonal colonies; [of rich slopes and bottomlands of the lower Piedmont of NC, SC, GA, and AL].
  .....Eurybia jonesiae
  2 Outer phyllaries appressed (or slightly and irregularly spreading); rhizomes long, the plants forming extensive clonal colonies; [of various habitats and distribution].
  .....Eurybia divaricata
1 Basal and lower cauline leaves not as above.
  8 Leaves linear, up to about 10 mm wide; leaves strongly basally disposed.
    11 Stem spreading-hairy throughout; ray florets 25-60, white or pinkish; [endemic of FL Panhandle and adjacent sw. GA and se. AL]; [subgenus *Heleastrum*, section *Eryngiifolii*]***..... Eurybia eryngiifolia***
    11 Lower stem glabrous, upper stem variously hairy; ray florets 8-30, deep lavender or purple; [collectively widespread]
    ..... Eurybia hemispherica
  8 Leaves broader, the largest on a plant over 15 mm wide; leaves somewhat basally disposed, the lowermost sometimes withering before flowering.
    16 Phyllaries glandular-pubescent on the back and also glandular-ciliate; involucre 8-16 mm high***..... Eurybia spectabilis***
    16 Phyllaries slightly or not at all glandular-pubescent on the back (sometimes glandular-ciliate); involucre 7-12 mm high***..... Eurybia surculosa***

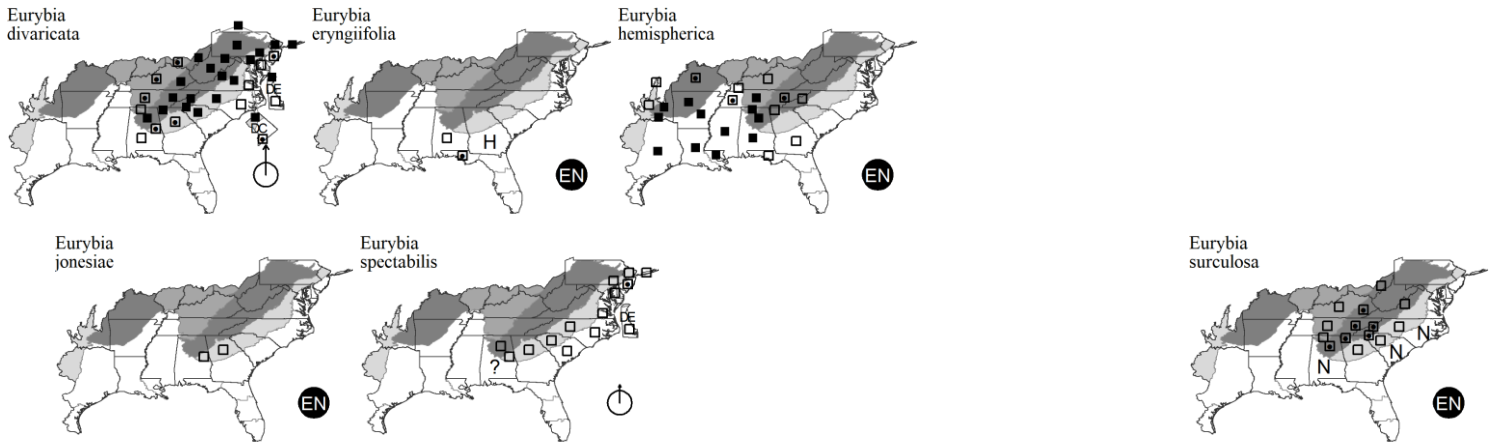
Eurybia divaricata (Linnaeus) Nesom. COMMON WHITE HEART-LEAVED ASTER. **Hab:** Moist to fairly dry forests and woodlands. **Dist:** N. NH west to s. ON, sw. QC, and n. OH, south to e. NC, c. SC, n. GA, and c. AL. **Phen:** Aug-Oct. **Tax:** The many species described by Burgess and here treated as synonyms may deserve further assessment; see S for details. A diploid species (2n=18). **Syn:** = FNA20, K1, K3, K4, NE, NY, Pa, Tn, Va, Nesom (1994b); = *Aster divaricatus* Linnaeus – G, Oh3, Lamboy (1987); = *Aster divaricatus* var. *divaricatus* – C, RAB, SE1, W; > *Aster boykinii* E.S. Burgess – S; > *Aster castaneus* E.S. Burgess – S; < *Aster divaricatus* Linnaeus – F, WV; > *Aster divaricatus* Linnaeus – S; > *Aster excavatus* E.S. Burgess – S; > *Aster flexilis* E.S. Burgess – S; > *Aster stillettiformis* E.S. Burgess – S; > *Aster tenebrosus* E.S. Burgess – S. NatureServe G5 (Secure).

Eurybia eryngiifolia (Torrey & A. Gray) Nesom. ERYNGO-LEAVED ASTER. **Hab:** Wet pine savannas and pineland bogs. **Dist:** East Gulf Coastal Plain endemic: sw. GA and Panhandle FL west to se. AL. **Phen:** May-Jun. **Syn:** = Fl7, FNA20, K1, K3, K4, WH3, Nesom (1994b); = *Aster eryngiifolius* Torrey & A. Gray – S, SE1. NatureServe G3G4 (Vulnerable).

Eurybia hemispherica (Alexander) Nesom. PRAIRIE GRASS-LEAVED ASTER, SOUTHERN PINE ASTER. **Hab:** Glades, barrens, rocky woodlands. **Dist:** E. TN west to MO, south to nw. GA, se. GA, and FL Panhandle. **Phen:** Jul-Oct. **Tax:** Apparently diploid (2n=18) and tetraploid (2n=36). **Syn:** = Ar, FNA20, K1, K3, K4, Tn, WH3, Nesom (1994b); = *Aster hemisphaericus* – W, orthographic variant; = *Aster hemisphericus* Alexander – C, F, SE1; = *Aster paludosus* Aiton ssp. *hemisphericus* (Alexander) Cronquist – G, GrPl; = *Aster pedionomus* Alexander – S; = *Heleastrum hemisphaericum* (Alexander) Shinners – Tx. NatureServe G4 (Apparently Secure).

Eurybia jonesiae (Lamboy) Nesom. PIEDMONT BIG-LEAVED ASTER. **Hab:** Moist forests. **Dist:** Endemic to the Piedmont: e. GA west to e. AL (Lee Co.). **Phen:** Aug-Oct. **Comm:** A hexaploid species (2n=54). **Syn:** = FNA20, K1, K3, K4, Nesom (1994b); = *Aster commixtus* (Nees) Kuntze – S, misapplied; < *Aster commixtus* (Nees) Kuntze – SE1, misapplied. NatureServe G3? (Vulnerable).

Eurybia spectabilis (Aiton) Nesom. LOW SHOWY ASTER. **Hab:** Pine barrens, dry road banks. **Dist:** Coastal Plain (and rarely adjacent provinces) from MA south to SC; disjunct in AL. **Phen:** Aug-Oct. **Comm:** An octoploid species (2n=72). **Syn:** = FNA20, K1, K3, K4, NE, NY, Pa, Va, Nesom (1994b); = *Aster spectabilis* Aiton – C, RAB, SE1; > *Aster smallii* Alexander – S; > *Aster spectabilis* Aiton – S; > *Aster spectabilis* Aiton var. *cinerascens* Blake – G; > *Aster spectabilis* Aiton var. *spectabilis* – F, G; > *Aster spectabilis* var. *suffultus* Fernald – F, G. NatureServe G5 (Secure).



Eurybia surculosa (Michaux) Nesom. CREEPING ASTER. **Hab:** Rock outcrops, glades, rocky woodlands. **Dist:** A Southern Appalachian endemic: se. KY and w. VA south to w. NC, e. TN, nw. SC, and n. GA. **Phen:** Late Aug-Oct. **Comm:** Alleged occurrences of *E. surculosa* on the Coastal Plain in se. SC and e. GA are based on misidentifications of *E. compacta*. A tetraploid species (2n=36). **Syn:** = FNA20, K1, K3, K4, Tn, Va, Nesom (1994b); = *Aster surculosus* Michaux – C, F, G, Oh3, RAB, S, SE1, W. NatureServe G4G5 (Apparently Secure).

Euthamia (Nuttall) Cassini 1825 (GOLDENTOP, FLAT-TOPPED GOLDENROD)

Contributed by Alan S. Weakley & Bruce A. Sorrie

A genus of about 12-14 species, perennial herbs, of North America. References: SE1; Haines (2006) in FNA20 (2006b); Johnson (1995); Nesom (2021e); Nesom (2021g); Nesom (2021h); Sieren (1981); Sorrie () (in prep); Szubryt et al (2020); Taylor & Taylor (1983).

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

1 Leaves with dense pustules (slightly raised, elliptical, pale or translucent, blister-like pustules -- use 10× or more magnification); [w. GA, AL, w. TN (Coastal Plain), w. KY (Coastal Plain), s. MO, AR, se. OK, and e. TX southwards to s. MS and s. LA]..... ***Euthamia leptocephala***

1 Leaves without pustules, but with sparse to dense, resin pits (depressed, circular, pale or translucent pits -- use 10× or more magnification); [collectively widespread].

4 Leaf midveins glabrous; stems glabrous; leaves 0.5-5 (-7) mm wide.
..... ***Euthamia caroliniana***

4 Leaf midveins hirsutulous or hirtellous on the lower leaf surface; stems usually sparsely to moderately hirtellous, especially near the nodes and upwards near and in the inflorescence (except glabrous and resinous in *E. gymnospermoides*); leaves 1-6 (-7) mm wide.

10 Leaf surfaces hirtellous (usually across the surfaces as well as on the main veins); [Gulf Coastal Plain, uusually in or near tidewater, Panhandle FL west to w. LA] ..... ***Euthamia scabra***

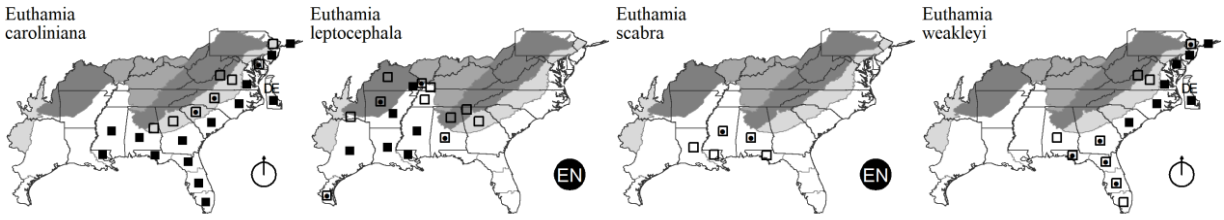
10 Leaf surfaces glabrous, except sometimes hirtellous only on the main veins; [Atlantic Coastal Plain, usually in or near tidewater, from s. NJ (and northwards) south to peninsular FL; Gulf Coast on west side of FL peninsula and FL panhandle west to near the Apalachicola River mouth]..... ***Euthamia weakleyi***

Euthamia caroliniana (Linnaeus) Greene ex Porter & Britton. CAROLINA GOLDENTOP. **Hab:** Pine savannas, moist forests, ditches, pastures, disturbed areas. **Dist:** S. MA south to s. FL and west to se. LA, mainly on the Coastal Plain, extending somewhat into the Piedmont in places (reports from farther north or farther west are based on misidentifications or on broader circumscriptions of the taxon). **Phen:** (Aug) Sep-Dec. **Syn:** = Fl7, Pa, Va, WH3, Johnson (1995), Nesom (2021e), Nesom (2021g), Nesom (2021h); = *Euthamia minor* (Michaux) Greene – S, SE1; = *Euthamia tenuifolia* (Pursh) Nuttall – W; < *Euthamia caroliniana* (Linnaeus) Greene ex Porter & Britton – FNA20, Il, K1, K3, K4, Szubryt et al (2020); > *Euthamia caroliniana* (Linnaeus) Greene ex Porter & Britton – Sorrie () (in prep); > *Euthamia minor* (Michaux) Greene – GW2; < *Euthamia tenuifolia* (Pursh) Nuttall – Sieren (1981); > *Euthamia tenuifolia* (Pursh) Nuttall – Sorrie () (in prep); > *Euthamia tenuifolia* (Pursh) Nuttall var. *microcephala* Nuttall – C; > *Solidago microcephala* (Nuttall) Bush – F, G, RAB; >< *Solidago tenuifolia* Pursh – RAB.

Euthamia leptocephala (Torrey & A. Gray) Greene. NARROWHEAD GOLDENTOP. **Hab:** Fields, pastures, roadsides, prairies, savannas. **Dist:** KY, IL, MO, and OK south to nw. GA (Floyd and Heard counties), AL, and TX. **Phen:** Aug-Oct. **Syn:** = Ar, C, FNA20, GW2, Il, K1, K3, K4, S, SE1, Tn, Tx, Nesom (2021e), Nesom (2021g), Sieren (1981), Sorrie () (in prep), Szubryt et al (2020); = *Solidago leptocephala* Torrey & A. Gray – F, G. NatureServe G5 (Secure).

Euthamia scabra Greene. GULF COAST GOLDENTOP. **Hab:** Estuarine and near-estuarine areas. **Dist:** FL Panhandle west to e. LA. **Tax:** See Szubryt et al. (2020) for additional, detailed information. **Syn:** = Nesom (2021e), Nesom (2021g), Szubryt et al (2020).

Euthamia weakleyi Nesom. **Hab:** Brackish marshes, salt marshes, marsh edges, wet hammocks. **Dist:** S. NJ and DE south to c. peninsular FL, west to s. AL. **Syn:** = Nesom (2021e), Nesom (2021g), Nesom (2021h); = *Euthamia graminifolia* (Linnaeus) Nuttall var. *hirtipes* (Fernald) C.E.S. Taylor & R.J. Taylor – Taylor & Taylor (1983), misapplied; = *Euthamia hirtipes* (Fernald) Sieren – Sieren (1981), misapplied; < *Euthamia* ×*hirtipes* (Fernald) Sieren (pro sp.) – C, misapplied. NatureServe G5TNR (Not Yet Ranked).



Eutrochium Rafinesque 1838 (JOE-PYE-WEED)

A genus of 5 species, perennial herbs, of North America. The separation of *Eutrochium* (*Eupatoriadelphus*) from *Eupatorium* was supported by Schmidt & Schilling (2000). Lamont (2004) made the necessary combinations under the oldest available generic name, *Eutrochium* Rafinesque. The widely used common name for the genus is discussed at detail by Pearce & Pringle (2017), who conclude that it relates to an 18th century native American in Massachusetts, named Joseph Shauquethqueat. References: SE1; Lamont (1995); Lamont (2004); Lamont (2006a) in FNA21 (2006c); Schmidt & Schilling (2000).

4 Stem hollow (with a large central cavity), purple throughout, strongly glaucous when fresh; flowers bright pink-purple; leaves in whorls of (3-) avg. 5 (-7); leaves mostly 3.5-5.5× as long as broad ..... ***Eutrochium fistulosum***

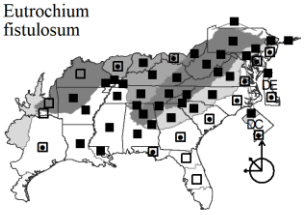
4 Stem solid (rarely with a slender central cavity), dark purple at the nodes or greenish purple throughout, not glaucous or only slightly so when fresh; flowers pale pink-purple; leaves in whorls of (2-) avg. 3-4 (-5); leaves mostly 2-4× as long as broad.
..... ***Eutrochium purpureum var. purpureum***

Eutrochium fistulosum (Barratt) E.E. Lamont. HOLLOW-STEM JOE-PYE-WEED. **Hab:** Moist forests, marshes, fields, ditches. **Dist:** S. ME, NY, s. MI, IL, and MO, south to c. peninsular FL, Panhandle FL, and e. TX. **Phen:** Jul-Oct. **Syn:** = Ar, Fl7, FNA21, Il, K3, K4, Mi, NE, Pa, Tn, Va, Lamont (2004); = *Eupatoriadelphus fistulosus* (Barratt) King & H.E. Robinson – GW2, Schmidt & Schilling (2000); = *Eupatorium fistulosum* Barratt – C, F, G, K1, Mo2, Oh3, RAB, SE1, Tx, W, WH3, WV, Lamont (1995); = *Eupatorium maculatum* – S, misapplied.

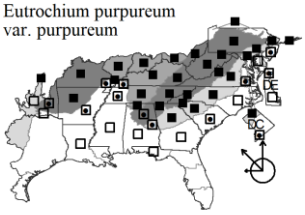
Eutrochium purpureum (Linnaeus) E.E. Lamont *var*. ***purpureum***. PURPLE-NODE JOE-PYE-WEED. **Hab:** Upland, usually mesic forests. **Dist:** NH west to se. MN, IA, and e. NE, south to SC, GA, Panhandle FL, n. LA, and e. OK; var. *holzingeri* (Rydberg) E.E. Lamont, differing in having the lower leaf surface densely and persistently pubescent (vs. glabrous or nearly so) is found in the Midwest (Lamont 1990). **Phen:** Jul-Oct. **Tax:** *Eupatorium purpureum* var. *amoenum* is smaller, more slender, with narrower leaves which are nearly glabrous below; it is probably only a form. **Syn:** = Ar, Il, K4, Va; = *Eupatorium purpureum* Linnaeus var. *purpureum* – Mo2; < *Eupatorium purpureum* – C, F, Fl7, GrPl, Mi, RAB, SE1, W, WH3; > *Eupatorium purpureum* var. *amoenum* (Pursh) Gray – G, WV; < *Eupatorium purpureum* Linnaeus var. *purpureum* – G, K1, WV, Lamont (1995); < *Eupatorium trifoliatum* Linnaeus – S; < *Eutrochium purpureum* – Pa, Tn; < *Eutrochium purpureum* (Linnaeus) E.E. Lamont var. *purpureum* – FNA21, NE, Lamont (2004).

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Eutrochium fistulosum

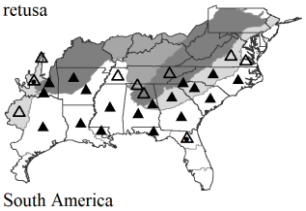


Eutrochium purpureum var. purpureum



Facelis Cassini 1819

Facelis retusa



South America

A genus of 3 species, herbs, of South America. References: Anderberg (1991); Arriagada (1998); SE1; Nesom (2006o) in FNA19 (2006a).

* ***Facelis retusa*** (Lamarck) Schultz 'Bipontinus'. TRAMPWEED. **Hab:** Fields, roadsides, lawns, disturbed areas. **Dist:** Native of s. South America. **Phen:** Apr-Jun. **Syn:** = Fl7, FNA19, K1, K3, K4, NcTx, RAB, SE1, Tx, WH3, Anderberg (1991), Arriagada (1998); ? *Facelis apiculata* Cassini – S. NatureServe GNR (Not Yet Ranked).

Flaveria A.L. de Jussieu 1789

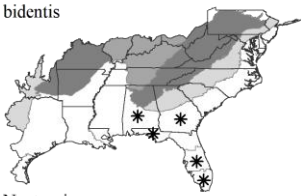
A genus of about 21 species, herbs and subshrubs, subcosmopolitan in tropical and subtropical areas. References: SE1; Yarborough & Powell (2006a) in FNA21 (2006c).

1 Heads borne in axillary glomerules; disc flowers 0-1 (-2) ..... ***Flaveria trinervia***
1 Heads borne in terminal arrays; disc flowers (2-) 3-14.
..... ***Flaveria bidentis***

* ***Flaveria bidentis*** (Linnaeus) Kuntze. **Hab:** Disturbed areas. **Dist:** Native of tropical America. FL Panhandle, s. and wc. FL, s. AL, e. GA. **Phen:** Jul-Oct. **Syn:** = Bah, Fl7, FNA21, K1, K3, K4, S, SE1, WH3. NatureServe GNR (Not Yet Ranked).

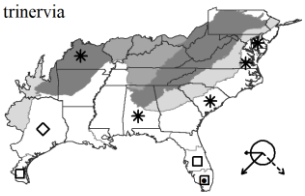
Flaveria trinervia (Sprengel) C. Mohr. CLUSTERED YELLOWTOPS. **Hab:** Marsh edges, disturbed uplands, waste areas around wool-combing mill, ore piles, seaport ballast, only a waif northwards and in some sites in the deep south. **Dist:** Native of sw. United States south into Central America, South America, and the West Indies (Nesom 2004d). Known from ballast at Mobile, AL (Cronquist 1980). **Phen:** (Jan-) Mar-Dec. **Syn:** = Bah, Fl7, FNA21, K1, K3, K4, NE, S, SE1, WH3. NatureServe G5 (Secure).

Flaveria bidentis



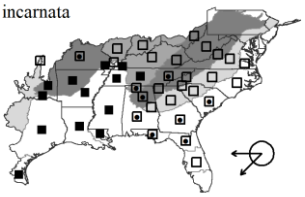
Neotropics

Flaveria trinervia



Fleischmannia Schultz 'Bipontinus' 1850

Fleischmannia incarnata



A genus of about 80 species of s. North America, south through Central America to w. (Andean) South America. References: SE1; Nesom (2006jj) in FNA21 (2006c); Schultz & Schilling (2000); Wooten & Clewell (1971).

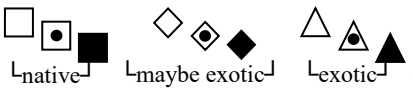
Fleischmannia incarnata (Walter) King & H. Robinson. PINK THOROUGHWORT, PINK EUPATORIUM. **Hab:** Nutrient-rich, moist to dry, forests and woodlands over diabase, limestone, coquina limestone, or other basic rocks, or on rich alluvium. **Dist:** Se. VA west to WV, s. OH, s. IN, s. IL, s. MO, and e. OK, south to w. peninsular FL, Panhandle FL, s. TX, and e. Mexico, the distribution oddly semi-fragmented. **Phen:** Late Aug-Oct. **Tax:** See Wooten & Clewell (1971) for further information about this species. **Syn:** = Ar, Fl7, FNA21, Il, K1, K3, K4, Tn, Va, WH3, Wooten & Clewell (1971); = *Eupatorium incarnatum* Walter – C, F, G, NcTx, Oh3, RAB, S, SE1, Tx, W, WV. NatureServe G5 (Secure).

Gaillardia Fougeroux de Bondaroy 1786 (BLANKET-FLOWER, GAILLARDIA, FIRE-WHEELS)

A genus of about 15-30 species, herbs, of temperate North America and South America. References: SE1; Franck (2020) in Weakley et al (2020); Strother (2006c) in FNA21 (2006c); Turner & Whalen (1975); Turner (1979); Turner et al (2003).

1 Receptacle naked, lacking well-developed setae (if setae present, < 1 mm long).
4 Disk flowers yellow; ray flowers usually present, yellow ..... ***Gaillardia aestivalis var. flavovirens***
4 Disk flowers brown or reddish brown; ray flowers present or absent, when present usually largely red, orange, or purplish

Key to Map Symbology:



* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable

X : extirpated

.....***Gaillardia aestivalis var. aestivalis***

1 Receptacle with well-developed setae 1.5-6 mm long.

7 Leaves fleshy; perennial or annual, strongly branching, the secondary branches spreading and therefore forming compact, rounded "bushes"; [widespread, primarily of coastal dunes and flats, NC south to FL, west to TX]..... ***Gaillardia pulchella var. drummondii***

7 Leaves herbaceous; annual, with secondary branches ascending.

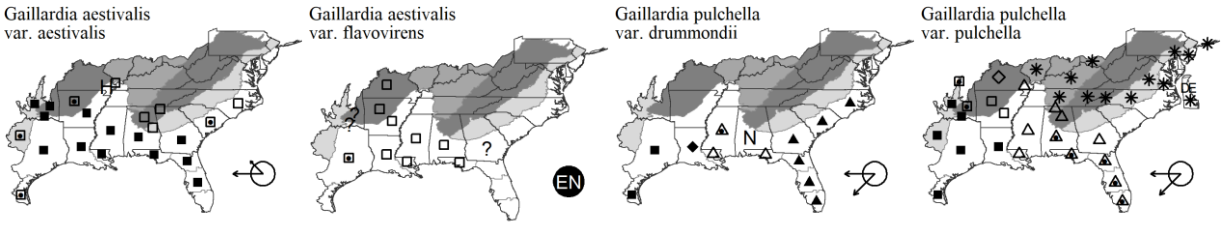
..... ***Gaillardia pulchella var. pulchella***

Gaillardia aestivalis (Walter) H. Rock *var*. ***aestivalis***. SANDHILL GAILLARDIA, PRAIRIE GAILLARDIA. **Hab:** Longleaf pine sandhills, prairies, disturbed sandy soils. **Dist:** Sc. NC south to c. peninsular FL, west to KS and e. and se. TX. **Phen:** Jul-Oct. **Syn:** = NcTx, SE1, Turner (1979); < *Gaillardia aestivalis* – Fl7, FNA21, RAB, WH3, WH3; < *Gaillardia aestivalis* (Walter) H. Rock var. *aestivalis* – GrPl, K1, K3, K4; < *Gaillardia lanceolata* – S; < *Gaillardia lanceolata* Michaux var. *lanceolata* – G.

Gaillardia aestivalis *var*. ***flavovirens***. YELLOW SANDHILL GAILLARDIA, YELLOW PRAIRIE GAILLARDIA. **Hab:** Longleaf pine sandhills, sandy prairies. **Dist:** Panhandle FL west to s. MO and se. TX. **Phen:** Jul-Oct. **Syn:** = Mo2, NcTx, SE1, Turner (1979); = *Gaillardia chrysantha* Small – S; < *Gaillardia aestivalis* – Fl7, FNA21, WH3; < *Gaillardia aestivalis* (Walter) H. Rock var. *aestivalis* – K1, K3, K4.

Gaillardia pulchella Fougeroux de Bondaroy *var*. ***drummondii*** (Hooker) B.L. Turner. BEACH BLANKET-FLOWER. **Hab:** Dunes, sandy flats behind the dunes, roadsides and vacant lots on barrier islands. **Dist:** Ne. NC south to FL, west to TX; Bahamas. Probably native only in TX (Franck 2020). **Phen:** Apr-Dec. **Syn:** = K3, K4, Turner et al (2003); = *Gaillardia picta* Sweet – S; = *Gaillardia pulchella* Fougeroux var. *picta* (Sweet) A. Gray – K1, Turner & Whalen (1975); < *Gaillardia pulchella* – Bah, C, F, Fl7, FNA21, G, GrPl, RAB, SE1, WH3. NatureServe G4G5T3T5 (Apparently Secure).

Gaillardia pulchella Fougeroux de Bondaroy *var*. ***pulchella***. COMMON BLANKET-FLOWER. **Hab:** Prairies, other open habitats, disturbed areas. **Dist:** MO, NE, CO, and AZ south to w. LA, TX, and Mexico; also naturalized eastwards, the pre-settlement distribution obscure. **Phen:** Apr-Sep. **Syn:** = K1, K3, K4, Mo2, NE, Turner & Whalen (1975), Turner et al (2003); = *Gaillardia drummondii* (Hooker) A.P. de Candolle – S, misapplied; < *Gaillardia pulchella* – Ar, C, F, Fl7, FNA21, G, GrPl, Il, Mi, NcTx, RAB, SE1, WH3. NatureServe G4G5T4T5 (Apparently Secure).



Galinsoga Ruiz & Pavón 1794 (PERUVIAN-DAISY, QUICKWEED, GALLANT SOLDIER)

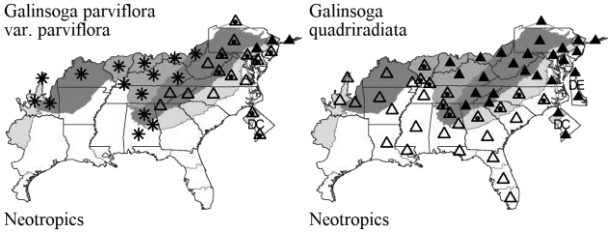
A genus of about 13 species, herbs, of temperate and subtropical Central America and South America. References: Canne-Hilliker (2006) in FNA21 (2006c); SE1; Smith et al (2020).

1 Rays 0-1.5 (-2) mm long, lacking pappus scales (or with vestigial scales); outer phyllaries 2-4, with scarious margins; inner paleae deeply 3-lobed; pappus scales of the disc florets not awn-tipped; stem usually glabrous or sparsely pubescent with appressed (rarely spreading) hairs; gland-tipped hairs of the peduncles < 0.5 mm long; teeth of leaf margin obscure, broadly rounded or reduced to thickened bumps ..... ***Galinsoga parviflora var. parviflora***

1 Rays 2-3 mm long, with pappus scales about as long as the corolla tube; outer phyllaries 1-2, with green herbaceous margins; inner paleae usually entire; pappus scales of the disc florets awn-tipped; stem usually moderately pubescent with long, spreading hairs; gland-tipped hairs of the peduncles > 0.5 mm long; teeth of leaf margins usually well developed, acute..... ***Galinsoga quadriradiata***

* ***Galinsoga parviflora*** Cavanilles *var*. ***parviflora***. LESSER PERUVIAN-DAISY. **Hab:** Disturbed areas, roadsides, barnyards. **Dist:** Native of Central and South America. **Phen:** May-Nov. **Syn:** = FNA21, K3, K4, Pa, Va; < *Galinsoga parviflora* – C, F, G, GrPl, Il, K1, Mi, NE, Oh3, S, SE1, Tn, W, WV. NatureServe G4G5TNR (Not Yet Ranked).

* ***Galinsoga quadriradiata*** Ruiz & Pavón. COMMON PERUVIAN-DAISY, DEVIL'S-DELIGHT, RACEWEED, QUICKWEED, GALLANT SOLDIER. **Hab:** Disturbed areas, roadsides, barnyards. **Dist:** Native of Central and South America. A serious weed, especially in the cooler climates of the Mountains; Small (1933) described it as "a particularly pestiferous weed of such rapid growth and seeding as to make eradication extremely difficult." Fortunately, it does not seem especially prone to invade undisturbed natural areas. **Phen:** May-Nov. **Comm:** "*Galinsoga* is one of the most troublesome weeds of nurseries and landscapes in many parts of the world. It is fast growing and can produce up to 7,500 seeds within only 8 to 9 weeks after germination." (Smith et al. 2020). **Syn:** = Ar, Bah, C, Fl7, FNA21, GrPl, Il, K1, K3, K4, Mi, NE, Oh3, Pa, SE1, Tn, Va, W, WH3; > *Galinsoga bicolorata* St. John & White – F, G; > *Galinsoga caracasana* (A.P. de Candolle) Schultz 'Bipontinus' – F, G; > *Galinsoga ciliata* (Rafinesque) Blake – F, G, RAB, S, WV. NatureServe GNR (Not Yet Ranked).



Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Gamochaeta Weddell 1856 (CUDWEED, EVERLASTING)

A genus of about 61 species, herbs, subcosmopolitan, but primarily native of South America. *Gamochaeta* is more closely related to other genera than it is to *Gnaphalium*. References: Arriagada (1998); SE1; Freire et al (2021); Nesom (1990); Nesom (2004b); Nesom (2004c); Nesom (2006n) in FNA19 (2006a); Nesom (2022b); Pruski & Nesom (2004); Urtubey et al (2016).

1 Leaves concolored or weakly bicolored (abaxial and adaxial faces more or less equally greenish to gray-greenish, indument usually loosely tomentose or arachnose, sometimes subpannose).
  2 Blades of basal and lower cauline leaves 4-16 mm wide; bracts among the inflorescence heads spatulate to oblanceolate, the lowermost (at least) surpassing the heads ..... ***Gamochaeta pensylvanica***
  2 Blades of basal and lower cauline leaves 2-6 (10) mm wide; bracts among the inflorescence heads linear, oblanceolate, or oblong, surpassing the heads or not.
    3 Involucres 2.5-3 mm high, seated in tomentum; capitulescence initially cylindric and uninterrupted, at least distally, the main axis obscured by clustered heads; phyllaries in 3-4 (-5) series, the outer and middle ovate-lanceolate with narrowly to broadly acute apices, the outer ½-2/3 as long as the inner, at least the innermost commonly tinged with purple at the stereome-lamina junction; flowering (Feb-) Mar-May (sometimes later because of moisture or disturbance) ..... ***Gamochaeta antillana***
    3 Involucres 3-3.5 mm high, lightly arachnose only at the base if at all; capitulescence interrupted at least distally, the main axis visible up to the terminal heads; phyllaries in 5-7 series, the outer and middle ovate-triangular with sharply acute-acuminate apices, the outer 1/3-½ as long as the inner, slightly brown, none with purplish color; flowering May-Jul ..... ***Gamochaeta calviceps***
1 Leaves strongly to weakly bicolored with greenish glabrescent upper surfaces; leaves spatulate-obovate to oblanceolate; basal leaves present at flowering.
  4 Basal and proximal cauline leaves usually withering before anthesis (clusters of smaller leaves usually present in cauline axils); stems erect or ascending; plants (30-) 50-85 cm; apices of inner phyllaries acute-acuminate; flowering mostly Jul-Aug ..... ***Gamochaeta simplicicaulis***
  4 Basal and proximal cauline leaves present or not at anthesis; stems erect to decumbent-ascending; plants mostly 10-50 cm; apices of inner phyllaries acute to obtuse, rounded, or blunt; flowering mostly Apr-Jun (-Jul in *G. calviceps*).
    5 Upper leaf surfaces glabrous or glabrate; involucres 2.5-3.0 mm high, more-or-less purplish, the bases glabrous; outer phyllaries elliptic-obovate to broadly ovate-elliptic, apices rounded to obtuse; bisexual florets 2-3 ..... ***Gamochaeta impatiens***
    5 Upper leaf surfaces sparsely arachnose (hairs persistent, evident at 10× magnification); involucres 3.0-4.5 (-5) mm high, sometimes purplish, bases (imbedded in tomentum) often sparsely arachnose on the lower 1/5-1/2; outer phyllaries ovate, ovate-triangular, or ovate-lanceolate, apices acute to acuminate; bisexual florets 2-6.
      6 Stems not pannose (indument whitish, like closely appressed, polished cloth, hairs usually not individually evident); involucres 3.0-3.5(-4.0) mm high; apices of inner phyllaries acute to acute-acuminate; bisexual florets 2-4; cypselas purple ..... ***Gamochaeta chionesthes***
      6 Stems usually ± pannose or pannose-tomentose (hairs individually evident, longitudinally arranged); involucres 3.0-4.5 mm high; apices of inner phyllaries acute, obtuse, or truncate-rounded, sometimes apiculate; bisexual florets 3-6; cypselas tan to brownish.
        7 Blades of cauline leaves oblanceolate to oblanceolate-oblong or oblanceolate-obovate; involucres 3.0-3.5 mm high; laminae of inner phyllaries elliptic-oblong to oblong, apices truncate-rounded or obtuse and apiculate; bisexual florets (3-) 4-6; plants usually fibrous-rooted, rarely taprooted ..... ***Gamochaeta argyrinea***
        7 Blades of cauline leaves oblanceolate to spatulate (basal cells of hairs on adaxial faces persistent, expanded, glassy); involucres 4.0-4.5 mm high; laminae of inner phyllaries triangular, apices acute (not apiculate); bisexual florets 3-4; plants fibrous-rooted or taprooted ..... ***Gamochaeta purpurea***

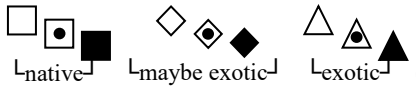
Gamochaeta antillana (Urban) Anderberg. CARIBBEAN EVERLASTING. **Hab:** Pine flatwoods, disturbed areas, fields, lawns. **Dist:** VA south to s. FL, west to AR and TX; Cuba; South America; Europe (introduced); New Zealand (introduced). **Phen:** Mar-Jul. **Syn:** = Ar, Fl7, FNA19, K3, K4, WH3, Nesom (2004b), Nesom (2004c), Urtubey et al (2016); < *Gamochaeta falcata* (Lamarck) Cabrera – K1, Nesom (1990); < *Gnaphalium calviceps* Fernald – F; < *Gnaphalium falcatum* Lamarck – S; < *Gnaphalium purpureum* Linnaeus – W; < *Gnaphalium purpureum* Linnaeus var. *falcatum* (Lamarck) Torrey & A. Gray – C, G, RAB, SE1.

Gamochaeta argyrinea Nesom. SILVERY CUDWEED. **Hab:** Disturbed areas, roadsides, fields, lawns. **Dist:** DE, MD, WV, KY, s. MO, se. KS, south to Panhandle FL and e. TX. **Phen:** Mar-Jul. **Syn:** = Ar, Fl7, FNA19, K3, K4, Tn, Va, WH3, Nesom (2004b), Nesom (2004c), Urtubey et al (2016); < *Gamochaeta purpurea* (Linnaeus) Cabrera – K1, Arriagada (1998), Nesom (1990); < *Gnaphalium purpureum* Linnaeus – F, S, W; < *Gnaphalium purpureum* Linnaeus var. *purpureum* – C, G, RAB, SE1.

Gamochaeta calviceps (Fernald) Cabrera. NARROW-LEAF PURPLE EVERLASTING. **Hab:** Disturbed areas, roadsides. **Dist:** VA south to FL, west to TX; South America, California (introduced); Europe (introduced), New Zealand (introduced). **Phen:** Mar-Jul. **Syn:** = Ar, FNA19, K3, K4, Va, Nesom (2004b), Nesom (2004c); < *Gamochaeta falcata* (Lamarck) Cabrera – K1, NcTx, Tx, Nesom (1990); < *Gnaphalium calviceps* Fernald – F; < *Gnaphalium falcatum* Lamarck – S; < *Gnaphalium purpureum* Linnaeus – W; < *Gnaphalium purpureum* Linnaeus var. *falcatum* (Lamarck) Torrey & A. Gray – C, G, RAB, SE1.

* ***Gamochaeta chionesthes*** Nesom. WHITE-CLOAKED CUDWEED. **Hab:** Roadsides, disturbed areas; apparently introduced from South America. **Phen:** Mar-Jul. **Syn:** = Fl7, FNA19, K3, K4, WH3, Nesom (2004b), Nesom (2004c), Urtubey et al (2016); < *Gamochaeta purpurea* (Linnaeus) Cabrera – K1, Arriagada (1998), Nesom (1990); < *Gnaphalium purpureum* Linnaeus – F, S, W; < *Gnaphalium purpureum* Linnaeus var. *purpureum* – C, G, RAB, SE1.

* ***Gamochaeta impatiens*** Nesom. ELEGANT CUDWEED. **Hab:** Sandy roadsides, disturbed areas. **Dist:** Native of South America. **Phen:** Mar-Jul. **Tax:** Nesom (2022b) demonstrated that what has been previously identified in North America as *G. coarctata* is actually a different species, *G. impatiens*. **Syn:** = Nesom (2022b), in press; < *Gamochaeta americana* (P. Miller) Weddell – K1, Arriagada (1998), Nesom (1990), misapplied; < *Gamochaeta coarctata* (Willdenow) Kerguélen – Fl7, FNA19, K3, K4, Va, WH3, Nesom (2004b), Urtubey et al (2016), misapplied; < *Gnaphalium americanum* P. Miller – Bah, misapplied; < *Gnaphalium purpureum* Linnaeus var. *americanum* (P. Miller) Klatt – RAB, misapplied. NatureServe GNR (Not Yet Ranked).

Key to Map Symbology: 

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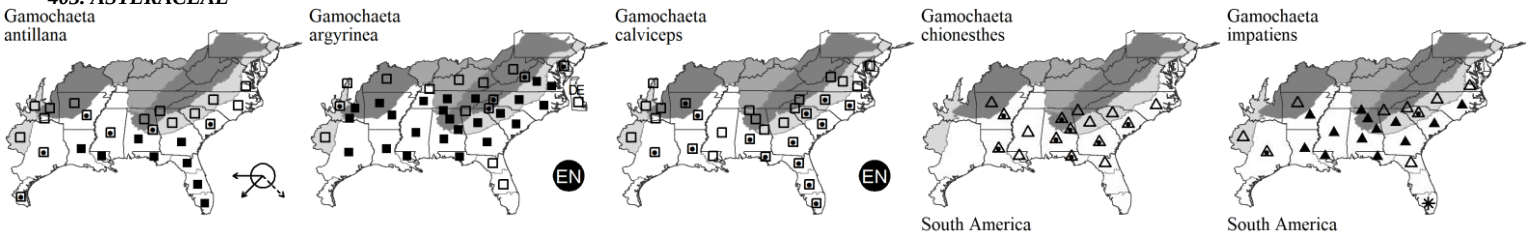
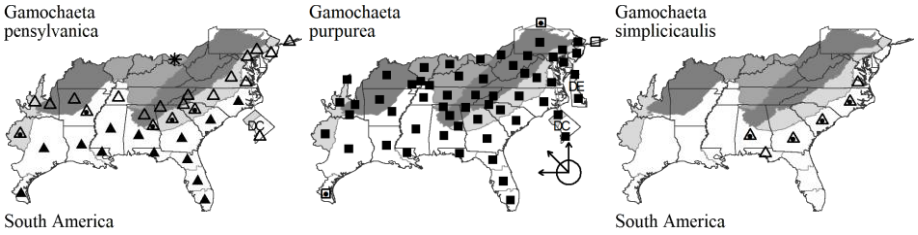


* ***Gamochaeta pensylvanica*** (Willdenow) Cabrera. PENNSYLVANIA EVERLASTING. **Hab:** Fields, roadsides, pastures, disturbed areas. **Dist:** Probably native of South America. PA south to s. FL, west to TX, mostly on the Coastal Plain, and widespread in South America and elsewhere. **Phen:** Mar-Jul. **Syn:** = Fl7, FNA19, K1, K3, K4, NcTx, NE, Tn, Va, WH3, Nesom (1990), Nesom (2004b), Nesom (2004c), Urtubey et al (2016); > *Gnaphalium peregrinum* Fernald – F; < *Gnaphalium purpureum* Linnaeus – Bah, Tx, W; < *Gnaphalium purpureum* Linnaeus var. *purpureum* – C, G, SE1; >< *Gnaphalium purpureum* Linnaeus var. *spathulatum* (Lamarck) Baker – RAB; >< *Gnaphalium spathulatum* Lamarck – S. NatureServe G5 (Secure).

Gamochaeta purpurea (Linnaeus) Cabrera. SPOONLEAF PURPLE EVERLASTING. **Hab:** Prairies, woodlands, fields, roadsides, pastures, disturbed areas. **Dist:** ME west to MI, south to s. FL and e. TX; apparently disjunct in CA and OR, adventive in w. US, Mexico, South America, and elsewhere. **Phen:** Late Mar-Sep. **Syn:** = Fl7, FNA19, GrPl, Il, K3, K4, Mi, NcTx, NE, Tn, Va, WH3, Nesom (2004b), Nesom (2004c), Urtubey et al (2016); = *Gamochaeta purpurea* var. *purpurea* – Pa; < *Gamochaeta purpurea* (Linnaeus) Cabrera – K1, Arriagada (1998), Nesom (1990); < *Gnaphalium purpureum* Linnaeus – F, Oh3, S, Tx, W, WV; < *Gnaphalium purpureum* Linnaeus var. *purpureum* – C, G, RAB, SE1.

* ***Gamochaeta simplicicaulis*** (Willdenow ex Sprengel) Cabrera. SINGLE-STEMMED EVERLASTING. **Hab:** Disturbed areas, roadsides. **Dist:** Apparently native of South America. **Phen:** Late Jun-Aug. **Comm:** See Nesom (1999, 2000d, 2004b) for additional information. **Syn:** = Fl7, FNA19, K4, WH3, Nesom (2004b), Urtubey et al (2016).



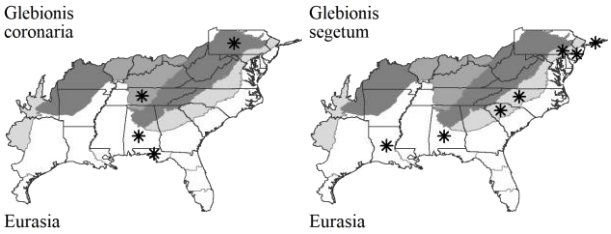
Glebionis Cassini 1826 (CHRYSANTHEMUM)

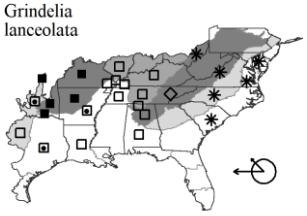
A genus of 2 species, annuals, native of Eurasia and n. Africa. References: Arriagada & Miller (1997); SE1; Strother (2006y) in FNA19 (2006a).

1 Leaf blades 2-3-pinnate; rays pale yellow, 15-25 mm long ..... ***Glebionis coronaria***
1 Leaf blades not lobed or coarsely 1-pinnate; rays golden yellow, 8-20 mm long..... ***Glebionis segetum***

* ***Glebionis coronaria*** (Linnaeus) Cassini ex Spach. GARLAND CHRYSANTHEMUM, CROWN-DAISY. **Hab:** Disturbed areas. **Dist:** Native of Eurasia, cultivated and escapes and occurs as waifs in our area. **Syn:** = Fl7, FNA19, K4, NE, WH3; = *Chrysanthemum coronarium* Linnaeus – K1, K3, Arriagada & Miller (1997). NatureServe GNR (Not Yet Ranked).

* ***Glebionis segetum*** (Linnaeus) Fourreau. CORN MARIGOLD, CORN CHRYSANTHEMUM. **Hab:** Disturbed areas, trash heaps, field edges; commonly cultivated, rarely escaped, persistent, or as a waif. **Dist:** Native of Eurasia. **Phen:** Apr-May. **Syn:** = FNA19, K3, K4, NE; = *Chrysanthemum segetum* Linnaeus – C, F, G, K1, Oh3, RAB, S, SE1. NatureServe GNR (Not Yet Ranked).





Grindelia Willdenow 1807 (GUM-PLANT, TARWEED, ROSINWEED, GUMWEED)

A genus of about 55 species, herbs and shrubs, of w. North America and South America. References: Bartoli & Tortosa (2012); SE1; Nesom (2019d); Strother & Wetter (2006a) in FNA20 (2006b).

1 Pappus in 2 series, the outer of 25-40 barbellate bristles, the inner of 8-15+ setiform awns or subulate scales 7-10 mm long ..... ***Prionopsis ciliata***

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

1 Pappus in 1 series, of 2-3 (-8) setiform awns or subulate scales 2.5-8 mm long.
.....***Grindelia lanceolata***

Grindelia lanceolata Nuttall. NARROW-LEAF GUMWEED. **Hab:** Limestone glades, limestone barrens, also disturbed areas (roadsides, railroad beds, waste areas around wool-combing mills). **Dist:** IL and MO south to TX; disjunct eastward in KY, TN, AL, and MS, and also a rare introduction farther east, such as in MD (Longbottom, Naczi, & Knapp 2016). **Phen:** Jun-Sep. **Syn:** = K4, Nesom (2019d); = *Grindelia lanceolata* Nuttall var. *lanceolata* – C, K1, K3, Bartoli & Tortosa (2012); < *Grindelia lanceolata* Nuttall – Ar, F, FNA20, G, GrPl, Il, NcTx, Oh3, SE1, Tn, Tx. NatureServe G3G5T3T5 (Apparently Secure).

Guizotia Cassini in Cuvier 1829 (NIGER-SEED)

A genus of 6 species, herbs, of Africa. References: Sherff & Alexander (1955); Strother (2006mm) in FNA20 (2006b).

* ***Guizotia abyssinica*** (Linnaeus f.) Cassini. NIGER-SEED, NIGER-THISTLE, RAMTILLA. **Hab:** Disturbed areas. **Dist:** Native of Africa. **Phen:** Jul-Oct. **Tax:** The original spelling is '*abyssinica*'; there is no basis for changing this. **Syn:** = FNA21, K4, Mi, Sherff & Alexander (1955); = *Guizotia abysinica* – C, F, G, K1, K3, orthographic variant. NatureServe GNR (Not Yet Ranked).

Helenium Linnaeus 1753 (SNEEZEWEED, BITTERWEED)

A genus of about 32-40 species, herbs, of America. References: Bierner (1972); Bierner (1989); Bierner (2006b) in FNA21 (2006c); SE1; Fernald (1943); Knox (1987); Knox et al (2016); Rock (1957); Rydberg (1915).

1 Stem leaves very numerous, 0.5-2 (-4) mm wide, not decurrent on the stem or branches; taprooted annuals.
.....***Helenium amarum***
1 Stem leaves few to numerous, at least the larger > 4 mm wide, decurrent on the stems and branches; fibrous-rooted perennials or taprooted annuals/biennials.
3 Ray flowers absent; disc flowers with lobes (at least) brown, red, or purple.....***Helenium flexuosum***
3 Ray flowers present; disc flowers either yellow or with lobes (at least) brown, red, or purple.
4 Ray flowers bearing a pistil and style, fertile.
5 Plants fibrous-rooted perennials; [section *Helenium*].
.....***Helenium autumnale***
5 Plants tap-rooted annuals or biennials; [section *Tetrodus*].
.....***Helenium quadridentatum***
4 Ray flowers lacking a pistil and style, sterile; [section *Leptopoda*].
10 Disc flowers with lobes (at least) brown, red, or purple.
11 Disc flowers predominately 4-lobed and with 4 stamens; heads 5-50 (-80) per plant; pappus scales aristate.....***Helenium flexuosum***
11 Disc flowers 5-lobed and with 5 stamens; heads 1-20 per plant; pappus scales acute.
.....***Helenium brevifolium***
10 Disc flowers with lobes yellow.
14 Midstem leaves barely decurrent on the stem, the decurrency < 0.5 cm; basal leaves often pinnatifid (less commonly merely dentate, repand, or entire), the lower portion of the leaf not contracted so as to be petiolate in form; achene pubescent on the ribs; peduncle pubescent; basal leaves (3.0-) 4.5-8.0 (-19.0) cm long, 0.3-1.1 cm wide, averaging ca. 7-10× as long as wide.....***Helenium pinnatifidum***
14 Midstem leaves decurrent on the stem, the decurrency > 2 cm , and usually extending to the next leaf down; basal leaves usually repand or entire (rarely somewhat lobed or pinnatifid), the lower portion narrowed into a petiolate form which enlarges at its base to more-or-less clasp the stem; achene glabrous, or pubescent on the ribs; peduncle pubescent or glabrous; basal leaves averaging narrower or broader in shape (see below).
15 Peduncle pubescent to tomentose or lanose between the uppermost leaf and the head; achene pubescent on the ribs; heads 1-4 per plant; basal leaves (2.5-) 4.0-10.5 (-18.0) cm long, (0.8-) 1.2-2.0 (-2.5) cm wide, averaging ca. 4-6× as long as wide.....***Helenium brevifolium***
15 Peduncle glabrous or glabrate between the uppermost leaf and the head; achene glabrous; heads 1 per plant; basal leaves (3.0-) 6.5-17.0 (-25.0) cm long, (0.4-) 0.6-1.0 (-1.5) cm wide, averaging ca. 10-15× as long as wide.....***Helenium vernale***

Helenium amarum (Rafinesque) H. Rock. BITTERWEED. **Hab:** Roadsides, overgrazed pastures, urban areas; in much of our area an introduction from farther west. **Dist:** Apparently native to e. and c. TX; now widespread in e. North America. **Phen:** May-Dec. **Tax:** Bierner (1989) discussed the taxonomy of section *Amarum*, consisting only of the two varieties of *H. amarum*. **Comm:** The plant has a very bitter taste and is generally avoided by grazing animals, a point noted by Rafinesque in his original description (in 1817): "the whole plant is odoriferous and intensely bitter, it gives an abominable taste to the milk of the cows that feed on it in summer". Overgrazed areas come to be dominated by *H. amarum*. In areas where it is frequently mowed, *H. amarum* appears to evolve a genotype capable of flowering and fruiting when only a few cm tall. **Syn:** = G, GrPl, Oh3, RAB, Tn, W, Bierner (1972); = *Helenium amarum* (Rafinesque) H. Rock var. *amarum* – Ar, C, FNA21, K1, K3, K4, NcTx, NE, Pa, Va, WH3, Bierner (1989); = *Helenium tenuifolium* Nuttall – F, S; < *Helenium amarum* (Rafinesque) H. Rock – Fl7, Il, Mi, SE1. NatureServe G5T5 (Secure).

Helenium autumnale Linnaeus. COMMON SNEEZEWEED. **Hab:** Moist pastures, forests, woodlands, forest edges. **Dist:** QC west to BC, south to n. peninsular FL, TX, and CA. **Phen:** Aug-Oct. **Tax:** The taxa included here (see synonymy) need additional study. **Comm:** Like *H. amarum*, *H. autumnale* is bitter and unpalatable to grazing animals, becoming more abundant in pastures. **Syn:** = Ar, Fl7, FNA21, GrPl, K3, K4, Mi, NcTx, NE, Oh3, Pa, RAB, Tn, Va, WH3; < *Helenium autumnale* Linnaeus – GW2, W; > *Helenium autumnale* var. *autumnale* – C, F, G, Il, K1, SE1, WV, Fernald (1943); > *Helenium autumnale* Linnaeus) var. *canaliculatum* (Lamarck) Torrey & A. Gray – Fernald (1943); > *Helenium autumnale* var. *parviflorum* (Nuttall) Fernald – F, Il, K1, WV, Fernald (1943); > *Helenium latifolium* P. Miller – S; > *Helenium parviflorum* Nuttall – S.

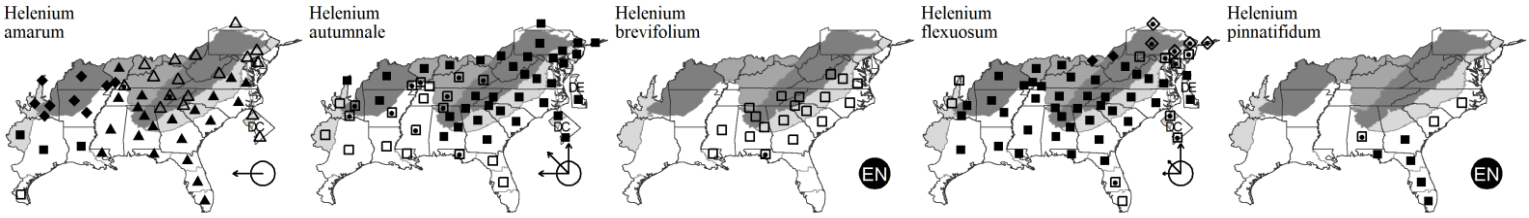
Helenium brevifolium (Nuttall) Alph. Wood. SHORTLEAF SNEEZEWEED. **Hab:** Seepage bogs, river-scoured cobble bars. **Dist:** *H. brevifolium* has a peculiar distribution, reaching its greatest abundance on the Gulf Coastal Plain, from Panhandle FL west to e. LA, and occurring at widely scattered disjunct sites in c. and n. AL, wc. GA, c. and w. NC, ec. TN (Chester, Wofford, & Kral 1997), and sw. and se. VA. **Phen:** May-Jun. **Syn:** = C, Fl7,

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

FNA21, G, GW2, K1, K3, K4, RAB, SE1, Tn, Va, W, WH3, Bierner (1972); > *Helenium brevifolium* (Nuttall) Alph. Wood – F, S; > *Helenium curtisii* A. Gray – F, S. NatureServe G4 (Apparently Secure).

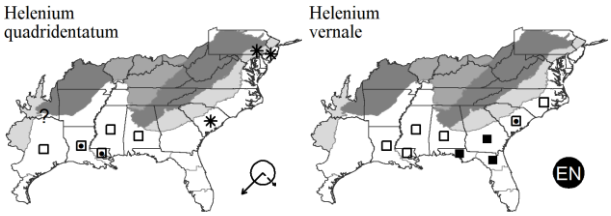
Helenium flexuosum Rafinesque. SOUTHERN SNEEZEWEED. **Hab:** Moist pastures, moist forests, riverbanks, wet pine rocklands (in s. FL). **Dist:** S. ME west to MN, south to c. peninsular FL and TX; disjunct in s. FL. **Phen:** May-Aug. **Tax:** Rayless plants of s. FL likely warrant taxonomic recognition. **Syn:** = C, Fl7, FNA21, G, GrPl, GW2, K1, K3, K4, Mi, NE, Oh3, Pa, RAB, SE1, Tn, Va, W, WH3, WV, Bierner (1972); > *Helenium floridanum* Fernald – Fernald (1943); > *Helenium godfreyi* Fernald – Fernald (1943); > *Helenium nudiflorum* Nuttall – F, S, Fernald (1943); > *Helenium polyphyllum* Small – S. NatureServe G5 (Secure).

Helenium pinnatifidum (Nuttall) Rydberg. SAVANNA SNEEZEWEED. **Hab:** Wet pine savannas and adjacent ditches. **Dist:** A Southeastern Coastal Plain endemic: se. NC south to s. FL, west to Panhandle FL, sw. GA, and s. AL. **Phen:** Apr-May. **Syn:** = Fl7, FNA21, GW2, K1, K3, K4, RAB, SE1, WH3, Bierner (1972); = *Helenium vernale* Walter – S, misapplied.



Helenium quadridentatum Labillardière. **Hab:** Moist soils of pond edges, streambanks, and ditches. **Dist:** AL west to TX, south to MX and Central America; Cuba. The occurrence in SC reported by Rydberg (1915), Small (1933), and Kartesz (1999) is likely an introduction. **Syn:** = FNA21, K1, K3, K4, S, SE1, Bierner (1972). NatureServe G4? (Apparently Secure).

Helenium vernale Walter. **Hab:** Wet pine savannas and adjacent ditches. **Dist:** A Southeastern Coastal Plain endemic: se. NC south to ne. FL, Panhandle FL, and west to e. LA. **Phen:** Apr-May. **Syn:** = FNA21, GW2, K1, K3, K4, RAB, SE1, WH3, Bierner (1972); = *Helenium helenium* (Nuttall) Small – S.



Helianthus Linnaeus 1753 (SUNFLOWER)

A genus of about 50 species, herbs, of North America. References: SE1; Heiser et al (1969); Schilling (2006c) in FNA21 (2006c); Schilling et al (1998).

Key based in part on Schilling (2006c).

Unkeyed taxa: *Helianthus species 1*

1 Leaves basally disposed, the plants scapose to subscapose, the stem leaves relatively few (with 2-8 nodes below the inflorescence), those on the upper stem opposite or alternate, strongly reduced upward in size as compared to the persistent basal leaves; [section *Atrorubentes*] ..... ***Key A***
1 Leaves cauline, plants leafy the length of the stem, the stem leaves many (with 10 or more nodes below the inflorescence), basal leaves lacking (at least at anthesis).
  2 Plant a tap-rooted annual (rarely surviving a second year) ..... ***Key B***
  2 Plant a perennial from crown buds or rhizomes, the roots sometimes tuberous-thickened; [section *Atrorubentes*].
    3 Disk flowers red or purple (at least in part) ..... ***Key C***
    3 Disk flowers yellow ..... ***Key D***

Key A - sunflowers with basally disposed leaves

1 Disk flowers yellow.
  2 Basal leaves 6-15 cm long, 2-8 cm wide; leaves 1.5-5× as long as wide, scabrous or hirsute (rarely glabrous) ..... ***Helianthus occidentalis ssp. occidentalis***
  2 Basal leaves 10-30 cm long, 0.5-2.0 cm wide; leaves 10-20× as long as wide, glabrous. ..... ***Helianthus longifolius***
1 Disk flowers red or purple (at least in part).
  5 Basal leaves 6-20 cm long; lower several pairs of stem leaves up to 1/2 as long and wide as the basal leaves; [collectively widespread in our region from VA, KY, IL, MO, and OK southwards, in the inland provinces and the Coastal Plain].
    6 Trichomes on the leaf abaxial midrib > 1 mm long; lower stem with a few pairs of leaves (< 8 nodes below the capitulescence), these strongly reduced upward; leaf blades (1.3-) 1.7-2.5 (-3)× as long as wide; petiole often > 1/3 as long as the blade, broadly winged toward the blade; plants to 2 m tall; nonflowering stems usually absent; [widespread in our area] ..... ***Helianthus atrorubens***
    6 Trichomes on the leaf abaxial midrib < 1 mm long; lower stem leafy, often to above the middle (> 8 nodes below the capitulescence); leaf blades 1-1.7 (-2)× as long as wide; petiole usually < 1/3 as long as the blade, narrowly winged toward the blade; plants to 3 m tall; nonflowering stems usually present; [west of our area] ..... ***Helianthus silphioides***

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

5 Basal leaves 4-15 cm long; lower several pairs of stem leaves often < 1/2 as long and wide as the basal leaves; [Coastal Plain, NC to FL to e. LA].
7 Basal leaves (1.6-) 2-5× as long as wide; ray flowers present, 12-18, typically 1.5-3.5 cm long; [wet savannas and bogs] ..... ***Helianthus heterophyllus***
7 Basal leaves 1-1.5× as long as wide; ray flowers none, or present, 2-8, but < 1 cm long; [dry savannas and sandhills] ..... ***Helianthus radula***

Key B - annual sunflowers

1 Disk flowers yellow.
2 Leaves ovate, 10-40 cm long, 5-25 cm wide, toothed, the base often cordate or subcordate; disc corollas 5-8 mm long; stems 10-30 dm tall; [section *Helianthus*] .. ***Helianthus annuus***
2 Leaves lanceolate, 5-10 cm long, 0.2-1.0 cm wide, entire or nearly so, the base cuneate; disc corollas 2.8-3.5 mm long; stems 4-10 dm tall; [section *Porteri*] ..... ***Helianthus porteri***
1 Disk flowers red or purple (at least in part).
5 Phyllaries ovate to ovate-oblong, > 4 mm wide; leaves 5-25 cm wide; disk (2-) 3-30 cm wide; plants (0.5-) 1-3 m tall ..... ***Helianthus annuus***
5 Phyllaries lanceolate, 1-4 (-5) mm wide; leaves 1.5-9 cm wide; disk 1-2.5 cm wide; plants 0.4-1.5 m tall.
12 Peduncles 25-50 cm long; leaves usually shallowly but regularly serrate; ligules usually > 2 cm long; blades of the ray flowers (15-) 20-30 mm long ..... ***Helianthus debilis ssp. cucumerifolius***
12 Peduncles usually 10-25 (-30) cm long; leaf usually deeply and irregularly coarsely serrate; ligules usually < 2 cm long; blades of the ray flowers 12-20 (-22) mm long ..... ***Helianthus debilis ssp. tardiflorus***

Key C - perennial sunflowers with leafy stems and red disk flowers

3 Leaf blades long and narrow, linear or lanceolate and usually > 10× as long as wide.
4 Plants < 1.5 m tall; leaves < 1 cm wide; rhizomes lacking or poorly developed ..... ***Helianthus angustifolius***
4 Plants > 1.5 m tall; leaves > 1 cm wide; rhizomes well developed ..... ***Helianthus simulans***
3 Leaf blades shorter and broader, lanceolate, lance-ovate, deltoid, deltoid-ovate and usually < 5× as long as wide.
5 Phyllaries 1.5-3 mm broad, lanceolate ..... ***Helianthus floridanus***
5 Phyllaries 3-5 mm broad, oblong, ovate, or obovate.
6 Abaxial surfaces of leaves and ligules lacking subsessile glandular trichomes; leaves usually broadly ovate to orbicular and with a petiole > 1 cm long ..... ***Helianthus silphioides***
6 Abaxial surfaces of leaves and ligules with subsessile glandular trichomes; leaves usually lanceolate to lance-ovate or rhombic-ovate and with a petiole usually < 1 cm long. ..... ***Helianthus laetiflorus***

Key D - perennial sunflowers with leafy stems and yellow disk flowers

1 Stems below the capitulescence glabrous or nearly so, sometimes glaucous.
2 Leaves whorled at principal nodes, either alternate or opposite at other nodes ..... ***Helianthus verticillatus***
2 Leaves either alternate or opposite (or both), never whorled.
3 Leaves grayish-green or bluish green in color, sessile, and glabrous and glaucous on the undersurface. ..... ***Helianthus eggertii***
3 Leaves light to dark green, sometimes whitish abaxially, but not grayish or bluish green in color; leaves sessile or petiolate, glabrous or pubescent.
5 Leaves linear-lanceolate, with only a single main vein ..... ***Helianthus smithii***
5 Leaves linear-lanceolate to lanceolate, lance-ovate, or ovate, triplinerved at base.
6 Rays few, usually 5 or 8; heads small, the involucres 9 mm broad or less. ..... ***Helianthus microcephalus***
6 Rays usually 10 or more in larger heads; heads larger, the involucres usually > 9 mm broad.
8 Leaves sessile, rounded to cordate at base, and trinerved, with the 2 lateral veins diverging from the midrib at the very base of the leaf ..... ***Helianthus divaricatus***
8 Leaves sessile to petiolate, but narrowing gradually to base and triplinerved, the 2 lateral veins diverging from the midrib above the base of the blade.
9 Anther appendages yellow.
10 Leave blade lanceolate to lance-ovate, sessile to petiolate but the petiole usually < ¼ as long as the blade; phyllaries not conspicuously graduated and imbricate, usually loose and spreading ..... ***Helianthus grosseserratus***
10 Leaf blade ovate to elliptic, with a distinct petiole usually > 2 cm long and ½ as long as blade or longer; phyllaries conspicuously graduated and imbricate, usually appressed, not exceeding disk ..... ***Helianthus occidentalis ssp. occidentalis***
9 Anther appendages dark or reddish-brown.
12 Longer phyllaries usually exceeding disk by ½ their length or more, apex acuminate; larger leaves moderately to conspicuously serrate, with a petiole 2-5 cm long, and abaxially with usually relatively few subsessile glandular trichomes ..... ***Helianthus decapetalus***
12 Phyllaries equal to or slightly exceeding disk, apex acute; leaves moderately serrate to entire, with a petiole 1-3 cm long, and abaxially with usually abundant subsessile glandular trichomes ('resin dots') ..... ***Helianthus strumosus***
1 Stems pubescent throughout, not glaucous.
13 Leaves sessile and cordate, mostly or all opposite ..... ***Helianthus mollis***
13 Leaves petiolate or sessile, but not cordate, and alternate or opposite.
14 Phyllaries attenuate, conspicuously exceeding the disk in length and reflexed, apically with numerous subsessile glandular trichomes ('resin dots'); leaf bases often convex, the basically ovate or lance-ovate blade joined to a broadly winged and gradually narrowed petiole ..... ***Helianthus resinosus***
14 Phyllaries acute to attenuate, but not reflexed, subsessile glandular trichomes present or absent; leaf bases usually attenuate to truncate or rounded, the blade lance-linear or lanceolate, or if ovate or lance-ovate either sessile or with a petiole that is at most narrowly winged.
15 Leaves conduplicate (strongly folded along the midvein, thus V-shaped) and entire, usually with only a single prominent main vein; inflorescence when well developed spiciform or racemose ..... ***Helianthus maximilianii***
15 Leaves not conduplicate, entire or serrate, triplinerved (with a prominent lateral pair of veins near the base); inflorescence not spiciform or racemose.

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

16 Phyllaries conspicuously graduated and imbricate, usually appressed.
17 Leaf blades lanceolate to ovate, petiole 1-5 cm long and usually < ½ as long as blade; anther appendages with dark pigment; cypselas 4-5 mm, usually sterile ..... ***Helianthus laetiflorus***
17 Leaf blades ovate to elliptic, petiole distinct, > 2 cm and usually > ½ as long as the blade; anther appendages yellow; cypselas 3-4 mm long, fertile ..... ***Helianthus occidentalis ssp. occidentalis***
16 Phyllaries not conspicuously graduated and imbricate, usually loose or spreading.
19 Leaves with a prominent petiole > 2 cm long, blades lance-ovate to ovate and > 5 cm broad; cypselas 5-7 mm long; tubers produced late in growing season ..... ***Helianthus tuberosus***
19 Leaves sessile or with a short petiole usually < 2 cm long; blades linear to lanceolate, < 4.5 cm broad; cypselas 3-5 cm long; tubers present or absent.
20 Leaves truncate to broadly rounded at base, shortly but distinctly petiolate ..... ***Helianthus hirsutus***
20 Leaves cuneate, gradually narrowing to base, sessile to petiolate.
21 Ligules lacking subsessile glandular trichomes; leaves not strongly revolute ..... ***Helianthus giganteus***
21 Ligules abaxially with subsessile glandular trichomes ('resin dots'); leaves usually revolute.
23 Leaves conspicuously undulate; ovate to elliptical to lanceolate, occasionally linear (if so, usually < 10 cm long), usually < 5× as long as wide; heads 1-6 per plant; outer phyllaries acute to obtuse ..... ***Helianthus floridanus***
23 Leaves not conspicuously undulate; linear to lanceolate, > 5× as long as broad (and also 8-16 cm long); heads 3-16 per plant; outer phyllaries acuminate to acute.
24 Plants short, < 1.5 m tall; leaves < 1 cm wide; rhizomes lacking or poorly developed ..... ***Helianthus angustifolius***
24 Plants robust, > 1.5 m tall; leaves > 1 cm wide; rhizomes well developed ..... ***Helianthus simulans***

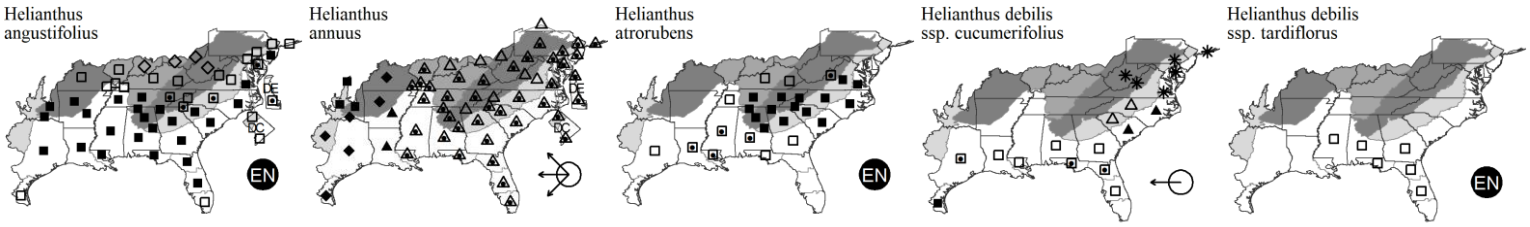
Helianthus angustifolius Linnaeus. NARROWLEAF SUNFLOWER. **Hab:** Pine savannas, ditches, marshes, other wet habitats. **Dist:** Primarily Coastal Plain, from Long Island, NY south to c. peninsular FL and west to TX, irregularly inland to OH, IN, and MO. **Phen:** (Jul-) Sep-Oct (-frost). **Comm:** This plant is very showy when in flower on roadsides, especially in Oct. **Syn:** = Ar, C, Fl7, FNA21, G, GW2, Il, K1, K3, K4, Oh3, Pa, RAB, S, SE1, Tn, Tx, Va, W, WH3, WV; > *Helianthus angustifolius* var. *angustifolius* – F; > *Helianthus angustifolius* var. *planifolius* Fernald – F. NatureServe G5 (Secure).

Helianthus annuus Linnaeus. COMMON SUNFLOWER, MIRASOL. **Hab:** Disturbed areas, often cultivated in gardens, sometimes cultivated in fields. **Dist:** Native of the Plains states. This is the common cultivated sunflower grown for its flowers, seeds, and oil. **Phen:** Jun-Oct. **Syn:** = C, F, Fl7, FNA21, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, Pa, RAB, S, SE1, Tn, Va, W, WH3, WV; > *Helianthus annuus* ssp. *annuus* – Tx; > *Helianthus annuus* ssp. *texanus* Heiser – Tx; > *Helianthus annuus* var. *macrocarpus* (A.P. de Candolle) Cockerell – Oh3.

Helianthus atrorubens Linnaeus. APPALACHIAN SUNFLOWER. **Hab:** Dry soils of rocky, sandy, or clayey woodlands and roadbanks. **Dist:** N. VA west to w. TN, and south to c. GA, Panhandle FL, AL, and se. LA. **Phen:** Late Jul-Oct. **Comm:** Related to the Ozarkian *H. silphioides* Nuttall. **Syn:** = C, Fl7, FNA21, K1, K3, K4, RAB, SE1, Tn, Va, W, WH3; = *Helianthus atrorubens* var. *atrorubens* – G; < *Helianthus atrorubens* Linnaeus – S; > *Helianthus atrorubens* var. *alsodes* Fernald – F; > *Helianthus atrorubens* var. *atrorubens* – F.

Helianthus debilis Nuttall *ssp.* ***cucumerifolius*** (Torrey & A. Gray) Heiser. CUCUMBER-LEAF SUNFLOWER. **Hab:** Sandy soils of fields and roadsides. **Dist:** Native from sw. GA and FL west to c. TX. **Phen:** May-Aug. **Syn:** = FNA21, K1, K3, K4, Mi, NcTx, NE, Tx; = *Helianthus debilis* ssp. *cucumerifolius* (Torrey & A. Gray) Heiser var. *cucumerifolius* (Torrey & A. Gray) A. Gray – SE1; = *Helianthus debilis* var. *cucumerifolius* (Torrey & A. Gray) A. Gray – C, F, RAB, WV; < *Helianthus cucumerifolius* Torrey & A. Gray – G, S; < *Helianthus debilis* Nuttall ssp. *cucumerifolius* (Torrey & A. Gray) Heiser – Fl7, WH3. NatureServe G5T5 (Secure).

Helianthus debilis Nuttall *ssp.* ***tardiflorus*** Heiser. GULF COAST BEACH SUNFLOWER. **Hab:** Sandy beaches, dry pinelands. **Dist:** GA, FL, AL, and MS. **Phen:** Mar-Sep. **Syn:** = FNA21, K1, K3, K4; = *Helianthus debilis* ssp. *cucumerifolius* (Torrey & Gray) Heiser var. *tardiflorus* (Heiser) Cronquist – SE1; < *Helianthus cucumerifolius* Torrey & A. Gray – S; < *Helianthus debilis* Nuttall ssp. *cucumerifolius* (Torrey & A. Gray) Heiser – Fl7, WH3.



Helianthus decapetalus Linnaeus. FOREST SUNFLOWER. **Hab:** Mesic woodlands and forests, oak savannas. **Dist:** ME and QC west to WI and IA, south to GA and MO. **Phen:** Jul-Oct. **Syn:** = C, FNA21, G, Il, K1, K3, K4, Mi, NE, Oh3, Pa, RAB, S, SE1, Tn, Va, W; > *Helianthus decapetalus* Linnaeus – F, WV; > *Helianthus saxicola* Small – S; > *Helianthus trachelifolius* P. Miller – F, WV. NatureServe G5 (Secure).

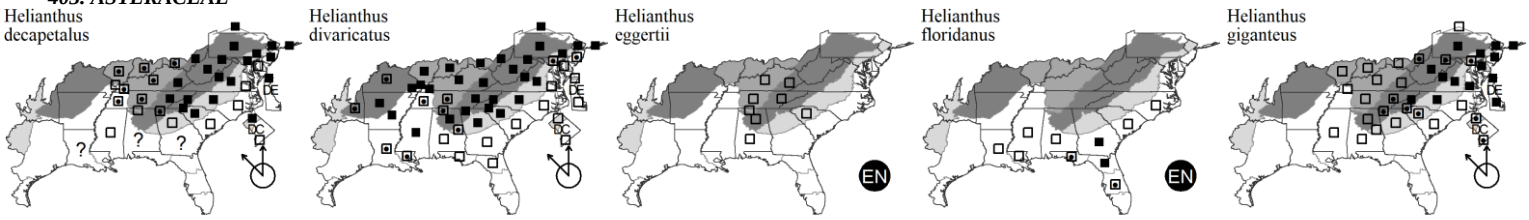
Helianthus divaricatus Linnaeus. WOODLAND SUNFLOWER. **Hab:** Mesic to dry woodlands and forests, forest edges. **Dist:** ME, QC, ON, and IA south to Panhandle FL, LA, and OK. **Phen:** Jun-Aug. **Syn:** = Ar, C, Fl7, FNA21, G, Il, K1, K3, K4, Mi, NE, Oh3, Pa, RAB, S, SE1, Tn, Va, W, WH3, WV; > *Helianthus divaricatus* var. *angustifolius* Kuntze – F; > *Helianthus divaricatus* var. *divaricatus* – F. NatureServe G5 (Secure).

Helianthus eggertii Small. EGGERT'S SUNFLOWER. **Hab:** Limestone and diabase barrens. **Dist:** Sc. KY, c. TN, n. AL, and sc. AL (Coastal Plain); disjunct in nc. SC. **Syn:** = FNA21, K1, K3, K4, S, SE1, Tn. NatureServe G3 (Vulnerable); USESA DL.

Helianthus floridanus A. Gray ex Chapman. FLORIDA SUNFLOWER. **Hab:** Wet pine savannas and pocosin edges. **Dist:** A Southeastern Coastal Plain species: se. NC south to c. peninsular FL, and west to se LA. **Phen:** Sep-Oct. **Syn:** = Fl7, FNA21, GW2, K1, K3, K4, RAB, S, SE1, WH3. NatureServe G3G4 (Vulnerable).

Helianthus giganteus Linnaeus. TUBEROUS SUNFLOWER, SWAMP SUNFLOWER. **Hab:** Bog edges, moist thickets, ditches. **Dist:** NB and ME west to MN, south to n. SC, n. GA, e. and c. TN, c. KY, n. IN, n. IL, and WI. **Phen:** Late Jul-Oct. **Syn:** = C, F, FNA21, G, GW2, Il, K1, K3, K4, Mi, NE, Oh3, Pa, RAB, S, SE1, Tn, Va, W, WV; > *Helianthus alienus* E.E. Watson – S; > *Helianthus giganteus* Linnaeus – S; > *Helianthus validus* E.E. Watson – S. NatureServe G5 (Secure).

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



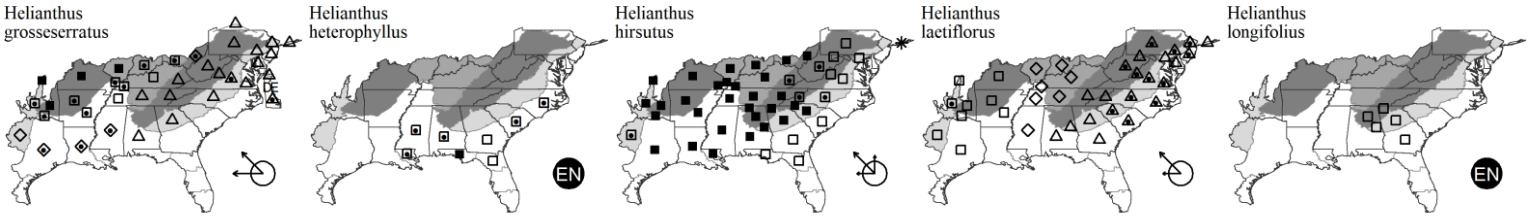
Helianthus grosseserratus M. Martens. SAWTOOTH SUNFLOWER. **Hab:** Prairies, fens, pastures, roadsides, disturbed areas. **Dist:** The original range of this species was apparently centered in OH, IN, IL, IA, and MO, but its exact extent is obscured by its subsequent spread. Reported for NC by Matthews & Mellichamp (1989). **Phen:** Jul-Oct. **Syn:** = Ar, C, F, FNA21, G, GrPl, K1, K3, K4, Mi, NcTx, NE, Oh3, Pa, Tn, Va, W, WV; = *Helianthus grosse-serratus* – S, SE1, Tx, orthographic variant. NatureServe G5 (Secure).

Helianthus heterophyllus Nuttall. SAVANNA SUNFLOWER. **Hab:** Wet pine savannas, seepage bogs. **Dist:** A Southeastern Coastal Plain endemic: se. NC south to Panhandle FL and west to se. LA. **Phen:** Aug-Oct. **Syn:** = Fl7, FNA21, GW2, K1, K3, K4, RAB, S, SE1, WH3. NatureServe G4 (Apparently Secure).

Helianthus hirsutus Rafinesque. HAIRY SUNFLOWER. **Hab:** Woodlands and other sunny or semi-sunny habitats. **Dist:** PA and MN, south to n. FL and TX. **Phen:** Jun-Oct. Jun-Oct. **Syn:** = Ar, C, Fl7, FNA21, G, GrPl, K1, K3, K4, Mi, NcTx, NE, Pa, RAB, S, SE1, Tn, Tx, Va, W, WH3, WV; > *Helianthus hirsutus* var. *hirsutus* – F, Il, Oh3; > *Helianthus hirsutus* var. *stenophyllus* Torrey & Gray – F, Il; > *Helianthus hirsutus* var. *trachyphyllus* Torrey & Gray – F, Il. NatureServe G5 (Secure).

Helianthus laetiflorus Persoon. **Hab:** Disturbed areas; introduced from farther west. **Dist:** Widely scattered in e. and c. North America, believed to be a derivative of the hybrid of *H. pauciflorus* Nuttall ssp. *subrhomboideus* (Rydberg) O. Spring & E. Schilling and *H. tuberosus*. **Phen:** Late Jul-Sep. **Syn:** = G, Pa, RAB, S, SE1, Va, WV; = *Helianthus* ×*laetiflorus* Persoon (pro sp.) – C, FNA21, GrPl, Il, K1, K3, K4, Mi, NE, Oh3, Tn; = *Helianthus laetiflorus* var. *laetiflorus* – F.

Helianthus longifolius Pursh. LONGLEAF SUNFLOWER. **Hab:** Sandstone and granite glades and woodlands, loamy to xeric longleaf pine sandhills. **Dist:** This species is apparently rare, occurring in ne. AL, nw. GA, south to sw. GA. **Phen:** Aug-Oct. **Syn:** = FNA21, K1, K3, K4, S, SE1; >< *Helianthus longifolius* Pursh – RAB, misidentification. NatureServe G3 (Vulnerable).



Helianthus maximilianii Schrader. MAXIMILIAN SUNFLOWER. **Hab:** Moist roadsides and disturbed areas. **Dist:** MI and MB west to BC and south to TX; introduced in the East. **Phen:** Aug-Oct. **Syn:** = GrPl, Il, Oh3, SE1, Tn, W; = *Helianthus maximiliani* – Ar, F, FNA21, G, K1, K3, K4, Mi, NcTx, NE, Pa, RAB, S, Tx, Va, orthographic variant. NatureServe G5 (Secure).

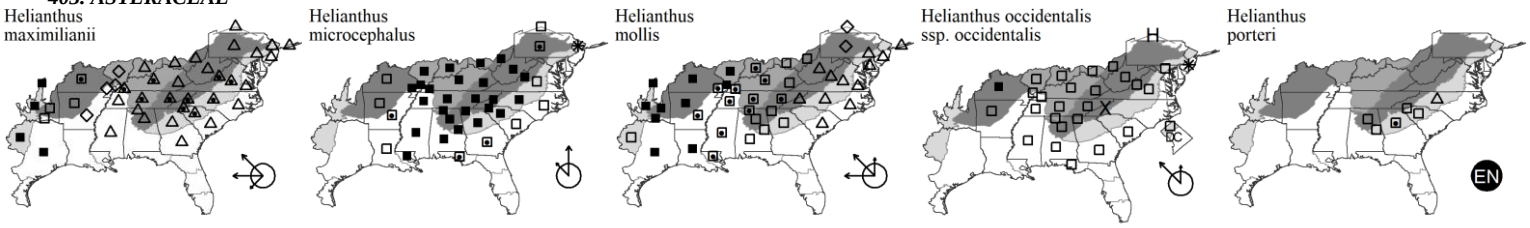
Helianthus microcephalus Torrey & A. Gray. SMALL-HEADED SUNFLOWER, SMALL WOOD SUNFLOWER. **Hab:** Dry woodlands and roadbanks. **Dist:** PA west to MI, south to Panhandle FL and se. LA. **Phen:** Jul-Oct. **Syn:** = Ar, F, Fl7, FNA21, G, Il, K1, K3, K4, Mi, NE, Oh3, Pa, RAB, S, Tn, Va, W, WH3, WV; < *Helianthus microcephalus* Torrey & A. Gray – C, SE1.

Helianthus mollis Lamarck. ASHY SUNFLOWER, GRAY SUNFLOWER. **Hab:** Calcareous prairies and barrens, disturbed places. **Dist:** Apparently native of the Midwest, centered in IN, IL, MO, AR, c. TN, and w. KY, its original distribution obscured by its subsequent spread. Native in nw. GA. **Phen:** Jul-Sep. **Syn:** = C, FNA21, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, Oh3, Pa, RAB, S, SE1, Tn, Tx, Va, W; > *Helianthus mollis* var. *cordatus* S. Watson – F; > *Helianthus mollis* var. *mollis* – F. NatureServe G4G5 (Apparently Secure).

Helianthus occidentalis Riddell *ssp.* ***occidentalis***. NAKED-STEM SUNFLOWER. **Hab:** Rocky or sandy flood-scoured riversides, dry hammocks (in FL). **Dist:** MD and DC west to MN, and south to w. NC, n. GA, Panhandle FL, and TX. **Phen:** Jul-Oct. **Tax:** Ssp. *occidentalis* occupies most of the range of the species. Ssp. *plantagineus* (Torrey & Gray) Shinners occurs in sw. LA, se. TX, and AR. Var. *dowellianus* Torrey & Gray, of uncertain status (if valid, then usually treated as a variety under ssp. *occidentalis*), occurs in the Appalachian portion of the range. **Comm:** The species has been collected only twice in NC, the type collection of *H. dowellianus* M.A. Curtis, from "near Franklin, Macon Co.", and in 1897, near Asheville, Buncombe County ("sandy bottoms along the French Broad River near Biltmore"). GAHP reports *H. occidentalis* as a rare species in the state, from "limestone glades and barrens, rocky or cherty soils" (GAHP 2003); it is uncertain what variety is represented. **Syn:** = Ar, FNA21, K1, K3, K4, NE, Oh3, Va; = *Helianthus occidentalis* – G, Il, Mi, RAB, S, Tn, W, WH3; = *Helianthus occidentalis* var. *occidentalis* – Pa; > *Helianthus dowellianus* M.A. Curtis – WV; < *Helianthus occidentalis* – Tx; > *Helianthus occidentalis* – WV; > *Helianthus occidentalis* Riddell var. *dowellianus* (M.A. Curtis) Torrey & A. Gray – C, F, SE1.

Helianthus porteri (A. Gray) Pruski. CONFEDERATE DAISY. **Hab:** In shallow soils over granite on low-elevation granite domes or flatrocks. **Dist:** A Piedmont endemic: nw. SC south to GA and ec. AL. **Phen:** Aug-Sep. **Comm:** The species has often been treated in *Viguiera*; see Pruski (1998) and Schilling et al. (1998) for discussion of the reasons for treating this species in *Helianthus*. It is well-established at two sites in NC, on Rocky Face Mountain (Alexander County, NC) and Mitchell Mill Flatrock (Wake County, NC), where it was introduced with soil blocks of *Diamorpha smallii* as part of a ecological experiment (Mellinger 1972; McCormick & Platt 1964); it is now aggressively weedy at these sites. **Syn:** = FNA21, K1, K3, K4; = *Viguiera porteri* (A. Gray) Blake – S, SE1. NatureServe G4 (Apparently Secure).

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



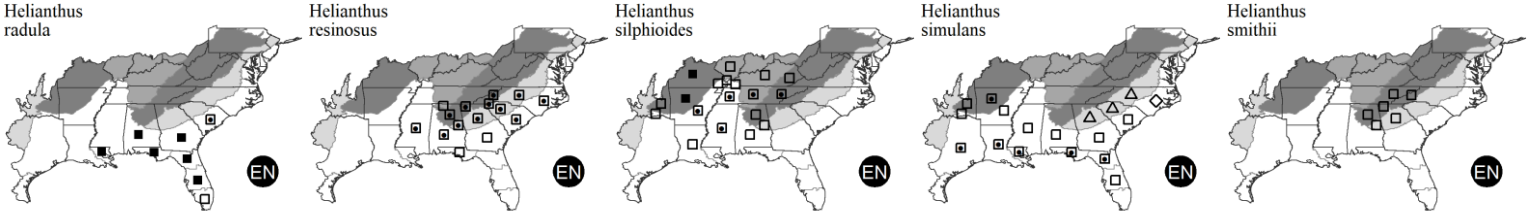
Helianthus radula (Pursh) Torrey & A. Gray. ROUNDLEAF SUNFLOWER, RAYLESS SUNFLOWER. **Hab:** Longleaf pine sandhills and dryish savannas, and dry pine flatwoods. **Dist:** S. SC south to s. peninsular FL and west to se. LA. **Phen:** Late Aug-Oct. **ID Notes:** It is readily distinguishable from all other species of *Helianthus* by its rosette of orbicular to nearly round leaves, borne flat against the ground. **Syn:** = Fl7, FNA21, GW2, K1, K3, K4, RAB, S, SE1, WH3. NatureServe G4G5 (Apparently Secure).

Helianthus resinosus Small. RESINOUS SUNFLOWER. **Hab:** Woodlands, thickets, roadsides. **Dist:** Nc. and w. NC south to Panhandle FL and west to MS. **Phen:** Jun-Oct. **Comm:** Listed for VA by F; documentation unknown. **Syn:** = Fl7, FNA21, K1, K3, K4, S, SE1, W, WH3; = *Helianthus tomentosus* Michaux – F, RAB, S, misapplied. NatureServe G4G5 (Apparently Secure).

Helianthus silphioides Nuttall. **Hab:** Woodland edges. **Dist:** S. KY, s. IL, and s. MO south to AL, MS, LA, and e. OK. **Phen:** Aug-Oct. **Syn:** = Ar, C, F, FNA21, Il, K1, K3, K4, SE1, Tn; = *Helianthus atrorubens* Linnaeus var. *pubescens* Kuntze – G; < *Helianthus atrorubens* Linnaeus – S.

Helianthus simulans E. Watson. MUCK SUNFLOWER. **Hab:** Wet soils, ditches, roadsides. **Dist:** Native from SC south to c. peninsular FL, FL Panhandle, and west to LA and e. TX; now spread more widely by horticultural use. **Phen:** Oct-Nov. **Syn:** = Ar, Fl7, FNA21, GW2, K1, K3, K4, S, SE1, Tx, WH3. NatureServe G4? (Apparently Secure).

Helianthus smithii Heiser. SMITH'S SUNFLOWER. **Hab:** Dry forests and woodlands. **Dist:** Known from n. GA, e. AL, and se. TN. **Phen:** Aug-Sep. **Comm:** It has small heads (like *H. microcephalus*, *H. laevigatus*, *H. schweinitzii*), the leaves narrowly lanceolate and subsessile (like *H. schweinitzii* or *H. laevigatus*), the leaves resin-dotted below (like *H. microcephalus*), but nearly glabrous. It may be a hybrid derivative of *H. microcephalus* and *H. strumosus*. **Syn:** = FNA21, K1, K3, K4, Tn; < *Helianthus microcephalus* Torrey & A. Gray – C, SE1.

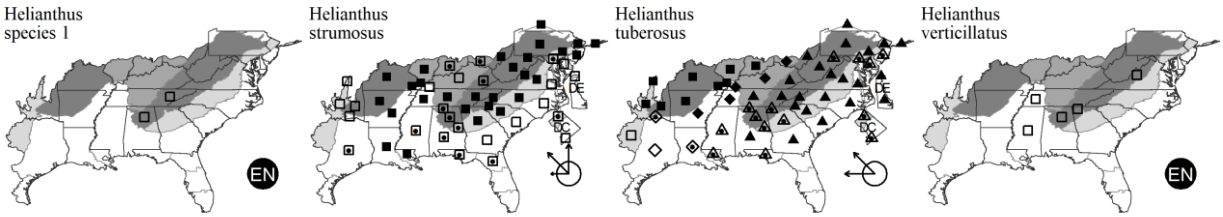


Helianthus species 1. **Hab:** Endemic to the Sequatchie Valley of Marion County, TN, and Jackson County, AL, known from 3 current populations. **Comm:** It is allied to *H. microcephalus* but with pubescence similar to *H. mollis* (D. Estes, pers. comm., 2012). {not yet keyed}.

Helianthus strumosus Linnaeus. ROUGHLEAF SUNFLOWER. **Hab:** Woodlands and roadsides. **Dist:** ME, MN, and KA south to ne. FL, Panhandle FL, and TX. **Phen:** Late Jul-Sep. **Syn:** = Ar, C, F, Fl7, FNA21, G, GrPl, Il, K1, K3, K4, Mi, NE, Oh3, Pa, RAB, SE1, Tn, Va, W, WH3, WV; > *Helianthus montanus* E.E. Watson – S; > *Helianthus saxicolus* – S; > *Helianthus strumosus* Linnaeus – S. NatureServe G5 (Secure).

Helianthus tuberosus Linnaeus. JERUSALEM ARTICHOKE. **Hab:** Native in rich bottomlands and along streams, disturbed areas, cultivated in gardens for the edible tubers. **Dist:** Native distribution is unclear, perhaps OH, MI, MN, ND, and e. MT south to w. TN, LA, and TX. **Phen:** Jul-Oct. **Syn:** = Ar, C, Fl7, FNA21, K1, K3, K4, Mi, NcTx, NE, Oh3, Pa, RAB, S, SE1, Tn, Tx, Va, W, WH3; > *Helianthus tuberosus* Linnaeus var. *subcanescens* A. Gray – GrPl; > *Helianthus tuberosus* var. *tuberosus* – F, G, Il.

Helianthus verticillatus Small. WHORLED SUNFLOWER. **Hab:** Seasonally wet to moist calcareous prairies. **Dist:** Nw. GA, ne. AL, w. TN, and n. MS; disjunct in sw. VA). The species has become a bit popular (niche market) as an ornamental and may be expected to be encountered outside its (admittedly poorly understood) native range. **Phen:** Aug-Oct. **Tax:** This taxon is a species, not a hybrid; its morphological characteristics alone (with its unique whorled leaves) make the hybrid status suggested by Cronquist (1980) ("a hybrid of *H. angustifolius* with either *H. eggertii* or *H. grosseserratus*") implausible. See Matthews et al. (2002) for additional information. Moore, Siniscalchi, & Mandel (2021) analyzed the genetic diversity of the species. **Syn:** = FNA21, K3, K4, S, Tn; = *Helianthus ×verticillatus* E.E. Watson (pro sp.) – C, K1, SE1. NatureServe G1 (Critically Imperiled); USESA E.



Heliopsis Persoon 1807 (SUNFLOWER-EVERLASTING, OXEYE)

A genus of about 18 species, herbs, of America. References: SE1; Fisher (1957); Smith (2006a) in FNA21 (2006c).

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

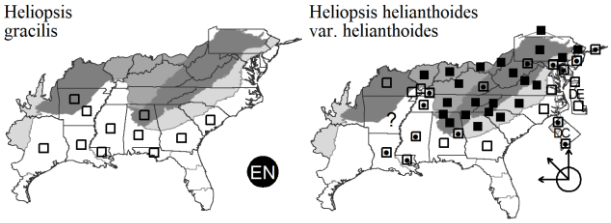
403. ASTERACEAE

1 Plants 3-8 dm tall; larger leaves on a plant generally 3-8 cm long; heads 1 (-3) per plant; rays 6-10 (-13) per head; rays 1-2 (-2.4) cm long; [of the Coastal Plain] ..... ***Heliopsis gracilis***

1 Plants (4-) 8-15 dm tall; larger leaves on a plant generally 7-15 cm long; heads (1-) 3-8 per plant; rays (8-) 10-16 per head; rays (1.5-) 2-4 cm long; [widespread in our area, rare in the Coastal Plain]. ..... ***Heliopsis helianthoides var. helianthoides***

Heliopsis gracilis Nuttall. SMOOTH OXEYE, PINEYWOODS OXEYE, COASTAL PLAIN SUNFLOWER-EVERLASTING, COASTAL PLAIN OXEYE. **Hab:** Moist calcareous forests. **Dist:** A Southeastern Coastal Plain endemic: se. SC (Berkeley, Dorchester, and Charleston counties) south to GA (Jones & Coile 1988) and Panhandle FL, and west to LA (Thomas & Allen 1996) and se. AR. **Phen:** Apr-Jul; May-Jul. **Syn:** = Ar, FNA21, K3, K4, SE1, Tx, Fisher (1957); = *Heliopsis helianthoides* (Linnaeus) Sweet var. *gracilis* (Nuttall) Gandhi & R.D. Thomas – Fl7, K1, WH3; = *Heliopsis minor* (Hooker) C. Mohr – S. NatureServe G5T5? (Secure).

Heliopsis helianthoides (Linnaeus) Sweet *var. **helianthoides***. EASTERN SUNFLOWER-EVERLASTING, EASTERN OXEYE. **Hab:** Bottomland and moist forests, woodlands, woodland borders. **Dist:** VT, ON, and WI south to GA and LA. **Phen:** May-Oct. **Syn:** = C, FNA21, G, Il, K1, K3, K4, Mi, Mo2, NE, Pa, SE1, Va; = *Heliopsis helianthoides* – S, WV; = *Heliopsis helianthoides* ssp. *helianthoides* – Oh3, Fisher (1957); < *Heliopsis helianthoides* – RAB, Tn, W; > *Heliopsis helianthoides* (Linnaeus) Sweet var. *helianthoides* – F; > *Heliopsis helianthoides* var. *solidaginoides* (Linnaeus) Fernald – F.



Heterotheca Cassini 1817 (CAMPHORWEED, GOLDEN-ASTER)

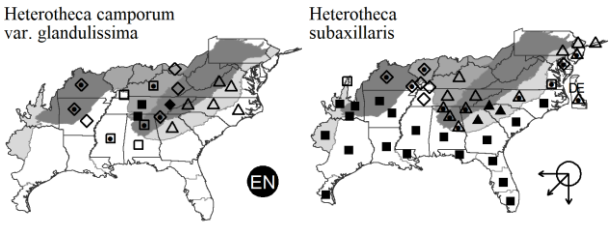
A genus of about 50 species, herbs, of North America. References: SE1; Gandhi & Thomas (1989); Levy (2020); Nesom (2019e); Nesom (2020e); Semple (1983); Semple (1996); Semple (2004); Semple (2006e) in FNA20 (2006b); Wagenknecht (1960).

3 Ray flowers without pappus; annual or biennial, taprooted; upper leaves rounded to clasping at the sessile base, lower leaves (deciduous by late in the season) petiolate; fruits developing from the ray florets 3- or 4-angled, glabrous or slightly strigose ..... ***Heterotheca subaxillaris***

3 Ray flowers with pappus; perennial, from creeping rhizomes; upper and lower leaves cuneate to a sessile base; fruits developing from the ray florets 2-angled (flattened), moderately to densely hairy. ..... ***Heterotheca camporum var. glandulissima***

Heterotheca camporum (Greene) Shinners *var. **glandulissima*** Semple. NASHVILLE CAMPHORWEED, LEMON-YELLOW GOLDENASTER. **Hab:** Roadsides, disturbed areas, shale roadsides, outcrops, and quarries. **Dist:** Native range is postulated to be KY through c. TN to n. AL; now more widespread. **Phen:** Jul-Oct. **Comm:** See discussion in Levy (2020) about distribution and habitats. **Syn:** = Ar, FNA20, Mi, Tn, Va; = *Chrysopsis camporum* Greene var. *glandulissima* (Semple) Cronquist – C; = *Heterotheca camporum* var. *glandulissimum* – K1, K3, K4, Semple (1996), orthographic error; < *Chrysopsis camporum* – F, Il, SE1, W; < *Chrysopsis villosa* (Pursh) Nuttall var. *camporum* (Greene) Cronquist – G; < *Heterotheca camporum* – Oh3. NatureServe G5TNR (Not Yet Ranked).

Heterotheca subaxillaris (Lamarck) Britton & Rusby. CAMPHORWEED. **Hab:** Coastal dunes and sand-flats, roadsides, disturbed areas. **Dist:** NJ, PA, IN, IL, SD, UT and CA south to FL, TX, and Mexico. **Phen:** Jul-Oct (-Jan). **Syn:** = C, F, Fl7, G, K1, K4, NcTx, Pa, RAB, S, SE1, WH3, Nesom (2019e); > *Heterotheca latifolia* var. *arkansana* Wagenknecht – Tx; > *Heterotheca latifolia* Buckley var. *latifolia* – Tx, Semple (1996), Wagenknecht (1960); > *Heterotheca latifolia* Buckley var. *macgregoris* Wagenknecht – GrPl; > *Heterotheca subaxillaris* (Lamarck) Britton & Rusby – Va, Semple (1996); > *Heterotheca subaxillaris* (Lamarck) Britton & Rusby ssp. *latifolia* (Buckley) Semple – Ar, FNA20, K3, Tn, Semple (2004); > *Heterotheca subaxillaris* ssp. *subaxillaris* – FNA20, K3, Semple (2004); > *Heterotheca subaxillaris* (Lamarck) Britton & Rusby var. *latifolia* (Buckley) Gandhi & R.D. Thomas – NE, Gandhi & Thomas (1989); > *Heterotheca subaxillaris* var. *procumbens* Wagenknecht – Tx; > *Heterotheca subaxillaris* (Lamarck) Britton & Rusby var. *subaxillaris* – Tx, Gandhi & Thomas (1989), Wagenknecht (1960).



Hieracium Linnaeus 1753 (HAWKWEED, KING-DEVIL)

A genus of 250-1000 species, herbs, primarily temperate. *Hieracium* is a complicated genus, with many apomictic races sometimes recognized as taxa. Often separated into *Hieracium* and *Pilosella*, an approach increasingly supported by molecular and morphological evidence, and has become the dominant approach in Europe and worldwide (Funk et al. 2009; Kilian, Gemeinholzer, & Lack 2009; Bräutigam & Greuter 2007). References: Bräutigam & Greuter (2007); SE1; Kilian, Gemeinholzer, & Lack (2009); Strother (2006t) in FNA19 (2006a).

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

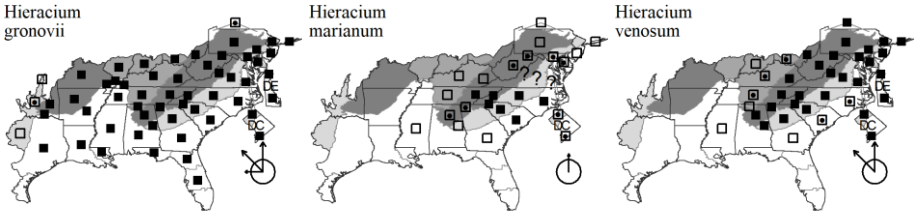
Identification Notes: Many of our species hybridize, and some of the species listed above are apparently hybrid derivatives. I prefer to treat taxa such as *H. marianum* as species (even if hybridization-derived) because they regularly occur independently of the parental taxa. Other hybrids of native species known in our area include: *H. gronovii* × *paniculatum* [*H.* ×*alleghaniense* Britton (pro sp.)], *H. gronovii* × *venosum, H. paniculatum* × *scabrum, H. paniculatum* × *venosum* [*H.* ×*scribneri* Small (pro sp.); *H. scribneri* – K1], *H. scabrum* × *venosum.*

6 Leaves purple-veined (when fresh).
7 Lower stem strongly pilose; leaves weakly purple-veined ..... ***Hieracium marianum***
7 Lower stem glabrous or nearly so; leaves strongly purple-veined ..... ***Hieracium venosum***
6 Leaves not purple-veined.
8 Inflorescence a narrow to broad panicle.
..... ***Hieracium gronovii***
8 Inflorescence corymbiform.
14 Stem with several well-developed leaves slightly smaller than the basal leaves; inflorescence corymbiform or tending toward paniculate.
..... ***Hieracium gronovii***
14 Stem leafless, or with only a few leaves distinctly smaller than the basal leaves; inflorescence strongly corymbiform.
..... ***Hieracium marianum***

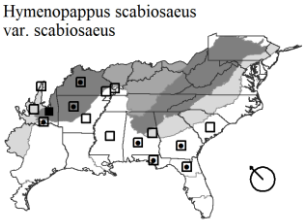
Hieracium gronovii Linnaeus. BEAKED HAWKWEED, QUEENDEVIL. **Hab:** Longleaf pine sandhills, dry forests and woodlands, woodland margins, roadsides. **Dist:** MA west to s. ON and KS, south to c. peninsular FL and TX. **Phen:** Jul-Nov. **Syn:** = Ar, C, F, Fl7, FNA19, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, Oh3, Pa, RAB, S, SE1, Tn, Va, W, WH3, WV. NatureServe G5 (Secure).

Hieracium marianum Willdenow. MARYLAND HAWKWEED. **Hab:** Dry forests, woodland margins, roadsides. **Dist:** NH west to OH, south to FL and MS. **Phen:** May-Nov. **Comm:** Considered to derive from hybridization between *H. gronovii* Linnaeus and *H. venosum* Linnaeus. There is apparently no definite report from VA. **Syn:** = F, K1, K3, K4, S, WV; = *Hieracium* ×*marianum* Willdenow (pro sp.) – C, NE, RAB, SE1. NatureServe G5? (Secure).

Hieracium venosum Linnaeus. VEINY HAWKWEED, RATTLESNAKE WEED. **Hab:** Dry forests, woodland margins, roadsides. **Dist:** NY west to MI, south to GA, AL, and MS. **Phen:** Apr-Sep. **Syn:** = C, FNA19, G, K3, K4, Mi, NE, Oh3, Pa, RAB, S, SE1, Tn, Va, W, WV; > *Hieracium venosum* var. *nudicaule* (Michaux) Farwell – F, K1; > *Hieracium venosum* var. *venosum* – F, K1.

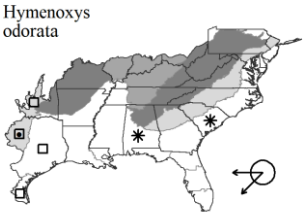


Hymenopappus L'Héritier 1788 (WOOLLY-WHITE)



A genus of about 11-14 species, herbs, of s. North America. References: SE1; Strother (2006eee) in FNA21 (2006c); Turner (1956); Turner (2015).

Hymenopappus scabiosaeus L'Héritier *var*. ***scabiosaeus***. OLD PLAINSMAN, SOUTHEASTERN WOOLLYWHITE. **Hab:** Longleaf pine sandhills and adjacent sandy fields, other open dry areas. **Dist:** Sc. SC south to n. peninsular FL, west to AR, MO, and OK, and north in the interior to n. IN, c. and s. IL, and se. MO. **Phen:** Apr-Jun. **Syn:** = Ar, C, FNA21, K1, K3, K4, SE1, Turner (1956); < *Hymenopappus scabiosaeus* – F, Fl7, G, Il, RAB, S, WH3. NatureServe G4G5T4T5 (Apparently Secure).



Hymenoxys Cassini 1825

A genus of about 25 species, annual (ours), biennial, and perennial herbs, of w. North America, south through Central America to South America. References: Bierner (2006c) in FNA21 (2006c); Mink, Singhurst, & Holmes (2012c).

Hymenoxys odorata A.P. de Candolle. WESTERN BITTERWEED, BITTER RUBBERWEED. **Hab:** Disturbed areas, especially where overgrazed; eastwards as a waif in waste areas around wool-combing mills (Nesom 2004d), on ballast, and in other disturbed ground. **Dist:** KS, CO, AZ, and s. CA south into Mexico. **Phen:** Apr-Jun. **Syn:** = FNA21, GrPl, K1, K3, K4, NcTx, NE, Tx.

Hypochaeris Linnaeus 1753 (CAT'S-EAR)

A genus of about 60 species, herbs, of South America, Europe, Asia, and n. Africa. The controversial spelling of the genus name is now resolved in favor of *Hypochaeris*. References: Bogler (2006e) in FNA19 (2006a); SE1.

1 Stem with at least a few well-developed leaves, clasping and similar to the basal; pappus of one length, all long and plumose.
2 Flowers yellow; middle and outer phyllaries hispid; heads usually 5-8 mm across at anthesis, the involucre campanulate ..... ***Hypochaeris chillensis***
2 Flowers white; middle and outer phyllaries glabrous or puberulent; heads usually 2-4 mm wide at anthesis, the involucre cylindric .....
..... ***Hypochaeris microcephala var. albiflora***

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

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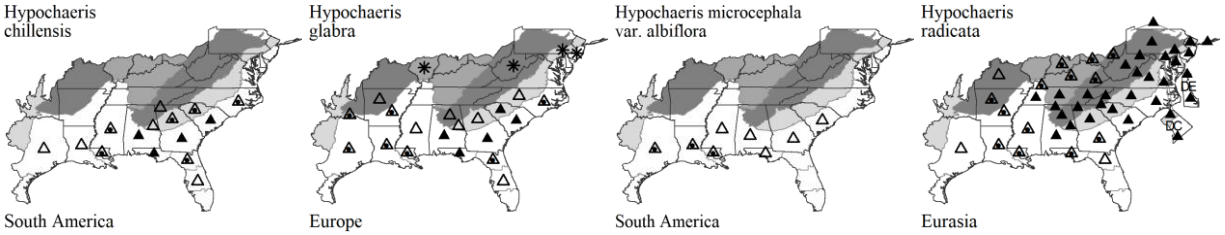
1 Stem naked, or only with few and very small bracts; pappus of two lengths, the outer short and barbellate, the inner long and plumose.
3 Plants glabrous or apparently so; plants mostly annual ..... ***Hypochaeris glabra***
3 Plants conspicuously pubescent, as on the hispid leaves; plants mostly perennial ..... ***Hypochaeris radicata***

* ***Hypochaeris chillensis*** (Kunth) Britton. BRAZILIAN CAT'S-EAR. **Hab:** Roadsides, fields, other disturbed places. **Dist:** Native of South America. More common in the NC Coastal Plain than shown in RAB (common in Duplin, Sampson, and Wayne cos.) (A.J. Bullard, pers. comm., 2003). **Phen:** Late Apr-Jul. **Syn:** = Fl7, FNA19, K3, K4, WH3; ? *Hypochaeris brasiliensis* (Less.) Grisebach var. *tweediei* (Hooker & Arnott) Baker – K1, SE1; ? *Hypochoeris elata* (Weddell) Grisebach – RAB, misapplied.

* ***Hypochaeris glabra*** Linnaeus. SMOOTH CAT'S-EAR. **Hab:** Roadsides, fields, disturbed areas. **Dist:** Native of Europe. **Phen:** Late Mar-Jul. **Syn:** = Ar, Fl7, FNA19, Il, K1, K3, K4, NcTx, NE, S, WH3; = *Hypochoeris glabra* – C, RAB, SE1, WV, orthographic variant. NatureServe GNR (Not Yet Ranked).

* ***Hypochaeris microcephala*** (Schultz 'Bipontinus') Cabrera *var.* ***albiflora*** (Kuntze) Cabrera. WHITE-FLOWERED CAT'S-EAR. **Hab:** Disturbed areas. **Dist:** Native of South America. This species has been found as a naturalized introduction at Fort Pulaski (Chatham County, GA) (T. Govus, pers. comm., 2006), in Camden County, GA (Carter, Baker, & Morris 2009), and in Beaufort, Charleston, and Jasper counties , SC (Bradley et al. [in prep.]. **Syn:** = Fl7, FNA19, K1, K3, K4, SE1. NatureServe GNRTNR (Not Yet Ranked).

* ***Hypochaeris radicata*** Linnaeus. SPOTTED CAT'S-EAR. **Hab:** Roadsides, fields, disturbed areas. **Dist:** Native of Eurasia. **Phen:** Apr-Oct. **Syn:** = Ar, Fl7, FNA19, G, Il, K1, K3, K4, Mi, NE, Oh3, Pa, S, Tn, Va, WH3; = *Hypochoeris radicata* – C, F, RAB, SE1, WV, orthographic variant. NatureServe GNR (Not Yet Ranked).



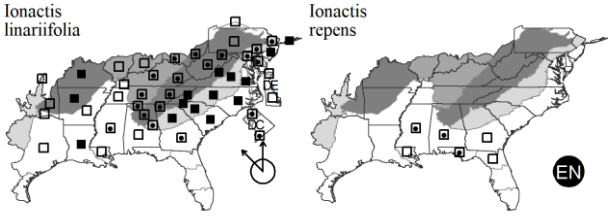
Ionactis Greene 1897 (STIFF-LEAVED ASTER)

A genus of 5 species, herbs, of North America. *Ionactis* has usually been included in *Aster*, but differs in many characters and is more closely related to *Heterotheca* (Nesom & Leary 1992). References: SE1; Nesom & Leary (1992); Nesom (2006s) in FNA20 (2006b); Nesom (2020h).

1 Rhizomes absent, stems cespitose, arising from a compact, woody, fibrous-rooted crown; heads relatively crowded, on short, distal branches); [widespread in our region] ..... ***Ionactis linariifolia***
1 Rhizomes branching, creeping and scale-leaved, evidently colonial; heads solitary on long, bracteate peduncle-like branches arising from midstem or slightly above; [ne. FL west to e. LA, largely limited to the East Gulf Coastal Plain] ..... ***Ionactis repens***

Ionactis linariifolia (Linnaeus) Greene. STIFF-LEAVED ASTER. **Hab:** Dry pine savannas, longleaf pine sandhills, pine flatwoods, prairie-like openings, glades, and barrens, high elevation rock outcrops and glades, to at least 1450 m, dry roadbanks, woodland edges, rocky woodlands. **Dist:** ME and QC west to WI, south to ne. FL, Panhandle FL, and TX. **Phen:** Jul-Nov. **Tax:** There appears to be substantial variation in *I. linariifolia*, with montane (and northern) populations having considerably longer and broader leaves than Coastal Plain (and southern) populations; additional study is needed. Nesom (2020h) described a new species, *I. repens*, from the Gulf Coastal Plain, but substantial variation remains taxonomically unaccounted for, including plants in xeric longleaf pine sandhills of the Carolinas that have narrow leaves, one or a few heads on long 'peduncles', but lack the creeping rhizomes of *I. repens*. **Syn:** = Nesom (2020h); < *Aster linariifolius* Linnaeus – C, G, GrPl, Oh3, RAB, SE1, W, WV; < *Ionactis linariifolia* (Linnaeus) Greene – Ar, Fl7, FNA20, K3, K4, NE, Tn, Tx, Va, WH3, Nesom & Leary (1992); < *Ionactis linariifolius* (Linnaeus) Greene – Il, Pa, S, orthographic variant.

Ionactis repens Nesom. CREEPING STIFF-LEAVED ASTER. **Hab:** Longleaf pine sandhills and dry pine flatwoods. **Dist:** Gulf Coastal Plain, FL Panhandle to e. LA; outliers in ne. FL. **Phen:** Oct-Nov. **Tax:** See Nesom (2020h) for detailed information. **Syn:** = Nesom (2020h); < *Ionactis linariifolia* (Linnaeus) Greene – Fl7, FNA20, SE1, WH3, Nesom & Leary (1992); < *Ionactis linariifolius* (Linnaeus) Greene – S.



Iva Linnaeus 1753 (MARSH-ELDER)

A genus of about 9 species, shrubs and herbs, of North America and the West Indies, as circumscribed more narrowly by recent authors. References: SE1; Jackson (1960); Strother (2006gg) in FNA20 (2006b); Turner (2009a).

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

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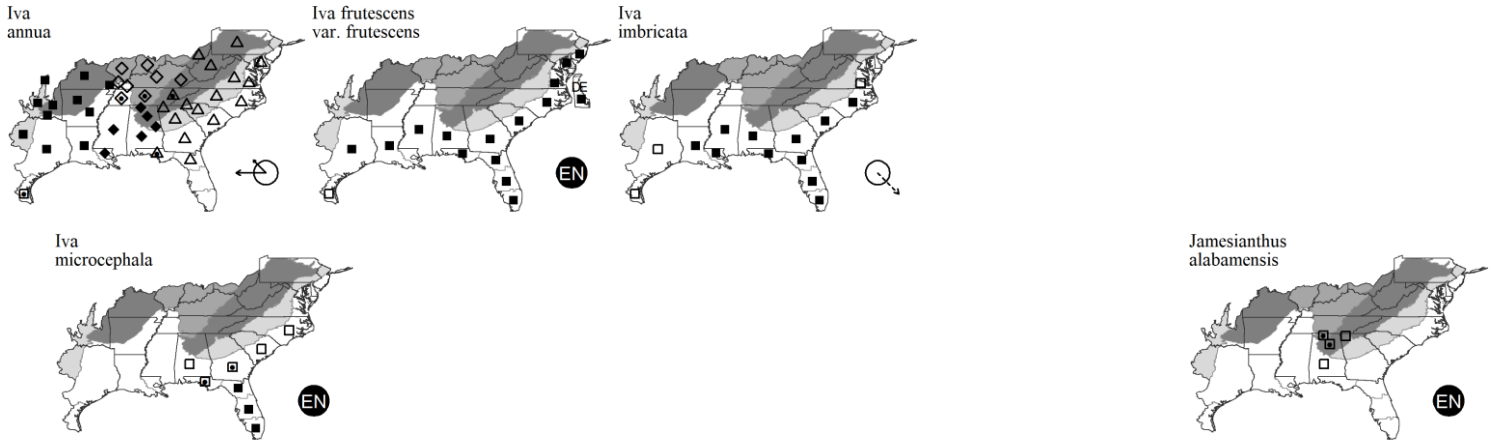
1 Plants perennial, fleshy, glabrous (or strigillose on the leaf faces); [mostly of maritime situations, such as brackish marshes, marsh edges, or ocean dunes]; [section *Iva*].
  3 Leaves 1.5-4.5 (-6.0) cm long, 0.4-1.0 (-1.5) cm wide, 1-3 mm thick when fresh, mostly untoothed; involucres 4-7 mm high; leaves alternate from midstem upward; [mostly of dunes and the upper beach] ..... ***Iva imbricata***
  3 Leaves 4-10 cm long, 0.7-4.0 cm wide, 0.5-1 mm thick when fresh, usually toothed; involucres 2-4 mm high; leaves opposite (alternate above or in the inflorescence); [mostly of marshes, marsh edges, and wet hammocks].
  ..... ***Iva frutescens var. frutescens***
1 Plants annual (perennial in *I. asperifolia*) , not fleshy, more-or-less pubescent (at least in the inflorescence); [of mainly inland wetlands or disturbed areas].
  5 Leaves 20-70 mm wide, ovate; staminate flowers usually 8-16 (-20) per head; [mostly of disturbed ground]; [section *Iva*] ..... ***Iva annua***
  5 Leaves 0.5-8 mm wide, linear; staminate flowers 1-9 per head; [section *Linearbractea*].
  ..... ***Iva microcephala***

Iva annua Linnaeus. SUMPWEED, ROUGH MARSH-ELDER. **Hab:** Fields, especially bottomlands, disturbed places; in the eastern and inland part of area probably introduced (by native Americans) from farther west. **Dist:** PA, ND, and CO south to FL, NM, and Mexico (the original distribution uncertain). Reported for MD (Longbottom, Naczi, & Knapp 2016). **Phen:** Aug-Nov. **Tax:** The so-called var. *macrocarpa* (Blake) R.C. Jackson, known only from archeological remains and presumed extinct, is almost certainly a cultivated form, selected for its large seeds. **Comm:** This species was apparently an important crop of native Americans. **Syn:** = C, Fl7, FNA21, GrPl, GW2, Il, K3, K4, Mi, NcTx, NE, Oh3, Pa, RAB, SE1, Tn, Tx, Va, W, WH3; = *Iva ciliata* Willdenow – F; > *Iva annua* var. *annua* – K1, Jackson (1960); > *Iva annua* var. *caudata* (Small) R.C. Jackson – K1, Jackson (1960); > *Iva annua* var. *macrocarpa* (Blake) R.C. Jackson – K1, Jackson (1960); > *Iva caudata* Small – S; > *Iva ciliata* Willdenow – S; > *Iva ciliata* Willdenow var. *ciliata* – G; > *Iva ciliata* var. *macrocarpa* Blake – G.

Iva frutescens Linnaeus *var*. ***frutescens***. SOUTHERN MARITIME MARSH-ELDER. **Hab:** Brackish marshes and marsh edges, normally on the back side of barrier islands. **Dist:** NJ south to s. FL, west to e. and se. TX. **Phen:** Late Aug-Nov. **Tax:** See *I. frutescens* var. *oraria* for discussion of the two taxa. **Syn:** = C, F, G, SE1, Tx; = *Iva frutescens* ssp. *frutescens* – GW2, Jackson (1960); < *Iva frutescens* – Fl7, FNA21, K3, K4, Pa, RAB, S, Va, WH3. NatureServe G5T4T5 (Apparently Secure).

Iva imbricata Walter. DUNE MARSH-ELDER. **Hab:** Dunes, upper beach, island-end flats. **Dist:** Se. VA south to s. FL, west to LA and coastal TX; Bahamas; Cuba. **Phen:** Late Aug-Nov. **Comm:** This plant is often the most oceanward perennial plant, often the first perennial to colonize the upper beach or incipient dunes on island-end flats, where it occurs with such upper beach annuals as *Euphorbia polygonifolia*, *Euphorbia bombensis*, *Cakile edentula*, and *Amaranthus pumilus*. **Syn:** = Bah, C, F, Fl7, FNA21, G, K3, K4, RAB, S, SE1, Tx, Va, WH3, Jackson (1960). NatureServe G5? (Secure).

Iva microcephala Nuttall. SMALL-HEADED MARSH-ELDER. **Hab:** Wet pine flatwoods, flatwood ponds, clay-based Carolina bays, Florida wet prairies, marshes. **Dist:** Sc. NC south to s. FL, west to se. AL. **Phen:** Sep-Oct. **Comm:** A seed-banking annual, locally abundant some years and absent in others, depending on the variable hydrologic conditions of Carolina bays and other seasonally flooded wetlands. **Syn:** = Fl7, FNA21, GW2, K3, K4, RAB, S, SE1, WH3, Jackson (1960). NatureServe G5 (Secure).



Jamesianthus Blake & Sherff 1940 (WARBONNET)

A monotypic genus, a perennial herb, endemic to c. AL and wc. GA. References: SE1; Strother (2006fff) in FNA21 (2006c).

Jamesianthus alabamensis Blake & Sherff. ALABAMA WARBONNET. **Hab:** Streambanks over limestone or other calcareous rocks. **Dist:** Endemic to stream banks in c. AL and wc. GA. **ID Notes:** The opposite leaves are squared off at the base in a distinctive manner. **Syn:** = FNA21, K1, K3, K4, SE1. NatureServe G3 (Vulnerable).

Krigia Schreber 1791 (CYNTHIA, DWARF-DANDELION)

A genus of 7 species, herbs, of (mainly e.) North America. References: Chambers & O'Kennon (2006) in FNA19 (2006a); Chambers (2004); SE1; Kim & Turner (1992).

1 Phyllaries erect in fruit, 2-4× as long as wide; pappus absent (or represented by minute scales or bristles < 2 mm long); plant a leafy-stemmed winter annual.
  ..... ***Krigia cespitosa***

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

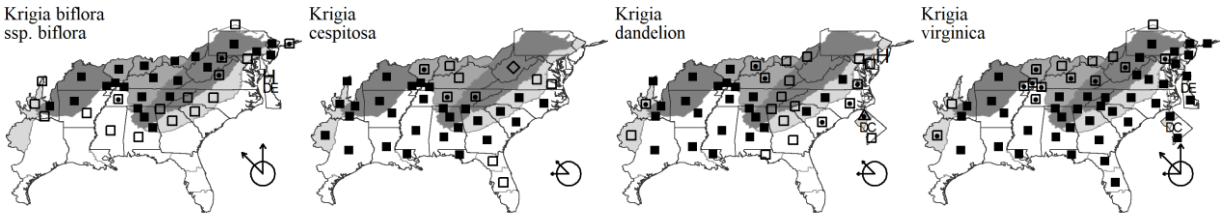
1 Phyllaries reflexed in fruit, 3-8× as long as broad; pappus present, consisting of 5 or more scales and 5 or more bristles (the bristles > 4 mm long); plant a scapose, subscapose, or leafy-stemmed perennial or a scapose or subscapose winter annual.
  5 Pappus of 5 scales and 5 bristles; plant a winter annual; stem leafless or leafy at the base only ..... ***Krigia virginica***
  5 Pappus of 15-40 scales and 15-40 bristles; plant a perennial; stem leafless, leafy at the base only, or with many leaves extending up the stem.
    6 Stems leafless, the peduncles terminal; perennial from ovoid tubers, with long slender stolons which form new plants or tubers; pappus bristles (5.0-) 5.3-7.7 (-10.0) mm long ..... ***Krigia dandelion***
    6 Stems leafy, at least at the base, the peduncles axillary; perennials from stout creeping rhizomes or short caudices, not bearing tubers; pappus bristles 4.0-7.0 mm long.
      ..... ***Krigia biflora ssp. biflora***

Krigia biflora Schreber *ssp.* ***biflora***. ORANGE DWARF-DANDELION, TWIN-FLOWERED CYNTHIA. **Hab:** Rich, moist forests. **Dist:** Var. *biflora* ranges from MA s. ON and MN south to GA, AL, MS, AR, and e. OK; the smaller var. *viridis* (Standley) Kim occurs in CO, AZ, and NM. **Phen:** May-Oct. **Comm:** The natural hexaploid hybrid *Krigia* ×*shinnersiana* K.L. Chambers [*K. biflora* × *montana*] is documented from the Craggy Mountains, Buncombe County, NC (Chambers 2004; Kim & Turner 1992). **Syn:** = Mi; = *Cynthia virginica* (Linnaeus) D. Don – S; < *Krigia biflora* – C, F, FNA19, G, GrPl, Il, K3, K4, Pa, RAB, SE1, Tn, W, WV; < *Krigia biflora* (Walter) S.F. Blake var. *biflora* – NE, Va, Kim & Turner (1992). NatureServe G5T5 (Secure).

Krigia cespitosa (Rafinesque) K.L. Chambers. OPPOSITE-LEAF DWARF-DANDELION. **Hab:** Fields, roadsides, disturbed places. **Dist:** Se. VA and NE south to c. peninsular FL and TX. **Phen:** Late Mar-early Jun. **Tax:** *K. gracilis* (A.P. de Candolle) Shinners occurs in TX, OK, and LA; it is sometimes treated as *K. cespitosa* var. *gracilis* (A.P. de Candolle) K.L. Chambers, but is better considered as a species, as it is sympatric and generally distinct. **Syn:** = Tn, Va; = *Krigia caespitosa* var. *caespitosa* – K3, orthographic variant; = *Krigia cespitosa* (Rafinesque) K.L. Chambers var. *cespitosa* – Ar, FNA19, K4, Chambers (2004); = *Krigia oppositifolia* Rafinesque – C, G, RAB, SE1, Tx, W; = *Serinia cespitosa* Rafinesque – Il; = *Serinia oppositifolia* (Rafinesque) Kuntze – F, S; < *Krigia caespitosa* – GrPl, orthographic variant; < *Krigia cespitosa* (Rafinesque) K.L. Chambers – Fl7, GW2, NcTx, WH3, Kim & Turner (1992).

Krigia dandelion (Linnaeus) Nuttall. COLONIAL DWARF-DANDELION, POTATO-DANDELION. **Hab:** Woodlands, roadsides, wet prairies, low damp meadows, disturbed areas. **Dist:** NJ, IL, and KA, south to Panhandle FL and ne. TX. **Phen:** Apr-May (-Jun). **Syn:** = Ar, C, F, Fl7, FNA19, G, GrPl, GW2, Il, K3, K4, NcTx, Oh3, RAB, SE1, Tn, Va, W, WH3, Kim & Turner (1992); = *Cynthia dandelion* (Linnaeus) A.P. de Candolle – S. NatureServe G5 (Secure).

Krigia virginica (Linnaeus) Willdenow. VIRGINIA DWARF-DANDELION. **Hab:** Rocky woodlands, roadsides, disturbed areas. **Dist:** ME west to MN, south to c. peninsular FL and c. TX. **Phen:** Late Mar-Jul. **Syn:** = C, F, Fl7, FNA19, G, GW2, Il, K3, K4, NcTx, NE, Oh3, Pa, RAB, S, SE1, Tn, Va, W, WH3, Kim & Turner (1992). NatureServe G5 (Secure).



Lactuca Linnaeus 1753 (LETTUCE)

A genus of about 75 species, herbs, nearly cosmopolitan (especially north temperate). References: SE1; McVaugh (1972); Strother (2006r) in FNA19 (2006a).

Identification Notes: Most species are highly variable in leaf lobing. Note that *L. serriola* can be mistaken for *Sonchus*, but *L. serriola* has prickles on the midrib, while the prickles of *Sonchus* are restricted to the leaf margins.

Unkeyed taxa: *Lactuca virosa*

1 Achene beaks stout and short, 0.1-0.5 (-1.0) mm long (< ½ as long as the body of the achene); rays blue to violet (rarely yellow or white).
  ..... ***Lactuca floridana***
1 Achene beaks filiform and long, 1-4 mm long (> ½ as long as the body of the achene); rays yellow or blue (sometimes white or drying bluish).
  3 Each face of the achene with (3-) 5-9 nerves; stems typically white or pale green; rays yellow (sometimes drying blue); [aliens].
    4 Unlobed cauline leaves lanceolate to linear ..... ***Lactuca saligna***
    4 Unlobed cauline leaves oblong, obovate, or spatulate.
      5 Phyllaries usually erect in fruit; midribs of leaves usually smooth ..... ***Lactuca sativa***
      5 Phyllaries usually reflexed in fruit; midribs of leaves prickly setose ..... ***Lactuca serriola***
  3 Each face of the achene with 1 (-3) nerves; stems typically medium to dark green or reddish; rays yellow or blue; [natives, though often weedy].
    6 Unlobed leaves and lobes of lobed leaves narrow, usually < 1 cm wide; leaves basally disposed, the basal and lower-stem leaves the largest and most persistent; plants 3-12 dm tall; [primarily of the Coastal Plain, rare elsewhere] ..... ***Lactuca graminifolia var. graminifolia***
    6 Unlobed leaves and lobes of lobed leaves wider, usually > 1 cm wide; leaves well-distributed on the stem; plants 3-33 dm tall; [collectively widespread].
      8 Lobes of leaves mostly widest at the base and tapering to a pointed tip; leaves and stems rarely noticeably pubescent; fruiting involucres 10-15 mm tall; achenes 2.5-3.5 mm long (excluding the beak) ..... ***Lactuca canadensis***
      8 Lobes of leaves blocky, widest above the base and blunt, square or rounded at the tip (like those of a Post Oak); leaves and stem almost always noticeably pubescent; fruiting involucres 15-22 mm tall; achenes 4.5-6 mm long (excluding the beak) ..... ***Lactuca hirsuta***

Lactuca canadensis Linnaeus. AMERICAN WILD LETTUCE. **Hab:** Fields, roadsides, disturbed ground. **Dist:** NS and BC south to n. peninsular FL, TX, and CA. **Phen:** Jun-Nov. **Syn:** = Ar, C, Fl7, FNA19, GrPl, K1, K3, K4, Mi, NcTx, NE, Pa, RAB, SE1, Tn, Va, W, WH3; > *Lactuca canadensis* Linnaeus – S;

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

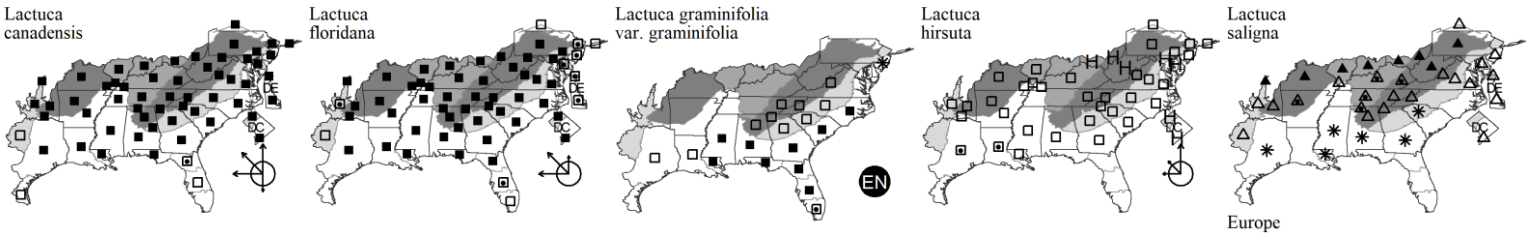
> *Lactuca canadensis* var. *canadensis* – F, G, Il, Oh3, WV; > *Lactuca canadensis* var. *latifolia* Kuntze – F, G, Il, Oh3, WV; > *Lactuca canadensis* var. *longifolia* (Michaux) Farwell – F, G, Il, Oh3, WV; > *Lactuca canadensis* var. *obovata* Wiegand – F, G, Il, Oh3; > *Lactuca sagittifolia* Elliott – S.

Lactuca floridana (Linnaeus) Gaertner. WOODLAND LETTUCE. **Hab:** Mesic and dry-mesic forests. **Dist:** NY, MB and MN south to s. FL and TX. **Phen:** Aug-Nov. **Syn:** = Ar, C, Fl7, FNA19, K3, K4, Mi, NcTx, RAB, SE1, Tn, Va, W, WH3, WV; > *Lactuca floridana* var. *floridana* – F, G, GrPl, Il, K1, Oh3, Pa; > *Lactuca floridana* var. *villosa* (Jacquin) Cronquist – F, G, GrPl, Il, K1, Oh3, Pa; > *Mulgedium floridanum* (Linnaeus) A.P. de Candolle – S; > *Mulgedium villosum* (Jacquin) Small – S.

Lactuca graminifolia Michaux *var*. ***graminifolia***. COASTAL PLAIN LETTUCE. **Hab:** Mesic to dry-mesic pine-oak woodlands and forests, longleaf pine sandhills, sandy fields, and sandy roadsides. **Dist:** E. NC south to s. FL, west to c. LA; disjunct in s. NJ. **Phen:** Apr-Jul. **Comm:** Var. *arizonica* McVaugh is distributed in mesic canyons in montane w. TX, s. CO, NM, and AZ, south into w. Mexico. Var. *mexicana* McVaugh is distributed in Tamaulipas, Veracruz, Oaxaca, Chiapas, and Guatemala. **Syn:** = K1, K3, K4, Va; = *Lactuca graminifolia* – S; < *Lactuca graminifolia* – Bah, F, Fl7, FNA19, RAB, SE1, Tn, W, WH3. NatureServe G5?T3T5 (Apparently Secure).

Lactuca hirsuta Muhlenberg ex Nuttall. RED WOOD LETTUCE. **Hab:** Forests and forest edges. **Dist:** NS and ON south to s. GA and e. TX. **Phen:** Late May-Nov. **ID Notes:** *Lactuca hirsuta* has a more open inflorescence, with long secondary branches that are widely spreading (almost perpendicular) from the stem, with fewer, spatially widely scattered flowers pointed in many directions (in contract to *Lactuca canadensis* and other *Lactuca* that tend to have all branches ascending, with flowers closer together and often facing upward/skyward. **Syn:** = Ar, C, FNA19, K3, K4, Mi, NE, Oh3, Pa, RAB, S, SE1, Tn, Va, W, WV; > *Lactuca hirsuta* var. *hirsuta* – F, G, K1; > *Lactuca hirsuta* var. *sanguinea* (Bigelow) Fernald – F, G, Il, K1.

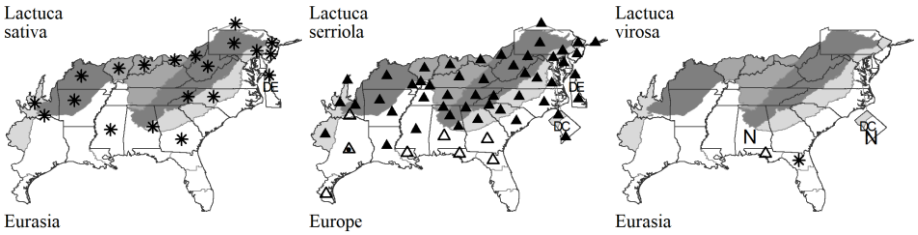
* ***Lactuca saligna*** Linnaeus. WILLOWLEAF LETTUCE. **Hab:** Fields, roadsides, disturbed ground, perhaps associated with circumneutral soils. **Dist:** Native of Europe. **Phen:** Aug-Nov. **Syn:** = C, F, FNA19, G, GrPl, Il, K1, K3, K4, Mi, Oh3, Pa, RAB, SE1, Tn, Va, W, WV. NatureServe GNR (Not Yet Ranked).



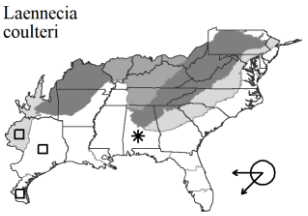
* ***Lactuca sativa*** Linnaeus. GARDEN LETTUCE. **Hab:** Cultivated throughout our area in home gardens and commercially, rarely weakly persistent, common as a cultivated plant, rare as a short-lived waif. **Dist:** Native of Eurasia. **Phen:** Jun-Oct. **Syn:** = Ar, F, FNA19, G, Il, K1, K3, K4, Mi, NE, Oh3. NatureServe GNR (Not Yet Ranked).

* ***Lactuca serriola*** Linnaeus. PRICKLY LETTUCE. **Hab:** Roadsides, disturbed ground, pastures. **Dist:** Native of Europe. **Phen:** Jun-Nov. **Syn:** = Ar, C, Fl7, FNA19, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, Pa, SE1, Tn, Va, WH3; = *Lactuca scariola* Linnaeus – F, RAB; > *Lactuca scariola* Linnaeus – S; > *Lactuca serriola* var. *integrata* Gren. & Godr. – G, Oh3, W; > *Lactuca serriola* var. *serriola* – Oh3; > *Lactuca virosa* Linnaeus – S, misapplied.

* ***Lactuca virosa*** Linnaeus. BITTER LETTUCE. **Hab:** Disturbed areas. **Dist:** Native of Eurasia. Reported for DC and AL (Kartesz 1999; Kartesz 2015; FNA19); no specimens have been seen that document this distribution. **Phen:** May-Oct. **Syn:** = FNA19, K1, K3, K4.



Laennecia Cassini 1822



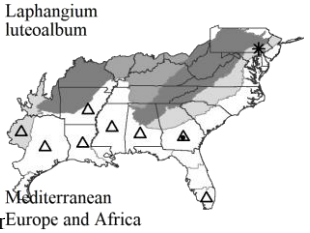
A genus of about 18 species, herbs, of the tropics, subtropics and temperate New World. References: Strother (2006bb) in FNA20 (2006b).

Laennecia coulteri (A. Gray) Nesom. **Hab:** Disturbed areas; probably merely a waif in s. AL. **Dist:** Native of sw. United States and Mexico. **Comm:** {not keyed}. **Syn:** = FNA20, K3, K4. NatureServe G5 (Secure).

Laphangium (Hilliard & B.L. Burtt) Tzvelev 1993 [1994] (RED-TIPPED RABBIT-TOBACCO)

A genus of 3 species, of Mediterranean Europe, Africa, and w. Asia. References: Anderberg (1991); Arriagada (1998); Galbany-Casals et al (2004); Greuter (2003b); Nesom (2001a); Nesom (2006k) in FNA19 (2006a).

* ***Laphangium luteoalbum*** (Linnaeus) Tzvelev. RED-TIPPED RABBIT TOBACCO. **Hab:** Mowed rights-of-way, other disturbed areas. **Dist:** Native of Eurasia. **Phen:** Apr-Jun. **Tax:** Best treated in *Laphangium* (see synonymy) (G. Nesom, pers. comm., 2016). **Comm:** {not yet keyed in Asteraceae key; add synonymy}. **Syn:** = Greuter (2003b); = *Helichrysum luteoalbum* (Linnaeus) Reichenbach – K3, K4, Galbany-Casals et al (2004); = *Pseudognaphalium luteoalbum* (Linnaeus) Hilliard & B.L. Burtt – Ar, Fl7, FNA19, WH3. NatureServe GNR (Not Yet Ranked).



Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : plar ? : questionable

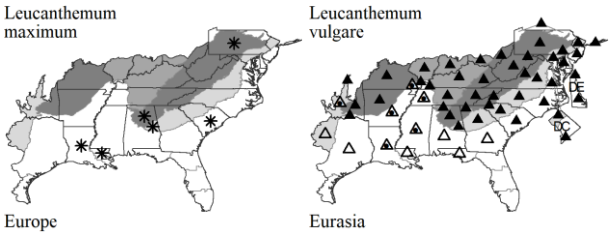
Leucanthemum P. Miller 1754 (OXEYE DAISY)

A genus of about 35 species, herbs, of Eurasia. References: Arriagada & Miller (1997); SE1; Strother (2006aa) in FNA19 (2006a).

Unkeyed waifs: *Leucanthemum maximum*

* ***Leucanthemum maximum*** (Ramond) A.P. de Candolle. SHASTA DAISY. **Hab:** Disturbed areas. **Dist:** Native of w. Europe. **Phen:** May-Jul. **Syn:** = FNA19, K3, K4. NatureServe GNR (Not Yet Ranked).

* ***Leucanthemum vulgare*** Lamarck. OXEYE DAISY, WHITE DAISY, COMMON DAISY, MARGUERITE. **Hab:** Fields, roadsides, pastures, disturbed areas. **Dist:** Native of Eurasia. **Phen:** Apr-Oct. **Syn:** = Ar, Fl7, FNA19, Il, K1, K3, K4, Mi, NcTx, NE, Pa, Va, WH3, Arriagada & Miller (1997); = *Chrysanthemum leucanthemum* Linnaeus – C, G, Oh3, RAB, SE1, W; = *Leucanthemum leucanthemum* (Linnaeus) Rydberg – S; > *Chrysanthemum leucanthemum* var. *pinnatifidum* Lecoq & Lamotte – F, GrPl, WV. NatureServe GNR (Not Yet Ranked).



Liatris Schreber 1791 (BLAZING-STAR, GAYFEATHER)

A genus of 40-50 species, herbs, of e. and c. North America. References: Bridges & Orzell (2017a) in Weakley et al (2017); Clark (2019); SE1; Gaiser (1946); Godfrey (1948); Mayfield (2002); Nesom & Stucky (2004); Nesom (2005c); Nesom (2006gg) in FNA21 (2006c); Nesom (2021b); Stucky & Pyne (1990); Stucky (1991); Stucky (1992).

Key based largely on Nesom in FNA (2006c).

1 Pappus plumose, the barbels along each pappus bristle mostly 0.5-1.0 mm long or longer.
  2 Inner phyllaries with apices prolonged, slightly dilated, and petaloid (white to yellow, pink, or purplish); heads 3-5 mm in diameter, with 4-6 flowers per head.
    4 Phyllary apices lavender to pink or magenta ..... ***Liatris elegans var. elegans***
    4 Phyllary apices white to cream or light yellow ..... ***Liatris elegans var. kralii***
  2 Inner phyllaries not prominently petaloid; heads 10-20 mm in diameter, with 10-60 flowers per head.
    10 Outer phyllaries as long as or (more usually longer than) the inner phyllaries, spreading or reflexed, the spreading portion typically > 2 mm long. ..... ***Liatris squarrosa var. squarrosa***
    10 Outer phyllaries shorter than the inner phyllaries, erect-appressed to spreading or reflexed, the spreading portion 0-2 mm long.
      13 Stems and leaves usually glabrous; inner phyllaries usually apically rounded to truncate, apiculate, all essentially erect and appressed, usually with a narrow hyaline border ..... ***Liatris cylindracea***
      13 Stems and leaves hirsute to hirsute-pilose; inner phyllaries apically acute-acuminate, all usually spreading to reflexed on the distal 1/3 (outer) to 1/5 (inner), usually without a hyaline border ..... ***Liatris hirsuta***
1 Pappus barbellate, the barbels along each pappus bristle 0.1-0.3 (-0.4) mm long.
  19 Heads mostly 1-30 in subcorymbiform or corymbiform arrays; [of either c. peninsular FL or Bibb Co., AL] ..... ***Liatris oligocephala***
  19 Heads usually > 10 in a spiciform or racemiform arrangement; [collectively widespread].
    21 Leaves 3-5-veined.
      24 Basal and lower cauline leaves (2-) 4-8 mm wide, cauline usually abruptly reduced in size at ca. midstem, continuing distally as linear, bract-like leaves; heads in a densely (- to loosely) spiciform arrangement; involucres 7-9 mm, purplish to greenish; florets 5-6 (-8) per head; [mainly of the Coastal Plain] .... ***Liatris resinosa***
      24 Basal and lower cauline leaves 4-10 (-20) mm wide, cauline usually gradually reduced in size distally; heads in a densely to loosely spiciform arrangement; involucres (7-) 8-11 mm, usually greenish; florets (4-) 6-8 (-12) per head; [of the Mountains and Piedmont] ..... ***Liatris spicata***
    21 Leaves 1 (-3) veined.
      27 Mid and inner phyllaries with a point of some kind: either apically acuminate or acute or (if rounded-retuse) minutely involute-cuspidate to apiculate.
        29 Stems hirtellous with spreading to slightly deflexed hairs or variously puberulent to hirsute.
          30 Involucres 4-6 (-7) mm high; stems hirsute to puberulent to pilose-puberulent or strigose-puberulent ..... ***Liatris gracilis***
          30 Involucres 8-15 mm high; stems hirtellous with spreading to slightly deflexed hairs.
            32 Heads sessile, relatively crowded in a cylindric arrangement. ..... ***Liatris chapmanii***
            32 Heads sessile to short-pedunculate, in a relatively loose, spiciform, racemose, or paniculate, commonly secund arrangement. ..... ***Liatris secunda***
        29 Stems glabrous or sometimes sparsely pilose. ..... ***Liatris tenuifolia***
      27 Mid and inner phyllaries lacking a point: apically rounded, obtuse, or truncate.
        40 Stems glabrous (rarely sparsely to moderately pilose in *L. pilosa*).
          41 Involucres 5-7 (-9) mm; florets 4-5 (-6); corolla tubes glabrous within; pappus bristles usually about half the length of corolla tubes ..... ***Liatris microcephala***
          41 Involucres 6-10 mm; florets (6-) 7-13 (-17); corolla tubes internally pilose; pappus bristles as long as the corolla tubes (shorter in some populations of *L. helleri*).

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

..... ***Liatris elegantula***

40 Stems puberulent to strigose.

45 Involucres 2.5-7 mm wide; florets 3-12.

..... ***Liatris gracilis***

45 Involucres 13-22 (-25) mm wide or (6-) 8-15 mm wide (*L. squarrulosa*); florets 11-80.

48 Heads usually on peduncles usually 8-50 mm (rarely subsessile); phyllaries erect, not reflexing; florets ca. 30-80 (19-33 in *L. scariosa*); corolla tubes glabrous or pilose within.

..... ***Liatris scariosa***

48 Heads usually sessile, less commonly subsessile on peduncles 1-8 mm (rarely more); at least outer phyllaries usually reflexing; florets 11-26 (-30) per head; corolla tubes pilose within.

52 Phyllaries glabrous, bullate, with broad, conspicuous, often erose to lacerate or irregular, hyaline border..... ***Liatris aspera***

52 Phyllaries glabrous to puberulent or puberulent-hirtellous, essentially flat (not bullate), without hyaline border or border narrow and inconspicuous..... ***Liatris squarrulosa***

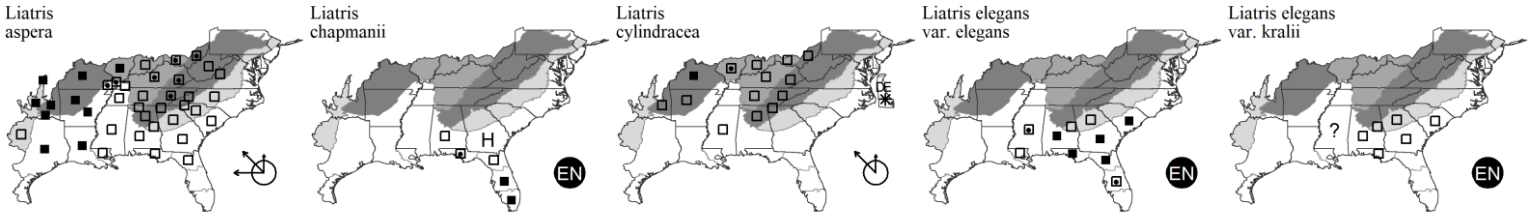
Liatris aspera Michaux. ROUGH BLAZING-STAR. **Hab:** Prairies, barrens, glades. **Dist:** ON and ND south to Panhandle FL and TX. **Phen:** Aug-Sep (-Oct). **Syn:** = Ar, C, Fl7, FNA21, G, GrPl, K3, K4, Mi, NcTx, RAB, SE1, Tn, Va, W, WH3; > *Laciniaria aspera* (Michaux) Greene var. *aspera* – S; > *Laciniaria aspera* (Michaux) Greene var. *spheroidea* (Michaux) Alexander – S; > *Liatris aspera* var. *aspera* – F, Il, Oh3, Tx; > *Liatris aspera* Michaux var. *intermedia* (Lunell) Gaiser – F, Il, K1, Oh3, WV, Godfrey (1948); > *Liatris aspera* var. *salutans* (Lunell) Shinners – Tx; > *Liatris spheroidea* Michaux – K1.

Liatris chapmanii Torrey & A. Gray. CHAPMAN'S BLAZING-STAR. **Hab:** Xeric sands of Florida scrub, longleaf pine sandhills, and pine rocklands. **Dist:** Sw. GA, s. AL (Barger, Spaulding, & Holt 2013), south to s. FL. **Phen:** Aug-Oct. **Syn:** = Fl7, FNA21, K3, K4, SE1, WH3; = *Laciniaria chapmanii* (Torrey & A. Gray) Kuntze – S. NatureServe G5 (Secure).

Liatris cylindracea Michaux. BARRELHEAD BLAZING-STAR. **Hab:** Limestone glades, dry prairies. **Dist:** NY, ON, and MN south to se. TN (Ridge and Valley) (Chester, Wofford, & Kral 1997), nw. GA, and c. AL (Bibb County), and OK. **Phen:** Jul-Sep. **Syn:** = Ar, C, F, FNA21, G, Il, K3, K4, Mi, Oh3, SE1, Tn. NatureServe G5 (Secure).

Liatris elegans (Walter) Michaux *var.* ***elegans***. COMMON ELEGANT BLAZING-STAR. **Hab:** Longleaf pine sandhills, {additional habitats}. **Dist:** SC south to c. peninsular FL, west to TX and OK. **Phen:** Aug-Oct. **Tax:** See Mayfield (2002) and Nesom (2021b) for discussion of the *Liatris elegans* complex. **Syn:** = Nesom (2021b); >< *Laciniaria elegans* (Walter) Kuntze – S; >< *Laciniaria flabellata* Small – S; < *Liatris elegans* (Walter) Michaux – Fl7, NcTx, RAB, SE1, WH3; < *Liatris elegans* (Walter) Michaux var. *elegans* – FNA21, K3, K4, Tx, Mayfield (2002); >< *Liatris elegans* (Walter) Michaux var. *elegans* – K1, Gaiser (1946); >< *Liatris elegans* var. *flabellata* (Small) Gaiser – K1, Gaiser (1946).

Liatris elegans (Walter) Michaux *var.* ***kralii*** Mayfield. KRAL'S ELEGANT BLAZING-STAR. **Hab:** Longleaf pine sandhills. **Dist:** Se. SC (Allendale Co.) south to n. FL and west to s. MS. **Phen:** Aug-Oct (-Nov). **Tax:** See Mayfield (2002) and Nesom (2021b) for discussion of the *Liatris elegans* complex. **Syn:** = FNA21, K3, K4, Mayfield (2002), Nesom (2021b); < *Laciniaria elegans* (Walter) Kuntze – S; < *Liatris elegans* (Walter) Michaux – Fl7, SE1, WH3; < *Liatris elegans* (Walter) Michaux var. *elegans* – Gaiser (1946).



Liatris elegantula (Greene) K. Schumann. **Hab:** Longleaf pine sandhills, other dry woodlands. **Dist:** GA south to n. peninsular FL, west to MS. **Phen:** Aug-Oct (-Nov). **Syn:** = Fl7, FNA21, K3, K4, WH3, Nesom & Stucky (2004); = *Liatris graminifolia* Willdenow var. *elegantula* (Greene) Gaiser – Gaiser (1946); < *Laciniaria graminifolia* (Willdenow) Kuntze – S; < *Liatris graminifolia* Willdenow – SE1.

Liatris gracilis Pursh. SLENDER BLAZING-STAR. **Hab:** Longleaf pine sandhills, dry pine flatwoods, pine rocklands. **Dist:** SC south to s. FL, west to MS. **Phen:** (Jul-) Aug-Oct (-Nov). **Syn:** = Fl7, FNA21, K4, WH3; = *Liatris gracilis* Pursh var. *gracilis* – K3; < *Laciniaria gracilis* Pursh – K1, RAB, SE1; > *Laciniaria gracilis* Pursh – S; > *Laciniaria laxa* Small – S.

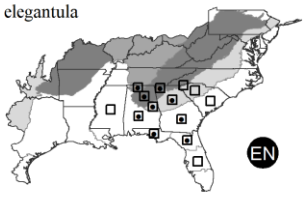
Liatris hirsuta Rydberg. RYDBERG'S BLAZING-STAR. **Hab:** Glades and prairies. **Dist:** W. IA and e. NE south to MS, LA, and e. TX; disjunct eastward in nw. GA, se. TN (D. Estes, T. Govus, T. Patrick, M. Medley, R. Ware, pers. comm., 2018), and ne. AL. **Phen:** Jun-Sep. **Tax:** The disjunct eastern material needs additional study and may warrant taxonomic recognition. **Syn:** = Ar, FNA21, Il, K3, K4; = *Liatris squarrosa* (Linnaeus) Michaux var. *hirsuta* (Rydberg) Gaiser – C, F, G, GrPl, K1, SE1, Gaiser (1946), Godfrey (1948); < *Laciniaria squarrosa* (Linnaeus) Hill – S; < *Liatris squarrosa* – W.

Liatris microcephala (Small) K. Schumann. SMALL-HEAD BLAZING-STAR. **Hab:** Outcrops of acidic rocks (sandstone, granite, gneiss), barrens, prairies. **Dist:** W. NC and KY south to w. SC, n. and c. GA, and n. AL. **Phen:** Aug-Oct. **Syn:** = C, F, FNA21, G, K1, K3, K4, RAB, SE1, Tn, W, Gaiser (1946), Godfrey (1948); = *Laciniaria microcephala* Small – S. NatureServe G3G4 (Vulnerable).

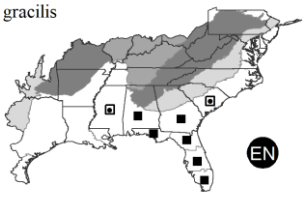
Liatris oligocephala J.R. Allison. CAHABA BLAZING-STAR, CAHABA TORCH. **Hab:** Dolomitic Ketona glades. **Dist:** Endemic to Bibb County, c. AL (Allison & Stevens 2001). **Phen:** Jun-Jul (-Aug). **Tax:** Also see Hardig, Allison, & Schilling (2005). **Syn:** = FNA21, K4. NatureServe G1 (Critically Imperiled).

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

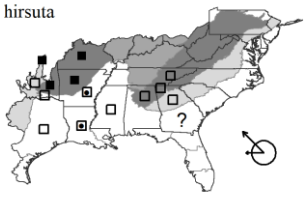
Liatris elegantula



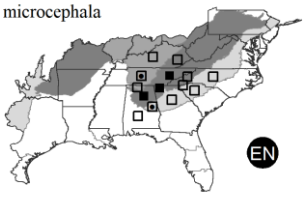
Liatris gracilis



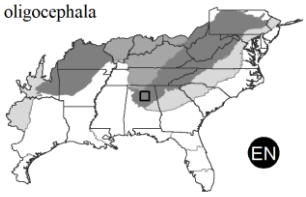
Liatris hirsuta



Liatris microcephala



Liatris oligocephala



Liatris resinosa Nuttall. **Hab:** Bogs, wet longleaf pine savannas, seepages. **Dist:** NJ south to s. FL, west to LA. **Phen:** (Jul-) Aug-Oct (-Nov). **Syn:** = *Liatris spicata* (Linnaeus) Willdenow var. *resinosa* (Nuttall) Gaiser – F, FNA21, G, K1, RAB, Va, WV, Gaiser (1946), Godfrey (1948); < *Laciniaria spicata* (Linnaeus) Kuntze – S; < *Liatris spicata* Linnaeus – C, Fl7, SE1, Tn, W, WH3; < *Liatris spicata* (Linnaeus) Willdenow var. *spicata* – K3, K4.

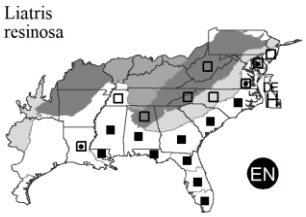
Liatris scariosa (Linnaeus) Willdenow. NORTHERN BLAZING-STAR. **Hab:** Shale barrens, dry rock outcrops, roadbanks. **Dist:** PA, MD, and WV south to NC and TN. **Phen:** Aug-Sep (-Oct). **Syn:** = F, G; = *Liatris scariosa* (Linnaeus) Willdenow var. *scariosa* – C, FNA21, K1, K3, K4, SE1, Va; < *Laciniaria scariosa* (Linnaeus) Hill – S, also see Liatris squarrulosa; < *Liatris scariosa* (Linnaeus) Willdenow – Pa, RAB, Tn, W; > *Liatris scariosa* (Linnaeus) Willdenow var. *scariosa* – WV, Gaiser (1946), Godfrey (1948); > *Liatris scariosa* var. *virginiana* (Lunell) Gaiser – WV, Gaiser (1946), Godfrey (1948).

Liatris secunda Elliott. SANDHILL BLAZING-STAR. **Hab:** Longleaf pine sandhills. **Dist:** S. NC south to w. Panhandle FL and s. AL. **Phen:** Aug-Sep (-Oct). **Syn:** = RAB, Godfrey (1948); = *Laciniaria secunda* (Elliott) Small – S; = *Liatris pauciflora* Pursh var. *secunda* (Elliott) D.B. Ward – Fl7, FNA21, K3, K4, WH3; < *Liatris pauciflora* Pursh – K1, SE1.

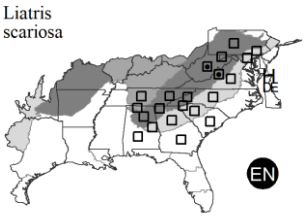
Liatris spicata Linnaeus. FLORIST'S GAYFEATHER. **Hab:** Prairies, roadsides, seepages, bogs, grassy balds. **Dist:** MA, ON, and MI, south to GA, AL, MS, and AR. **Phen:** Jun-Aug (-Sep). **Tax:** Blooming earlier than the coastal *L. resinosa*, even though occurring inland, more northerly, and at higher elevations. **Syn:** = *Liatris spicata* (Linnaeus) Willdenow var. *spicata* – F, FNA21, G, K1, NE, Pa, RAB, Va, WV; = *Liatris spicata* var. *typica* – Gaiser (1946), Godfrey (1948); < *Laciniaria spicata* (Linnaeus) Kuntze – S; < *Liatris spicata* Linnaeus – C, Il, Mi, Oh3, SE1, Tn, W; < *Liatris spicata* (Linnaeus) Willdenow var. *spicata* – K3, K4. NatureServe G5T5? (Secure).

Liatris squarrosa (Linnaeus) Michaux *var*. ***squarrosa***. **Hab:** Dry woodlands, glades, barrens, dry prairies, wet prairies. **Dist:** MD, OH, s. MI, s. IN, s. IL, MO south to Panhandle FL and e. TX. **Phen:** Aug-Nov. **Syn:** = C, FNA21, G, K1, K3, K4, Oh3, SE1, Va; < *Laciniaria squarrosa* (Linnaeus) Hill – S; < *Liatris squarrosa* – Fl7, Il, Mi, RAB, Tn, W, WH3, WV; > *Liatris squarrosa* var. *alabamensis* (Alexander) Gaiser – NcTx, Tx; > *Liatris squarrosa* var. *gracilenta* Gaiser – F, Gaiser (1946), Godfrey (1948); > *Liatris squarrosa* (Linnaeus) Michaux var. *squarrosa* – F, Tx; > *Liatris squarrosa* var. *typica* Gaiser – Gaiser (1946), Godfrey (1948).

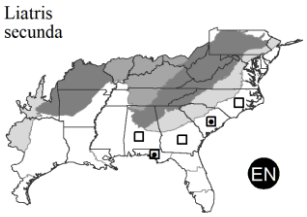
Liatris resinosa



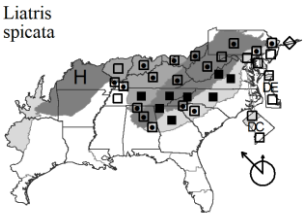
Liatris scariosa



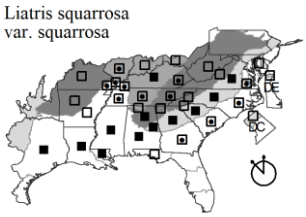
Liatris secunda



Liatris spicata



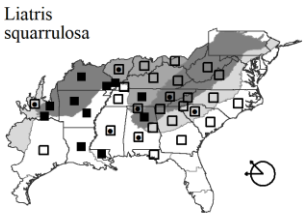
Liatris squarrosa var. squarrosa



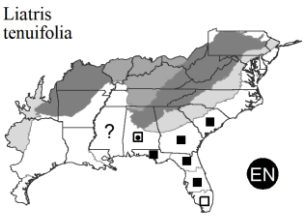
Liatris squarrulosa Michaux. **Hab:** Diabase barrens, other glades and barrens, prairies, longleaf pine sandhills, open woodlands. **Dist:** Nc. NC, s. WV, OH, IN, IL, MO, and OK south to sw. GA, Panhandle FL, AL, MS, LA, and e. TX. **Phen:** Aug-Oct (-Nov). **Tax:** Highly variable in morphology and habitats and badly in need of additional study to determine if multiple taxa should be recognized, as seems likely. In the Atlantic Coastal States, there is a striking difference between plants of the fall-line Sandhills and rest of the Coastal Plain (small plants, strict inflorescences, narrow leaves < 2 cm long below the inflorescence, small heads with few flowers) vs. plants of diabase barrens (robust plants, inflorescences often branched, larger leaves, large heads with many flowers). **Syn:** = C, Fl7, FNA21, Il, K1, K3, K4, SE1, Tn, Tx, Va, W, WH3; > *Laciniaria ruthii* Alexander – S; > *Laciniaria shortii* Alexander – S; > *Laciniaria tracyi* Alexander – S; > *Liatris earlei* (Greene) Schumann – F, RAB, Gaiser (1946), Godfrey (1948); > *Liatris scabra* (Greene) K. Schumann – F, G, Il; > *Liatris scariosa* var. *squarrulosa* – Gaiser (1946), Godfrey (1948); > *Liatris squarrulosa* Michaux – G.

Liatris tenuifolia Nuttall. **Hab:** Longleaf pine sandhills. **Dist:** SC south to s. FL, west to AL. **Phen:** Aug-Nov. **Syn:** = FNA21, K3, K4, RAB, Bridges & Orzell (2017a) in Weakley et al (2017); = *Liatris tenuifolia* Nuttall var. *tenuifolia* – Fl7, K1, SE1, WH3; < *Laciniaria tenuifolia* (Nuttall) Kuntze – S. NatureServe G4G5T4T5 (Apparently Secure).

Liatris squarrulosa



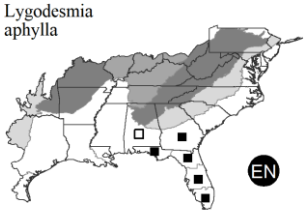
Liatris tenuifolia



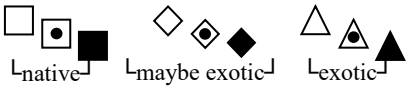
Lygodesmia D. Don 1829 (RUSH PINK, SKELETONPLANT)

A genus of about 5-7 species, herbs, of w. and s. North America. References: Bogler (2006f) in FNA19 (2006a); SE1; Tomb (1980).

Lygodesmia aphylla



Key to Map Symbology:



* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable
X : extirpated

Key based on Bogler (2006f).

Lygodesmia aphylla (Nuttall) A.P. de Candolle. FLOWERING STRAW, ROSE-RUSH, FLORIDA SKELETONPLANT. **Hab:** Longleaf pine sandhills. **Dist:** C. GA south to s. FL and west to c. Panhandle FL. **Phen:** Feb-Nov. **Syn:** = Fl7, FNA19, K3, K4, S, SE1, WH3, Tomb (1980). NatureServe G4G5 (Apparently Secure).

Marshallia Schreber 1791 (BARBARA'S-BUTTONS)

A genus of about 11-13 species, perennial herbs, of the se. United States. *Marshallia* ranges from sc. VA, sw. PA, WV, s. KY, s. MO, and c. OK, south to c. peninsular FL, and wc. TX. References: Beadle & Boynton (1901); Channell (1957); SE1; Knapp, Poindexter, & Weakley (2020); Watson & Estes (1990); Watson (2006) in FNA21 (2006c); Watson, Elisens, & Estes (1991); Watson, Jansen, & Estes (1991); Weakley & Poindexter (2012).

1 Leaves not basally disposed, the leaves all about the same size; plants glabrous throughout; plants colonial by persistent rhizomes; internodes 10-25 (and leaves 2-5× as long as wide) ..... ***Marshallia trinervia***
1 Leaves basally disposed, either all of the leaves below the midpoint of the stem, or the upper leaves markedly smaller than the lower stem and basal leaves (the basal leaves sometimes withered); plants pubescent at least below the heads; plants producing lateral offsets which are separated from the parent in less than a year; internodes 1-12 (and leaves 3-15× as long as wide) or 10-35 (and leaves 8-20× as long as wide).
  2 Phyllaries with acuminate-subulate tips; paleae (receptacular bracts, interspersed with the flowers) with acuminate-subulate tips; plants usually with 2 or more heads; flowering late Jul-mid Oct. ..... ***Marshallia angustifolia***
  2 Phyllaries with rounded to acute apices; paleae (receptacular bracts, interspersed with the flowers) slightly to strongly broadened or clavate-thickened just below the acute to obtuse apex; plants with 1 head (or more in *M. mohrii* and *M. ramosa*); flowering in late Apr-Jul.
    4 Head solitary.
      7 Plant with 3-10 leaves on the lower stem, extending (5-) 8-20 (-30) cm up the stem; pappus scales (0.5-) 0.7-1.2 (1.5) mm long; plant (2-) 3-5 (-7) dm tall; outer surface of phyllaries and paleae lacking sessile resin glands (rarely with a very few); [of the Piedmont and rarely Coastal Plain from sc. VA southward] ..... ***Marshallia obovata var. obovata***
      7 Plant scapose (all of the leaves basal) or nearly scapose, with 1-5 leaves extending 1-5 (-10) cm up the stem; pappus scales (1.0-) 1.5-2.5 (-3.0) mm long; plant (0.5-) 1.5-3.5 (-5.0) dm tall; outer surface of phyllaries and paleae with many sessile resin glands; [of the Coastal Plain and rarely outer Piedmont from NC southward] ..... ***Marshallia obovata var. scaposa***
    4 Heads 2-10 (-20) (rarely solitary on depauperate plants). ..... ***Marshallia mohrii***

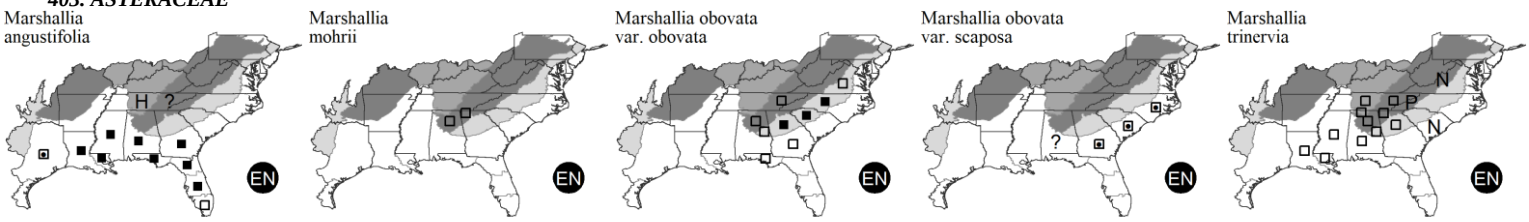
Marshallia angustifolia (Michaux) Pursh. GULF COAST BARBARA'S-BUTTONS. **Hab:** Pine savannas, seepage bogs. **Dist:** E. GA south to c. peninsular FL, west to e. TX; historically disjunct on (likely) the eastern Highland Rim (where mapped here) or Cumberland Plateau of e. TN (Michaux's type came from TN). **Phen:** Late Jun-Sep. **Tax:** We disagree with Channell's dismissal of the TN record by Michaux as a mislabeling and his identification of the Michaux specimen as representing *M. graminifolia* of the Atlantic Coastal Plain. **Syn:** = *Marshallia graminifolia* (Walter) Small – S, misapplied; = *Marshallia graminifolia* (Walter) Small ssp. *tenuifolia* (Rafinesque) L. Watson – Watson & Estes (1990); = *Marshallia graminifolia* (Walter) Small var. *cynanthera* (Elliott) Beadle & F.E. Boynton – K1, K3, K4, Beadle & Boynton (1901); = *Marshallia tenuifolia* Rafinesque – GW2, SE1, Channell (1957); < *Marshallia graminifolia* (Walter) Small – Fl7, FNA21, WH3. NatureServe G4T4Q (Apparently Secure).

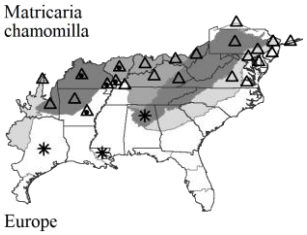
Marshallia mohrii Beadle & F.E. Boynton. COOSA BARBARA'S-BUTTONS. **Hab:** Sandstone, limestone, and dolostone glades, calcareous prairies. **Dist:** Nw. GA and n. and c. AL. **ID Notes:** It somewhat resembles *M. grandiflora*, but typically has 2-10 heads per plant (or solitary in depauperate individuals). **Syn:** = FNA21, K1, K3, K4, S, SE1, Beadle & Boynton (1901), Channell (1957), Watson & Estes (1990). NatureServe G3 (Vulnerable); USESA T.

Marshallia obovata (Walter) Beadle & F.E. Boynton *var. **obovata***. PIEDMONT BARBARA'S-BUTTONS, SPOON-LEAVED BARBARA'S-BUTTONS. **Hab:** Clay flats, woodland borders, dry woodlands, sandy riverbanks. **Dist:** Sc. VA south to se. TN (Chester, Wofford, & Kral 1997), sw. GA, Panhandle FL, and c. AL, primarily in the Piedmont. **Phen:** Late Apr-May (-early Jun). **Syn:** = C, G, K1, K3, K4, RAB, SE1, Va, Channell (1957), Watson & Estes (1990), Weakley & Poindexter (2012); = *Marshallia obovata* var. *platyphylla* (M.A. Curtis) Beadle & F.E. Boynton – F, Beadle & Boynton (1901); < *Marshallia obovata* – Fl7, FNA21, S, Tn, W, WH3. NatureServe G4G5T3T5 (Apparently Secure).

Marshallia obovata (Walter) Beadle & F.E. Boynton *var. **scaposa*** Channell. SANDHILL MARSHALLIA. **Hab:** Longleaf pine savannas, flatwoods, and moister longleaf pine sandhills. **Dist:** E. NC south to se. AL (?), in the Coastal Plain. **Phen:** Late Apr-May. **Tax:** Likely warranting species rank, distinct from *Marshallia obovata*. **Syn:** = K1, K3, K4, RAB, SE1, Channell (1957), Watson & Estes (1990), Weakley & Poindexter (2012); = *Marshallia obovata* (Walter) Beadle & F.E. Boynton var. *obovata* – F, Beadle & Boynton (1901), misapplied; < *Marshallia obovata* – FNA21, S.

Marshallia trinervia (Walter) Trelease. COLONIAL BARBARA'S-BUTTONS, BROADLEAF BARBARA'S-BUTTONS. **Hab:** Moist rocky streambanks and in calcareous clays, more often in shady habitats than its congeners. **Dist:** C. TN, south to s. AL and s. MS (Sorrie & Leonard 1999) and e. and w. LA(!). Reported for VA by C; the documentation is unknown. Michaux gave his *Persoonia latifolia* as "Habitat in montosis Carolinæ". The only moderately recent NC record (Macon County) appears to be from the yard of the director of the Highlands Biological Station at the time; other herbarium specimens from his property are of clearly cultivated material. The SC record from Walter seems dubious on biogeographic grounds; the only other purported SC specimen (from 1973) is misidentified. **Phen:** Jul. **Syn:** = C, F, FNA21, G, K1, K3, K4, RAB, S, SE1, Tn, W, Beadle & Boynton (1901), Channell (1957), Watson & Estes (1990). NatureServe G3 (Vulnerable).

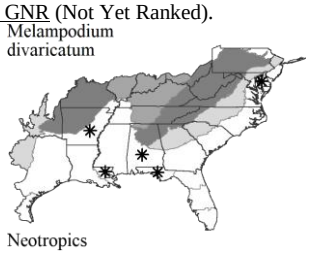




Matricaria Linnaeus 1740 (MAYWEED)

A genus of about 7 species, herbs, of Eurasia and n. Africa. References: Arriagada & Miller (1997); Brouillet (2006b) in FNA19 (2006a); SE1.

* ***Matricaria chamomilla*** Linnaeus. GERMAN CHAMOMILE, FALSE CHAMOMILE, SCENTED MAYWEED. **Hab:** Roadsides, disturbed areas, also on ballast. **Dist:** Native of Europe. **Phen:** Jul-Sep. **Syn:** = Ar, F, FNA19, G, GrPl, Il, K3, K4, Mi, Oh3, Pa, SE1; = *Matricaria recutita* Linnaeus – C, Arriagada & Miller (1997); > *Matricaria chamomilla* Linnaeus – K1; > *Matricaria chamomilla* var. *chamomilla* – NE; > *Matricaria chamomilla* var. *recutita* (Linnaeus) Fiori – NE; > *Matricaria recutita* Linnaeus – K1. NatureServe GNR (Not Yet Ranked).

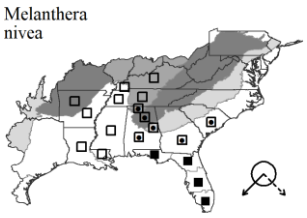


Melampodium Linnaeus 1753

A genus of about 36 species, herbs, of tropical and subtropical America. References: SE1; Strother (2006jj) in FNA20 (2006b).

Key based on Strother (2006jj).

* ***Melampodium divaricatum*** (Richard) A.P. de Candolle. **Hab:** Disturbed areas. **Dist:** Native of tropical America. **Phen:** Jan-Dec. **Syn:** = Ar, Fl7, FNA21, K1, K3, K4, WH3. NatureServe G5 (Secure).



Melanthera Rohr 1792 (BLACK-ANTHERS)

As more narrowly circumscribed, a genus of about 4-8, herbs, of the southeastern United States and the Caribbean regions of Mexico, Central America, n. South America, and the West Indies (Orchard 2013, Edwards et al. 2018). References: WI; SE1; Edwards et al (2018); Franck et al (2021); SFla; Orchard (2013); Parks (1973); Parks (2006) in FNA21 (2006c); Wagner & Robinson (2001).

Melanthera nivea (Linnaeus) Small. SNOWY BLACK-ANTHERS, SNOW SQUARESTEM. **Hab:** Calcareous outcrops, sandy woodlands. **Dist:** E. SC south to s. FL, west to LA; also widespread in the West Indies, Mexico, Central America, and northern South America (Colombia, Ecuador, Peru, and Venezuela). **Phen:** Jun-Oct. **Tax:** Additional taxa have sometimes been recognized within what is treated here as a very broad *M. nivea*; they warrant additional study. **Syn:** = FNA21, Il, K1, K3, K4, SE1, Tn, Franck et al (2021), Wagner & Robinson (2001); > *Melanthera aspera* (Jacquin) Sprengel var. *aspera* – SFla, Parks (1973); > *Melanthera aspera* var. *glabriuscula* (Kuntze) J.C. Parks – Bah, Parks (1973); > *Melanthera deltoidea* Michaux – S; > *Melanthera hastata* Michaux – RAB, S; > *Melanthera ligulata* Small – S, Parks (1973); < *Melanthera nivea* (Linnaeus) Small – Fl7, WH3, WI; > *Melanthera nivea* (Linnaeus) Small – SFla, Parks (1973).

Mikania Willdenow 1803 (CLIMBING HEMPWEED)

A genus of about 430-450 species, vines, perennial herbs, and shrubs, primarily pantropical in distribution, but with extensions into temperate areas (Holmes 1995). References: Anderson et al (2012); SE1; Holmes (1981); Holmes (2006) in FNA21 (2006c); Nauman (1981).

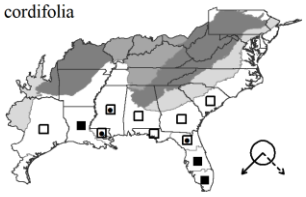
1 Involucre 6.5-8 mm; achenes 3.5-4.5 mm long; stems, leaves, and involucres spreading pubescent; pseudostipule a low ridge with a tomentose fringe; stem 6-angled; [of se. SC southward] ..... ***Mikania cordifolia***
1 Involucre 4-5.5 (-6) mm high; achenes 1.5-2.5 (-2.7) mm long; stems, leaves, and involucres puberulent or nearly smooth; pseudostipule membranous; stem round in ×-section to obscurely 6-angled; [widespread in our area].
..... ***Mikania scandens***

Mikania cordifolia (Linnaeus f.) Willdenow. HEARTLEAF CLIMBING HEMPWEED. **Hab:** Bottomland hardwood forests, mesic hammocks near the coast, margins of tidal marshes. **Dist:** Se. SC (Beaufort and Colleton counties) (P. McMillan, pers. comm. 2005), e. GA (Bryan & Camden counties) (Carter, Baker, & Morris 2009), south to s. FL, west to s. LA; West Indies, Mexico, Central America, South America. **Syn:** = Fl7, FNA21, K1, K3, K4, S, SE1, WH3, WI, Holmes (1981), Nauman (1981). NatureServe G5 (Secure).

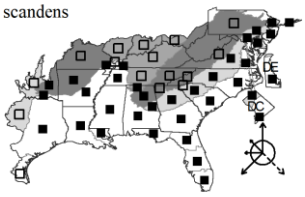
Mikania scandens (Linnaeus) Willdenow. CLIMBING HEMPWEED. **Hab:** Marshes, swamp forests, wet thickets, streambanks, seepages. **Dist:** ME to s. ON, south to s. FL and e. TX, south into the tropics. **Phen:** Jun-Oct. **Syn:** = Ar, C, Fl7, FNA21, G, GW2, Il, K1, K3, K4, Mi, NcTx, NE, Oh3, Pa, RAB, S, Tn, Tx, Va, W, WI, Holmes (1981); < *Mikania scandens* (Linnaeus) Willdenow – Bah, SE1, WH3, Nauman (1981); > *Mikania scandens* var. *pubescens* (Nuttall) Torrey & A. Gray – F; > *Mikania scandens* var. *scandens* – F.

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

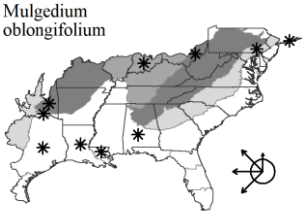
Mikania cordifolia



Mikania scandens



Mulgedium oblongifolium



Mulgedium Cassini 1824 (SHOWY-LETTUCE)

A genus of about 15 species, of Eurasia and w. North America. References: Strother (2006q) in FNA19 (2006a).

* ***Mulgedium oblongifolium*** (Nuttall) Reveal. WESTERN BLUE LETTUCE, SHOWY BLUE LETTUCE. **Hab:** Meadows, roadsides. **Dist:** Native of w. North America. **Phen:** Jun-Sep. **Syn:** = K4; = *Lactuca pulchella* (Pursh) A.P. de Candolle – C, F, G, Oh3; = *Lactuca tatarica* (Linnaeus) C.A. Meyer ssp. *pulchella* (Pursh) Stebbins – Mo2; = *Lactuca tatarica* (Linnaeus) C.A. Meyer var. *pulchella* (Pursh) Breitung – K3; = *Mulgedium pulchellum* (Pursh) G. Don – FNA19, Il, Mi, NE.

Nabalus Cassini 1825 (RATTLESNAKE-ROOT)

A genus of about 20 species, perennial herbs, of temperate North America and e. Asia. Molecular and morphological studies suggest that *Prenanthes* includes disparate components, and North American taxa are best treated in the segregate genus *Nabalus* (Schilling, Floden, & Schilling 2015; Kilian, Gemeinholzer, & Lack 2009; Lack in Kadereit & Jeffrey 2007). The sectional treatment of Sennikov (2000) does not appear to offer a coherent and helpful division of the genus and is not followed here. References: Bogler (2006c) in FNA19 (2006a); SE1; Fusiak & Schilling (1984); Johnson (1980); Kilian, Gemeinholzer, & Lack (2009); Lack in Kadereit & Jeffrey (2007); Sennikov (2000); Shih (1987).

Identification Notes: The species cannot be reliably identified in sterile condition. "Principal phyllaries" are the inner, well-developed, excluding the few smaller and poorly-developed outer phyllaries.

2 Phyllaries glabrous or with few cilia or inconspicuous fine short pubescence at the tip.
..... ***Nabalus altissimus***
2 Phyllaries evidently (though sometimes sparsely) pubescent with long coarse hairs (1.5-3 mm long).
6 Inflorescence corymbiform to paniculiform, many of the branches well-developed.
7 Phyllaries densely setose; leaves usually merely toothed, sinuate, or shallowly lobed..... ***Nabalus barbatus***
7 Phyllaries sparsely setose; principal leaves usually evidently lobed..... ***Nabalus serpentaria***
6 Inflorescence cylindric, thyrsoid, the branches very short.
..... ***Nabalus asper***

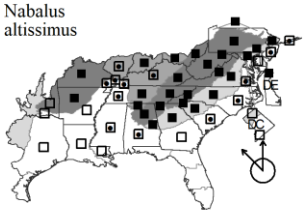
Nabalus altissimus (Linnaeus) Hooker. TALL RATTLESNAKE-ROOT. **Hab:** Forests. **Dist:** NL (Newfoundland) west to MI, south to GA, LA, and AR. **Phen:** Aug-Nov. **Tax:** The variation of pappus color responsible for the sometime recognition of two varieties (see synonymy) needs additional study. **Syn:** = K3, NE, S, Tn, Va; = *Prenanthes altissima* Linnaeus – Ar, FNA19, G, K1, Mi, Oh3, Pa, RAB, W, WV, Fusiak & Schilling (1984), Johnson (1980); > *Nabalus altissimus* var. *altissimus* – Il; > *Nabalus altissimus* var. *cinnamomea* (Fernald) Mohlenbrock – Il; > *Prenanthes altissima* var. *altissima* – C, F, SE1; > *Prenanthes altissima* var. *cinnamomea* Fernald – C, F, SE1. NatureServe G5 (Secure).

Nabalus asper (Michaux) Torrey & A. Gray. ROUGH RATTLESNAKE-ROOT. **Hab:** Prairies, glades, and barrens, limestone woodlands. **Dist:** PA, OH, WI, MN, and SD south to c. TN, MS, LA, and OK. Discovered in AL (D. Estes, pers.comm. 2021). **Phen:** Aug-Sep. **Syn:** = Il, K4, S, Tn; = *Nabalus asperus* (Michaux) Torrey & A. Gray – K3; = *Prenanthes aspera* Michaux – Ar, C, F, FNA19, G, GrPl, K1, Oh3, SE1. NatureServe G4? (Apparently Secure).

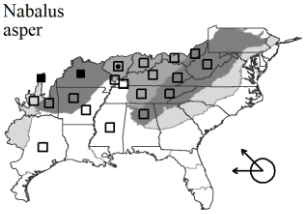
Nabalus barbatus (Torrey & A. Gray) A. Heller. BARBED RATTLESNAKE-ROOT, FLATWOODS RATTLESNAKE-ROOT, PRAIRIE LION'S-FOOT. **Hab:** Limestone glades, calcareous barrens, and calcareous oak flatwoods. **Dist:** C. TN (Western Highland Rim) (Chester, Wofford, & Kral 1997), nw. GA, and n. AL west to se. AR, e. TX and w. LA. **Phen:** Aug-Oct. **Syn:** = K3, K4, Tn; = *Prenanthes barbata* (Torrey & A. Gray) Milstead – Ar, FNA19, K1, SE1; < *Nabalus integrifolius* Cassini – S, misapplied. NatureServe G3 (Vulnerable).

Nabalus serpentaria (Pursh) Hooker. LION'S-FOOT, GALL-OF-THE-EARTH. **Hab:** Forests. **Dist:** MA south to GA, ne. FL, Panhandle FL, and MS. **Phen:** Aug-Oct. **Tax:** Pursh (1814) capitalized the epithet (in *Prenanthes*), indicating that he regarded the epithet as a noun in apposition, not an adjective; the correct spelling of the epithet in *Nabalus* is therefore "*serpentaria*". **Syn:** = Fl7; = *Nabalus serpentarius* (Pursh) Hooker – K3, K4, Tn, Va; = *Prenanthes serpentaria* Pursh – C, F, FNA19, G, K1, Oh3, Pa, RAB, SE1, W, WH3, WV, Fusiak & Schilling (1984), Johnson (1980); >< *Nabalus integrifolius* Cassini – S, (also see Prenanthes barbata); > *Nabalus serpentarius* (Pursh) Hooker – S. NatureServe G5 (Secure).

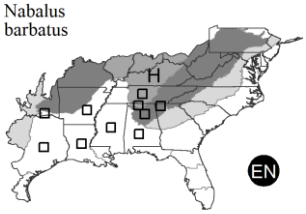
Nabalus altissimus



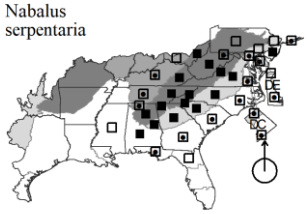
Nabalus asper



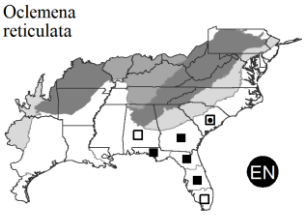
Nabalus barbatus



Nabalus serpentaria



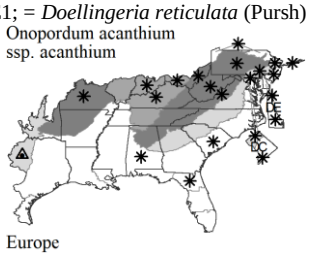
Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



Oclemena E.L. Greene 1903 (ASTER, NODDING-ASTER)

A genus of 3 species, perennial herbs, of e. North America. There now appears to be strong evidence (morphologic and molecular) and something approaching a consensus for the recognition of *Oclemena* as distinct from *Aster*. It appears that *Oclemena* is most closely related to *Ionactis*, and that these two genera are more closely related to *Solidago* and *Heterotheca* than to *Aster* (in a narrower sense). References: Brouillet & Simon (1981); Brouillet (2006f) in FNA20 (2006b); SE1; Nesom (1994a); Nesom (1997a); Semple, Heard, & Xiang (1996).

Oclemena reticulata (Pursh) Nesom. PINE-BARREN ASTER. **Hab:** Wet pine flatwoods. **Dist:** Se. SC south through e. GA to c. peninsular FL. **Phen:** Early Apr-early Jun. **Syn:** = Fl7, FNA20, K1, K3, K4, WH3, Nesom (1994a); = *Aster reticulatus* Pursh – GW2, RAB, SE1; = *Doellingeria reticulata* (Pursh) Greene – S. NatureServe G4G5 (Apparently Secure).



Onopordum Linnaeus 1753 (SCOTCH THISTLE, COTTON-THISTLE)

A genus of about 60 species, herbs, of the Mediterranean region and w. Asia. References: SE1; Keil (2006d) in FNA19 (2006a).

* ***Onopordum acanthium*** Linnaeus *ssp.* ***acanthium***. SCOTCH THISTLE, COTTON-THISTLE. **Hab:** Disturbed areas. **Dist:** Native of Europe. **Phen:** Jul-Oct. **Syn:** = FNA19, NE, Pa; < *Onopordum acanthium* – C, F, Fl7, G, GrPl, Il, K1, K3, K4, Mi, NcTx, Oh3, S, SE1, WH3. NatureServe GNRTNR (Not Yet Ranked).

Packera Á. Löve & D. Löve 1976 (RAGWORT)

A genus of about 65 species, annual and perennial herbs, of subtropical, temperate, and arctic North American, with a few species in Siberia. These species have usually been considered part of *Senecio*, and have often been given informal status as "the Aureoid group". According to recent interpretations, this group warrants generic status, as *Packera* (Bremer 1994). References: Barkley (1962); Barkley (1978); Barkley (1999); Boufford et al (2014); Bremer (1994); SE1; Gramling (2006); Kowal & Mahoney (2016); Kowal et al (2015); Mabberley (2020); Mahoney & Kowal (2008); Trock (2006) in FNA20 (2006b); Weakley et al (2011).

Unkeyed taxa: *Packera plattensis*

1 Plant an annual (rarely a biennial) from a fibrous root system or a taproot; leaves with lateral lobes either broadly rounded (and toothed) apically and broadly triangular-cuneate or rounded at the base, or parallel-sided in their lower half and 3-5-lobed apically, the lateral lobes resembling the terminal lobe in shape and usually size; [of wet soil of swamps and wet fields] ..... ***Packera glabella***

1 Plant a perennial (rarely a biennial) from a short caudex or longer rhizome; leaves with lateral lobes absent, or distinctly narrower than the terminal lobe; [of dry to mesic soils, but not generally as above].

5 Basal leaves with leaf bases cordate, truncate, obliquely truncate, or rounded, abruptly tapering to the petiole; leaf blades either 0.8-2× as long as broad or 4-7× as long as broad. ..... ***Packera aurea***

5 Basal leaves cuneate at the base, with leaf tissue often somewhat decurrent along upper petiole or petiole winged throughout; leaf blades oblong, elliptic, lanceolate, oblanceolate, or spathulate, 1.5-8× longer than broad.

8 Plants glabrate to sparsely floccose when young, becoming glabrous to glabrate later in the growing season, though some species with some persistent floccose tomentum near the base or in the leaf axils (the leaves appearing green); basal leaves serrate or lobed.

9 Basal leaves ovate, orbicular, or reniform, the blade 0.8-2× as long as wide; plants often forming clonal patches by stolons or widely creeping rhizomes ..... ***Packera obovata***

9 Basal leaves oblanceolate, narrowly elliptic, the blade 2-8× as long as wide; plants usually not forming clonal patches by stolons or widely creeping rhizomes.

10 Heads many, generally 20-100; basal leaves (including petioles) up to 30 cm long and 3.5 cm wide ..... ***Packera anonyma***

10 Heads few, generally 5-20; basal leaves (including petioles) up to 12 cm long and 2 cm wide.

11 Leaves with 11-25 teeth per margin; leaves not triple-nerved; plants 28-50 cm tall; larger basal leaves 10-26 cm long; stem leaves pinnatifid; [of wetlands: wet meadows, wet prairies, bogs, seeps, and wet pine savannas] ..... ***Packera crawfordii***

11 Leaves with 3-10 teeth per margin; leaves somewhat triple-nerved; plants 14-30 cm tall; larger basal leaves 5-10 cm long; stem leaves unlobed, entire or few-toothed; [of dry uplands: cobble bars, riverbanks, glades and barrens] ..... ***Packera paupercula var. paupercula***

8 Plants densely tomentose or floccose when young, remaining visibly tomentose throughout the growing season on the leaves (these appearing grayish because of the persistent tomentum); basal leaves entire, obscurely crenate, or serrate (rarely lobed). ..... ***Packera dubia***

Packera anonyma (Wood) W.A. Weber & Á. Löve. APPALACHIAN RAGWORT, SMALL'S RAGWORT. **Hab:** Rock outcrops, roadsides, woodlands; hammocks, disturbed areas. **Dist:** S. PA, DE, and KY, south to Panhandle FL and c. MS. First reported for LA in Caddo Parsh by Kelley (2020). **Phen:** May-early Jun. **Syn:** = Fl7, FNA20, K1, K3, K4, Pa, Tn, Va, WH3, Barkley (1999), Kowal & Mahoney (2016); = *Senecio anonymus* Wood – C, Oh3, SE1, Barkley (1978); = *Senecio smallii* Britton – F, G, RAB, S, WV. NatureServe G5 (Secure).

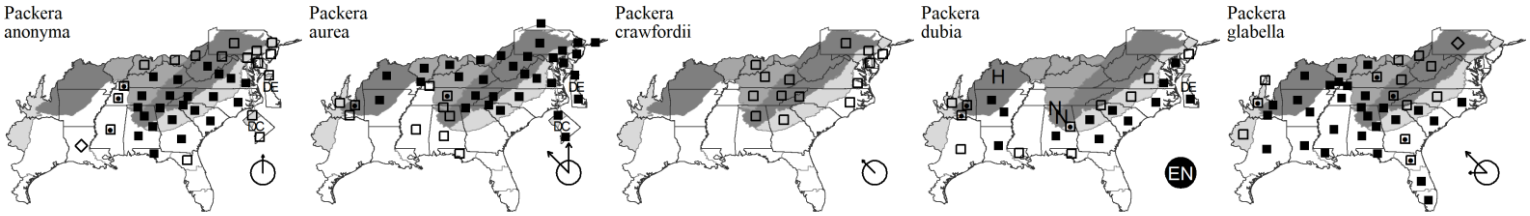
Packera aurea (Linnaeus) Á. Löve & D. Löve. GOLDEN GROUNDSEL, GOLDEN RAGWORT, HEARTLEAF RAGWORT. **Hab:** Moist forests, bottomlands, bogs, stream banks. **Dist:** NL (Labrador) west to MN, south to NC, ne. SC, n. GA, n. AL, and c. AR; disjunct in Panhandle FL. **Phen:** Late Mar-Jun. **Tax:** This species is variable, and some of the more striking variants have been named; some may well warrant formal taxonomic recognition, but additional study is needed. **Syn:** = Ar, Fl7, FNA20, Il, K1, K3, K4, Mi, NE, Pa, Tn, Va, WH3, Barkley (1999); = *Senecio aureus* Linnaeus – C,

G, GW2, Oh3, RAB, SE1, WV, Barkley (1978); > *Senecio aureus* Linnaeus – S; > *Senecio aureus* var. *aureus* – F; > *Senecio aureus* var. *gracilis* (Pursh) Hooker – F; > *Senecio aureus* var. *intercursus* Fernald – F; > *Senecio gracilis* Pursh – S. NatureServe G5 (Secure).

Packera crawfordii (Britton) A.M. Mahoney & R.R. Kowal. CRAWFORD'S GROUNDSEL, CRAWFORD'S RAGWORT. **Hab:** Bogs, fens, calcareous longleaf pine savannas. **Dist:** NJ, PA, and n. IL south to e. NC, w. NC, and TN. **Comm:** See Kowal et al. (2015) and Mahoney & Crawford (in press) for additional information. **Syn:** = K4, Tn, Kowal & Mahoney (2016); = *Senecio crawfordii* (Britton) G.W. & G.R. Douglas – F; < *Packera paupercula* (Michaux) Á. & D. Löve – Fl7, FNA20, Pa, WH3; < *Senecio pauperculus* Michaux – C, G, GW2, RAB, S, SE1, Barkley (1978).

Packera dubia (Sprengel) Trock & Mabberley. WOOLLY GROUNDSEL, WOOLLY RAGWORT, WOOLLY GOLDENWORT. **Hab:** Sandy roadsides, sandy woodlands and forests, granitic flatrocks, granitic domes. **Dist:** S. NJ south to GA, west to TX, primarily on the Coastal Plain, but extending inland in the Piedmont and Mountains in thin sandy soils around rock outcrops, and as a roadside weed. **Phen:** Apr-early Jun. **Syn:** = Mabberley (2020), replacement name; = *Packera tomentosa* (Michaux) C. Jeffrey – Ar, FNA20, K1, K3, Va, Barkley (1999), Kowal & Mahoney (2016); = *Senecio tomentosus* Michaux – C, F, G, GW2, RAB, SE1, Barkley (1978), nom. illegit.; > *Senecio alabamensis* Britton – S; > *Senecio tomentosus* Michaux – S, nom. illegit.. NatureServe G4G5 (Apparently Secure).

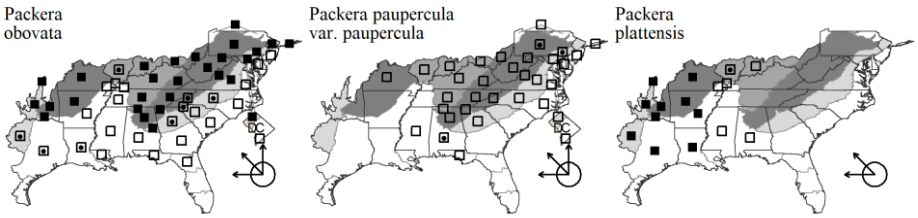
Packera glabella (Poiret) C. Jeffrey. BUTTERWEED, SMOOTH RAGWORT, SMOOTH GROUNDSEL, YELLOWTOP. **Hab:** Swamp forests, bottomland forests, cleared areas in bottomlands, wet agricultural fields, ditches, often in mucky soils. **Dist:** E. NC south to s. FL, west to e. TX, north in the interior to sw. WV, OH, MO, and SD. **Phen:** Mar-early Jun. **Syn:** = Ar, Fl7, FNA20, Il, K1, K3, K4, Mi, Pa, Tn, WH3, Barkley (1999); = *Senecio glabellus* Poiret – C, F, G, GrPl, GW2, Oh3, RAB, S, SE1, WV, Barkley (1978). NatureServe G5 (Secure).



Packera obovata (Muhlenberg ex Willdenow) W.A. Weber & Á. Löve. ROUNDLEAF GROUNDSEL, ROUNDLEAF RAGWORT, RUNNING RAGWORT. **Hab:** Nutrient rich forests and woodlands (dry or moist), usually over calcareous or mafic rocks. **Dist:** VT west to KS, south to Panhandle FL and TX. **Phen:** Mar-Jun. **Syn:** = Ar, Fl7, FNA20, Il, K1, K3, K4, Mi, NcTx, NE, Pa, Tn, Va, WH3, Barkley (1999), Kowal & Mahoney (2016); = *Senecio obovatus* Muhlenberg ex Willdenow – C, GrPl, Oh3, RAB, SE1, Barkley (1978); > *Senecio obovatus* Muhlenberg ex Willdenow – S; > *Senecio obovatus* var. *elliottii* (Torrey & A. Gray) Fernald – F, G, WV; > *Senecio obovatus* var. *obovatus* – F, G, WV; > *Senecio obovatus* var. *rotundus* Britton – F; > *Senecio rotundus* (Britton) Small – S. NatureServe G5 (Secure).

Packera paupercula (Michaux) Á. Löve & D. Löve *var*. ***paupercula***. NORTHERN MEADOW GROUNDSEL, BALSAM RAGWORT. **Hab:** Thickets, meadows, glades, generally over circumneutral soils derived from calcareous or mafic rocks. **Dist:** NL (Labrador) west to AK, south to GA, Panhandle FL (Bay County), AL, and OR. **Phen:** Apr-May. **Tax:** This taxon is heterogeneous and needs additional study. **Syn:** = Il, K3, K4, Tn, Va, Kowal & Mahoney (2016), Mahoney & Kowal (2008); < *Packera paupercula* (Michaux) Á. & D. Löve – Fl7, FNA20, K1, NE, Pa, WH3, Barkley (1978), Barkley (1999); < *Senecio pauperculus* Michaux – C, G, GrPl, GW2, Oh3, RAB, S, SE1; > *Senecio pauperculus* var. *balsamitae* (Muhlenberg ex Willdenow) Fernald – F; > *Senecio pauperculus* var. *pauperculus* – F; > *Senecio pauperculus* var. *praelongus* (Greenman) House – F.

Packera plattensis (Nuttall) W.A. Weber & Á. Löve. PRAIRIE GROUNDSEL, PRAIRIE RAGWORT. **Hab:** Thin calcareous soils. **Dist:** N. OH, n. IN, IL, WI, MN, ON, MB, SK, and BC south to MS, LA, TX, and NM. **Phen:** May-Jul. **Syn:** = K3, K4, NcTx, Kowal & Mahoney (2016); < *Packera plattensis* (Nuttall) W.A. Weber & Á. Löve – Ar, FNA20; < *Senecio plattensis* Nuttall – GrPl, Oh3. NatureServe G5 (Secure).



Parthenium Linnaeus 1753 (WILD QUININE)

A genus of about 16 species, herbs and shrubs, of North America and the West Indies. The genus should be divided, based on multiple lines of evidence. References: SE1; Mears (1975); Rollins (1950); Strother (2006ff) in FNA21 (2006c).

1 Leaves pinnatifid to bipinnatifid, the primary sinuses extending 9/10 or more of the way to the midrib; leaves thin in texture; pappus of 2 petaloid scales; [section *Parthenium*].
..... ***Parthenium hysterophorus***

1 Leaves toothed (pinnatifid or sinuous-margined in forms of *P. integrifolium* var. *mabryanum*, the sinuses extending up to 3/4 of the way to the midrib); leaves somewhat thick in texture; pappus of 2-3 weak awns; [native perennials]; [section *Partheniastrum*].
3 Plants arising from a short caudex surmounting a system of fleshy-thickened but tough roots; stems glabrous or with short, appressed pubescence < 1 mm long; cauline leaves seldom auriculate-clasping, the upper cauline leaves typically sessile or petiolate, the lower cauline leaves petiolate, the petioles winged or not; blades of basal leaves (4-) 6-21 (-27) cm long, (1.4-) 2-12 (-13.5) cm wide.
..... ***Parthenium integrifolium var. integrifolium***

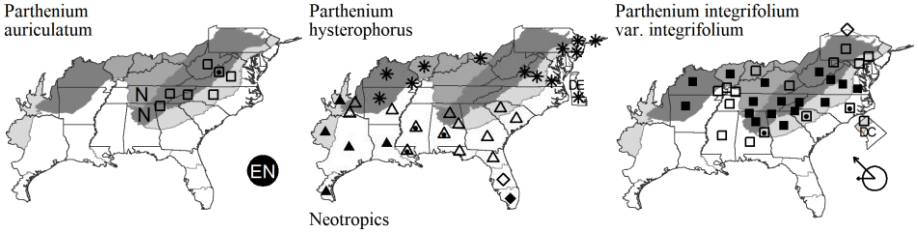
Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

3 Plants arising from a long, even-width, 3–5(–6) mm wide, branching, woody or lignescent rhizome; stems either with coarse, spreading pubescence 1-3 mm long or puberulous or strigose with hairs < 1 mm long; cauline leaves all auriculate-clasping, the upper cauline leaves sessile and auriculate-clasping, the lower cauline leaves with winged petioles, the wings expanded at the base; blades of basal leaves 11-18 (-20) cm long, 5-8 cm wide. ..... ***Parthenium auriculatum***

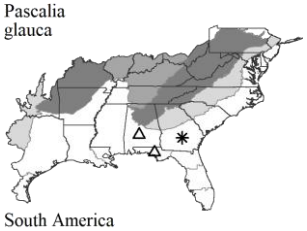
Parthenium auriculatum Britton. GLADE WILD QUININE. **Hab:** In shallow, xeric, circumneutral soil of glades, barrens, and woodlands, over calcareous rocks (such as dolostone) or mafic rocks (such as diabase). **Dist:** Ne. WV south to nc. SC. Reports from AL and c. TN appear to be misidentified. **Phen:** Mid May-Aug. **Tax:** As indicated by the confusion over its taxonomy, the relationships and appropriate taxonomic treatment of this taxon are unclear. It is clearly specifically distinct from *P. integrifolium*, and I have not followed the reduction of it to varietal rank by Mears (1975). **Syn:** = C, G, K1, K3, K4, SE1, Va; = *Parthenium hispidum* Rafinesque var. *auriculatum* (Britton) Rollins – F, WV, Rollins (1950); = *Parthenium integrifolium* var. *auriculatum* (Britton) Cornelius ex Cronquist – RAB, Mears (1975); < *Parthenium hispidum* Rafinesque – W; < *Parthenium integrifolium* – FNA21, S.

* ***Parthenium hysterophorus*** Linnaeus. SANTA MARIA, FEVERFEW, GAJARGHASS, CONGRESS GRASS. **Hab:** Disturbed areas. **Dist:** Native of tropical America, including the West Indies. **Phen:** Jul-Nov. **Syn:** = Ar, Bah, C, F, Fl7, FNA21, G, GrPl, Il, K1, K3, K4, Mi, Mo2, NcTx, NE, Oh3, Pa, S, SE1, Tx, WH3, Rollins (1950). NatureServe GNR (Not Yet Ranked).

Parthenium integrifolium Linnaeus *var. **integrifolium***. COMMON WILD QUININE. **Hab:** Woodlands, roadsides, various dryish habitats, mainly open or sparsely wooded. **Dist:** VA west to MN, south to SC, GA, ne. MS, and nw. AR. **Phen:** Late May-Aug. **Tax:** Var. *henryanum* Mears appears to be merely a form of var. *integrifolium*. **Syn:** = K1, Mo2, NE, Va; < *Parthenium integrifolium* – Ar, C, F, FNA21, G, GrPl, Il, K3, K3, K4, Mi, Oh3, Pa, S, SE1, W, WV, Rollins (1950); > *Parthenium integrifolium* var. *henryanum* Mears – Mears (1975); < *Parthenium integrifolium* Linnaeus var. *integrifolium* – RAB, Tn; > *Parthenium integrifolium* Linnaeus var. *integrifolium* – Mears (1975).



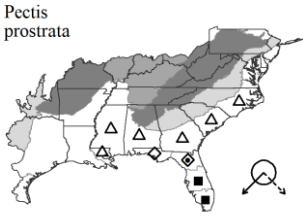
Pascalia Ortega 1797



A genus of 2 species, perennial herbs, of South America. References: SE1; Strother (2006tt) in FNA21 (2006c).

* ***Pascalia glauca*** Ortega. BEACH CREEPING OXEYE. **Hab:** Coastal dunes, disturbed areas. **Dist:** Native of South America, perhaps only a waif. Reported for FL, GA, and AL. **Syn:** = Fl7, FNA21, K1, K3, K4, S, WH3; = *Wedelia glauca* (Ortega) O. Hoffmann – SE1. NatureServe GNR (Not Yet Ranked).

Pectis Linnaeus 1759

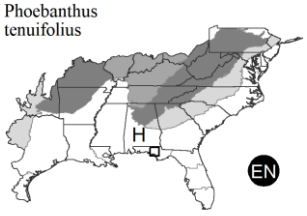


A genus of about 90 species, herbs, of s. North America, Mexico, Central America, West Indies, South America, and Pacific Islands. References: SE1; Keil (2006m) in FNA21 (2006c).

Key based on Keil (2006m).

Pectis prostrata Cavanilles. **Hab:** Roadsides, mowed areas, other dry disturbed areas. **Dist:** Native of tropical America (probably including s. FL). Reported for NC (Basinger, pers. comm., 2006), GA (Carter, Baker, & Morris 2009), and SC (Bradley et al. [in prep.]). **Phen:** Jul-Nov. **Comm:** Spreading northward along roadsides, the original distribution unclear. **Syn:** = Bah, Fl7, FNA21, K3, K4, S, SE1, WH3. NatureServe G4 (Apparently Secure).

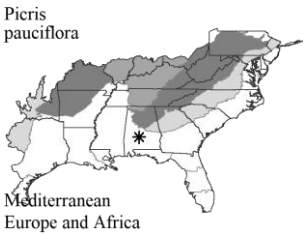
Phoebanthus S.F. Blake 1916



A genus of 2 species, perennial herbs, of the Southeastern United States (FL and AL). References: SE1; Schilling (2006a) in FNA21 (2006c).

Phoebanthus tenuifolius (Torrey & A. Gray) S.F. Blake. **Hab:** Longleaf pine sandhills and flatwoods. **Dist:** Endemic to s. AL and Panhandle FL. **Phen:** May-Sep. **Syn:** = Fl7, FNA21, K1, K3, K4, SE1, WH3; = *Phoebanthus tenuifolia* – S, orthographic variant. NatureServe G3 (Vulnerable).

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



Picris Linnaeus 1753 (BITTERWEED, OXTONGUE)

A genus of about 40 species, of the Old World, particularly the Mediterranean region. References: SE1; Strother (2006w) in FNA19 (2006a).

* ***Picris pauciflora*** Willdenow. SMALLFLOWER OXTONGUE. **Hab:** On ballast. **Dist:** Native of Mediterranean Europe and w. Asia. **Syn:** = K4. NatureServe GNR (Not Yet Ranked).

Pityopsis Nuttall 1840 (GRASS-LEAVED GOLDEN-ASTER)

Contributed by Alan S. Weakley, Edwin L. Bridges, & Bruce A. Sorrie

A genus of about 13 taxa (variously recognized at species or varietal rank), perennial herbs, of se. North America south to Central America. *Pityopsis* is taxonomically and nomenclaturally difficult. The problems include species and varietal concepts in a morphologically and cytologically diverse group, nomenclatural issues involving typification and application (and frequently misapplication) of a plethora of names at specific and varietal ranks, in three genera: a narrow *Pityopsis*, a broader *Chrysopsis*, or a very broad *Heterotheca*. References: Bowers (1972); Bridges & Orzell (2018b) in Weakley et al (2018a); SE1; Nesom (2019a); Nesom (2019b); Semple & Bowers (1985); Semple & Jabbour (2019); Semple (2006d) in FNA20 (2006b); Ward (2004c).

1 Basal leaves shorter than to equaling the stem leaves; middle and upper stem leaves similar in size to one another, 1-20 mm wide. ..... ***Pityopsis pinifolia***
1 Basal leaves much longer than the stem leaves; stem leaves strongly reduced upward, the upper stem leaves much smaller than middle stem leaves, usually the largest stem leaves > 5 mm wide.
  7 Heads < 10, often only 1-6; cauline leaves few, generally 2-7; [distinctly wetland in habitat and typically spring-flowering]; [sw. GA, s. AL, and the FL Panhandle]..... ***Pityopsis oligantha***
  7 Heads > 10; cauline leaves many; [primarily upland in habitat and fall-flowering]; [collectively widespread in our area].
    8 Peduncles and upper stem densely glandular-hairy (stipitate-glandular); phyllaries densely glandular-hairy; involucres 4.5-8 mm high; lower leaves < 10 mm wide. ..... ***Pityopsis aspera var. adenolepis***
    8 Peduncles and upper stem eglandular to sparsely glandular; phyllaries eglandular, or the inner phyllaries sparsely to densely glandular, at least distally; involucres 5-14 mm high; lower leaves up to 20 mm wide.
      12 Phyllaries in unequal series, linear triangular (outer) to narrowly oblong-lanceolate (innermost), innermost series unevenly longer than the next outer series, inner to middle often glandular distally or only at the very apex, inner usually distinctly thinner; [widespread in our region, including in the inland provinces east of the Mississippi]..... ***Pityopsis nervosa***
      12 Phyllaries all similar, linear-triangular, evenly imbricate, glandular or eglandular, of even texture; [either Coastal Plain NC to n. FL west to se. LA, or west of the Mississippi River].
        14 Inner phyllaries densely stipitate-glandular apically, sparsely to moderately sericeous proximally..... ***Pityopsis graminifolia***
        14 Inner phyllaries sometimes sparsely stipitate-glandular, usually sparsely to moderately sericeous throughout..... ***Pityopsis microcephala***

Pityopsis aspera (Shuttleworth ex Small) Small *var.* ***adenolepis*** (Fernald) Semple & F.D. Bowers. **Hab:** Longleaf pine sandhills, dry woodlands, forests, and disturbed places, apparently in the NC Mountains only in the Escarpment. **Dist:** E. MD (R. Simmons, pers. comm., 2016) and e. and c. VA south to n. FL and west to s. MS. **Phen:** Late Jun-Oct. **Tax:** *P. aspera* var. *adenolepis* includes 2 chromosome numbers (2n = 18 and 36), which "account, in part, for the range of variation in involucre, floret, and fruit size" (Semple & Bowers 1985). Nesom (2019a) subsumes this variety under a more broadly defined *P. aspera*, since he did not find a clear morphological or geographic separation between these varieties. We are tentatively maintaining the varieties, pending further field study of this variation. **Syn:** = FNA20, K1, K3, Va, Semple & Bowers (1985); = *Chrysopsis graminifolia* (Michaux) Elliott – F, misapplied; = *Heterotheca adenolepis* (Fernald) H.E. Ahles – Bowers (1972); < *Chrysopsis graminifolia* (Michaux) Elliott var. *aspera* (Shuttleworth ex Small) A. Gray – C, G, SE1, W; > *Heterotheca adenolepis* (Fernald) H.E. Ahles – RAB; > *Heterotheca graminifolia* (Michx.) Shinners – RAB, misapplied; < *Pityopsis aspera* (Shuttleworth ex Small) Small – Fl7, K4, S, WH3, Nesom (2019a). NatureServe G5T5 (Secure).

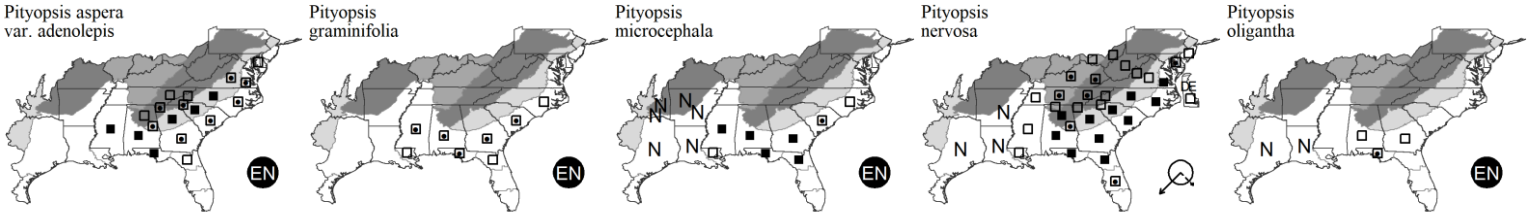
Pityopsis graminifolia (Michaux) Nuttall. **Hab:** Longleaf pine sandhills, other dry woodlands. **Dist:** Se. NC south to n. FL, and west to s. MS. **Phen:** Jul-Oct. **Tax:** Semple & Bowers (1985) treat *P. graminifolia* as encompassing five varieties "that intergrade and hybridize, when the ploidy level is the same" (Semple & Bowers 1985). More recent work by Bridges and Orzell (2018b) and Nesom (2019a) has elevated most of these to species level, as reflected in this treatment. Nesom (2019a) interprets *P. graminifolia* as mostly corresponding to the plants referred to *P. graminifolia* var. *latifolia* by Semple and Bowers (1985) and Semple (2006) in FNA. However, Semple (2019) clearly shows that the type of *Inula graminifolia* is a small-headed specimen with densely stipitate-glandular phyllaries, consistent with the characters of *P. graminifolia* var. *graminifolia* in Semple & Bowers (1985). Pending further study, this name must be used in that sense. This taxon is diploid (2n=18). **Syn:** = *Pityopsis graminifolia* (Michaux) Nuttall var. *graminifolia* – FNA20, K1, K3, Bridges & Orzell (2018b) in Weakley et al (2018a), Semple & Bowers (1985); < *Chrysopsis graminifolia* (Michaux) Elliott var. *graminifolia* – C; < *Chrysopsis graminifolia* (Michaux) Elliott var. *microcephala* (Small) Cronquist – SE1; < *Heterotheca microcephala* (Small) Shinners var. *microcephala* – Bowers (1972); < *Heterotheca nervosa* (Willdenow) Shinners var. *microcephala* (Small) Shinners ex H.E. Ahles – RAB; < *Pityopsis graminifolia* (Michaux) Nuttall – Fl7, K4, WH3; < *Pityopsis microcephala* (Small) Small – S, Nesom (2019a). NatureServe G5T4 (Apparently Secure).

Pityopsis microcephala (Small) Small. **Hab:** Longleaf pine sandhills, sandy woodlands, pine savannas, pine flatwoods, other dry woodlands. **Dist:** Se. NC south to n. FL and west to se. LA (specimens from west of the Mississippi River formerly referred to this species were determined by Nesom (2019a) to represent *P. tenuifolia*). **Phen:** Jul-Oct. **Comm:** This taxon is diploid (2n=18). **Syn:** = K4; = *Pityopsis graminifolia* (Michaux) Nuttall var. *tenuifolia* (Torrey) Semple & F.D. Bowers – Ar, FNA20, K1, K3, Semple & Bowers (1985); < *Chrysopsis graminifolia* (Michaux) Elliott var. *microcephala* (Small) Cronquist – SE1; < *Heterotheca microcephala* (Small) Shinners var. *microcephala* – Bowers (1972); < *Heterotheca nervosa* (Willdenow) Shinners var.

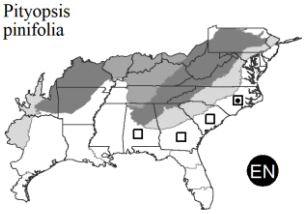
microcephala (Small) Shinners ex H.E. Ahles – RAB; < *Pityopsis graminifolia* (Michaux) Nuttall – Fl7, WH3; < *Pityopsis microcephala* (Small) Small – S, Nesom (2019a). NatureServe G5T5? (Secure).

Pityopsis nervosa (Willdenow) Dress. **Hab:** Longleaf pine sandhills, dry woodlands and forests (such as ridgetop pine/heath communities in the Mountains), roadbanks. **Dist:** S. NJ, DE (formerly), s. OH, and c. AR south to s. FL and nc. TX; Bahamas; also in Mexico (TAM, VER, OAX, CHP) and Central America (Belize, Guatemala, Honduras). **Phen:** Jun-Oct. **Tax:** This is the oldest species name for the most common large-headed member of the *P. graminifolia* complex, including a wide range of variation and possible introgression with other taxa of *Pityopsis*. Most populations are tetraploid (2n=36), but occasional diploids have also been referred here. **Syn:** = *Pityopsis graminifolia* (Michaux) Nuttall – Nesom (2019a); = *Pityopsis nervosa* (Willdenow) Dress var. *nervosa* – Ward (2004c); < *Chrysopsis graminifolia* (Michaux) Elliott – G; < *Chrysopsis graminifolia* (Michaux) Elliott var. *graminifolia* – SE1, misapplied; < *Chrysopsis graminifolia* (Michaux) Elliott var. *latifolia* Fernald – C, W; > *Chrysopsis nervosa* (Willdenow) Fernald var. *nervosa* – F; > *Chrysopsis nervosa* var. *stenolepis* Fernald – F; > *Chrysopsis nervosa* var. *virgata* Fernald – F; > *Heterotheca correllii* (Fernald) H.E. Ahles – RAB; < *Heterotheca graminifolia* (Michx.) Shinners – Bah, Tx, Bowers (1972); > *Heterotheca nervosa* (Willdenow) Shinners var. *nervosa* – RAB; > *Heterotheca oligantha* (Chapman) Harms – Tx, misidentifications; < *Pityopsis graminifolia* (Michaux) Nuttall – Fl7, K4, Oh3, S, WH3, misapplied; < *Pityopsis graminifolia* (Michaux) Nuttall var. *latifolia* Fernald – Ar, FNA20, K1, K3, NcTx, Tn, Va, Semple & Bowers (1985).

Pityopsis oligantha (Chapman ex Torrey & A. Gray) Small. NARROW-LEAVED GOLDENASTER, BOG GOLDENASTER. **Hab:** Wet pine flatwoods, pine savannas, and pitcherplant bogs. **Dist:** Sw. GA and Panhandle FL west to s. AL; reports from e. TX (Holmes & Singhurst 2012), e. LA, and w. LA, represent misidentifications of *Pityopsis nervosa*. **Phen:** Mar-Jun. **Syn:** = Fl7, FNA20, K1, K3, K4, S, WH3, Nesom (2019a), Semple & Bowers (1985); = *Chrysopsis oligantha* Chapman ex Torrey & A. Gray – SE1; = *Heterotheca oligantha* (Chapman) Harms – Bowers (1972). NatureServe G2? (Imperiled).



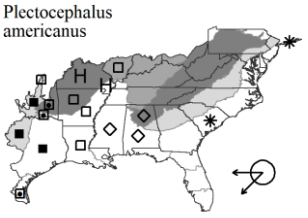
Pityopsis pinifolia (Elliott) Nuttall. SANDHILL GOLDENASTER. **Hab:** Sandhills, sandy roadsides. **Dist:** This species is locally abundant (and often weedy) but very local in distribution, limited to (apparently) scattered counties in the Sandhills (rarely middle Coastal Plain) of s. NC, SC, GA, and c. AL. **Phen:** Aug-Oct. **Syn:** = FNA20, K1, K3, K4, S, Nesom (2019a), Semple & Bowers (1985); = *Chrysopsis pinifolia* Elliott – SE1; = *Heterotheca pinifolia* (Elliott) H.E. Ahles – RAB, Bowers (1972). NatureServe G4 (Apparently Secure).



Plectocephalus D. Don in R. Sweet 1830 (BASKETFLOWER)

A genus of 4 species, annual herbs, of midwestern North America, Mexico, South America, and Africa. References: Keil (2006j) in FNA19 (2006a).

Plectocephalus americanus (Nuttall) D. Don in R. Sweet. AMERICAN BASKETFLOWER. **Hab:** Glades and woodlands; eastwards as a waif in waste ground around wool-combing mills in e. SC (Nesom 2004d). **Dist:** S. IL, MO, KS, NM, and AZ south to s. AR, w. LA, TX, and Mexico (CHH, COA, DUR, HID, NLE, OAX, ROO, SLP, SON, TAM). **Phen:** Jul-Sep. **Syn:** = Ar, FNA19, Il, K3, K4; = *Centaurea americana* Nuttall – C, F, G, GrPl, K1, Mo2, NcTx, SE1. NatureServe G5 (Secure).



Pluchea Cassini 1817 (MARSH-FLEABANE)

A genus of about 40 species, herbs and shrubs, of tropical, subtropical, and warm temperate regions. References: Arriagada (1998); SE1; Godfrey (1952); Nesom (1989); Nesom (2004a); Nesom (2006r) in FNA19 (2006a); Pruski (2005).

1 Stems winged by decurrent leaf bases ..... ***Pluchea sagittalis***
1 Stems not winged by decurrent leaf bases.
  2 Leaves petiolate or narrowly cuneate at the base; [section *Pluchea*].
    4 Phyllaries glandular on the outer surface (the outer bracts also somewhat pubescent); inflorescence paniculiform, the lateral branches not reaching or exceeding the central branches; plants to 20 dm tall; [in freshwater habitats and uplands, widespread inland] ..... ***Pluchea camphorata***
    4 Phyllaries short-pubescent with several-celled glandular-tipped hairs; inflorescence more-or-less corymbiform and flat-topped, some of the lower lateral branches elongate and reaching or exceeding the central branches; plants to 10 (-15) dm tall; [mainly in salty or brackish habitats, restricted to the outer Coastal Plain] ..... ***Pluchea odorata***
  2 Leaves sessile, and either rounded, truncate, or clasping at the base; [section *Amplectifolium*].
    6 Stems and leaves glandular, otherwise nearly glabrous; involucre 4-5 mm wide ..... ***Pluchea yucatanensis***
    6 Stems and leaves puberulent or arachnose as well as glandular; involucre 5-12 mm wide.
      7 Corollas pink or purple; heads 4-6 mm high, 5-9 mm wide; phyllaries usually arachnoid and commonly also with dense, thick, viscid hairs; outer phyllaries acuminate; nutlets black, 0.5-1 mm long, densely pubescent; [flowering Jun-Jul] ..... ***Pluchea baccharis***
      7 Corollas creamy white; heads 6-10 mm high, 6-12 mm wide; phyllaries thinly arachnoid, with sessile glands; outer phyllaries obtuse or obtuse-apiculate; nutlets pinkish, ca. 1 mm long, pubescent on the angles; [flowering late Jul-Oct]. ..... ***Pluchea foetida var. foetida***

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

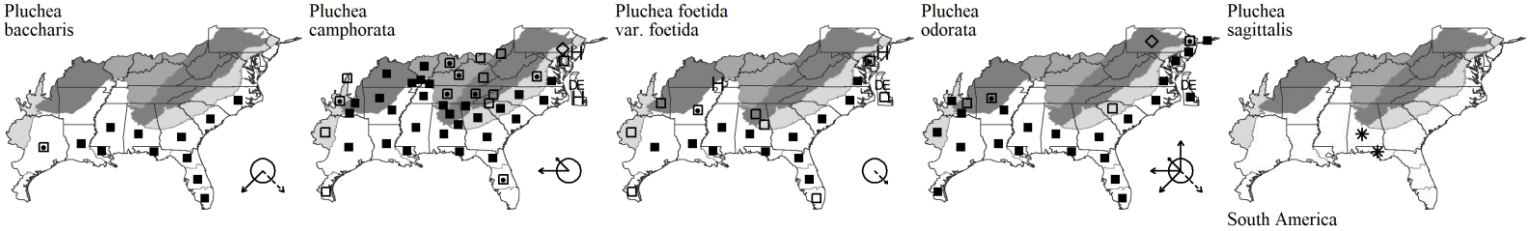
Pluchea baccharis (P. Miller) Pruski. ROSE FLEABANE, SAVANNA FLEABANE. **Hab:** Wet pine savannas, other saturated wetlands. **Dist:** E. NC south to s. FL, west to se. TX; Bahamas, Cuba, Mexico, and Central America. **Phen:** Jun-Jul. **Tax:** Pruski (2005) established that *P. baccharis* is the correct name for the taxon known in recent decades as *P. rosea*. Godfrey (1952) recognized two varieties of *P. rosea*, var. *rosea* of se. United States and var. *mexicana* R.K. Godfrey of gypsum plains in San Luis Potosí, Mexico; Nesom (1989) recognized the latter taxon at the species level, *P. mexicana* (R.K. Godfrey) Nesom. **Syn:** = Fl7, FNA19, K3, K4, WH3, Pruski (2005); = *Pluchea rosea* R.K. Godfrey – Bah, K1, RAB, Tx, Arriagada (1998), Nesom (1989), Nesom (2004a); = *Pluchea rosea* var. *rosea* – GW2, SE1. NatureServe G4G5 (Apparently Secure).

Pluchea camphorata (Linnaeus) A.P. de Candolle. CAMPHORWEED, CAMPHOR PLUCHEA. **Hab:** Bottomland sloughs, clay flatwoods, other freshwater wetlands, also weedy in upland areas, particularly in sunny areas and following disturbance. **Dist:** DE and NJ (formerly) and MD south to n. peninsular FL, west to TX and OK, north in the interior to s. OH and e. KS. **Phen:** Aug-Oct. **Syn:** = C, F, Fl7, FNA19, G, GW2, Il, K1, K3, K4, NcTx, Oh3, RAB, SE1, Tn, Tx, Va, WH3, Arriagada (1998), Nesom (1989), Nesom (2004a); = *Pluchea petiolata* Cassini – S.

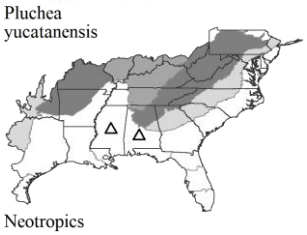
Pluchea foetida (Linnaeus) A.P. de Candolle *var.* ***foetida***. STINKING FLEABANE. **Hab:** Seasonally wet areas, ditches, various other freshwater wetlands. **Dist:** S. NJ south to s. FL, west to e. TX and se. OK; West Indies (Hispaniola). **Phen:** Late Jul-Oct. **Syn:** = K1, K4, Va; < *Pluchea foetida* – Ar, C, F, Fl7, FNA19, G, GW2, K3, NcTx, RAB, SE1, Tx, WH3, Arriagada (1998), Nesom (1989), Nesom (2004a); > *Pluchea foetida* – S; > *Pluchea tenuifolia* Small – S. NatureServe G5T5 (Secure).

Pluchea odorata (Linnaeus) Cassini. SALTMARSH FLEABANE. **Hab:** Salt and brackish marshes. **Dist:** MA and MI south to s. FL and TX (mostly on the Coastal Plain), also in w. United States, Central America, and South America. **Phen:** Aug-Oct. **Tax:** Two varieties are sometimes recognized, the widespread and more robust, but small headed var. *odorata* (involucre 4-6 (-7) mm across the disk, with 6-13 (19) functionally staminate flowers; plants 2-8 (-20) dm tall; of VA southward), and the northeastern North American and less robust but large-headed var. *succulenta* (involucre 7-8 (-10) mm across the disk, with (14-) 21-34 functionally staminate flowers; plants 2-6 dm tall; of NC northward). Additional study is needed to warrant recognition of the varieties. **Syn:** = Bah, Fl7, GW2, NcTx, Va, WH3, Arriagada (1998), Nesom (1989), Nesom (2004a); = *Pluchea purpurascens* (Swartz) A.P. de Candolle – RAB, Tx; > *Pluchea camphorata* (Linnaeus) A.P. de Candolle – S, misapplied; > *Pluchea odorata* var. *odorata* – Ar, C, FNA19, GrPl, K1, K3, K4, SE1; > *Pluchea odorata* (Linnaeus) Cassini var. *succulenta* (Fernald) Cronquist – C, FNA19, Il, K1, K3, K4, Mi, NE, Pa, SE1; > *Pluchea purpurascens* (Swartz) A.P. de Candolle var. *purpurascens* – F, G; > *Pluchea purpurascens* (Swartz) A.P. de Candolle var. *succulenta* Fernald – F, G.

* ***Pluchea sagittalis*** (Lamarck) Cabrera. WING-STEM CAMPHORWEED. **Hab:** Disturbed areas, probably only a waif, known from old collections (1891-1901) from Pensacola, FL, and Mobile, AL. **Dist:** Native of South America. **Phen:** Jul-Aug. **Comm:** {synonymy incomplete}. **Syn:** = Fl7, FNA19, K3, K4, WH3; = *Pluchea quitoc* A.P. de Candolle – S; = *Pluchea suaveolens* (Vellozo) Kuntze – SE1. NatureServe GNR (Not Yet Ranked).



* ***Pluchea yucatanensis*** Nesom. YUCATAN CAMPHORWEED. **Hab:** Brackish marshes. **Dist:** Native of Mexico and Belize. Introduced in s. AL and s. MS. **Syn:** = FNA19, K4. NatureServe GNR (Not Yet Ranked).



Polymnia Linnaeus 1753

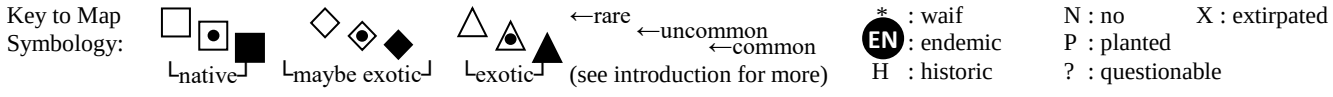
A genus of 4 species, herbs, of e. North America. References: SE1; Estes & Beck (2011); Pittman, Bates, & Kral (1989); Strother (2006ll) in FNA20 (2006b); Wells (1965).

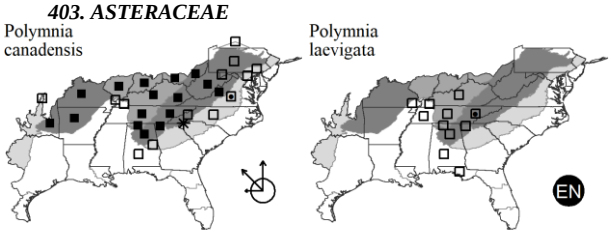
1 Cypselas (4-) 5 (-6)-ribbed; stem either glabrous to glabrescent or glandular-puberulent; heads 3-7 mm in diameter; disc florets 12-29; ray florets (2-) 3-6. ..... ***Polymnia laevigata***

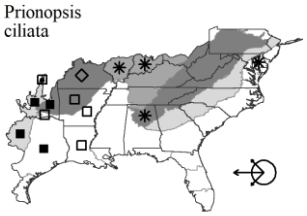
1 Cypselas 3-ribbed; stem obviously and usually densely long-pubescent (rarely glabrous or glabrescent except the upper stem); heads 6-15 mm in diameter; disc florets 26-74; ray florets 5-17. ..... ***Polymnia canadensis***

Polymnia canadensis Linnaeus. WHITE-FLOWERED LEAFCUP. **Hab:** Moist forests, particularly over calcareous rocks. **Dist:** VT and ON west to MN, south to NC, nw. GA, AL, and AR. **Phen:** Jul-Oct. **Tax:** Previously recognized species or varieties (see synonymy) may have merit and need additional evaluation (Tennessee Flora Committee 2015). The "*canadensis* entity" has short rays (1-5 mm long; the "*radiata* entity" has longer, showier rays (6-13 mm long). **Syn:** = Ar, C, F, FNA21, G, GrPl, Il, K1, K3, K4, Mi, NE, Oh3, Pa, RAB, SE1, Tn, Va, W, WV, Estes & Beck (2011), Pittman, Bates, & Kral (1989), Wells (1965); > *Polymnia canadensis* Linnaeus – S; > *Polymnia radiata* (A. Gray) Small – S. NatureServe G5 (Secure).

Polymnia laevigata Beadle. TENNESSEE LEAFCUP. **Hab:** Bouldery slopes, coquina outcrops and rubble (in FL). **Dist:** W., c., and se. TN (Chester, Wofford, & Kral 1997), se. MO, AL, nw. GA, and Panhandle FL (Jackson County). **Phen:** May-Jul. **Syn:** = Fl7, FNA21, K1, K3, K4, S, SE1, Tn, WH3, Estes & Beck (2011), Pittman, Bates, & Kral (1989), Wells (1965). NatureServe G3 (Vulnerable).







Prionopsis Nuttall 1840

. References: Strother & Wetter (2006a) in FNA20 (2006b).

Prionopsis ciliata (Nuttall) Nuttall. SPANISH-GOLD, WAX GOLDENWEED. **Hab:** Glades, prairies, roadsides, other disturbed areas. **Dist:** IA and CO south to LA, TX, NM, AZ, and Mexico; occurrences in IL, MO, AR, and LA are sometimes considered adventive. Reported as a waif in AL by Barger et al. (2019). **Phen:** Aug-Oct. **Syn:** = Il, K3, K4, Tx, Bartoli & Tortosa (2012); = *Grindelia ciliata* (Nuttall) Sprengel – Ar, FNA20, Mi, Mo2; = *Haplopappus ciliatus* (Nuttall) A.P. de Candolle – C, F, GrPl, SE1; > *Grindelia papposa* Nesom & Y.B. Suh – NcTx. NatureServe G4G5 (Apparently Secure).

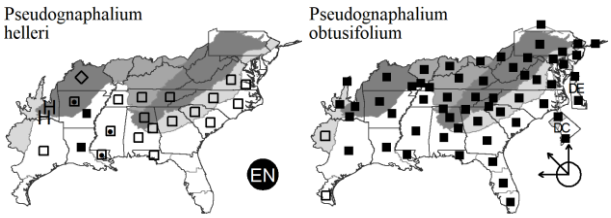
Pseudognaphalium Kirpicznikov 1950 (RABBIT-TOBACCO)

A genus of about 100 species, herbs, nearly cosmopolitan, especially of American temperate regions. References: Anderberg (1991); Arriagada (1998); SE1; Galbany-Casals et al (2004); Mahler (1975); Nesom (2001a); Nesom (2006k) in FNA19 (2006a).

2 Leaves distinctly (but shortly) decurrent 1-10 mm and adnate-auriculate on the stem. ..... ***Laphangium luteoalbum***
2 Leaves sessile, not decurrent or adnate-auriculate.
5 Stem glandular-pubescent or glandular-puberulent, the hairs at right angles to the stem, the stem surface plainly visible. ..... ***Pseudognaphalium helleri***
5 Stem white-woolly or arachnoid with matted white hairs, the stem surface generally obscured (sometimes glandular-pubescent at the base of the stem only) ..... ***Pseudognaphalium obtusifolium***

Pseudognaphalium helleri (Britton) A. Anderberg. HELLER'S RABBIT-TOBACCO. **Hab:** Dry woodlands and openings (especially over mafic rocks), longleaf pine sandhills. **Dist:** Sc. VA south to Panhandle FL, s. AL, west to AR, LA, and ne. TX. **Phen:** Sep-Oct. **Syn:** = Ar, FNA19, Tn, Va, Nesom (2001a); = *Gnaphalium helleri* Britton var. *helleri* – Mahler (1975); = *Gnaphalium obtusifolium* var. *helleri* (Britton) Blake – F, Arriagada (1998); = *Pseudognaphalium helleri* (Britton) A. Anderberg ssp. *helleri* – K3, K4; < *Gnaphalium helleri* – C, G, RAB, S, SE1, W; < *Pseudognaphalium helleri* (Britton) A. Anderberg – Fl7, WH3. NatureServe G4G5T3T4 (Vulnerable).

Pseudognaphalium obtusifolium (Linnaeus) Hilliard & Burtt. EASTERN RABBIT-TOBACCO, FRAGRANT RABBIT-TOBACCO, CAT'S-FOOT. **Hab:** Prairies, openings, woodlands, coastal dunes, sandy pinelands, disturbed areas. **Dist:** NL (Newfoundland) west to ON, south to s. FL and c. and s. TX. **Phen:** Aug-Nov. **Syn:** = Fl7, FNA19, Il, Mi, NcTx, NE, Pa, Tn, Va, WH3, Nesom (2001a); = *Gnaphalium obtusifolium* Linnaeus – GrPl, Oh3, RAB, S, SE1, W, WV; = *Gnaphalium obtusifolium* var. *obtusifolium* – C, G, Arriagada (1998); > *Gnaphalium obtusifolium* var. *obtusifolium* – F; > *Gnaphalium obtusifolium* Linnaeus var. *praecox* Fernald – F; > *Pseudognaphalium obtusifolium* ssp. *obtusifolium* – K3, K4; > *Pseudognaphalium obtusifolium* ssp. *praecox* (Fernald) Kartesz – K3, K4.



Pterocaulon Elliott 1823 (WINGSTEM, BLACKROOT)

A genus of about 18 species, herbs, of tropical, subtropical, and warm temperate America, and of Oceania and se. Asia. References: Arriagada (1998); Cabrera & Ragonese (1978); SE1; Diamond (2020); Nesom (2006p) in FNA19 (2006a).

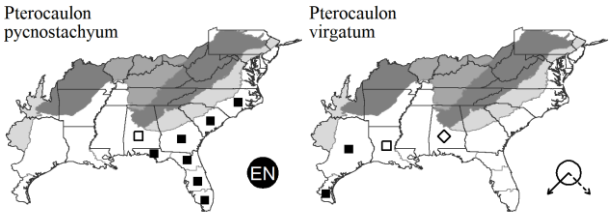
Identification Notes: *Pterocaulon* is an unmistakable plant, the stems and leaf undersurfaces creamy-white floccose-tomentose, the leaf bases decurrent down the stem, the heads in oblong, terminal spikes, the tip nodding before anthesis.

1 Heads in dense, usually continuous clusters 2-8 cm long (the inflorescence axis usually completely hidden by the crowded heads); flowering May-Jun; [AL eastwards] ..... ***Pterocaulon pycnostachyum***
1 Heads in open, interrupted arrays, (5-) 8-20 cm long (the inflorescence axis visible in the interruptions between clusters of heads); flowering Aug-Oct; [s. AL westwards] ..... ***Pterocaulon virgatum***

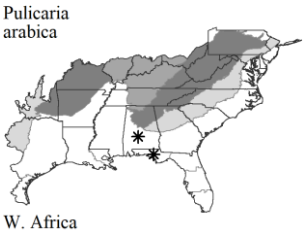
Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Pterocaulon pycnostachyum (Michaux) Elliott. BLACKROOT, PINELAND WINGSTEM. **Hab:** Longleaf pine sandhills, pine flatwoods. **Dist:** Se. NC south to s. FL and west to s. AL. **Phen:** Apr-Jun. **Syn:** = Fl7, FNA19, GW2, K1, K3, K4, RAB, SE1, WH3, Arriagada (1998), Cabrera & Ragonese (1978); = *Pterocaulon undulatum* (Walter) C. Mohr – S. NatureServe G5 (Secure).

Pterocaulon virgatum (Linnaeus) A.P. de Candolle. WAND BLACKROOT. **Hab:** Coastal prairies, pine flatwoods, wet pine savannas, marshes, disturbed grassy areas. **Dist:** S. AL, W. LA, e. TX, s. TX, and Mexico (TAM); Central and South America; West Indies. Reported for s. AL by Diamond (2020). **Phen:** Aug-Oct. **Syn:** = FNA19, K3, K4, Tx, Cabrera & Ragonese (1978), Diamond (2020). NatureServe G5 (Secure).



Pulicaria Gaertner 1791 (FALSE-FLEABANE)



A genus of 100 or more species, herbs (rarely shrubs), of Europe, Asia, and Africa. References: Preston (2006a) in FNA19 (2006a).

* ***Pulicaria arabica*** (Linnaeus) Cassini. LADIES' FALSE FLEABANE. **Hab:** Disturbed areas (on ballast); perhaps just a waif (not recently collected). **Dist:** Native of Africa. **Comm:** {not keyed}. **Syn:** = Fl7, FNA19, K4, SE1, WH3; = *Vicoa auriculata* Cassine – S, misapplied. NatureServe GNR (Not Yet Ranked).

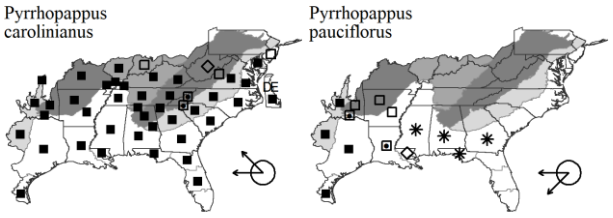
Pyrrhopappus A.P. de Candolle 1838 (FALSE-DANDELION)

A genus of 4-5 species, herbs, of sw., sc., and se. North America. References: SE1; Strother (2006x) in FNA19 (2006a).

2 Outer phyllaries mainly 1/3-2/3 as long as the inner phyllaries; lower and middle stem usually glabrous; leaf margins usually glabrous; upper cauline leaves usually unlobed or with 1-2 (-5) small lobes ..... ***Pyrrhopappus carolinianus***
2 Outer phyllaries mainly < 1/3 as long as the inner phyllaries; lower and middle stem usually sparsely to densely pilose; leaf margins usually ciliate; upper cauline leaves usually pinnately (3-) 5-7 (-9)-lobed ..... ***Pyrrhopappus pauciflorus***

Pyrrhopappus carolinianus (Walter) A.P. de Candolle. FALSE-DANDELION, CAROLINA DESERT-CHICORY. **Hab:** Dry and moist forests, roadsides, meadows, fields. **Dist:** DE, se. PA, and MD south to c. peninsular FL, west to IL, MO, and TX; the pre-Columbian range is uncertain. **Phen:** Mar-Jun (and sometimes later). **Syn:** = Ar, C, F, Fl7, FNA19, G, GrPl, Il, K1, K3, K4, NcTx, Tn, Va, W, WH3, WV; = *Sitilias caroliniana* (Walter) Rafinesque – S; > *Pyrrhopappus carolinianus* var. *carolinianus* – RAB, SE1; > *Pyrrhopappus carolinianus* var. *georgianus* (Shinners) H.E. Ahles – RAB, SE1. NatureServe G5 (Secure).

Pyrrhopappus pauciflorus (D. Don) A.P. de Candolle. SMALL-FLOWERED DESERT-CHICORY. **Hab:** Disturbed areas. **Dist:** AR, OK, NM, and AZ, south to w. LA, TX, and Mexico (AGU, CHH, COA, DUR, GUA, JAL, MEX, NLE, PUE, ROO, SLP, SIN, SON, TAM, ZAC); also adventive eastwards. **Phen:** (Feb.) Apr-May. **Tax:** Here interpreted to exclude *Pyrrhopappus rothrockii* A. Gray. **Syn:** = FNA19; = *Pyrrhopappus multicaulis* A.P. de Candolle – SE1, Tx; = *Sitilias multicaulis* (A.P. de Candolle) Greene – S; > *Pyrrhopappus multicaulis* A.P. de Candolle var. *geiseri* (Shinners) Northington – GrPl; < *Pyrrhopappus pauciflorus* (D. Don) A.P. de Candolle – K1, K3, K4, NcTx.



Ratibida Rafinesque 1817 (PRAIRIE CONEFLOWER)

A genus of about 7 species, herbs, of North America. References: SE1; Richards (1968); Urbatsch & Cox (2006b) in FNA21 (2006c).

Key, in part, from Urbatsch & Cox (2006b).

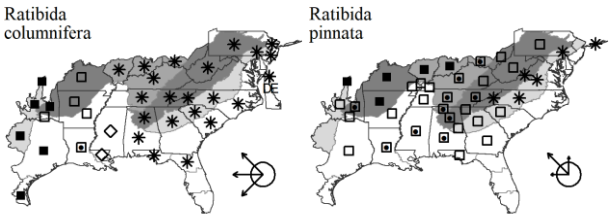
1 Disks ellipsoid-globular, 10-25 mm tall, 1-1.6× as long as thick; plant a fibrous-rooted perennial from a woody rhizome or caudex; rays 2.5-3.5 (-6.0) cm long; achenes smooth, lacking a pappus ..... ***Ratibida pinnata***

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated

1 Disks columnar,10-70 mm tall, 2-4.5× as long as thick; plant a tap-rooted perennial; rays < 2 (-2.5) cm long; achenes ciliate and winged, crowned by a pappus consisting of 1 or more awn-teeth.
..... ***Ratibida columnifera***

Ratibida columnifera (Nuttall) Wooton & Standley. COLUMNAR PRAIRIE CONEFLOWER. **Hab:** Prairies, eastwards in dry disturbed areas, established around nurseries or plantings, waste areas near wool-combing mills. **Dist:** ON west to AB, south to TX, NM, AZ, and Mexico (CHH, COA, HID, NLE, PUE, SLP, SON, TAM, VER, ZAC); introduced at scattered sites eastward, including e. NC, e. SC, and c. TN (Chester, Wofford, & Kral 1997). **Phen:** May-Aug (-Oct). **Syn:** = Ar, C, F, Fl7, FNA21, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, Oh3, Pa, SE1, WH3, WV, Richards (1968); = *Ratibida columnaris* (Sims) D. Don – S, Tx. NatureServe G5 (Secure).

Ratibida pinnata (Ventenat) Barnhart. GLOBULAR PRAIRIE CONEFLOWER, GREY-HEADED CONEFLOWER, DROOPING CONEFLOWER. **Hab:** Prairie-like glades and oak savannas over gabbro (usually in Iredell soils) or calcareous rocks, cedar glades, calcareous (black belt or chalk) prairies, disturbed areas (often planted in 'wildflower mixes' and naturalized from cultivation). **Dist:** S. ON west to MN and SD, south to w. PA, e. TN, nw. GA, Panhandle FL, MS, OK, and ne. TX (Singhurst, Mink, & Holmes 2010); disjunct in nc. SC (Nelson 1993). **Phen:** Jun-Aug (-Oct). **Comm:** A characteristic plant of midwestern prairies and limestone glades. **Syn:** = Ar, C, F, Fl7, FNA21, G, GrPl, Il, K1, K3, K4, Mi, NE, Oh3, Pa, S, SE1, Tn, W, WH3, WV, Richards (1968). NatureServe G5 (Secure).



Rudbeckia Linnaeus 1753 (YELLOW CONEFLOWER, BLACK-EYED SUSAN)

A genus of about 25 or more species, herbs, of North America. References: Campbell & Seymour (2013); SE1; Perdue (1957); Urbatsch & Cox (2006a) in FNA21 (2006c).

Identification Notes: This treatment needs considerable additional work in the herbarium, and will likely be substantially modified. Pales are receptacular bracts which subtend all or some of the disc florets of capitulum. They differ from phyllaries in that they subtend individual florets atop the receptacle vs. phyllaries which subtend the entire head of flowers. They are present within some, but not all, Asteraceae genera, and are most common in the Heliantheae tribe.

3 Leaves (at least some of the largest and generally more basal) 3-lobed or more divided (except *R. laciniata* var. *heterophylla* with sometimes few if any leaves lobed, and these usually the stem leaves).
4 Disc flowers yellow or yellowish-green; achenes 3.5-6.0 mm long.
5 Basal and lower stem leaves 1-2-pinnatifid, with 5-many lobes; plants 1-3 m tall.
..... ***Rudbeckia laciniata var. laciniata***
5 Basal and lower stem leaves 1-5-lobed; plants 0.5-2 m tall.
..... ***Rudbeckia laciniata var. digitata***
4 Disc flowers purple-brown; achenes 1.9-3.5 mm long.
10 Cauline leaves 1-3-lobed (at least some on a plant 3-lobed).
..... ***Rudbeckia triloba var. triloba***
10 Cauline leaves 1-7-lobed (at least some on a plant 5-7-lobed).
..... ***Rudbeckia triloba var. pinnatiloba***
3 Leaves simple, unlobed, toothed (or entire).
13 Pales (bracts of the receptacle) densely pubescent near the tip.
14 Plants glabrous or with scattered inconspicuous hairs.
15 Stem very sparsely spreading-villous (to more conspicuously hairy, and then keyable under 21b); disc to 15 mm high..... ***Rudbeckia heliopsidis***
15 Stem glabrous; disc elongating in fruit, ultimately 12-60 mm high.
16 Leaves strongly blue-green and glaucous, strongly clasping stems.
..... ***Dracopis amplexicaulis***
16 Leaves green, not glaucous, not strongly clasping stems.
..... ***Rudbeckia nitida***
14 Plants conspicuously hirsute or pilose.
19 Plants perennials from a woody rhizome; pappus a low crown; style appendages short, blunt.
..... ***Rudbeckia heliopsidis***
19 Plants annuals, biennials, or perennials from fibrous roots; pappus lacking or a low crown to 0.1 mm high; style appendages elongate, subulate (*R. hirta*) or short, acute to obtuse (*R. mollis*).
22 Stems and leaves softly pilose to woolly; style branches short, acute to obtuse; [plants of dry sands of the Coastal Plain of SC southward] .....
..... ***Rudbeckia mollis***
22 Stems and leaves with coarse and stiffish hairs; style branches elongate, subulate; [plants collectively widespread in our area].
23 Stems leafy mainly toward the base, branched mainly near the middle; peduncles usually ½ the height of the plants; [of the Coastal Plain] .....
..... ***Rudbeckia hirta var. angustifolia***
23 Stems leafy throughout, branched mainly well above the middle; peduncles < 1/3 the height of the plants; [collectively widespread].
24 Basal leaves broadly elliptic to ovate, 2.5-7 cm wide, mostly ca. 2× as long as wide, with coarsely serrate margins; rays typically yellow or tinged orange throughout; [mostly undisturbed woodlands and fields, Appalachian highlands westward to IL] ..... ***Rudbeckia hirta var. hirta***

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

24 Basal leaves lanceolate to oblanceolate 1-2.5 (-5) cm wide, mostly 3-5× as long as wide (or basal leaves absent), with entire to serrate margins; rays typically yellow with maroon, brown, or reddish bases; [disturbed areas OR glades and similar dry habitats, e. US westward].
25 Plants annual; lacking basal tufts of leaves; cauline leaves with consistent size; lower leaves sessile or subsessile; [sandstone glades, other dry areas, IL and IN south to MS and TX]..... ***Rudbeckia bicolor***
25 Plants biennial or short-lived perennials; with basal tufts of leaves; cauline leaf size gradually decreasing along stem; lower leaves petiolate; [disturbed areas, widespread] ..... ***Rudbeckia hirta var. pulcherrima***

13 Pales (bracts of the receptacle) glabrous or nearly so (except sometimes for a minutely ciliate margin).
26 Pales cuspidate, with awn-like tips ca. 1.5 mm long
27 Cauline leaves 1-3-lobed (at least some on a plant 3-lobed).
..... ***Rudbeckia triloba var. triloba***
27 Cauline leaves 1-7-lobed (at least some on a plant 5-7-lobed).
..... ***Rudbeckia triloba var. pinnatiloba***
26 Pales obtuse to acute.
31 Stem leaves auriculate or auriculate-clasping.
..... ***Rudbeckia auriculata***
31 Stem leaves petiolate or sessile, but not auriculate-clasping.
33 Basal leaves with bases cordate (some may be merely rounded); upper stem leaves notably reduced in size relative to the lower stem leaves.
..... ***Rudbeckia umbrosa***
33 Basal leaves with bases cuneate to broadly cuneate or rounded; upper stem leaves similar in size to the lower stem leaves.
36 Paleae ciliate.
37 Stem leaves elliptic to ovate..... ***Rudbeckia fulgida***
37 Stem leaves spatulate to oblanceolate ..... ***Rudbeckia spathulata***
36 Paleae eciliate (erose to minutely toothed, rarely with 1-2 cilia).
..... ***Rudbeckia terranigrae***

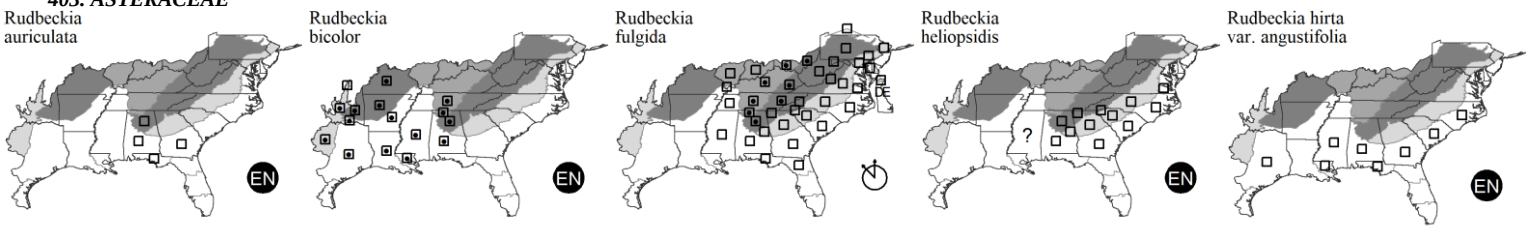
Rudbeckia auriculata (Perdue) Kral. SWAMP BLACK-EYED SUSAN. **Hab:** Pitcherplant bogs, wet roadsides and powerline rights-of-way, seepages. **Dist:** Sw. GA and Panhandle FL (Walton County) west to nc. and s. AL. **Comm:** See Diamond & Boyd (2004) for detailed information. **Syn:** = Fl7, FNA21, K1, K3, K4, SE1, WH3. NatureServe G2 (Imperiled).

Rudbeckia bicolor Nuttall. **Hab:** Sandstone glades, other dry soils. **Tax:** There is a major discrepancy in two conflicting names, *Rudbeckia bicolor* Nutt. and *Rudbeckia hirta* L. *var. pulcherrima* Farr., and to which material these names appropriately refer. Nuttall's type for *Rudbeckia bicolor* from "R. River", in Arkansas, was published in 1834 (Journ. Acad. Philad. 7:81), which predated Farwell's published name of *Rudbeckia hirta var. pulcherrima* (Michigan Acad. Sci. 6:209. 1904). Farwell simply describes *R. hirta var. pulcherrima* as a "form that differs from the species only in having a part of the upper surface of the ray, or even the whole upper face, brown-purple." Nuttall describes *R. bicolor* as (translated): annual, pilose, scabrous, stem unicolored; leaves oblong, sessile, rarely subserrate or obtuse, with the lower subovate and petiolate; and with short rays of color (the lower half of rays brown colored). He also states it is somewhat related to *R. serotina* (another apparent synonym of var. pulcherrima), but he elaborates, "…the flower is entirely different, the leaves all nearly oblong and softly hairy…In Arkansas and near to Red River." Some authors choose to synonymize *R. bicolor* into *R. hirta var. pulcherrima* (GBIF 2022, IT IS 2022, Keener et al. 2022, Urbatsch and Cox in FNA vol. 21 (2006c)). If the two are not recognized as distinct, then one name needs to be prioritized, which would depend on its recognition at varietal or species rank. Both taxa are also buried deeply into other synonyms (e.g. *R. serotina, R. sericea, R. lanceolata, R. longipes, R. hirta var. corymbifera, R. hirta var. serotina*). *R. hirta var. pulcherrima* is apparently a widespread weedier species of disturbed areas and *R. bicolor* may be more restricted to sandstone glades and similar habitats in a handful of states in the southeast and lower midwest. Farwell's short description lists *R. hirta var. pulcherrima* from Detroit, Michigan, which may have not included analysis of southern material (i.e. "bicolor"). The *R. hirta* and *R. fulgida* complexes are both widespread and highly variable, and unsurprisingly accompany a complicated history of synonymy and taxon recognition. Haines (2011) recognizes *R. bicolor* as distinct from *R. hirta* as annual plants lacking basal tufts of leaves with cauline leaves of consistent size proximally and distally and all leaves being sessile or subsessile (vs. *R. hirta* as biennial or short-lived perennials with basal tufts of leaves and cauline leaves decreasing in size distally, with lower leaves borne on petioles). However, Haines (2011) lists both *R. bicolor* and *R. hirta var. pulcherrima* as adventive species in New England, with the former only being reported from MA. Numerous specimens from the apparent native range of both taxa (AL, AR, etc…) show tremendous overlap in cauline leaf shape and size (Kral 53236, Kral 58158, Parker 853, Spaulding 11911, Diamond 13617), which appear to have upper cauline leaves broadly oblanceolate to distinctly linear-lanceolate, although few specimens contain persistent basal tufts of leaves which complicates distinctions listed in Haines (2011). We choose to currently recognize both *R. bicolor* and *R. hirta var. pulcherrima* as distinct pending further research that determines to what extent the two taxa are distinct morphologically, geographically, and ecologically. **Syn:** = F, NE, S; < *Rudbeckia hirta* Linnaeus var. *hirta* – K3, K4.

Rudbeckia fulgida Aiton. COMMON EASTERN CONEFLOWER. **Hab:** Dry to wet meadows. **Dist:** NY and IL south to FL and AL. **Phen:** Aug-Oct. **Comm:** {add to synonymy, especially Z}. **Syn:** = F, Il, Mi, Tn; = *Rudbeckia fulgida* Aiton var. *fulgida* – C, FNA21, G, K1, K3, K4, Oh3, Pa, SE1, Campbell & Seymour (2013); > *Rudbeckia acuminata* C.L. Boynton & Beadle – S; > *Rudbeckia foliosa* C.L. Boynton & Beadle – S; < *Rudbeckia fulgida* Aiton – Fl7, GW2, RAB, Va, W, WH3; > *Rudbeckia fulgida* Aiton – S. NatureServe G5T4? (Apparently Secure).

Rudbeckia heliopsidis Torrey & A. Gray. SUNFACING CONEFLOWER, PINEYWOODS CONEFLOWER. **Hab:** Limestone or sandstone streambanks and barrens, pinelands, roadside relict woodlands. **Dist:** VA south to GA and AL. **Phen:** Jul-Sep. **Syn:** = C, F, FNA21, G, K1, K3, K4, RAB, S, SE1, Va, W, Perdue (1957). NatureServe G2 (Imperiled).

Rudbeckia hirta Linnaeus *var.* ***angustifolia*** (T.V. Moore) Perdue. COASTAL PLAIN BLACK-EYED SUSAN. **Hab:** Longleaf pine woodlands, other dry sandy woodlands. **Dist:** SC south to FL, west to TX. **Phen:** May-Jul. **Syn:** = FNA21, K1, SE1, Tx, Perdue (1957); ? *Rudbeckia divergens* T.V Moore – S; < *Rudbeckia hirta* – Fl7, RAB, WH3; < *Rudbeckia hirta* Linnaeus var. *hirta* – K4.



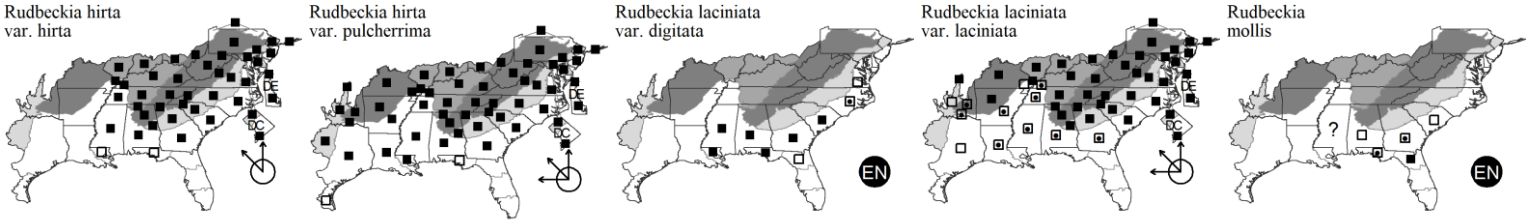
Rudbeckia hirta Linnaeus *var*. ***hirta***. WOODLAND BLACK-EYED SUSAN. **Dist:** ME and MI south to GA and MS. **Phen:** May-Jul. **Syn:** = Ar, C, FNA21, K1, Mi, NE, Pa, SE1, Tn, WV, Perdue (1957); = *Rudbeckia hirta* – Il; > *Rudbeckia amplectens* T.V. Moore – S; > *Rudbeckia brittonii* Small – S; < *Rudbeckia hirta* – G, RAB, Va, W; > *Rudbeckia hirta* – S; > *Rudbeckia hirta* var. *brittonii* (Small) Fernald – F; < *Rudbeckia hirta* Linnaeus var. *hirta* – K3, K4; > *Rudbeckia hirta* Linnaeus var. *hirta* – F; > *Rudbeckia monticola* Small – S. NatureServe G5T4T5 (Apparently Secure).

Rudbeckia hirta Linnaeus *var*. ***pulcherrima*** Farwell. WEEDY BLACK-EYED SUSAN. **Hab:** Roadsides, fields. **Dist:** NL (Newfoundland) and BC south to FL, TX, CA, and beyond. **Phen:** May-Jul. **Tax:** See discussion under *Rudbeckia bicolor*. **Syn:** = Ar, C, FNA21, GrPl, K1, Mi, NcTx, NE, Oh3, Pa, SE1, Tn, Tx, WV; > *Rudbeckia bicolor* Nuttall – Il, S; < *Rudbeckia hirta* – Fl7, G, RAB, W, WH3; > *Rudbeckia hirta* – Il; > *Rudbeckia hirta* var. *corymbifera* Fernald – Perdue (1957); < *Rudbeckia hirta* Linnaeus var. *hirta* – K3, K4; > *Rudbeckia hirta* Linnaeus var. *pulcherrima* Farwell – Perdue (1957); > *Rudbeckia longipes* T.V. Moore – S; > *Rudbeckia sericea* T.V. Moore – S; > *Rudbeckia serotina* var. *corymbifera* (Fernald) Fernald & Schubert – F; > *Rudbeckia serotina* var. *sericea* (T.V. Moore) Fernald & Schubert – F; > *Rudbeckia serotina* Nuttall var. *serotina* – F, Il.

Rudbeckia laciniata Linnaeus *var*. ***digitata*** (Miller) Fiori. COASTAL PLAIN CUTLEAF CONEFLOWER. **Hab:** Seepage bogs, streamsides. **Dist:** VA south to FL, west to LA. **Phen:** Jul-Oct. **Syn:** = C, F, K1, K3, Tn; < *Rudbeckia laciniata* – Fl7, GW2, RAB, S, W, WH3; < *Rudbeckia laciniata* Linnaeus var. *digitata* (Miller) Fiori – SE1, Va; < *Rudbeckia laciniata* Linnaeus var. *humilis* A. Gray – FNA21, K4; < *Rudbeckia laciniata* Linnaeus var. *laciniata* – G.

Rudbeckia laciniata Linnaeus *var*. ***laciniata***. COMMON CUTLEAF CONEFLOWER, GOLDENGLOW. **Hab:** Moist forests, bottomlands, streambanks. **Dist:** NB, ON, and MB south to FL and TX. **Phen:** Jul-Oct. **Tax:** 'Goldenglow' (var. *hortensia*) is a cultivar or form with 2-3× as many ray flowers; it may be encountered as a casual from horticultural use. **Syn:** = Ar, FNA21, GrPl, K1, K3, NE, SE1, Tn, Va; < *Rudbeckia laciniata* – Fl7, GW2, Il, Mi, RAB, S, Tx, W, WH3; > *Rudbeckia laciniata* var. *hortensa* – Oh3, misspelling; > *Rudbeckia laciniata* var. *hortensia* L.H. Bailey – F; > *Rudbeckia laciniata* var. *hortensis* L.H. Bailey – Pa, WV, misspelling; < *Rudbeckia laciniata* Linnaeus var. *laciniata* – C, G, K4; > *Rudbeckia laciniata* Linnaeus var. *laciniata* – F, Oh3, WV; >< *Rudbeckia laciniata* Linnaeus var. *laciniata* – Pa.

Rudbeckia mollis Elliott. WOOLLY CONEFLOWER. **Hab:** Longleaf pine / turkey oak sandhills. **Dist:** SC south to n. peninsular FL, FL Panhandle, west to s. AL. **Phen:** Late Aug-Oct. **Syn:** = Fl7, FNA21, K1, K3, K4, RAB, S, SE1, WH3, Perdue (1957). NatureServe G3G5 (Apparently Secure).



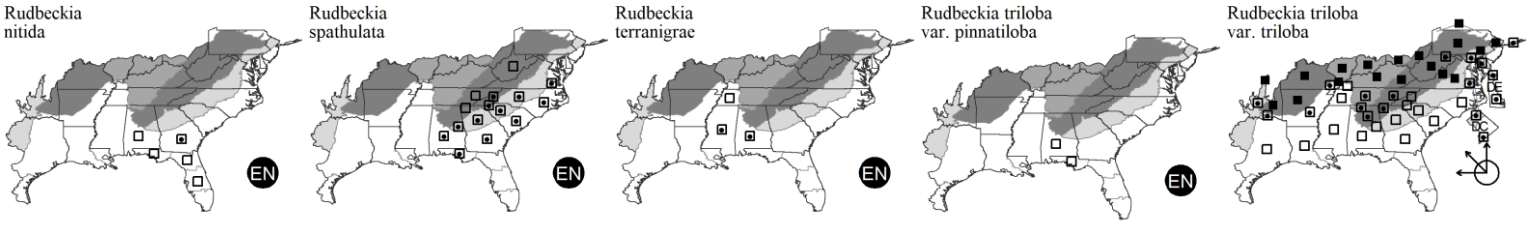
Rudbeckia nitida Nuttall. ST. JOHN'S BLACK-EYED SUSAN. **Hab:** Wet pine savannas, adjacent roadsides. **Dist:** E. GA and ne. FL south to c. peninsular FL, west to s. AL (Diamond 2016). **Syn:** = Fl7, FNA21, K1, K3, K4, WH3; = *Rudbeckia nitida* var. *nitida* – SE1; > *Rudbeckia glabra* A.P. de Candolle – S; > *Rudbeckia nitida* Nuttall – S. NatureServe G3 (Vulnerable).

Rudbeckia spathulata Michaux. **Hab:** Bottomlands, bogs. **Dist:** VA, WV, and TN south to FL and AL. **Phen:** Aug-Oct. **Syn:** = F, S, Tn; = *Rudbeckia fulgida* Aiton var. *spathulata* (Michaux) Perdue – FNA21, Campbell & Seymour (2013); < *Rudbeckia fulgida* Aiton – RAB, Va, WH3; < *Rudbeckia fulgida* Aiton var. *fulgida* – K1, K3, K4.

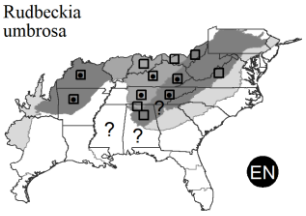
Rudbeckia terranigrae J.J.N. Campbell & W.R. Seymour. BLACKLAND CONEFLOWER. **Hab:** Blackland prairies and perhaps other habitats. **Dist:** Black Belt of AL and MS, and perhaps more widespread, the distribution currently poorly understood. **Tax:** For additional information, see Campbell & Seymour (2014). **Comm:** {not yet keyed}. **Syn:** = K4, Campbell & Seymour (2013).

Rudbeckia triloba Linnaeus *var*. ***pinnatiloba*** Torrey & A. Gray. PINNATE-LEAF CONEFLOWER. **Hab:** Calcareous soils in wet savannas. **Dist:** S. AL and Panhandle FL. **Phen:** Jul-Oct. **Comm:** {synonymy incomplete, etc.}. **Syn:** = *Rudbeckia pinnatiloba* (Torrey & A. Gray) Beadle – S; < *Rudbeckia triloba* – Fl7, WH3; < *Rudbeckia triloba* Linnaeus var. *pinnatiloba* Torrey & A. Gray – C, FNA21, G, K1, K3, K4, SE1, Perdue (1957), defined broadly to include "R. beadlei". NatureServe G5T3 (Vulnerable).

Rudbeckia triloba Linnaeus *var*. ***triloba***. COMMON THREE-LOBED CONEFLOWER. **Hab:** Moist forests and rock outcrops. **Dist:** VT, ON, MN, and NE south to GA and TX; westward in CO and UT (presumably as introductions). **Phen:** Jul-Oct. **Syn:** = Ar, C, F, FNA21, G, GrPl, Il, K1, K3, K4, NE, Pa, SE1, Tn, Va; = *Rudbeckia triloba* – S; < *Rudbeckia triloba* – Mi, NcTx, Oh3, RAB, W, WV. NatureServe G5T4T5 (Apparently Secure).



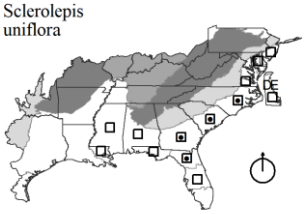
Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



Rudbeckia umbrosa C.L. Boynton & Beadle. APPALACHIAN CONEFLOWER. **Hab:** Rich calcareous slopes, bottomlands. **Dist:** VA, OH, IN, and MO south to GA, MS, and AR. **Phen:** Aug-Oct. **Syn:** = F, Il, Tn, Campbell & Seymour (2013); = *Rudbeckia fulgida* Aiton var. *umbrosa* (C.L. Boynton & Beadle) Cronquist – Ar, FNA21, G, K1, K4, Oh3, SE1, Perdue (1957); > *Rudbeckia chapmanii* C.L. Boynton & Beadle – S; < *Rudbeckia fulgida* Aiton – GW2, RAB, Va, W; > *Rudbeckia umbrosa* C.L. Boynton & Beadle – S. NatureServe G5T4T5 (Apparently Secure).

Sclerolepis Cassini 1816 (SCLEROLEPIS)

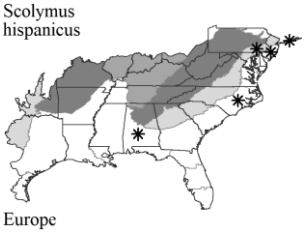
A monotypic genus, a perennial herb, of se. North America. References: SE1; Lamont (2006b) in FNA21 (2006c).



Sclerolepis uniflora (Walter) Britton, Sterns, & Poggenburg. SCLEROLEPIS. **Hab:** In shallow water (later sometimes stranded on shore by dropping water levels) of clay-based Carolina bays, natural lake shores, blackwater stream shores and swamps, in seepage wetlands including sea-level fens. **Dist:** NH south to c. peninsular FL, west to sw. AL (very rare north of NC); slightly disjunct in s. MS and se. LA (Sorrie & LeBlond 2008). **Phen:** May-Aug; Jul-Oct. **Syn:** = C, F, Fl7, FNA21, G, GW2, K1, K3, K4, NE, RAB, SE1, Va, WH3. NatureServe G4 (Apparently Secure).

Scolymus Linnaeus 1753 (GOLDEN THISTLE)

A genus of 3 species, herbs, of the Mediterranean region. References: Strother (2006m) in FNA19 (2006a).



* ***Scolymus hispanicus*** Linnaeus. GOLDEN THISTLE, SPANISH SALSIFY. **Hab:** On ballast at seaports (at least formerly). **Dist:** Native of Europe. Mobile, Wilmington, Philadelphia, Camden, and New York. **Phen:** Jul. **Syn:** = FNA19, K1, K3, K4. NatureServe GNR (Not Yet Ranked).

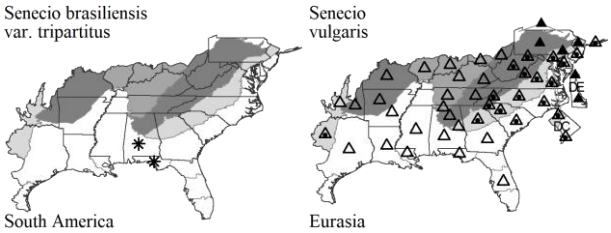
Senecio Linnaeus 1753 (RAGWORT, GROUNDSEL)

A genus of very uncertain circumscription, if treated broadly with as many as 1500-2000 species, trees, shrubs, herbs, and vines. The trend is to divide *Senecio* into smaller, more natural genera. Most species in our flora traditionally treated as "*Senecio*" are not even part of a broadly defined core group, and have been transferred to *Packera*, *Hasteola*, and *Rugelia*. References: Anderson (1994); Barkley (1978); Barkley (1999); Barkley (2000); Barkley (2006a) in FNA20 (2006b); Bremer (1994); SE1; Pelser et al (2007); Pippen (1978).

Unkeyed waifs: *Senecio brasiliensis var. tripartitus*

* ***Senecio brasiliensis*** (Sprengel) Lessing *var.* ***tripartitus*** (A.P. de Candolle) Baker. HEMPLEAF RAGWORT. **Hab:** Disturbed areas (on ballast); rare (not collected since 1894, Pensacola, Escambia County, FL). **Dist:** Native of South America. **Syn:** = Fl7, FNA20, K4, WH3.

* ***Senecio vulgaris*** Linnaeus. GROUNDSEL. **Hab:** Roadsides, fields, disturbed areas. **Dist:** Native of Eurasia. **Phen:** (Jan-) Mar-Jun (-Dec). **Syn:** = Ar, C, F, Fl7, FNA20, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, Oh3, Pa, RAB, S, SE1, Tn, Va, W, WH3, WV, Barkley (1978), Barkley (1999). NatureServe GNR (Not Yet Ranked).



Sericocarpus Nees 1832 (WHITE-TOPPED ASTER)

A genus of 5 species, herbs, of North America. This group of species, traditionally treated as *Sericocarpus*, was transferred to *Aster* by Cronquist, a treatment followed by most (but not all) recent floristic works. It now appears, based on morphological and molecular studies, that the traditional treatment as a separate genus is far superior. Nesom (1993a) argued that a variety of characters indicate that *Sericocarpus* is more closely allied to *Solidago*, *Euthamia*, *Bigelowia*, *Chrysoma*, and *Gutierrezia* than it is to *Aster*. Noyes & Rieseberg (1999) provided strong support for this contention, based on molecular evidence. See Nesom (1993a), Jones (1980), Semple & Brouillet (1980), and Noyes & Rieseberg (1999) for further discussion about the affinities of this group. References: SE1; Leonard, Cook, & Semple (2005); Nesom (1993a); Nesom (2021c); Semple & Leonard (2006) in FNA20 (2006b).

1 Leaves basally disposed, the basal leaves (these sometimes withered by flowering season) and/or lower stem leaves larger than the upper stem leaves; leaves (at least the lower stem or basal) toothed.
..... ***Sericocarpus caespitosus***

1 Leaves cauline, basal rosette lacking, the mid-stem leaves the largest; leaves entire (or with 1-2 teeth in *S. tortifolius*).

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated

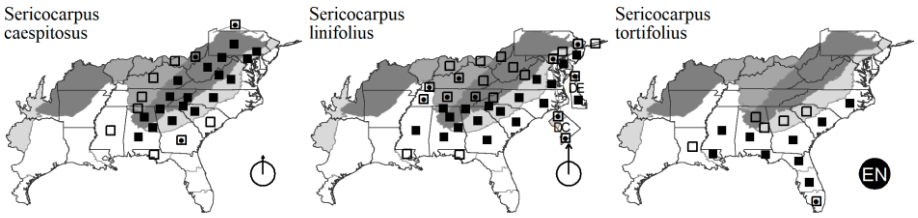
3 Leaves (2-) 4-8 cm long, 0.2-1.2 cm wide, linear to oblanceolate, 6-12× as long as wide, not twisted at the base (the leaf blade in a more-or-less horizontal plane); leaves glabrous (but with a ciliate margin), glandular-punctate; involucres glabrous..... ***Sericocarpus linifolius***

3 Leaves 1.5-4 cm long, 0.6-1.5 (-2.0) cm wide, obovate, 1.5-4× as long as wide, twisted at the base (bringing most of the leaf blade into a more-or-less vertical plane); leaves puberulent, glandular-punctate, and with prominent resin globules (at 10× magnification); involucres puberulent..... ***Sericocarpus tortifolius***

Sericocarpus caespitosus Nesom. **Hab:** Dry woodlands, thin soils around rock outcrops, longleaf pine sandhills, other dry pinelands, woodland margins. **Dist:** C. and w. NY south to se. PA, c. MD, c. NC, SC, c. and sw. GA, w. FL Panhandle, s. AL, and MS, primarily in the Piedmont and provinces west of that. **Phen:** (Apr-) May-Jul (-Aug). **Tax:** See Nesom (2021c) for additional information. **Syn:** = Nesom (2021c); < *Aster paternus* Cronquist – C, G, Oh3, RAB, SE1, W; < *Sericocarpus asteroides* (Linnaeus) Britton, Sterns, & Poggenburg – F, Fl7, FNA20, K1, K3, K4, Mi, Pa, S, Tn, Va, WH3, WV, Nesom (1993a).

Sericocarpus linifolius (Linnaeus) Britton, Sterns, & Poggenburg. NARROW-LEAF WHITE-TOPPED ASTER. **Hab:** Dry woodlands, woodland margins, longleaf pine sandhills. **Dist:** MA west to s. OH and s. IN, south to se. SC, c. GA, s. AL, Panhandle FL (Santa Rosa County, Grayson Sasser, 2019, pers. comm.), s. MS, and e. LA (Florida parishes). **Phen:** Jun-Aug. **Syn:** = F, FNA20, K1, K3, K4, Mi, NE, Pa, S, Tn, Va, WV, Leonard, Cook, & Semple (2005), Nesom (1993a); = *Aster solidagineus* Michaux – C, G, Oh3, RAB, SE1, W. NatureServe G5 (Secure).

Sericocarpus tortifolius (Michaux) Nees. TWISTED-LEAF WHITE-TOPPED ASTER. **Hab:** Dry to mesic longleaf pine sandhills, other dry woodlands. **Dist:** E. NC south to s. FL, west to e. LA (Florida parishes), more or less restricted to the Coastal Plain, but inland onto hard-rock provinces in nc. GA and nc. AL. **Phen:** Aug-Nov. **Syn:** = Fl7, FNA20, K1, K3, K4, WH3, Leonard, Cook, & Semple (2005), Nesom (1993a); = *Aster tortifolius* Michaux – RAB, SE1, W; = *Sericocarpus bifoliatus* (Walter) Porter – S. NatureServe G4 (Apparently Secure).



Silphium Linnaeus 1753 (ROSINWEED)

Contributed by Mason Brock and Alan Weakley

A genus of 20-30 species, herbs, of e. North America. References: Clevinger (2004); Clevinger (2006) in FNA21 (2006c); SE1; Cruden (1962); Medley (1989); Perry (1937); Steyermark (1951); Sweeney (1970).

Identification Notes: The number of ray flowers per head is a useful taxonomic character in *Silphium*; since only ray flowers are fertile, the number of ray flowers can also be estimated by the number of achenes in freshly fruiting material. The leaves of *Silphium* in the "*Asteriscus* group" are typically opposite at the lowermost nodes and alternate at the uppermost nodes subtending the inflorescence. However, mid-stem leaf arrangement remains a useful diagnostic character. Specimens of predominately opposite-leafed taxa that have regrown from damage earlier in the year will often develop alternate leaves at mid-stem. The key and taxonomic treatment is provisional.

1 Leaves basally disposed, the basal leaves large and persistent, the stem with very few to many leaves, but these definitely reduced upward in size; leaves entire to toothed, to deeply cut; plants with definite taproots (except *S. brachiatum*, *S. confertifolium*, *S. gracile*, *S. mohrii*, *S. simpsonii*, and *S. wasiotense*).

2 Stem relatively leafy, with 4-5 nodes or more, the stem leaves smaller than the basal, but not merely bracteal.

3 Leaves deeply pinnatifid to bipinnatifid ..... ***Silphium laciniatum***

3 Leaves nearly entire to coarsely toothed (but not pinnatifid).

5 Basal and lower stem leaves cordate, subcordate, or truncate-sagittate; [Interior provinces: KY, TN, n. AL, and nw. GA]. ..... ***Silphium brachiatum***

5 Basal and lower stem leaves rounded or cuneate at the base.

7 Stem, inflorescence, and phyllaries glabrous or very nearly so; [AL and perhaps MS] ..... ***Silphium confertifolium***

7 Stem, inflorescence, and phyllaries obviously scabrous, hirsute, or hispid; [collectively more widespread].

8 Stem, inflorescence, and phyllaries densely shaggy-hirsute, hairs > 5 mm long; inflorescence corymbose with many heads (around 3-15); pales eglandular; [TN, north AL, and northwest GA]..... ***Silphium mohrii***

8 Stem, inflorescence and phyllaries scabrous to hispid, hairs < 2.5 mm long; inflorescence consisting of a 1-5 heads subtended by a long, wand-like scape; pales glandular or eglandular. ..... ***Silphium simpsonii***

2 Stem nearly naked, bearing only a few bracteal (very reduced) leaves.

10 Heads relatively large (involucre 13-25 mm high, disk 15-25 mm wide), with 14-40 ray flowers; [calcareous or mafic glades or woodlands].

11 Principal leaves shallowly to deeply pinnatifid; leaf blade base cuneate, rounded or shallowly cordate; leaf blade often > 2× as long as wide..... ***Silphium pinnatifidum***

11 Principal leaves only toothed (or subentire); leaf blade base cordate or truncate at the base (rarely abruptly narrowed); leaf blade < 1.5× as long as wide ..... ***Silphium terebinthinaceum***

10 Heads relatively small (involucre 6-11 mm high, disk 8-15 mm wide), with 6-12 ray flowers; [a wide range of mostly dry, often acidic habitats]; ["*Silphium compositum* group"].

12 Blades of basal leaves unlobed (or with a single obscure basal lobe on one or both sides), reniform, usually wider than long, often > 25 cm wide; leaves usually puberulent beneath; achenes shorter than the phyllaries at maturity; [upper Piedmont and Mountains] ..... ***Silphium reniforme***

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

12 Blades of basal leaves divided or shallowly to deeply lobed, with several lobes on each side, about as wide as long, or longer than wide, < 25 cm wide; leaves usually glabrous (or sparsely scabrous) beneath; achenes longer than (or as long as) the phyllaries at maturity; [collectively widespread].
13 Involucre mostly 1.0-1.5 cm wide; achenes 6-9 mm long at maturity; achene wings < 1 mm wide, the wing tips long acute to acuminate, the sinus between the wing tips V-shaped; [VA south to GA, and west to AL]..... ***Silphium compositum var. compositum***
13 Involucre mostly 1.5-3.0 cm wide; achenes 8-14 mm long at maturity; achene wings 1-2 mm wide, the wing tips either acute to acuminate or obtuse, the sinus between the wing tips either V-shaped or narrowly U-shaped.
..... ***Silphium compositum var. ovatifolium***

1 Leaves primarily on the stem, basal leaves usually absent or soon withering, the stem with many leaves, these similar in size; leaves entire or toothed; plants fibrous-rooted from a crown, rhizome, or caudex.
15 Stem square in ×-section; upper leaves connate, fused basally, the stem thus perfoliate.
..... ***Silphium perfoliatum***
15 Stem terete; leaves not connate.
17 Basal and lower cauline leaf blades cordate, sagittate, or truncate at the base, and on well-developed petioles..... ***Silphium brachiatum***
17 Basal and lower cauline leaf blades either rounded or cuneate at the base, or sessile.
18 Ray flowers 20-30 per head (or more); pales eglandular; [west of the Mississippi River].
..... ***Silphium integrifolium var. integrifolium***
18 Ray flowers 12-22 per head; pales eglandular or stipitate-glandular (glands often mixed with other pubescence, use 20× magnification); [east of the Mississippi River, except for *S. asperrimum*]
21 Mid-stem leaves predominately alternate (lower leaves often opposite); inflorescence eglandular except for inconspicuous dull yellow-brown stipitate-glands on pales; stem glabrous, hispid, or hirsute with hairs >1 mm.
22 Stem glabrous or short-hispid; mid-stem leaves petiolate or sessile (not clasping); inflorescence open and widely branching.....
..... ***Silphium dentatum***
22 Stem hispid or hirsute, with hairs often > 1mm long (rarely nearly glabrous); mid-stem leaves clasping, sessile, or short-petiolate; inflorescence open or congested.
23 Phyllary abaxial surface hispid; inflorescence congested, with peduncles usually less than 4 cm long; basal leaves withered by flowering.....
..... ***Silphium asperrimum***
23 Phyllary abaxial surface scabrous or glabrous; inflorescence open, with peduncles up to 13 cm long; basal leaves sometimes persisting at flowering; [Coastal Plain, SC, GA, FL, AL, and MS]..... ***Silphium simpsonii***
21 Mid-stem leaves predominately opposite or whorled (occasionally alternate in damaged re-growth); inflorescence eglandular, or if glandular then glands conspicuous and not restricted to pales; stem various, but never hirsute with hairs >1 mm.
24 Mid-stem leaves petiolate or subsessile (not clasping), with a cuneate or rounded base; leaves typically lanceolate, gradually tapering towards the tip; stem and inflorescence branches eglandular.
26 Mid and lower stem leaves opposite, broadly ovate, 5-8 cm wide when 10-16 cm long..... ***Silphium asteriscus var. latifolium***
26 Mid and lower stem leaves whorled or opposite, lance-ovate, 2-4 cm wide when 10-16 cm long..... ***Silphium asteriscus var. trifoliatum***
24 Mid-stem leaves clasping to short-petiolate, with a subcordate to rounded base; leaves typically ovate, widest at base and abruptly tapering to an acute tip; stem and inflorescence branches eglandular or stipitate-glandular.
27 Stems, leaves, and phyllaries eglandular, or if glands present then dark and dull, and restricted to phyllaries and inflorescence bracts.
..... ***Silphium integrifolium var. integrifolium***
27 Stems, leaves, and phyllaries with yellow-brown and shining stipitate glands, usually well-evident on leaves and stem in addition to phyllaries (in addition to the eglandular pubescence).
29 Plants mostly 8-15 dm tall, with usually 6 or 7 nodes below the inflorescence; glandular hairs of the stems and leaves longer than the eglandular hairs; rays (8-) 12-14 (-16) per head; [dolomite or limestone in Bibb County, c. AL] ..... ***Silphium glutinosum***
29 Plants mostly 15-20 dm tall, with usually 9-12 nodes below the inflorescence; glandular hairs of the stems and leaves about as long as the eglandular hairs; rays (17-) 19-23 (-33) per head; [chalk in c. AL]..... ***Silphium perplexum***

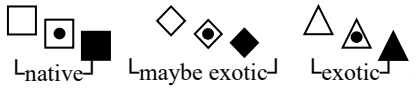
Silphium asperrimum Hooker. {NAME}. **Hab:** Prairies and woodlands. **Dist:** N. GA, TN, and MO south to AL and LA. **Phen:** May-Oct. **Tax:** There has been confusion as to which entity the name *Silphium asperrimum* is best applied. Perry (1937) interpreted the name *S. asperrimum* as a synonym of the western *S. radula*, and therefore assigned the eastern entity to the next available name *Silphium gatesii*. However, the type specimen of *S. asperrimum* is collected from east of the Mississippi River (vicinity of Covington, Louisiana), a region to which *S. radula* is unknown, and it appears to have the small heads and reduced ray flowers typical of the eastern entity. The name *S. asperrimum* is therefore best applied to the eastern entity. Nomenclatural issues aside, *Silphium asperrimum* appears morphologically close to *Silphium radula* and likely intergrades near their region of contact. **Syn:** > *Silphium asperrimum* Hooker – Tx, Perry (1937); < *Silphium asteriscus* – F, G, W; < *Silphium asteriscus* Linnaeus var. *asteriscus* – C, FNA21, K1, K3, K4; > *Silphium gatesii* C. Mohr – Tn, Perry (1937).

Silphium asteriscus Linnaeus *var.* ***latifolium*** (A. Gray) J.A. Clevinger. **Hab:** Woodlands, roadsides. **Dist:** VA, WV, and KY south to GA and LA. **Phen:** Jul-Sep. **Tax:** This taxon appears to occasionally intergrade with *S. integrifolium* in the western edge of its range, and more commonly intergrade with *S. asteriscus* var. *trifoliatum* in the Interior Plateau and Cumberland Plateau. However, in the broad core of its range (spanning a region of AL, TN, and KY) populations of *S. asteriscus* var. *latifolium* are morphologically consistent and readily recognizable, with large leaves uncharacteristic of both *S. integrifolium* and *S. asteriscus* var. *asteriscus*. Some recent authors have chosen species status, under the name *Silphium glabrum*. The taxonomy and map are very speculative. **Syn:** = *Silphium glabrum* Eggert ex Small – S, Tn; = *Silphium laevigatum* Pursh – RAB; = *Silphium trifoliatum* Linnaeus var. *latifolium* A. Gray – C, F, G, K1, SE1, Perry (1937); < *Silphium asteriscus* – Va; < *Silphium asteriscus* Linnaeus var. *latifolium* (A. Gray) J.A. Clevinger – FNA21, K3, K4; < *Silphium trifoliatum* – W.

Silphium asteriscus Linnaeus *var.* ***trifoliatum*** (Linnaeus) J.A. Clevinger. **Hab:** Woodlands, roadsides, river scours. **Dist:** NY, OH, and IL south to GA and AL. **Phen:** Jun-Sep. **Syn:** = FNA21, Il, K3, K4, Pa; = *Silphium trifoliatum* – Oh3, RAB, Tn, WV; = *Silphium trifoliatum* Linnaeus var. *trifoliatum* – C, G, K1, SE1; < *Silphium asteriscus* – Va; > *Silphium atropurpureum* Retzius ex Willdenow – F, Perry (1937); < *Silphium trifoliatum* – W; > *Silphium trifoliatum* Linnaeus var. *trifoliatum* – F, Perry (1937).

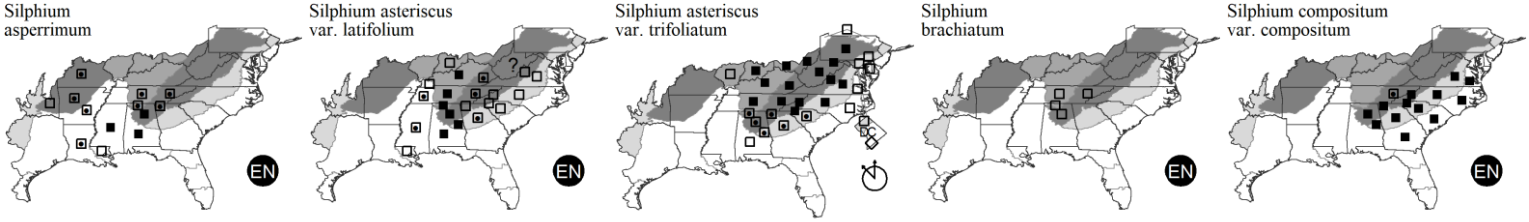
Silphium brachiatum Gattinger. CUMBERLAND ROSINWEED. **Hab:** Open calcareous woodlands and outcrops . **Dist:** Endemic to sc. and se. TN (Chester, Wofford, & Kral 1997) and n. AL, and GA? **Syn:** = F, FNA21, G, K1, K3, K4, S, SE1, Tn, Medley (1989), Perry (1937). NatureServe G3 (Vulnerable).

Silphium compositum Michaux *var*. ***compositum***. CAROLINA ROSINWEED. **Hab:** Longleaf pine sandhills, other xeric forests and woodlands, roadbanks. **Dist:** As currently broadly circumscribed, distributed from VA south to GA, and west to AL. **Phen:** May-Sep. **Tax:** Perhaps worth

Key to Map Symbology:  ←rare ←uncommon ←common (see introduction for more)

* : waif
: endemic
H : historic
N : no
P : planted
? : questionable
X : extirpated

dividing further into two taxa: *S. compositum* sensu stricto, restricted to the Coastal Plain and extreme lower Piedmont, and distributed from se VA through the Carolina Coastal Plain to extreme e. GA, a distribution very similar to those of *Carphephorus bellidifolius*, *Cirsium repandum*, and *Vaccinium crassifolium*; and *S. collinum* Greene, with less deeply lobed leaves, and distributed from se. and sc. VA, nc. NC, sw. NC and ne. AL south to sc. SC, c. GA, and ec. AL. **Syn:** = K1, Va, Perry (1937); = *Silphium compositum* – F; = *Silphium compositum* ssp. *compositum* – Sweeney (1970); < *Silphium compositum* – C, FNA21, G, K3, K4, SE1, Tn, W; > *Silphium compositum* – S; < *Silphium compositum* Michaux var. *compositum* – RAB; > *Silphium orae* Small – S. NatureServe G5T5 (Secure).



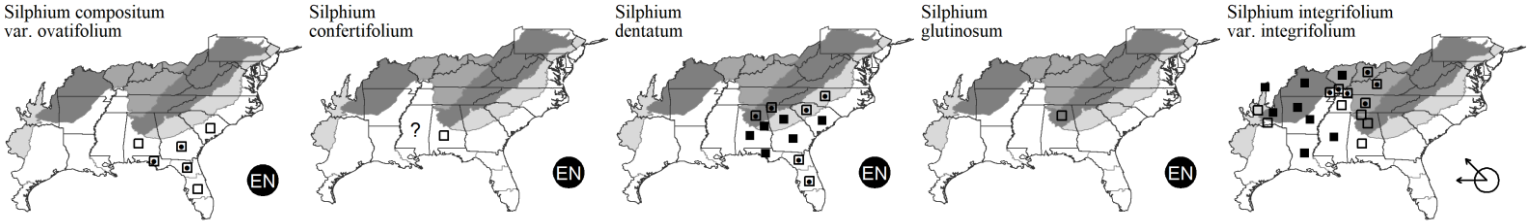
Silphium compositum Michaux *var*. ***ovatifolium*** Torrey & A. Gray. FLORIDA ROSINWEED. **Hab:** Longleaf pine sandhills. **Dist:** Se. SC south to c. peninsular FL and FL Panhandle. **Phen:** May-Sep. **Syn:** = K1; = *Silphium compositum* ssp. *ovatifolium* (Torrey & A. Gray) Sweeney & Fisher – Sweeney (1970); = *Silphium ovatifolium* (Torrey & A. Gray) Small – S, Perry (1937); < *Silphium compositum* – Fl7, FNA21, K3, K4, SE1, WH3. NatureServe G5T5 (Secure).

Silphium confertifolium Small. BLACK BELT ROSINWEED. **Hab:** Chalk prairies. **Dist:** Black Belt of AL and possibly e. MS, also on limestone. **Syn:** = S, SE1, Perry (1937); < *Silphium asteriscus* Linnaeus var. *latifolium* (A. Gray) J.A. Clevinger – FNA21, K4.

Silphium dentatum Elliott. **Hab:** Woodlands, roadsides. **Dist:** NC south to FL and AL. **Phen:** Jul-Sep. **Tax:** This highly variable species is poorly understood. **Syn:** = F, W; = *Silphium asteriscus* Linnaeus var. *dentatum* (Elliott) Chapman – FNA21, K3, K4; = *Silphium dentatum* var. *dentatum* – RAB; < *Silphium asteriscus* – Fl7, Tn, WH3; > *Silphium asteriscus* Linnaeus var. *angustatum* A. Gray – K1, SE1; > *Silphium asteriscus* Linnaeus var. *laevicaule* A.P. de Candolle – K1; > *Silphium dentatum* Elliott – SE1; > *Silphium dentatum* var. *angustatum* (A. Gray) L.M. Perry – Perry (1937); > *Silphium dentatum* var. *dentatum* – Perry (1937); > *Silphium elliottii* Small – S; > *Silphium incisum* Greene – S; > *Silphium nodum* Small – S.

Silphium glutinosum J.R. Allison. STICKY ROSINWEED. **Hab:** Dolomite glades. **Dist:** Known only from calcareous Ketona glades in Bibb County, c. AL (Allison & Stevens 2001). **Syn:** = FNA21, K2. NatureServe G2 (Imperiled).

Silphium integrifolium Michaux *var*. ***integrifolium***. PRAIRIE ROSINWEED. **Hab:** Prairies, calcareous glades and barrens. **Dist:** MI, WI, and se. SD south to c. TN, se. AL, s. MS, s. LA, and OK. **Phen:** Jul-Sep. **Syn:** < *Silphium integrifolium* Michaux – Mi, Tn; > *Silphium integrifolium* var. *deamii* L.M. Perry – F, Il, K1, Perry (1937); < *Silphium integrifolium* Michaux var. *integrifolium* – Ar, C, FNA21, G, GrPl, K3, K4, SE1; > *Silphium integrifolium* Michaux var. *integrifolium* – F, Il, K1, Perry (1937).



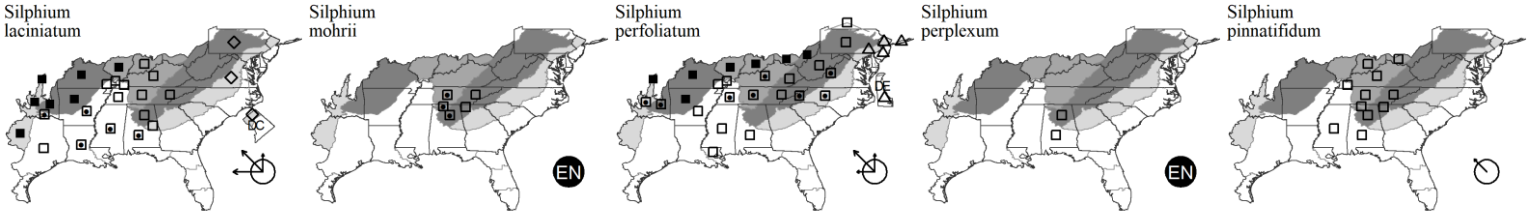
Silphium laciniatum Linnaeus. COMPASS-PLANT. **Hab:** Prairies, limestone barrens, calcareous glades, also sometimes cultivated (including outside of its native distribution). **Dist:** S. ON, MI. WI, s. MN, and e. SD south to se. TN, s. AL, c. MS, s. LA, c. TX, and n. NM. Populations discovered at outlying sites to the east (Chester Co. VA, Chain Bridge in Washington DC in the 1880s, etc.) are ambiguous as to nativity (R. Wright, pers. comm. 2012). **Phen:** Jun-Sep. **Syn:** = Ar, C, FNA21, G, GrPl, K3, K4, Mi, NcTx, Oh3, SE1, Tn, Tx; > *Silphium laciniatum* var. *laciniatum* – F, Il, K1, Perry (1937); > *Silphium laciniatum* var. *robinsonii* L.M. Perry – F, Il, K1, Perry (1937).

Silphium mohrii Small. SHAGGY ROSINWEED. **Hab:** Prairies. **Dist:** Endemic to c., sc., and se. TN (Chester, Wofford, & Kral 1997) south to nw. GA (Jones & Coile 1988) and nc. AL. **Syn:** = C, FNA21, K1, K3, K4, S, SE1, Tn, Medley (1989), Perry (1937). NatureServe G3?Q (Vulnerable).

Silphium perfoliatum Linnaeus. COMMON CUP-PLANT. **Hab:** Floodplain forests and openings, sometimes escaped from cultivation. **Dist:** VT, ON, and ND south to sc. NC, AL, and TX. **Phen:** Jun-Sep. **Syn:** = GrPl, Il, Mi, Oh3, RAB, S, Tn, WV, Perry (1937); = *Silphium perfoliatum* Linnaeus ssp. *perfoliatum* – Cruden (1962); = *Silphium perfoliatum* Linnaeus var. *perfoliatum* – Ar, C, FNA21, K1, K3, K4, NE, Pa, SE1, Va; < *Silphium perfoliatum* Linnaeus – G, W. NatureServe G5T5? (Secure).

Silphium perplexum J.R. Allison. OLD CAHABA ROSINWEED. **Hab:** Dolomitic glades and woodlands. **Dist:** Endemic to c. AL (Allison & Stevens 2001). **Syn:** = FNA21, K4; = *Silphium* ×*perplexum* – K2, pro species. NatureServe G1 (Critically Imperiled).

Silphium pinnatifidum Elliott. TANSY ROSINWEED. **Hab:** Limestone glades and woodlands, blackland prairies. **Dist:** OH and IN south to nw. GA, AL, and ne. MS. **Phen:** Jul-Sep. **Syn:** = Il, K1, S, SE1, Tn; = *Silphium terebinthinaceum* Jacquin var. *pinnatifidum* (Elliott) A. Gray – F, FNA21, K3, K4, Perry (1937); < *Silphium terebinthinaceum* Jacquin – G.



Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more)

* : waif
EN : endemic
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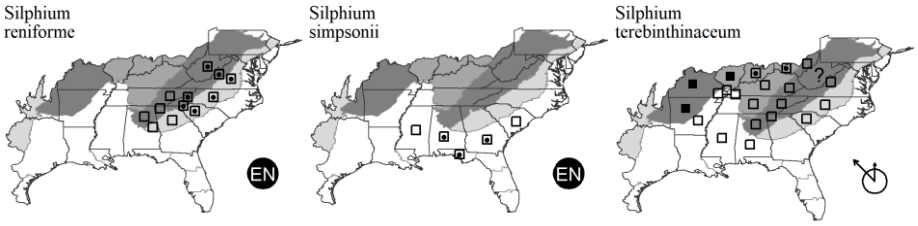
P : planted
? : questionable
X : extirpated

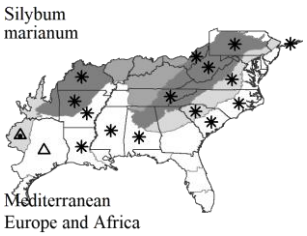
Silphium reniforme Rafinesque ex Nuttall. **Hab:** Dry forests, woodlands, roadsides. **Dist:** Sc. VA, e. WV, and e. TN, south to c. SC, c. GA, and e. AL. **Comm:** Plants with shallowly lobed leaves, with nearly the same distribution as typical *S. reniforme*, have been variously interpreted. **Syn:** = S; = *Silphium compositum* ssp. *reniforme* (Rafinesque ex Nuttall) Sweeney & Fisher – WV, Sweeney (1970); = *Silphium compositum* Michaux var. *reniforme* (Rafinesque ex Nuttall) Torrey & A. Gray – F, K1, RAB, Va, Perry (1937); < *Silphium compositum* – C, FNA21, G, K3, K4, SE1, W. NatureServe G5T3T5 (Apparently Secure).

Silphium simpsonii Greene. **Hab:** Longleaf pinelands. **Dist:** SC south to FL, west to MS. **Syn:** = K1; = *Silphium asteriscus* Linnaeus var. *simpsonii* (Greene) J.A. Clevinger – FNA21, K3, K4, Clevinger (2004); = *Silphium simpsonii* var. *simpsonii* – Perry (1937); < *Silphium asteriscus* – WH3; < *Silphium gracile* A. Gray – S, SE1, misapplied.

Silphium terebinthinaceum Jacquin. PRAIRIE-DOCK. **Hab:** Mafic or calcareous glades, barrens, woodlands, prairies, and roadsides and powerline-rights-of-ways with remnant historical vegetation of those types. **Dist:** NY, ON, WI, and e. IA south to nw. GA, AL, MS, and AR (its distribution in s. OH, KY, TN, nw. GA, AL, and MS fragmented and disjunct); further disjunct eastward in the Piedmont of NC and n. SC. **Phen:** Jul-Sep. **Tax:** *S. rumicifolium* Small refers to plants of limestone in the Ridge and Valley province of e. TN and extreme sw. VA, alleged to differ from *S. terebinthinaceum* in the leaf bases cuneate at the base (vs. cordate or truncate), smaller leaf blades (only to 15 cm long), smaller plants (to 8 dm tall vs. to 30 dm tall), and outer phyllaries broader than long (vs. longer than broad). Var. *lucybrauniae* Steyermark, with leaf blades glabrous above vs. scabrous, and also alleged to have generally smaller leaves and stature may also warrant recognition (Steyermark 1951); if var. *lucybrauniae* is accepted, it should be spelled '*lucybrauniae*' under provisions of the Shenzhen Code (Turland et al. 2018). *S. terebinthinaceum* (as still broadly treated after the removal of *S. pinnatifidum*) has a fragmented distribution, different habitats in disjunct portions of its distribution, and morphological variation suggestive that there is more than one taxon passing under that name. A rangewide study is needed. **Syn:** = Mi, RAB, SE1, Tn, Va; = *Silphium terebinthinaceum* var. *terebinthinaceum* – Ar, F, FNA21, K3, K4; > *Silphium rumicifolium* Small – S, Perry (1937); < *Silphium terebinthinaceum* Jacquin – G; > *Silphium terebinthinaceum* Jacquin – S; > *Silphium terebinthinaceum* var. *luciae-brauniae* Steyermark – K1, orthographic variant; > *Silphium terebinthinaceum* var. *lucy-brauniae* Steyermark – Il, Oh3, Steyermark (1951), orthographic variant; > *Silphium terebinthinaceum* var. *terebinthinaceum* – Il, K1, Oh3, Perry (1937), Steyermark (1951).



Silybum Adanson 1763 (MILK-THISTLE)

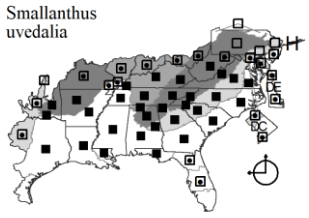


A genus of 2 species, herbs, of the Mediterranean region. References: SE1; Keil (2006g) in FNA19 (2006a).

* ***Silybum marianum*** (Linnaeus) Gaertner. MILK-THISTLE, BLESSED-THISTLE. **Hab:** Disturbed areas. **Dist:** Native of Mediterranean Europe. **Phen:** May-Jul. **Syn:** = Ar, C, F, FNA19, G, K1, K3, K4, Mi, NcTx, NE, Oh3, Pa, SE1; = *Mariana mariana* (Linnaeus) Hill – S. NatureServe GNR (Not Yet Ranked).

Smallanthus Mackenzie 1933 (BEARSFOOT)

A genus of about 20 species, of tropical, subtropical, and warm temperate America. Robinson (1978) describes the morphological and karyological differences warranting recognition of *Smallanthus* as a genus separate from *Polymnia*. References: SE1; Robinson (1978); Strother (2006ii) in FNA20 (2006b); Wells (1965); Wells (1969).



Smallanthus uvedalia (Linnaeus) Mackenzie. BEARSFOOT, LEAFCUP. **Hab:** Moist forests, bottomland forests, and disturbed places. **Dist:** NY, s. MI, IL, MO, and se. KS south to c. peninsular FL and c. TX. **Phen:** Jul-Oct. **Tax:** Here *S. uvedalia* is provisionally treated as an e. North American endemic; it is sometimes circumscribed more broadly, with a range then extending through e. Mexico and Central America to Panama. Within e. United States, *S. uvedalia* has sometimes been separated into varieties (see synonymy); further study is warranted, but Wells (1969) did not consider them to warrant recognition. The epithet retains the spelling '*uvedalia*' regardless of the grammatical gender of the genus, as it is a pre-Linnaean genus name honoring Robert Uvedale (1642-1722) and being used as a noun in apposition. **Syn:** = Fl7, FNA21, GrPl, K3, K4, Mi, NcTx, S, Tn, WH3; = *Polymnia uvedalia* (Linnaeus) Linnaeus – C, Oh3, RAB, SE1, W, WV, Wells (1969); = *Smallanthus uvedalius* – Ar, Il, K1, Pa, Va, Robinson (1978), orthographic variant; > *Polymnia uvedalia* var. *densipilis* Blake – F, G, Tx, Wells (1965); > *Polymnia uvedalia* var. *floridana* Blake – F, Wells (1965); > *Polymnia uvedalia* var. *uvedalia* – F, G, Wells (1965). NatureServe G4G5 (Apparently Secure).

Solidago Linnaeus 1753 (GOLDENROD)

A genus of 90-110 species, herbs, primarily North American, but with a few species in South America, Macaronesia, and Eurasia. The placement of the "flat-topped goldenrods" has been controversial; they are sometimes excluded from *Solidago* and treated as an apparently sister lineage and genus, *Oligoneuron*. References: Beck et al (2021); Braun (1942); Brouillet & Semple (1981); Cook & Semple (2004); SE1; Heard & Semple (1988); Johnson (1995); LeBlond (2000); Levy & Donaldson (2018); Martino, Semple, & Beck (2020); Morton (1973); Morton (1974); Nesom (1993b); Nesom (2009f); Semple &

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Beck (2021); Semple & Chmielewski (2021); Semple & Cook (2006) in FNA20 (2006b); Semple & Nelson (2018); Semple & Peirson (2013); Semple (2003); Semple (2013); Semple (2017a); Semple (2022); Semple et al (2012); Semple et al (2015); Semple et al (2016a); Semple et al (2016b); Semple et al (2017a); Semple et al (2017b); Semple et al (2019a); Semple et al (2019b); Semple et al (2020a); Semple et al (2020b); Semple et al (2021); Semple, Bzovsky, & Tong (2016); Semple, Kornobis, & Bzovsky (2018); Semple, Tong, & Chong (2017a); Semple, Tong, & Chong (2017b); Semple, Tong, & Pastolero (2012); Sorrie (2018a) in Weakley et al (2018a); Zhang (1996).

Identification Notes: Several related genera sometimes mistaken for (and/or sometimes included in) *Solidago* are included here as keying "fail-safes". Key adapted (in part) from various sources, especially FNA and SE.

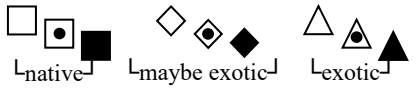
1 Inflorescence corymbiform, flat-topped or broadly rounded and about as broad as long, or broader; [section *Ptarmicoidea*, and section *Solidago* subsection *Multiradiatae*] ..... ***Key A***
1 Inflorescence a panicle, raceme, thyrse, or in axillary clusters, usually longer than broad, or with either the central branch well-developed and elongate, or with numerous branches elongate and more-or-less secund heads; [section *Solidago*].
  2 Leaves basally disposed, the basal and lower stem leaves larger, petiolate, and usually persistent, the middle and upper stem leaves smaller and less petiolate.
    3 Inflorescence cylindrical, of axillary clusters subtended by well-developed stem leaves, or a terminal thyrse or raceme, the branches not secund (unless the stem is arching and the heads become oriented to the side of the axis); [subsections *Glomeruliflorae*, *Humiles*, *Maritimae*, *Squarrosae*) ..... ***Key B***
    3 Inflorescence paniculiform, the major branches (at least) recurved with the heads borne secundly; [subsections *Argutae*, *Junceae*, *Maritimae*, *Nemorales*] ..... ***Key C***
  2 Leaves chiefly on the stem, the basal and lower stem leaves (when not early withering) the same size as or smaller than the middle and upper stem leaves.
    4 Inflorescence predominantly axillary, with well-developed leaves in at least the lower part of the inflorescence; [subsections *Argutae*, *Glomeruliflorae*, *Squarrosae*, *Thyrsiflorae*] ..... ***Key D***
    4 Inflorescence a well-developed panicle; [subsections *Triplinervae*, *Venosae*] ..... ***Key E***

Key A - goldenrods and similar genera with corymbiform inflorescences (*Bigelowia*, section Ptarmicoidei, and section *Solidago*, subsection *Multiradiatae*) (clone)

1 Plant a woody shrub; leaves with a markedly pebbled surface ..... ***Chrysoma***
1 Plant an herb; leaves variously smooth or rugose, but not pebbled.
  2 Inflorescence flat-topped; disk flowers 2-12, usually fewer than the ray flowers ..... ***Bigelowia***
  2 Inflorescence corymbose (rounded); disk flowers 17-60, more than the ray flowers.
    3 Rays white; leaves linear-lanceolate to linear-oblanceolate, the longer (10-) 15-20× as long as wide; pappus bristles slightly to strongly clavellate-thickened; [*Solidago* sect. *Ptarmicoideae*] ..... ***Solidago ptarmicoides***
    3 Rays yellow; leaves oblong, elliptic, obovate, or spatulate, 2-8× as long as wide; pappus bristles not clavellate thickened.
      8 Outer series of phyllaries glabrous on the back (glabrous to short-ciliate on the margin); leaf undersurface glabrous to somewhat hispid (0-20 hairs per square mm) (the margins and midrib beneath often more densely pubescent); stems glabrous to somewhat hispid (0-25 hairs per square mm)..... ***Solidago jacksonii***
      8 Outer series of phyllaries pubescent on the back (short-ciliate on the margin); leaf undersurface hispid (7-50 hairs per square mm); stems slightly to strongly hispid (10-70 hairs per square mm) ..... ***Solidago rigida***

Key B - goldenrods with basally disposed leaves and elongate, cylindrical inflorescences (section *Solidago*, subsections *Glomeruliflorae*, *Humiles*, *Maritimae*, *Squarrosae*)

1 Basal and lower stem leaves with blades truncate to cordate to a winged petiole; heads discoid (lacking ray flowers); [GA and FL Panhandle west through AL and MS to w. LA]; [subgenus *Solidago*, section *Brintonia*] ..... ***Solidago discoidea***
1 Basal and lower stem leaves sessile, or with blades cuneate to the petiole; heads radiate (with 1-16 disc flowers); [collectively widespread].
  3 Phyllaries and often also vegetative parts with minute sticky glands (use at least 10× magnification); stem leaves petiolate; [subsection *Humiles*]. ..... ***Solidago arenicola***
  3 Phyllaries and vegetative parts lacking minute sticky glands; stem leaves sessile.
    10 Petioles of lower stem leaves sheathing the stems; [of bog and marsh habitats, growing in soils which are permanently or at least seasonally saturated]; [subsection *Maritimae*].
      16 Leaf margins (or the basal leaves at least) serrate and also scabrous. ..... ***Solidago austrina***
      16 Leaf margins (of the basal leaves at least) merely scabrous or smooth.
        18 Leaf margins scabrous (or at least tuberculate) throughout; panicle branches often spreading-erect with recurved-secund tips; pappus 2.2-4.0 mm long .. ***Solidago gracillima***
        18 Leaf margins tending to become smooth on leaves of the upper stem; panicle branches usually stiffly erect; pappus 4.0-4.5 (-5.0) mm long ..... ***Solidago virgata***
    10 Petioles of lower stem leaves not sheathing the stems; [mesic or drier habitats]; [subsection *Squarrosae*].
      21 Phyllaries linear-lanceolate, attenuate, tapering to a pointed or minutely rounded tip.
        24 Leaves 20-50 (-60) per stem; midstem leaves usually 4-5 cm long; phyllaries attenuate; [Mountains and Piedmont of GA northward, and Coastal Plain from VA northward] ..... ***Solidago puberula***
        24 Leaves (20-) 50-120 per stem; midstem leaves usually 1-4 cm long; phyllaries acute to acuminate; [Coastal Plain from DE southward] ..... ***Solidago pulverulenta***
      21 Phyllaries ovate to lanceolate, acute to obtuse or rounded.
        26 Involucres (6-) avg. 7.2 (-9.5) mm high ..... ***Solidago porteri***
        26 Involucres 3.5-6.5 mm high.
          27 Leaves and stems sparsely to densely hairy with spreading to appressed hairs ..... ***Solidago hispida var. hispida***
          27 Leaves and upper stems glabrous.

Key to Map Symbology: 

* : waif N : no X : extirpated
EN : endemic P : planted
H : historic ? : questionable

28 Inflorescence either very narrowly thyrsiform and often interrupted or branches well spaced; mid-stem leaves 0.5-2.0 cm wide; [MA to se. IN, south to GA and MI, mostly avoiding the Coastal Plain southward]..... ***Solidago erecta***
28 Inflorescence usually denser, broader, and crowded, sometimes more open in robust plants, or narrow in plants outside range of *S. erecta*; mid-stem leaves often > 2.0 cm wide; [MA to GA, west to SD and scattered south in CO to ne. NM].
29 Mid-stem leaves 0.4-1.5 (-2.0) cm wide; basal leaves 0.8-2.0 cm wide, entire or slightly serrate, present or absent at flowering..... ***Solidago rigidiuscula***
29 Mid-stem leaves usually > 2 cm wide; basal leaves (2.0-) 3.0-5.5 cm wide, coarsely serrate, present at flowering..... ***Solidago speciosa***

Key C - goldenrods with basally disposed leaves and paniculiform inflorescences with heads secund on the branches (section *Solidago*, subsections *Argutae, Junceae, Maritimae, Nemorales*) {add *S. ulmifolia* vars to Key C}

1 Basal and lower stem leaves petiolate with a cordate or subcordate blade and/or a cordate-clasping petiole; [subsection *Argutae*].
2 Pappus > ½× as long as the disc corollas; rays 1-3..... ***Solidago auriculata***
2 Pappus < ¼× as long as the disc corollas; rays 3-6..... ***Solidago sphacelata***
1 Basal and lower stem leaves with cuneate leaf blades and petioles not cordate-clasping (though leaves may have petioles which sheath the stem).
3 Blades of lower leaves ovate to elliptic to oblanceolate, their bases truncate, abruptly tapering, or gradually tapering to petiole; lower leaves including petioles mostly less than 4× as long as wide (sometimes longer in *S. brachyphylla* with densely puberulent leaf surfaces and stems, and in *S. arguta* var. *boottii* and *S. arguta* var. *caroliniana* with blades sharply serrate and heads lacking phyllary-like bracts interior to ray florets); [subsection *Argutae*].
4 Leaves either definitely scabrous or moderately to densely soft-villous or puberulent.
5 Leaves scabrous on the upper surface.
6 Involucre (2.5-) avg. 3.9 (-6.5) mm high; basal and lower stem leaves 8-30 cm long, 4-10 cm wide, mostly 2-3× as long as wide; upper stem leaves few, somewhat reduced; disc florets averaging 11.8 per head; [Mountains, Interior Low Plateau, rarely Piedmont, and Coastal Plain only from DE northwards]..... ***Solidago patula***
6 Involucre (3.5-) avg. 6.1 (-8.8) mm high; basal and lower stem leaves 6-24 cm long, 2-6 cm wide, mostly 3-5× as long as wide; upper stem leaves many, strongly reduced; disc florets averaging 9.3 per head; [Coastal Plain and very rarely lower Piedmont and AL Mountains]..... ***Solidago salicina***
5 Leaves moderately to densely soft-villous or puberulent.
8 Inner phyllaries linear; leaves green (not glaucous)..... ***Solidago brachyphylla***
8 Inner phyllaries oblong; leaves glaucous..... ***Solidago pallescens***
4 Leaves either glabrous (or nearly so) or strigose or strigillose.
9 Plants with slender, stoloniferous rhizomes (in addition to the main, more deeply-seated rhizomes)..... ***Solidago tarda***
9 Plants lacking slender, stoloniferous rhizomes.
14 Leaves strigose or strigillose..... ***Solidago boottii***
14 Leaves glabrous..... ***Solidago vaseyi***
3 Blades of lower leaves oblanceolate to narrowly ovate, gradually tapering to petiole; lower leaves including petioles mostly more than 4× as long as wide (sometimes shorter in *S. juncea* with at least a few phyllary-like bracts interior to ray florets).
15 Petiole bases of basal and lower stem leaves not sheathing the stem; [of mesic or dry habitats].
16 Stems obviously densely and loosely puberulent; [subsection *Nemorales*]..... ***Solidago nemoralis var. nemoralis***
16 Stems glabrous or nearly so; [subsection *Junceae*].
..... ***Solidago juncea***
15 Petiole bases of basal and lower stem leaves sheathing the stem; [seasonally saturated habitats]; [subsection *Maritimae*].
21 Leaves somewhat fleshy, the stem leaves reduced but not very markedly so; inflorescence almost always with lower branches strongly recurved with secund heads; [usually of maritime or otherwise saline habitats, rarely in nontidal marshes or swamps].
..... ***Solidago mexicana***
21 Leaves not fleshy (rarely so in *S. stricta* of near coastal situations), the stem leaves much reduced relative to the basal; inflorescence showing only relatively weak tendency to recurved branches with secund heads; [inland habitats, except rarely *S. stricta*].
28 Leaf margins (or the basal leaves at least) serrate and also scabrous.
..... ***Solidago austrina***
28 Leaf margins (of the basal leaves at least) merely scabrous or smooth.
30 Leaf margins scabrous (or at least tuberculate) throughout; panicle branches often spreading-erect with recurved-secund tips; pappus 2.2-4.0 mm long..... ***Solidago gracillima***
30 Leaf margins tending to become smooth on leaves of the upper stem; panicle branches usually stiffly erect; pappus 4.0-4.5 (-5.0) mm long..... ***Solidago virgata***

Key D - goldenrods with stem leaves dominant and axillary inflorescences (section *Solidago*, subsections *Argutae, Glomeruliflorae, Squarrosae, Thyrsiflorae*)

1 Leaves entire or obscurely few-toothed; achenes glabrous at maturity; outer phyllaries with squarrose tips (tips appressed in *S. rigidiuscula*).
2 Outer phyllaries appressed; [subsection *Squarrosae*]..... ***Solidago rigidiuscula***
2 Outer phyllaries with squarrose tips; [subsection *Thyrsiflorae*].
3 Leaves oblanceolate-obovate, often short acuminate at the apex; mid-stem leaves 8-14 cm long, 18-40 mm wide, the margins sharply serrate on at least the upper 2/3..... ***Solidago buckleyi***
3 Leaves narrowly to broadly elliptic (or less commonly slightly oblanceolate), acute at the apex; mid-stem leaves 3-8 (-10) cm long, 8-25 mm wide, margins entire to shallowly serrate on only the upper ½ to 2/3.
..... ***Solidago petiolaris var. petiolaris***
1 Leaves generally many- and sharp-toothed; achenes persistently pubescent; outer phyllaries with appressed tips; [subsection *Glomeruliflorae*].
6 Stem terete, glaucous.
7 Lower midstem leaves narrowly lanceolate, 5-15 cm long, 0.8-3 cm wide, 5-6× as long as wide; stems strongly arching; [plants widespread in our area] .....
..... ***Solidago caesia***

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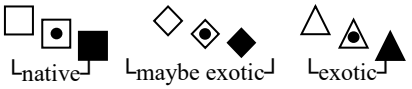

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7 Lower midstem leaves broadly lanceolate to rhombic, 5-9 cm long, 1.3-2.4 cm wide, 3-4× as long as wide; stems weakly arching; [plants of the Gulf Coastal Plain of GA westward]..... ***Solidago zedia***

6 Stem striate-angled, green.

9 Leaves 1-3 (-3.5)× as long as wide.

10 Leaves 1-2.2 (-2.5)× as long as wide, abruptly contracted to a winged petiole; teeth of the leaf margins elongate and narrow, acuminate, mostly (2-) 3-8 mm long (as measured on the upper side of the tooth)..... ***Solidago flexicaulis***

10 Leaves (2.2-) 2.5-3 (-3.5)× as long as wide, cuneate to a sessile base; teeth of the leaf margins not notably elongate and narrow, mostly 1-2 (-3) mm long (as measured on the upper side of the tooth)
..... ***Solidago flaccidifolia***

9 Leaves 3-10× as long as wide.
..... ***Solidago curtisii***

Key E - goldenrods with stem leaves dominant and well-developed paniculiform inflorescences (section *Solidago*, subsections *Nemorales, Triplinervae* and *Venosae*)

1 Leaves with only the midvein readily apparent; leaves entire; leaf surfaces finely translucent punctate (most obviously seen with transmitted light or with 10× magnification); fresh leaves usually anise-scented; [subgenus *Triactis*, section *Odorae*].
..... ***Solidago odora***

1 Leaves either triple-veined or pinnately-veined; leaves entire or often at least obscurely toothed; leaf surfaces not translucent punctate; fresh leaves not anise-scented.

3 Leaves pinnately veined; leaves mostly 3-5× as long as wide.

4 Leaf venation not notably reticulate; plants to 12 dm tall, from a compact caudex; [subgenus *Pleiactila*, section *Venosae*, subsection *Ulmifoliae*].

5 Leaves glabrous..... ***Solidago delicatula***

5 Leaves sparsely hirsute below, at least on the midvein and larger lateral veins..... ***Solidago ulmifolia***

4 Leaves pinnately veined and also forming a prominent reticulum, the veins (primary, secondary, and tertiary) very evidently raised on the undersurface (less obviously so in *S. fistulosa*); plants to 30 (-40) dm tall, from long-creeping rhizomes, thus forming clonal patches; [subgenus *Pleiactila*, section *Venosae*, subsection *Venosae*].

6 Mid-stem leaves sessile, somewhat clasping; leaf margins nearly entire to obscurely serrulate; leaves planar..... ***Solidago fistulosa***

6 Mid-stem leaves subsessile, not clasping; leaf margins strongly serrate; leaves rugose.

7 Involucres 4-6 mm high; broader phyllaries 0.7-1.2 mm wide; stems glabrous below the inflorescence; mid-stem leaves elliptic (widest near the middle)..... ***Solidago latissimifolia***

7 Involucres (2-) 2.5-3.5 (4.5) mm high; phyllaries mostly < 0.5 mm wide; stems hairy or glabrous below the inflorescence; mid-stem leaves lanceolate to ovate (widest below the middle).

8 Leaves relatively thin, not very rugose, usually sharply serrate, the apices acuminate, glabrous or soft-hairy on the surfaces; rays (4-) 5-12 (-13).
..... ***Solidago rugosa var. rugosa***

8 Leaves relatively thick and firm, strongly rugose, usually subentire to bluntly serrate, the apices often only acute, slightly to strongly scabrous or stiffly-hairy on the surfaces; rays 4-9.

11 Upper stem leaves lanceolate to elliptic, not much reduced relative to leaves lower on the stem..... ***Solidago rugosa var. aspera***

11 Upper stem leaves ovate, much reduced relative to leaves lower on the stem..... ***Solidago rugosa var. celtidifolia***

3 Leaves triple-veined (two side veins arising near the base of the leaf and arching first away and then back towards the midvein); leaves 2-20× as long as wide.

12 Upper stem (above the midpoint, up to the branches of the inflorescence) glabrous.
..... ***Solidago gigantea***

12 Upper stem hairy (above the midpoint, up to the branches of the inflorescence), variously puberulent, strigillose to strigose, villous, or scabrous.

15 Midstem leaf blades 1-4 (-5)× as long as wide, the base attenuated to a winged petiole (at least in leaves of the lower midstem(; plants 1-10 dm tall; [collectively in IL, MO, AR, and LA westwards, disjunct eastwards in KY, NC, SC, GA, and AL]
..... ***Solidago radula***

15 Midstem leaf blades 4-20× as long as wide, the base sessile and cuneate to rounded; plants 3-20 dm tall; [collectively widespread].

18 Rays 2-8; midstem leaves 4-15 mm wide, mostly 6-20× as long as wide, either twisted at base or not.
..... ***Solidago tortifolia***

18 Rays 4-17 (-24); midstem leaves 5-30 mm wide, 4-12× as long as wide, not twisted at base.

21 Midstem leaves mostly 8-12× as long as wide.
..... ***Solidago leavenworthii***

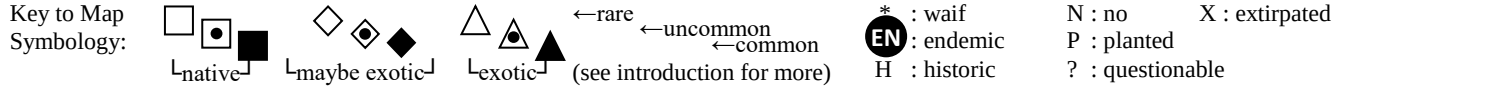
21 Midstem leaves mostly 4-6× as long as wide; [subgenus *Pleiactilis*, section *Unilaterales*, subsection *Canadensae*].

26 Inflorescence broad; upper stem leaves not reduced in size relative to the mid-stem leaves; [broadly eastern] .....
..... ***Solidago altissima var. altissima***

26 Inflorescence elongated, narrow; upper stem leaves reduced; [southern]..... ***Solidago altissima var. pluricephala***

Solidago altissima Linnaeus *var*. ***altissima***. TALL GOLDENROD. **Hab:** Fields, roadsides, disturbed areas. **Dist:** NS, QC, and SK south to n. GA, n. AL, n. MS, AR, and e. OK; introduced in w. North America. **Phen:** Aug-Oct. **Tax:** Semple (2022) reports tetraploid (2n=36) and hexaploid (2n=54) counts for this variety, with most of its broad distribution hexaploid, and smaller zones of distribution of tetraploids centered in the Interior Highlands of AR and OK, and the ne. edge of our region, in NJ and se. NY. **Syn:** = Il, K4, Tx, Semple (2022), Semple et al (2015); < *Solidago altissima* Linnaeus – F, GW2, K1, Mi, Pa, RAB, Tn, WV, Johnson (1995); < *Solidago altissima* ssp. *altissima* – Ar, FNA20, K3, NE; < *Solidago altissima* Linnaeus var. *altissima* – Va; < *Solidago canadensis* – Oh3, W; < *Solidago canadensis* Linnaeus var. *scabra* Torrey & Gray – C, G, GrPl, NcTx, SE1, WH3; < *Solidago hirsutissima* P. Miller – S.

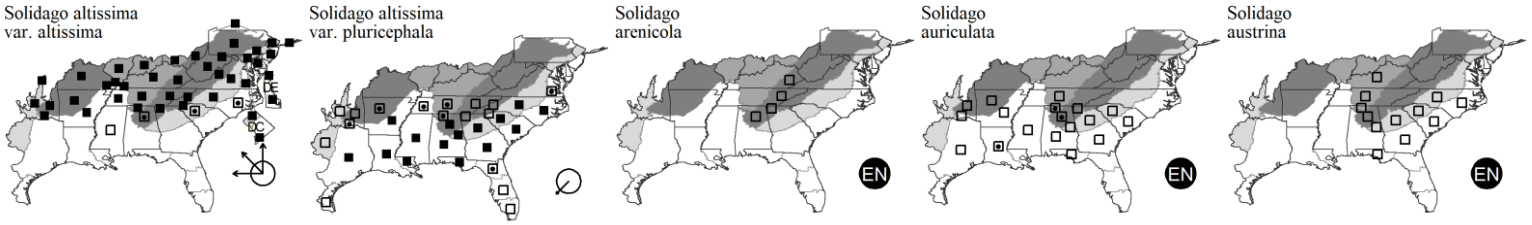
Solidago altissima Linnaeus *var*. ***pluricephala*** M.C. Johnston. SOUTHERN TALL GOLDENROD. **Hab:** Fields, roadsides, disturbed areas. **Dist:** Se. VA, NC, TN, AR, and OK south to c. peninsular FL, s. TX, and adjacent Mexico. **Phen:** Aug-Oct. **Tax:** See Semple et al. (2015) for detailed information. Semple (2022) reports tetraploid (2n=36), pentaploid (2n=45), and hexaploid (2n=54) chromosome counts for var. *pluricephala*, with hexaploid counts across most of its distribution, except tetraploid counts in w. LA and TX; the lone pentaploid count is from s. TX. **Syn:** = K4, Tx, Semple et al (2015); < *Solidago altissima* Linnaeus – F, GW2, K1, Pa, RAB, WV; < *Solidago altissima* ssp. *altissima* – FNA20; < *Solidago altissima* Linnaeus var. *altissima* – Va; < *Solidago canadensis* – W; < *Solidago canadensis* Linnaeus var. *scabra* Torrey & Gray – C, Fl7, G, SE1, WH3; < *Solidago hirsutissima* P. Miller – S.



Solidago arenicola B.R. Keener & Kral. BLACK WARRIOR GOLDENROD. **Hab:** Riverside scour areas. **Dist:** Known from Blount County, AL (Black Warrior River), on rivers in the Cumberland Plateau of TN and KY (notably Big South Fork of the Cumberland River), and on Rocky Creek (Walker County), GA. **Phen:** Sep-Oct. **Tax:** There remains some question whether plants from these various river systems are conspecific. **Comm:** See Keener & Kral (2003) for additional information. **Syn:** = FNA20, Tn, Semple et al (2019a). NatureServe G2G3 (Imperiled).

Solidago auriculata Shuttleworth ex Blake. EARED GOLDENROD. **Hab:** Rocky forests over circumneutral rocks, bottomland forests, calcareous hammocks. **Dist:** Wc. SC, sc. TN (Chester, Wofford, & Kral 1997), AR, and se. OK south to GA, c. Panhandle FL, AL, MS, LA, and e. TX. **Phen:** Aug-Sep. **Syn:** = Ar, Fl7, FNA20, K1, K3, K4, SE1, Tn, Tx, WH3; = *Solidago notabilis* Mackenzie – RAB, S. NatureServe G4 (Apparently Secure).

Solidago austrina Small. PIEDMONT WAND GOLDENROD. **Hab:** Piedmont prairie remnants, openings in xeric hardpan forests, upland depressions, clay roadbanks and powerline rights-of-way, post oak savannas, and open oak-hickory woodlands. **Dist:** Sc. NC south to GA, Panhandle FL, and nw. AL, possibly extending into TN and KY. **Tax:** The distinction between *S. gracillima* s.s. and *S. austrina* seems to be warranted; they are alleged to differ as follows: *S. austrina*: pappus 2.2-2.8 mm long, ray flowers 2-4, disc flowers 6-8; of the inner Coastal Plain and lower Piedmont; *S. gracillima*: pappus (3.0-) 3.5-4.0 mm long; ray flowers 3-7; disk flowers 9-13; of the Coastal Plain. **Syn:** = F, G, K4, S, Tn; < *Solidago gracillima* Torrey & A. Gray – K1, RAB, SE1, W, WH3; < *Solidago stricta* Aiton ssp. *gracillima* (Torrey & A. Gray) Semple – FNA20.



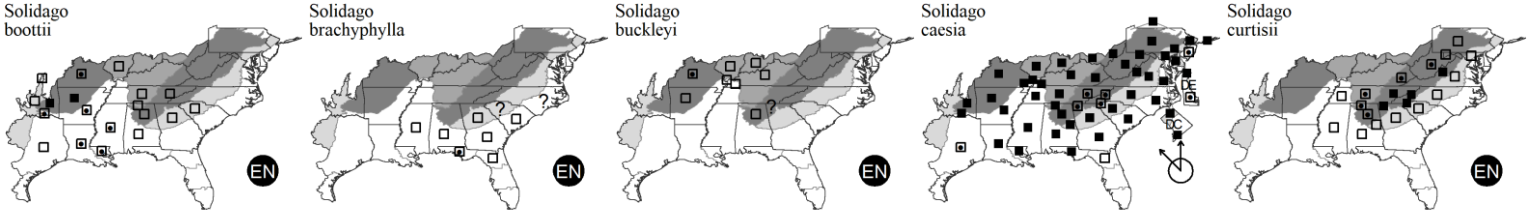
Solidago boottii Hooker. BOOTT'S GOLDENROD. **Hab:** Dry open woodlands, dry slopes, often in sandy or rocky soils. **Dist:** C. SC south to s. AL, west to LA, AR, and s. MO, most common in the Ozarks. Reported for n. WV by Harmon, Ford-Werntz, & Grafton (2006), but it seems likely that this is based on different interpretations of the taxa. **Phen:** Aug-Oct. **Syn:** = Tx, Semple et al (2021); = *Solidago arguta* ssp. *caroliniana* (A. Gray) G.H. Morton var. *boottii* (Hooker) Palmer & Steyermark – Ar, FNA20; = *Solidago arguta* Aiton var. *boottii* (Hooker) Palmer & Steyermark – K1, K3, K4, SE1, Tn; < *Solidago arguta* – RAB; > *Solidago boottii* Hooker – F, S, WV; > *Solidago boottii* var. *boottii* – G, Johnson (1995); > *Solidago strigosa* – F, G, S.

Solidago brachyphylla Chapman. DIXIE GOLDENROD. **Hab:** Open woodlands, bluff forests. **Dist:** SC (NC?) south to ne. FL and Panhandle FL, west to s. AL (s. MS?). **Phen:** Sep-Nov. **Syn:** < *Solidago brachyphylla* Chapman – Fl7, FNA20, K1, K3, K4, S, SE1, WH3.

Solidago buckleyi Torrey & A. Gray. BUCKLEY'S GOLDENROD. **Hab:** Forests, open ridgetop and bluff woodlands. **Dist:** W. KY, s. IN, s. IL, s. MO and n. AR; perhaps southeastwards in GA and AL (these occurrences controversial as to identification). **Phen:** Sep. **Syn:** = Ar, F, FNA20, G, Il, K1, K3, K4, S, SE1, Semple et al (2017b). NatureServe G4 (Apparently Secure).

Solidago caesia. AXILLARY GOLDENROD. **Hab:** Moist forested slopes. **Dist:** ME and ON south to FL and LA. **Phen:** Aug-Oct. **Syn:** = Semple & Beck (2021); = *Solidago caesia* Linnaeus var. *caesia* – Ar, FNA20, K3, K4, NE, Va, Johnson (1995); < *Solidago caesia* – C, F, Fl7, G, Il, K1, Mi, Oh3, Pa, RAB, S, SE1, Tn, Tx, W, WH3, WV.

Solidago curtisii Torrey & A. Gray. CURTIS'S GOLDENROD. **Hab:** Moist forested slopes, and rarely in mafic woodlands in the Piedmont of VA. **Dist:** A Central and Southern Appalachian endemic: PA, WV, and MD south to n. GA and n. AL. **Phen:** Sep-Oct. **Tax:** Var. *curtisii*, with stem glabrous or slightly puberulent in the inflorescence, and var. *pubens* (M.A. Curtis) A. Gray, with stem densely puberulent, are sometimes distinguished. They do not appear to be worthy of taxonomic recognition. **Syn:** = C, K3, K4, Pa, SE1, Tn, Va, W, WV; = *Solidago caesia* Linnaeus var. *curtisii* (Torrey & A. Gray) Wood – Johnson (1995); = *Solidago curtisii* var. *curtisii* – FNA20; < *Solidago curtisii* Torrey & A. Gray – K1; > *Solidago curtisii* Torrey & A. Gray – S; < *Solidago curtisii* var. *curtisii* – RAB; > *Solidago curtisii* var. *curtisii* – F, G; > *Solidago curtisii* var. *pubens* (M.A. Curtis) A. Gray – F, G, RAB; > *Solidago pubens* M.A. Curtis – S. NatureServe GNR (Not Yet Ranked).

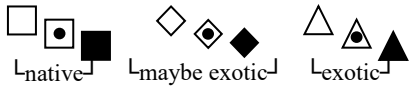


Solidago delicatula Small. SMOOTH ELMLEAF GOLDENROD. **Hab:** Bottomlands, woodland openings. **Dist:** Se. KS, OK, and AR south to TX and w. LA; disjunct eastward in AL and Panhandle FL. **Phen:** (Jul-) Aug-Oct (-Jan). **Tax:** The recognition of *Solidago delicatula* was supported by Beck et al. (2021) using morphological and molecular evidence. **Syn:** = Ar, FNA20, K3, K4, SE1, Tx, Beck et al (2021); = *Solidago ulmifolia* Muhlenberg ex Willdenow var. *microphylla* A. Gray – GrPl, K1, NcTx; < *Solidago ulmifolia* Muhlenberg ex Willdenow – S. NatureServe G5TNR (Not Yet Ranked).

Solidago discoidea (Elliott) Torrey & A. Gray. BRINTONIA, RAYLESS MOCK-GOLDENROD. **Hab:** Rich bluff forests. **Dist:** Sw. GA and Panhandle FL west to w. LA. **Phen:** Aug-Oct. **Syn:** = K1; = *Brintonia discoidea* (Elliott) Greene – Fl7, FNA20, K3, K4, S, SE1, WH3. NatureServe G4G5 (Apparently Secure).

Solidago erecta Banks ex Pursh. **Hab:** Woodlands, old fields, woodland borders, grassy balds. **Dist:** NY and CT south to GA, AL, and MS. **Phen:** Aug-Oct. **Syn:** = C, F, FNA20, G, K1, K3, NE, Oh3, Pa, RAB, S, SE1, Tn, Va, W, WV, Semple et al (2017a); = *Solidago speciosa* Nuttall var. *erecta* (Banks ex Pursh) MacMillan – Johnson (1995); < *Solidago erecta* Banks ex Pursh – FNA20, (also see S. porteri).

Solidago fistulosa P. Miller. HAIRY PINEYWOODS GOLDENROD. **Hab:** Pocosins, swamp forests, wet pine savannas, wet pine flatwoods, maritime forests. **Dist:** NJ south to s. FL, west to LA. **Phen:** Aug-Nov. **Syn:** = C, F, Fl7, FNA20, G, GW2, K1, K3, K4, RAB, S, SE1, Va, WH3, Johnson (1995), Semple, Bzovsky, & Tong (2016). NatureServe G4G5 (Apparently Secure).

Key to Map Symbology:


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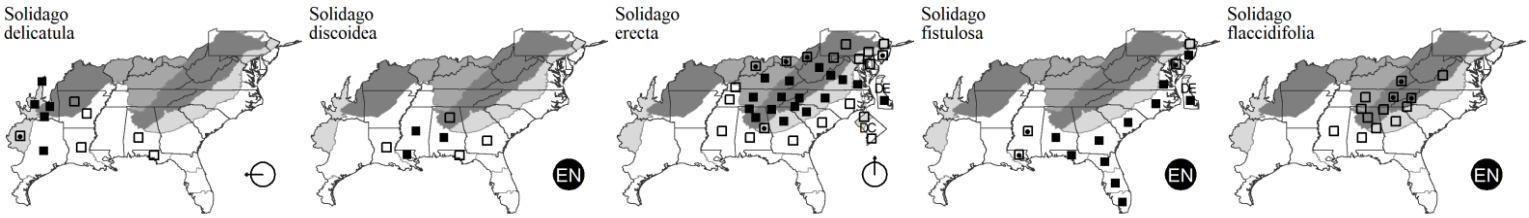
H : historic
N : no
P : planted
? : questionable
X : extirpated

Solidago flaccidifolia Small. APPALACHIAN GOLDENROD. **Hab:** Forests. **Dist:** VA and KY south to GA and ne. AL; disjunct in nc. MS. **Phen:** Sep-Oct. **Syn:** = C, G, K1, K3, K4, SE1, Tn, Va, W; = *Solidago curtisii* Torrey & A. Gray var. *flaccidifolia* (Small) R.E. Cook & Semple – FNA20; = *Solidago latissimifolia* P. Miller – S, misapplied; < *Solidago caesia* – F, RAB.



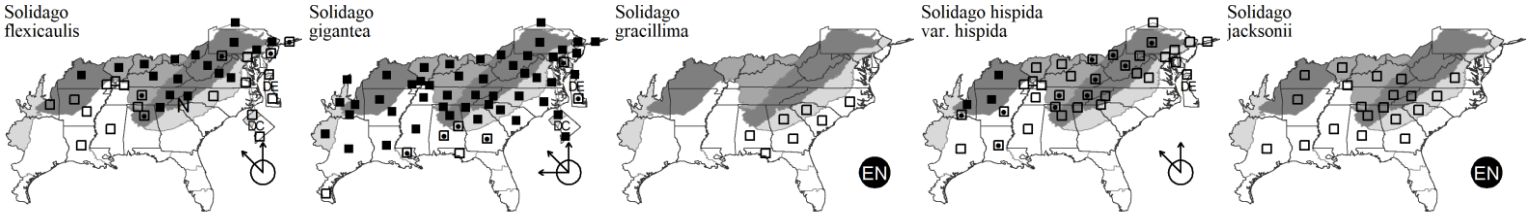
Solidago flexicaulis Linnaeus. ZIGZAG GOLDENROD, BROAD-LEAVED GOLDENROD. **Hab:** Moist wooded slopes, especially over calcareous or mafic rocks. **Dist:** NS, ON, and ND south to GA, AL, MS, and KS. **Phen:** Jul-Oct. **Syn:** = Ar, C, F, FNA20, G, GrPl, Il, K1, K3, K4, Mi, NE, Oh3, Pa, RAB, S, SE1, Tn, Va, W, WV, Johnson (1995). NatureServe G5 (Secure).

Solidago gigantea Aiton. SMOOTH GOLDENROD. **Hab:** Old fields, roadsides, streamside meadows, bottomlands. **Dist:** NS west to SK and MT, south to Panhandle FL (Liberty County), TX, and CO. **Phen:** Aug-Sep (-Oct). **Tax:** Three cytotypes are documented and have available names at specific rank -- diploid = *Solidago gigantea*, tetraploid = *Solidago serotinoides*, and hexaploid = *Solidago shinnersii*. Martino, Semple, & Beck (2020) studied these and recommended against giving them taxonomic status, though they do differ in morphology, distribution, nutrient use, and invasiveness. **Syn:** = Ar, C, Fl7, GrPl, GW2, Il, K1, K3, K4, Mi, Mo2, NcTx, NE, RAB, Tn, Tx, Va, W, WH3, Martino, Semple, & Beck (2020); = *Solidago serotina* Aiton – S; > *Solidago gigantea* var. *gigantea* – F, G, Oh3, Pa, SE1, WV, Johnson (1995); > *Solidago gigantea* var. *leiophylla* Fernald – F, Oh3, WV; > *Solidago gigantea* Aiton var. *serotina* (Kuntze) Cronquist – G, Pa, SE1, Johnson (1995). NatureServe G5T5 (Secure).

Solidago gracillima Torrey & A. Gray. SOUTHERN BOG GOLDENROD, GRACEFUL GOLDENROD. **Hab:** Wet pine savannas, seepage bogs. **Dist:** E. NC south to c. Panhandle FL, west to s. AL. **Phen:** Aug-Oct. **Tax:** Several distinct entities appear to have been referred to this taxon; the number of entities, and the appropriate names to apply to them, are presently obscure. The names *S. perlonga* Fernald, *S. austrina* Small, and *S. simulans* Fernald have been synonymized under *S. gracillima* (as by Cronquist 1980). Cronquist (1980) refers material from WV and high elevation granitic domes of sw. NC (*S. simulans*) to *S. gracillima*, a treatment which is not phytogeographically or otherwise credible. The distinction between *S. gracillima* s.s. and *S. austrina* seems to be warranted; they are alleged to differ as follows: *S. austrina*: pappus 2.2-2.8 mm long, ray flowers 2-4, disc flowers 6-8; of the inner Coastal Plain and lower Piedmont; *S. gracillima*: pappus (3.0-) 3.5-4.0 mm long; ray flowers 3-7; disk flowers 9-13; of the Coastal Plain. **Syn:** = K3, K4, Semple et al (2016b); < *Solidago gracillima* Torrey & A. Gray – C, Fl7, K1, RAB, SE1, Va, W, WH3, Johnson (1995); > *Solidago gracillima* Torrey & A. Gray – S; < *Solidago stricta* Aiton ssp. *gracillima* (Torrey & A. Gray) Semple – FNA20, Semple (2003).

Solidago hispida Muhlenberg ex Willdenow *var.* ***hispida***. HAIRY GOLDENROD. **Hab:** Dry rocky forests and woodland edges. **Dist:** NL (Labrador) west to SK, south to nw. GA, AL, AR, IA, and SD. **Phen:** Jul-Oct. **Comm:** Widespread in e. and c. TN (Chester, Wofford, & Kral 1997) and in nw. GA (Jones & Coile 1988). Also reported for NC and SC by Kartesz (1999, 2010). Our variety is the typic; other varieties are more northern, around the Great Lakes and in maritime Canada. **Syn:** = F, G, Mi, NE, LeBlond (2000), Semple et al (2017a); < *Solidago hispida* – Ar, C, FNA20, K3, K4, Oh3, Pa, S, SE1, Tn, Va, W, WV, Johnson (1995); > *Solidago hispida* Muhlenberg ex Willdenow var. *hispida* – F, G, Il, K1, Mo2. NatureServe G5T5 (Secure).

Solidago jacksonii (Kuntze) Fernald. SOUTHEASTERN BOLD GOLDENROD. **Hab:** Glades, barrens, and prairie-like areas, over mafic (such as diabase) or calcareous (such as calcareous shale) rocks, and in adjacent disturbed areas, such as roadbanks and powerline rights-of-way. **Dist:** Sc. VA, se. TN, sc. OH, and e. MO south to c. SC, sw. GA, and e. TX. **Phen:** Late Aug-Oct. **Tax:** This taxon is apparently strictly diploid; it seems to warrant specific rank, though it has been given varietal and subspecific rank. **Comm:** This taxon (variously treated as a species, subspecies, or variety) is rare and scattered throughout its range, restricted to prairie-like, barren, or glade situations. **Syn:** = F; = *Oligoneuron jacksonii* (Kuntze) Small – S; = *Oligoneuron rigidum* (Linnaeus) Small var. *glabratum* (E.L. Braun) Nesom – Il, K1, Nesom (1993b); = *Solidago rigida* ssp. *glabrata* (E.L. Braun) Heard & Semple – Ar, FNA20, K4, Tn, Heard & Semple (1988); = *Solidago rigida* Linnaeus var. *glabrata* E.L. Braun – C, G, K3, SE1, Va; < *Solidago rigida* Linnaeus – NcTx, RAB, Tx, W. NatureServe G5T4 (Apparently Secure).



Solidago juncea Aiton. EARLY GOLDENROD. **Hab:** Meadows, pastures, roadbanks, woodland borders. **Dist:** NS west to MN, south to GA, AL, MS, and n. LA. **Phen:** Jul-Oct. **Syn:** = Ar, C, FNA20, K3, K4, Mi, Mo2, NE, Oh3, Pa, RAB, S, SE1, Tn, Va, W, WV, Johnson (1995); > *Solidago juncea* var. *juncea* – F, G, K1; > *Solidago juncea* var. *neobohemica* Fernald – F, K1; > *Solidago juncea* var. *ramosa* Porter & Britton – G.

Solidago latissimifolia P. Miller. COASTAL SWAMP GOLDENROD. **Hab:** Pocosins, swamp forests, sandhill seepages, sandhill-pocosin ecotones. **Dist:** NS south c. peninsular FL, west to Panhandle FL. **Phen:** Aug-Oct. **Syn:** = Fl7, FNA20, K1, K3, K4, NE, Va, WH3, Johnson (1995), Weakley et al (2018a); = *Solidago elliottii* Torrey & A. Gray – C, G, GW2, RAB, S, SE1; > *Solidago elliottii* var. *ascendens* Fernald – F; > *Solidago elliottii* var. *pedicellata* Fernald – F.

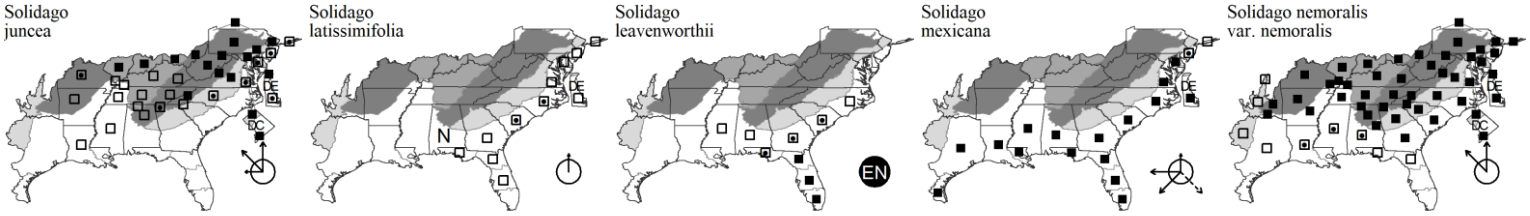
Solidago leavenworthii Torrey & A. Gray. LEAVENWORTH'S GOLDENROD. **Hab:** Wet pine savannas, wet pine flatwoods, pond margins, marshes. **Dist:** Se. NC south to s. FL, west to s. AL. **Phen:** Aug-Nov. **Syn:** = Fl7, FNA20, GW2, K1, K3, K4, RAB, S, SE1, WH3. NatureServe G3G4 (Vulnerable).

Solidago mexicana Linnaeus. SOUTHERN SEASIDE GOLDENROD. **Hab:** Coastal dunes, dune slacks, maritime wet grasslands, tidal marshes. **Dist:** E. MA south to s. FL, west and south to TX and Mexico; West Indies. **Phen:** Late Aug-Dec (and year-round southwards). **Tax:** This taxon warrants

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

distinction at specific rank from *S. sempervirens*. **Syn:** = K4, S, Semple et al (2016a); = *Solidago sempervirens* ssp. *mexicana* (Linnaeus) Semple – FNA20, Semple (2003); = *Solidago sempervirens* var. *mexicana* (Linnaeus) Fernald – C, F, G, GW2, Il, K1, K3, NE, SE1, Tx, Va, Johnson (1995); < *Solidago sempervirens* Linnaeus – Bah, Fl7, RAB, WH3. NatureServe G5T5? (Secure).

Solidago nemoralis Aiton *var*. ***nemoralis***. EASTERN GRAY GOLDENROD. **Hab:** Woodlands, glades, barrens, roadbanks. **Dist:** NS west to ND, south to Panhandle FL and TX. **Phen:** Jun-Nov. **Syn:** = K1, K3, NcTx, Oh3, Tx, Va; = *Solidago nemoralis* – Il, Mi; = *Solidago nemoralis* ssp. *nemoralis* – Ar, FNA20, NE, Semple, Kornobis, & Bzovsky (2018); < *Solidago nemoralis* – Fl7, Pa, RAB, S, Tn, W, WH3, Johnson (1995); > *Solidago nemoralis* var. *haleana* Fernald – C, F, G, SE1, WV; > *Solidago nemoralis* Aiton var. *nemoralis* – C, F, G, SE1, WV.



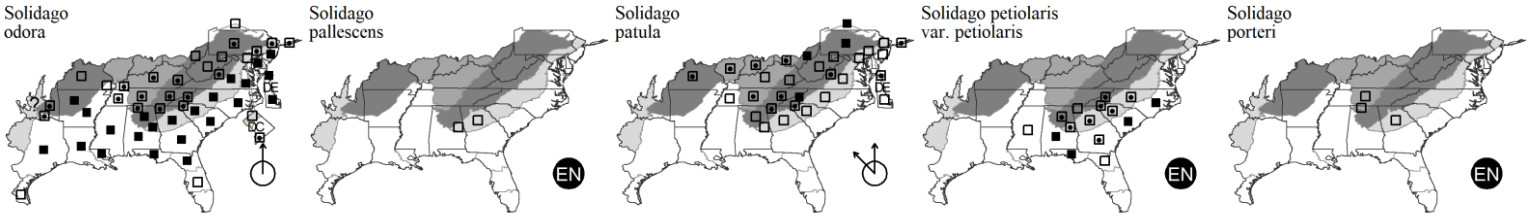
Solidago odora Aiton. LICORICE GOLDENROD. **Hab:** Dry forests and woodlands, especially in dry pinelands, such as sandhills, of the Coastal Plain, inland in dry, fire-maintained sites, such as glades, barrens, and ridgetop pine-oak woodlands. **Dist:** NH, VT, NY, OH, and MO south to FL and TX. **Phen:** Jul-Oct. **Syn:** = F, G, NcTx, Oh3, Pa, RAB, S, Tn, Tx, Va, W, WV, Johnson (1995), Semple, Bzovsky, & Tong (2016); = *Solidago odora* ssp. *odora* – Ar, FNA20, NE; = *Solidago odora* var. *odora* – C, Fl7, K1, K3, K4, Mo2, WH3. NatureServe G5T5 (Secure).

Solidago pallescens C. Mohr. PIEDMONT PALE GOLDENROD. **Hab:** Dry hillsides. **Dist:** Ec. AL and wc. GA. **Phen:** Sep-Oct. **Syn:** < *Solidago brachyphylla* Chapman – Fl7, FNA21, K1, K3, K4, S, SE1, WH3.

Solidago patula Muhlenberg ex Willdenow. NORTHERN ROUGHLEAF GOLDENROD. **Hab:** Bogs, seepages over mafic rocks, grassy balds (as Whitetop Mountain). **Dist:** NH, VT, NY, s. ON, MI and WI south to w. VA, w. NC, nc. GA, c. TN, w. TN, and se. MO. Coastal Plain records (except northwards, in DE, NJ, and NY) represent misidentifications of *S. salicina*. **Phen:** Aug-Sep (-Oct). **Tax:** Semple, Tong, & Pastolero (2012) have clarified the taxonomy, distribution, and nomenclature of this and *S. salicina*. **ID Notes:** The broad basal leaves, saturated wetland habitat, and finely but definitely scabrous upper leaf surface are distinctive. **Syn:** = Il, K3, K4, Mi, Tn, Semple et al (2021), Semple, Tong, & Pastolero (2012); = *Solidago patula* ssp. *patula* – FNA20, Pa; = *Solidago patula* Muhlenberg ex Willdenow var. *patula* – C, F, G, K1, NE, Oh3, RAB, SE1, Va, Johnson (1995); = *Solidago rigida* Linnaeus – S, misapplied; < *Solidago patula* Muhlenberg ex Willdenow – GW2, W, WV. NatureServe G5T5 (Secure).

Solidago petiolaris Aiton *var*. ***petiolaris***. DOWNY GOLDENROD. **Hab:** Upland forests and woodlands. **Dist:** NC, SC, GA, AL, and MS south to n. FL. **Phen:** Late Aug-Nov. **Tax:** The eastern component is sometimes treated as *S. petiolaris* (sensu stricto) and the western as *S. angusta* Torrey & A. Gray. Alternatively these are recognized as the varietal rank (as here), or combined entirely. Var. *angusta* (Torrey & A. Gray) A. Gray and var. *wardii* (Britton) Fernald are Ozarkian and more western (Nesom 2008a). See Semple et al. (2017b). **Syn:** = C, F, GrPl, K1, K3, K4, SE1, Semple et al (2017b); = *Solidago petiolaris* Aiton – G, Il; > *Solidago harperi* Mackenzie in Small – S; > *Solidago milleriana* Mackenzie – S; < *Solidago petiolaris* Aiton – Fl7, NcTx, RAB, W, WH3. NatureServe G5T4? (Apparently Secure).

Solidago porteri Small. PORTER'S GOLDENROD. **Hab:** Oak savannas, barrens, woodland edges (roadsides). **Dist:** Piedmont of GA; Interior Low Plateau of c. TN and n. AL. **Phen:** Aug-Sep. **Tax:** Rediscovered and clarified by Semple & Estes (2014). **Syn:** = K1, K3, K4, S, SE1, Tn, Semple et al (2017a), Semple, Tong, & Chong (2017b); < *Solidago erecta* Banks ex Pursh – FNA20.



Solidago ptarmicoides (Torrey & A. Gray) B. Boivin. WHITE PRAIRIE-GOLDENROD, UPLAND WHITE ASTER. **Hab:** Prairie-like barrens over mafic, ultramafic, or calcareous rock, serpentine woodlands, prairies. **Dist:** VT and NY west to SK, south to e. TN (Rhea and Roane counties in the Ridge and Valley) (Chester, Wofford, & Kral 1997), nw. GA (Floyd County), AR, and CO; disjunct in nc. NC (Granville County, and historically in Rowan County [Small & Heller 1892]) and nc. SC (York County). **Phen:** Aug-Oct. **Syn:** = Ar, C, FNA20, GrPl, K3, K4, Mi, Mo2, Oh3, SE1, Tn, W, Brouillet & Semple (1981); = *Aster ptarmicoides* Torrey & A. Gray – F, G, S; = *Oligoneuron album* (Nuttall) Nesom – Il, K1, NE, Nesom (1993b). NatureServe G5 (Secure).

Solidago puberula Nuttall. DOWNY GOLDENROD. **Hab:** Bogs, wet meadows, and wet pastures, in dry acid soils in VA and WV. **Dist:** NS west to ON, south to GA, nw. AL, and TN. **Phen:** Aug-Oct. **Syn:** = S, Tn, LeBlond (2000); = *Solidago puberula* ssp. *puberula* – FNA20; = *Solidago puberula* var. *puberula* – C, F, G, K1, K3, K4, NE, RAB, SE1, Va, Johnson (1995); < *Solidago puberula* Nuttall – Pa, W, WV. NatureServe G5T4T5 (Apparently Secure).

Solidago pulverulenta Nuttall. **Hab:** Savannas, streamhead pocosins, flatwoods, swamps, seepages in pinelands, and disturbed areas. **Dist:** Se. VA south to Panhandle FL, west to LA. **Phen:** Sep-Oct. **Syn:** = S; = *Solidago puberula* ssp. *pulverulenta* (Nuttall) Semple – FNA20, Semple (2003); = *Solidago puberula* Nuttall var. *pulverulenta* (Nuttall) Chapman – C, F, Fl7, G, K1, K3, K4, RAB, SE1, Va, WH3, Johnson (1995). NatureServe G5T4T5 (Apparently Secure).

Solidago radula Nuttall. ROUGH GOLDENROD. **Hab:** Calcareous prairies, dry woodlands, bluffs, glades, and barrens over mafic or calcareous rocks. **Dist:** IL west to KS, south to LA and TX; disjunct eastward in KY, NC, SC, GA, and AL. **Phen:** Aug-Oct. **Syn:** = Ar, C, FNA20, G, GrPl, K3, Mo2, NcTx, RAB, S, SE1, Tx, W, Semple, Kornobis, & Bzovsky (2018); > *Solidago radula* var. *radula* – Il, K1; > *Solidago radula* var. *stenolepis* Fernald – Il, K1.

Solidago rigida Linnaeus. MIDWESTERN BOLD GOLDENROD. **Hab:** Glades, barrens, and prairie-like areas, over mafic or calcareous rocks. **Dist:** RI and MA west to NY, s. ON, MI, WI, s. MN and c. NE, south to c. VA, sc. NC, w. NC, sc. TN, c. AR, and se. TX. East of MI, IN, IL, MO, and OK, *Solidago rigida* is generally rare and restricted to relictual prairie-like situations. **Phen:** Aug-Oct. **Tax:** This taxon is tetraploid (2n=36) through

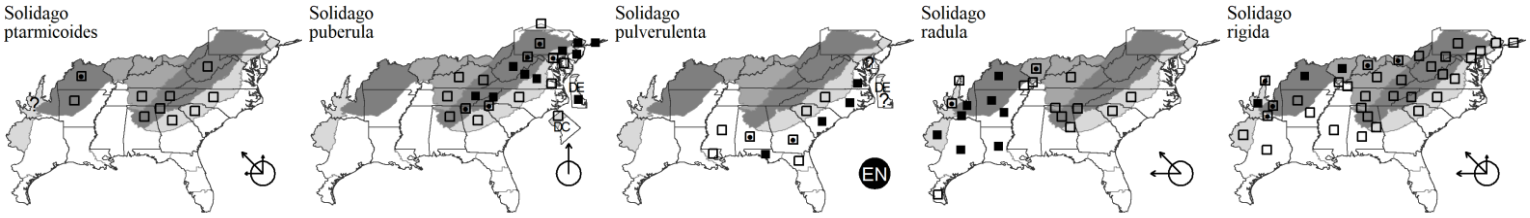
Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more)

* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable

X : extirpated

most of its range, with a few diploids reported for OK. **Syn:** = *Oligoneuron rigidum* (Linnaeus) Small var. *rigidum* – Il, K1, NE, Nesom (1993b); = *Solidago rigida* ssp. *rigida* – Ar, FNA20, K3, K4, Mo2, Tn, Heard & Semple (1988); = *Solidago rigida* Linnaeus var. *rigida* – C, G, GrPl, SE1, Va; < *Solidago rigida* Linnaeus – F, Mi, NcTx, Oh3, Pa, RAB, Tx, W, Johnson (1995); < *Solidago rigida* var. *grandiflorus* – S. NatureServe G5T5 (Secure).



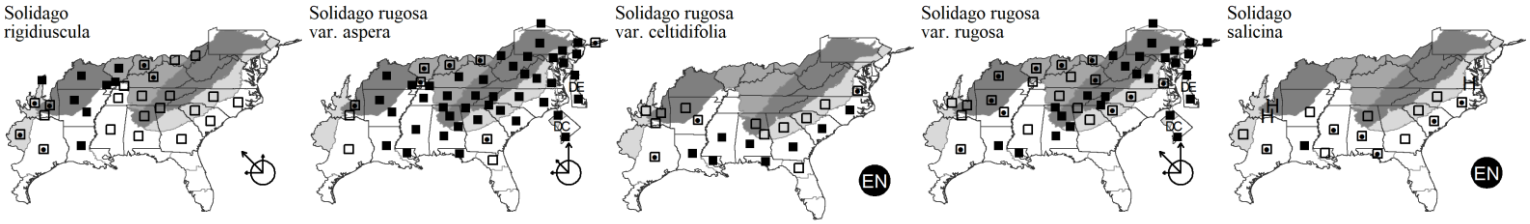
Solidago rigidiuscula (Torrey & A. Gray) Porter. NARROWLEAF SHOWY GOLDENROD. **Hab:** Limestone barrens. **Dist:** ON west to ND and WY, south to TN, LA, and TX; disjunct eastward in glade habitats to nw. GA (GANHP), TN (Chester, Wofford, & Kral 1997), KY, and possibly NC and SC. Semple et al. (2012) also mention occurrences as far east as the Carolinas; this requires additional assessment. **Phen:** (Aug-) Sep-Oct. **Tax:** Probably best accorded specific rank, following Semple et al. (2012). **Syn:** = Il, S, Semple et al (2012), Semple, Tong, & Chong (2017a); = *Solidago speciosa* ssp. *speciosa* var. *rigidiuscula* – Ar, FNA20; = *Solidago speciosa* var. *angustata* Torrey & A. Gray – F, misapplied; = *Solidago speciosa* Nuttall var. *rigidiuscula* Torrey & A. Gray – C, G, GrPl, K1, K3, K4, Mo2, NcTx, Oh3, SE1, Tn, Tx. NatureServe G5T4 (Apparently Secure).

Solidago rugosa P. Miller *var*. ***aspera*** (Aiton) Fernald. **Hab:** Fields, forests, roadsides. **Dist:** ME west to MI, south to FL and TX. **Phen:** Aug-Nov. **Syn:** = F, Mi, NcTx, Oh3, Tn, WV, Sorrie (2018a) in Weakley et al (2018a); = *Solidago aspera* Aiton – Il; = *Solidago rugosa* ssp. *aspera* (Aiton) Cronquist var. *aspera* – Ar, FNA20, K3, K4, NE, Pa; < *Solidago altissima* Linnaeus – S, misapplied; < *Solidago rugosa* – GW2, Va; < *Solidago rugosa* ssp. *aspera* (Aiton) Cronquist – C, G, K1, SE1, W; < *Solidago rugosa* P. Miller var. *aspera* (Aiton) Fernald – Fl7, WH3; < *Solidago rugosa* P. Miller var. *rugosa* – RAB.

Solidago rugosa P. Miller *var*. ***celtidifolia*** (Small) Fernald. HACKBERRY-LEAF GOLDENROD. **Hab:** Pocosins, seepage slopes, bogs, wetlands. **Dist:** VA south to FL, west to OK and TX. **Phen:** Sep-Nov. **Syn:** = F, RAB, Tx, Sorrie (2018a) in Weakley et al (2018a); = *Solidago celtidifolia* Small – S; = *Solidago rugosa* ssp. *aspera* (Aiton) Cronquist var. *celtidifolia* (Small) Fernald – FNA20, K3, K4; < *Solidago rugosa* – GW2, Va; < *Solidago rugosa* ssp. *aspera* (Aiton) Cronquist – C, G, K1, SE1, W; < *Solidago rugosa* P. Miller var. *aspera* (Aiton) Fernald – WH3.

Solidago rugosa P. Miller *var*. ***rugosa***. WRINKLE-LEAF GOLDENROD. **Hab:** Fields, forests, wetlands. **Dist:** NS west to ON, south to GA, AL, MS, LA, TX. **Phen:** Aug-Oct. **Syn:** = Mi, NcTx, Oh3; = *Solidago rugosa* – Il; = *Solidago rugosa* ssp. *rugosa* – K4, NE; = *Solidago rugosa* ssp. *rugosa* var. *rugosa* – Ar, C, FNA20, G, K3, Pa, SE1; < *Solidago rugosa* – GW2, Va; < *Solidago rugosa* ssp. *rugosa* – W; > *Solidago rugosa* ssp. *rugosa* var. *rugosa* – K1; > *Solidago rugosa* ssp. *rugosa* var. *villosa* – C, G, K1, SE1, Johnson (1995); < *Solidago rugosa* P. Miller var. *rugosa* – RAB; > *Solidago rugosa* P. Miller var. *rugosa* – F, WV, Sorrie (2018a) in Weakley et al (2018a); > *Solidago rugosa* var. *villosa* – F, WV, Sorrie (2018a) in Weakley et al (2018a).

Solidago salicina Elliott. SOUTHERN ROUGHLEAF GOLDENROD. **Hab:** Streamhead pocosins, sandhill seepages, swamp edges, rarely inland in seepage over rock. **Dist:** Primarily Coastal Plain: se. VA south to Panhandle FL, west to se. OK and e. TX, and somewhat disjunct in the Ozarks and Ouachitas of MO and AR, also rarely reaching the lower Piedmont; disjunct in w. SC in the uppermost Piedmont in the Blue Ridge Escarpment region. **Phen:** Sep-Oct. **Tax:** Semple, Tong, & Pastolero (2012) have clarified the taxonomy, distribution, and nomenclature of this and *S. patula*. **Syn:** = K3, K4, S, Tx, Semple et al (2021), Semple, Tong, & Pastolero (2012); = *Solidago patula* ssp. *strictula* (Torrey & A. Gray) J.C. Semple – Ar, FNA20, Semple (2003); = *Solidago patula* Muhlenberg ex Willdenow var. *strictula* Torrey & A. Gray – C, Fl7, G, K1, NcTx, RAB, SE1, Va, WH3, Johnson (1995); < *Solidago patula* Muhlenberg ex Willdenow – GW2; > *Solidago patula* Muhlenberg ex Willdenow var. *strictula* Torrey & A. Gray – F; > *Solidago salicina* Elliott – F.



Solidago speciosa Nuttall. SHOWY GOLDENROD, NOBLE GOLDENROD. **Hab:** Pastures, forests, woodlands, roadbanks. **Dist:** NH, VT, NY, and WI south to GA, MS, LA, and OK. **Phen:** Aug-Oct. **Tax:** Probably better accorded species rank separate from *S. rigidiuscula*, following Semple et al. (2012). **Syn:** = Il, Semple et al (2012), Semple, Tong, & Chong (2017a); = *Solidago speciosa* ssp. *speciosa* var. *speciosa* – Ar, FNA20; = *Solidago speciosa* var. *speciosa* – C, F, G, GrPl, K1, K3, K4, Mo2, NE, Oh3, SE1, Tn, Va, Johnson (1995); > *Solidago conferta* – S; > *Solidago harperi* Mackenzie in Small – S; < *Solidago speciosa* Nuttall – Pa, RAB, W, WV. NatureServe G5T5? (Secure).

Solidago sphacelata Rafinesque. LIMESTONE GOLDENROD, HEARTLEAVED GOLDENROD. **Hab:** Rock outcrops and dry rocky forests, usually over calcareous or mafic rocks. **Dist:** C. VA, s. WV, s. OH, c. IN, and s. IL south to n. GA, c. AL, and ne. MS. **Phen:** (Jul-) Aug-Sep (-Oct). **Syn:** = C, F, G, Il, K1, K3, K4, RAB, SE1, Tn, Va, W, WV, Johnson (1995), Semple et al (2021); = *Brachychaeta sphacelata* (Rafinesque) Britton – S. NatureServe G4G5 (Apparently Secure).

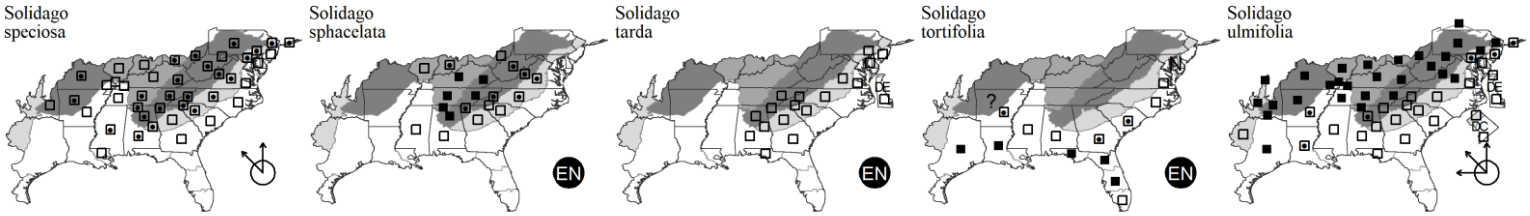
Solidago tarda Mackenzie. **Hab:** Longleaf pine sandhills, other dry pinelands, xeric fluvial sand ridges, Piedmont barrens and rocky woodlands. **Dist:** NJ and e. PA south to e. VA, c. and s. GA, AL, and Panhandle FL; disjunct in Marion County, TN (Chester, Wofford, & Kral 1997). **Phen:** Sep-Oct. **Syn:** = C, FNA20, K3, K4, S, SE1, Tn, Va, Semple et al (2021); < *Solidago arguta* – RAB, Johnson (1995); < *Solidago arguta* – K1; < *Solidago arguta* Aiton var. *caroliniana* A. Gray – WH3; < *Solidago ludoviciana* (A. Gray) Small – F.

Solidago tortifolia Elliott. LEAFY PINEYWOODS GOLDENROD. **Hab:** Longleaf pine sandhills and other dry pinelands. **Dist:** Se. VA south to s. FL, west to AR and TX. **Phen:** Aug-Nov. **Syn:** = Ar, C, F, Fl7, FNA20, G, K1, K3, K4, RAB, S, SE1, Tx, Va, WH3, Johnson (1995). NatureServe G4G5 (Apparently Secure).

Solidago ulmifolia Muhlenberg ex Willdenow. ELMLEAF GOLDENROD. **Hab:** Rocky forests and woodlands, especially on mafic and calcareous substrates, moist hammocks (in FL). **Dist:** NS, ME, ON, and MN, south to FL and TX. **Phen:** Aug-Oct. **Tax:** Beck et al. (2021) studied the recognition of var. *palmeri* and var. *ulmifolia* and did not find a basis for recognition of two varieties; a controversial decision. **Syn:** = F, Fl7, Il, Mi, Pa,

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

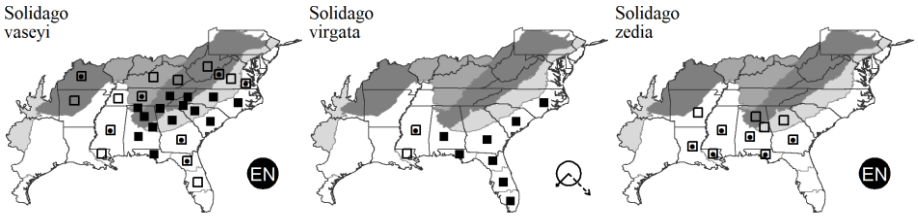
RAB, S, Tn, Va, W, WH3, WV; > *Solidago ulmifolia* Muhlenberg ex Willdenow var. *palmeri* Cronquist – Ar, FNA20, G, K1, K3, K4, SE1; > *Solidago ulmifolia* Muhlenberg ex Willdenow var. *ulmifolia* – Ar, C, FNA20, G, GrPl, K1, K3, K4, NE, SE1.



Solidago vaseyi (A. Gray) A. Heller. VASEY'S GOLDENROD. **Hab:** Forests, woodlands, grassy balds. **Dist:** W. MD (C. Frye, pers. comm., 2014) and WV west to c. TN and s. MO, south to ne. FL, Panhandle FL, s. MS, and c. AR. **Phen:** Sep-Oct. **Syn:** = Semple et al (2021); = *Solidago arguta* ssp. *caroliniana* (A. Gray) G.H. Morton var. *caroliniana* – FNA20; = *Solidago arguta* Aiton var. *caroliniana* A. Gray – C, K1, K3, SE1, Tn, Va, W, Johnson (1995); = *Solidago yadkinensis* (Porter) Small – F, S, misapplied; < *Solidago arguta* – RAB, WV; < *Solidago arguta* Aiton var. *caroliniana* A. Gray – Fl7, WH3; > *Solidago boottii* Hooker var. *caroliniana* (A. Gray) Cronquist – G; >< *Solidago harrisii* Steele – S, misapplied in part by Small (1933).

Solidago virgata Michaux. WAND GOLDENROD. **Hab:** Longleaf pine savannas, Coastal Plain bogs, pocosins, marshes. **Dist:** NC south to s. FL, west to e. LA; West Indies and s. Mexico. **Phen:** Late Aug-Oct. **Syn:** = K3, K4, Semple (2013), Semple et al (2016a), Semple et al (2016b); = *Solidago petiolata* P. Miller – S, misapplied; = *Solidago stricta* Aiton – C, F, Fl7, G, K1, SE1, WH3, misapplied; = *Solidago stricta* Aiton ssp. *stricta* – FNA20, misapplied; < *Solidago stricta* Aiton – GW2, RAB, misapplied.

Solidago zedia (Cook & Semple) Semple & J.B. Beck. GULF COAST AXILLARY GOLDENROD. **Hab:** Moist forests. **Dist:** GA and Panhandle FL west to LA and AR. **Phen:** Sep-Oct. **Syn:** = Semple & Beck (2021); = *Solidago caesia* Linnaeus var. *zedia* R.E. Cook & Semple – Ar, FNA20, K3, K4; < *Solidago caesia* – Fl7, K1, S, SE1, WH3.



Soliva Ruiz & Pavón 1794 (BURWEED)

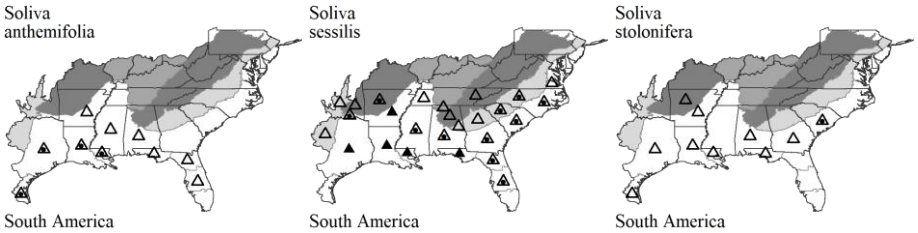
A genus of about 8 species, herbs, of South America. References: Arriagada & Miller (1997); SE1; Watson (2006g) in FNA19 (2006a).

1 Achenes (1.5-) 2.5-3.0 mm long, usually winged, the wings not transversely ribbed ..... ***Soliva sessilis***
1 Achenes 1.5-2.2 mm long, winged, transversely ribbed.
  2 Leaves mostly basal; leaf blades 3-8 (-15) cm long, 2-3× pinnatifid ..... ***Soliva anthemifolia***
  2 Leaves cauline and basal; leaf blades 1-2 (-3) cm long, 1 (-2)× pinnatifid ..... ***Soliva stolonifera***

* ***Soliva anthemifolia*** (A.L. de Jussieu) Sweet. **Hab:** Lawns, disturbed areas. **Dist:** Native of South America. **Phen:** Feb-Apr. **Syn:** = Ar, Fl7, FNA19, K3, K4, SE1, Arriagada & Miller (1997); = *Gymnostyles anthemifolia* Antoine Laurent de Jussieu – K1, S, WH3; ? *Soliva mutisii* Kunth – NcTx.

* ***Soliva sessilis*** Ruiz & Pavón. FIELD BURWEED, LAWN BURWEED, SPURWEED, JO-JO, BAREFOOT-DEMON, EVILWEED. **Hab:** Lawns, roadsides. **Dist:** Native of South America. **Phen:** Apr-May. **Comm:** An unpleasant and painful lawn weed. **Syn:** = Ar, Fl7, FNA19, K1, K3, S, Va, WH3, Arriagada & Miller (1997); = *Cotula sessilis* (Ruiz & Pavón) Stace – K4; = *Soliva pterosperma* (A.L. de Jussieu) Lessing – NcTx, RAB, SE1. NatureServe GNR (Not Yet Ranked).

* ***Soliva stolonifera*** (Brotero) R. Brown ex Sweet. CARPET BURWEED. **Hab:** Lawns, roadsides, moist open areas. **Dist:** Native of South America. **Phen:** Mar-Apr. **Syn:** = Ar, Fl7, FNA19, K3, K4, NcTx, SE1, Arriagada & Miller (1997); = *Gymnostyles stolonifera* (Brotero) Tutin – K1, WH3; ? *Gymnostyles nasturtiifolia* Antoine Laurent de Jussieu – S, misapplied; ? *Soliva nasturtiifolia* (Antoine Laurent de Jussieu) A.P. de Candolle – RAB, misapplied. NatureServe GNR (Not Yet Ranked).



Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated

Sonchus Linnaeus 1753 (SOW-THISTLE, MILK-THISTLE)

A genus of about 50-60 species, herbs and shrubs, of the Old World. References: SE1; Hyatt (2006) in FNA19 (2006a).

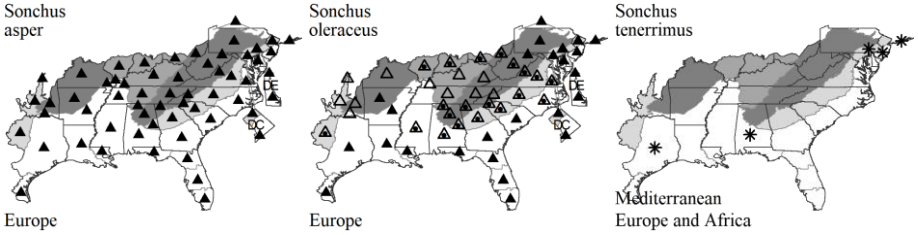
Unkeyed waifs: *Sonchus tenerrimus*

3 Leaf base auricles rounded; mature achenes not transversely rugose..... ***Sonchus asper***
3 Leaf base auricles sagittate, the two lobes on either side of the stem coming to a point; mature achenes transversely rugose..... ***Sonchus oleraceus***

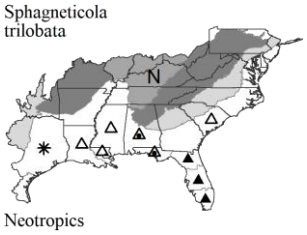
* ***Sonchus asper*** (Linnaeus) Hill. SPINYLEAF SOW-THISTLE, PRICKLY SOW-THISTLE. **Hab:** Roadsides, fields, pastures, disturbed areas. **Dist:** Native of Europe. **Phen:** Late Mar-Jul. **Syn:** = Ar, Bah, C, F, Fl7, FNA19, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, Oh3, Pa, RAB, S, SE1, Tn, Va, W, WH3, WV. NatureServe GNR (Not Yet Ranked).

* ***Sonchus oleraceus*** Linnaeus. COMMON SOW-THISTLE. **Hab:** Roadsides, fields, pastures, disturbed areas. **Dist:** Native of Europe. **Phen:** Late Mar-Jul. **Syn:** = Ar, Bah, C, F, Fl7, FNA19, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, Pa, RAB, S, SE1, Tn, Va, W, WH3, WV. NatureServe GNR (Not Yet Ranked).

* ***Sonchus tenerrimus*** Linnaeus. SLENDER SOW-THISTLE. **Hab:** Disturbed ground, as on ballast. **Dist:** Native of Mediterranean Europe, w. Asia, and n. Africa. **Phen:** Mar-Jun. **Syn:** = FNA19, K3, K4. NatureServe GNR (Not Yet Ranked).



Sphagneticola O. Hoffmann 1900

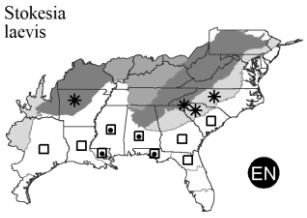


A genus of about 4 species, perennial herbs, of tropical America and Asia. References: Strother (2006qq) in FNA21 (2006c).

* ***Sphagneticola trilobata*** (Linnaeus) Pruski. CREEPING OXEYE. **Hab:** Disturbed areas. **Dist:** Native of tropical America. Naturalized in FL (including several counties in the Panhandle adjacent to GA) (Wunderlin & Hansen 2003). Reported for Beaufort County, SC (Bradley et al. [in prep.]). **Phen:** Jan-Dec. **Syn:** = Fl7, FNA21, K1, K3, K4, WH3; = *Wedelia trilobata* (Linnaeus) A.S. Hitchcock – Bah, S, SE1. NatureServe G5 (Secure).

Stokesia L'Héritier 1789 (STOKESIA, STOKES ASTER)

A monotypic genus, an herb, of se. North America. References: SE1; Jones (1982); Loos et al (2019); Strother (2006a) in FNA19 (2006a).



Stokesia laevis (Hill) Greene. STOKESIA, STOKES ASTER, BLUE STOKESIA. **Hab:** Pitcherplant bogs and moist pinelands, and also rather frequently grown as a garden plant and naturalized from cultivation in states outside its native distribution. **Dist:** Native from e. SC south ne. FL, FL Panhandle, west to e. LA (St. Tammany Parish); disjunct in w. LA and e. TX (Loos et al. 2019). **Phen:** Late Jun-Aug. **Tax:** There seems no reason to question the validity and native status of the early record from SC. A unique tetraploid population found by the Atlanta Botanical Garden in Omega, GA (near Tifton) in the 1990s was distinguished by having distinct upright and long scapes, up to 1 meter in length; the original population has been destroyed, but a selection derived from it was named 'Omega Skyrocket' and introduced into the commercial trade (Barb, Werner, & Tallury 2008). **Syn:** = Fl7, FNA19, K1, K3, K4, RAB, S, SE1, WH3, Jones (1982). NatureServe G4 (Apparently Secure).

Symphyotrichum Nees 1833 (AMERICAN ASTER)

A genus of about 90-100 species, of North America. References: Brouillet & Semple (1981); Brouillet et al (2006) in FNA20 (2006b); Campbell & Seymour (2014); SE1; Haines (2010); Holmes & Singhurst (2021); Jones & Young (1983); Jones (1980a); Jones (1980b); Jones (1983); Jones (1984); Jones (1992); Jones, Witsell, & Nesom (2008); Kauffman et al (2004); Kral (1983a); Lamboy (1987); Lamboy (1992); Medley (2021a); Nesom (1993a, 1993b, 1994, 1997); Nesom (1994a); Nesom (1994b); Nesom (1997a); Nesom (1997b); Nesom (2005b); Nesom (2006oo); Nesom (2007); Noyes & Rieseberg (1999); Reveal & Keener (1981); Semple & Brouillet (1980a); Semple & Brouillet (1980b); Semple & Chmielewski (1987); Semple (2019); Semple, Chmielewski, & Lane (1989); Semple, Heard, & Xiang (1996); Sundberg (2004); Ward (2012a); Warners & Laughlin (1999); Xiang & Semple (1996).

Key to subgenus *Astropolium* based on Nesom (2005b).

1 Basal and lower stem leaves both petiolate and with cordate blades..... ***Key A***
1 Basal and lower stem leaves not both petiolate and with cordate blades.
  2 Annuals, from a taproot; [of moist, usually maritime, and usually saline habitats]; [subgenus *Astropolium*]..... ***Key B***
  2 Perennials, from a caudex, rhizome, or crown; [collectively of various habitats].

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated

3 Stem leaves fleshy, entire, linear; stems glabrous ..... ***Key C***
3 Leaves not fleshy, usually toothed, stems usually variously pubescent.
4 Leaves either very numerous on the main stem, the internodes < 1 cm long (in some species the leaves of the lower and middle main stem withered or deciduous by flowering season, the internode length then reckonable by leaf scars), the leaves clasping or sessile, or leaves rather numerous on main stem, the internodes < 3.5 cm long, the leaves of the main stem strongly auriculate clasping (*S. georgianum*, *S. phlogifolium*); stem leaves entire, (often scabrous-margined); rays purple, lavender, rose, or blue (or characteristically white in *S. ericoides* and very rarely also in other species); [subgenus *Virgulus*] ..... ***Key D***
4 Leaves less numerous on the main stem, the internodes averaging > 3.5 cm long, the leaves clasping, subclasping, or not clasping; stem leaves toothed (or rarely entire); rays blue, purple, lavender, pink, or white.
5 Stem leaves clasping to sheathing; rays blue, purple, or lavender ..... ***Key E***
5 Stem leaves not clasping; rays blue, purple, lavender, rose, or white
6 Phyllaries (most or all) with an involute (inrolled) subulate green tip ..... ***Key F***
6 Phyllaries flat or sometimes with sides slightly curved, but lacking a subulate tip ..... ***Key G***

Key A - perennial asters with petiolate, cordate-bladed lower leaves [of subgenus *Symphyotrichum*, sections *Heterophylli* and *Concinni*]

3 Cauliine leaf blades sessile and cordate-clasping, or petiolate, the petiole strongly dilated to a cordate-clasping base, or both ..... ***Symphyotrichum undulatum***
3 Cauline leaves not cordate clasping; [collectively widespread].
4 Lower stems glabrous; upper stems sparsely hirtellous or pilose.
5 Basal leaves deeply cordate; phyllaries with lanceolate diamond shaped blaze (2-3× as long as wide), purple to greenish purple ..... ***Symphyotrichum cordifolium***
5 Basal leaves shallowly cordate to truncate; phyllaries with short diamond shaped blaze (1-1.5× as long as wide) or linear-lanceolate-shaped blaze (> 4× as long as wide), green.
6 Phyllaries with linear-lanceolate-shaped green blaze (> 4× as long as wide) ..... ***Symphyotrichum urophyllum***
6 Phyllaries with short diamond shaped green blaze (1-1.5× as long as wide) ..... ***Symphyotrichum lowrieanum***
4 Lower stems glabrous to sparsely hirsute; upper stems densely hirtellous to hirsute; [mainly west of the Appalachians].
8 Phyllaries with short diamond-shaped green blaze (1-1.5× as long as wide); basal and lower stem leaves mostly crenate to entire; upper stem leaves entire.
9 Plants with only the basal and lower stem leaf blades cordate or subcordate, the midstem and upper leaves not petiolate and with cuneate bases; phyllary faces glabrous; disc flowers (15-) 20-25 (-30) ..... ***Symphyotrichum oolentangiense var. oolentangiense***
9 Plants with nearly all basal and stem leaf blades cordate or subcordate; phyllary faces short-pubescent; disc flowers 16-23 ..... ***Symphyotrichum shortii***
8 Phyllaries with elongate green blaze (> 2× as long as wide); basal and lower stem leaves serrate or crenate; upper stem leaves serrate or crenate (to entire). ..... ***Symphyotrichum drummondii***

Key B - annual salt-marsh asters [of subgenus *Astropolium*]

1 Heads usually dense in an elongate, pyramidal-paniculate arrangement; inner phyllaries 6-7 mm long, phyllary apices linear-acuminate, distal margins often inrolled/involute, green zone of phyllaries narrowly lanceolate, usually extending the entire length of the phyllary, chartaceous bases short or absent; pappus accrescent, 4-5.5 mm long at maturity and usually longer than coiled ray corollas; [habitats wet, saline] ..... ***Symphyotrichum subulatum***
1 Heads corymbiform to thyrsiform, diffusely paniculate, or secund to subsecund and paniculiform arrangements or at the tips of long, bracteate branches; inner phyllaries 4-6.5 mm long, phyllary apices acute to acuminate, distal margins inrolled/involute or not, green zone of phyllaries lanceolate to elliptic, chartaceous bases usually conspicuous; pappus not accrescent, 3.5-4 (-5) mm long at maturity, longer or shorter than ray corollas; [habitats moist to wet, rarely saline].
2 Phyllary tips appressed, acute, flat, inner phyllaries with broadly lanceolate, distinctly demarcated, apical green zone, proximal ½ -1/3 white-chartaceous; ray flower blades erect, often involute along the edges (curling inward lengthwise), rarely coiling back distally (if so, then only ca. 1/2 coil), usually shorter than mature pappus; disc flowers (3-) 7-14 ..... ***Symphyotrichum squamatum***
2 Phyllary tips loose, linear-acuminate, distal margins often inrolled/involute, inner phyllaries with narrowly lanceolate, often weakly demarcated apical green zone, white-chartaceous bases short, ca. 1/3–1/2 the length of the phyllaries; ray flower blades not involute along edges, usually coiling back distally in 1–4 or more coils, usually as long or longer than mature pappus; disc flowers either (6-) 8-15 or 11-23 or (20-) 33-45 (-50).
3 Heads usually corymbiform to thyrsiform in arrangement (borne primarily on distal branches, distally clustered); inner phyllaries 4-5.5 (-6) mm long; phyllary apices acute to abruptly short-acuminate or long-acuminate, the distal margins inrolled/involute or not; ray flowers in 1 (-2) series, corollas 2-3 mm long, the blades 0.1-0.3 mm wide (dried), white to light pinkish or slightly blue, coiling back in 1-2 coils or less commonly remaining straight; disc flowers (6-) 8-15; [of FL westward across the Gulf Coast] ..... ***Symphyotrichum expansum***
3 Heads diffusely paniculiform to pyramidal-paniculiform to corymbiform or second to subsecund and paniculiform; inner phyllaries 5-6.5 mm long; phyllary apices long-acuminate, the distal margins usually inrolled/involute; ray flowers in 1-3 series, corollas 2-7 mm long, the blades 0.2-0.8 mm wide (dried), white to blue or purple, coiling back in 2-5 coils; disc flowers either 11-23 or (20-) 33-45 (-50).
..... ***Symphyotrichum divaricatum***

Key C - perennial asters with linear, fleshy leaves [of *Symphyotrichum* subgenera *Astropolium* and *Chapmaniani*]

1 Leaves basally disposed; disc flowers 47-57; ray flower blades (10-) 14-15 (-20) mm long; [of FL]; [subgenus *Chapmaniani*] ..... ***Symphyotrichum chapmanii***
1 Leaves mainly cauline, the basal and lower stem lives typically withered by flowering season; disc flowers (10-) 13-45 (-54); ray flower blades (4.5-) 5-8.5 (-9.5) mm long; [collectively widespread]; [subgenus *Astropolium*]
2 Midstem leaves (1.0-) 1.5-2.7 mm wide; involucres 4.1-5.3 mm high; ray flowers 10-16; disc flowers (10-) 13-23; achenes 1.5-2.0 (-2.5) mm long; pappus 3.0-4.4 mm long; [of FL southward] ..... ***Symphyotrichum bracei***

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

2 Midstem leaves (1.5-) 3-6 mm wide; involucres 6-9.5 (-11) mm high; ray flowers (12-) 17-25; disc flowers 25-45 (-54); achenes 2.8-4.0 (-4.5) mm long; pappus 5.0-6.1 mm long; [widespread in our area] ..... ***Symphyotrichum tenuifolium***

Key D - perennial asters [of subgenus *Virgulus*]

1 Mid and upper stem leaves > 8× as long as wide; phyllaries tipped with a small, white spine; rays white (to pale pink); involucre 2.5-4.5 (-5) mm high; disc flowers 6-12 (-20) per head; [section *Ericoidi*] ..... ***Symphyotrichum ericoides var. ericoides***

1 Mid and upper stem leaves 2-7× as long as wide; phyllaries not spine-tipped; rays purple, lavender, rose, blue (rarely nearly white); involucre > 5 mm high (except sometimes as short as 4 mm high in *S. adnatum* of s. GA and FL west to LA); disc flowers (6-) 11-110 per head.

2 Mid and upper stem leaves with bases rounded to cuneate (or clasping in *S. plumosum* of FL Panhandle), usually twisted at the base by 90 degrees to bring one leaf margin along the stem; phyllaries not stipitate-glandular; [section *Virgulus*].

3 Rays 13-36; cypselas glabrous. ..... ***Symphyotrichum pratense***

3 Rays 7-16; cypselas densely strigose.

6 Phyllaries and upper stem leaves moderately to densely sericeous (silky-pubescent); [widespread] ..... ***Symphyotrichum concolor var. concolor***

6 Phyllaries and upper stem leaves glabrous or sparsely pilose; [of the Gulf Coastal Plain] ..... ***Symphyotrichum concolor var. devestitum***

2 Mid and upper stem leaves with bases clasping or auriculate clasping (except cuneate, rounded, or slightly clasping in *S. grandiflorum*, *S. oblongifolium*, and *S. fontinale*), the blade not twisted at the base (except in *S. adnatum*); phyllaries stipitate glandular (or sometimes or always lacking stipitate glands in *S. fontinale* and *S. walteri* (of the Coastal Plain from e. NC southward), and *S. patens* var. *patentissimum* (of KY and MS westward).

7 Mid-stem leaves < 1.5 cm long, either ascending-appressed, or spreading and with the apical portion abruptly deflexed; rays 5-9 (-11) mm long; [of the Coastal Plain]; [section *Patentes*]. ..... ***Symphyotrichum adnatum***

7 Mid-stem leaves > 2 cm long, spreading; rays > 9 mm long (to as short as 7 mm in *S. fontinale* of Panhandle FL); [collectively widespread].

9 Mid-stem leaves cuneate, rounded, or subclasping; [section *Grandiflori*]. ..... ***Symphyotrichum oblongifolium***

9 Mid-stem leaves clasping to auriculate-clasping.

13 Phyllaries with attenuate, loosely spreading tips; disc flowers 50-110; ray flowers (40-) 50-75 (-100); [mainly of sunny, moist to wet marshes, swamps, fens, south to GA, wc. AL, c. MS]; [section *Grandiflori*] ..... ***Symphyotrichum novae-angliae***

13 Phyllaries with obtuse to acute tips (the inner phyllaries sometimes acuminate, but not attenuate); disc flowers 15-50; ray flowers 9-24 (-30); [of sunny to semi-sunny dry sites, or of moist forests, collectively widespread, south to ne. FL, Panhandle FL, s. AL, s. MS, se. LA].

14 Involucres 8-10 (-12) mm high; disc flowers 8-10 mm long, white with purplish lobes; heads 4-5 (-6) cm across (ray tip to ray tip), the rays 14-24 mm long; plants strongly rhizomatous, forming clonal colonies with the stems mostly scattered along the rhizome (new stems typically arising at least several cm from the old ones); achenes 2.5-4.0 mm long, pale gray-brown, the trichomes about 0.4 mm long and distributed on and between the ribs; anthers purplish; pollen white; [section *Grandiflori*] ..... ***Symphyotrichum georgianum***

14 Involucres 5.5-7.5 (-8.5) mm high (or to 12 mm high in *S. patens* var *patentissimum*, barely entering our area in w. KY and w. MS); disc flowers 5.5-8 mm long, either white with purplish lobes or bright yellow; heads 3-4 (-4.5) cm across (ray tip to ray tip), the rays 10-18 (-20) mm long; plants cespitose, generally with 1 or more stems arising from caudices (the new stems arising near the old); achenes 2.0-4.0 mm long, tan, gray, brown, dark-brown, or black, the trichomes various (see below); anthers purplish or yellow; pollen white or yellow; [section *Patentes*].

15 Disc flowers white with purplish lobes; stem leaves 7.5-12.5 (-14) cm long, thin in texture, soft-pubescent, the venation apparent, rugose-veiny and wrinkled; anthers purplish; pollen white; achenes 2.5-4.0 mm long, the trichomes concentrated on the ribs, < 0.4 mm long, appressed; [primarily of the Mountains, less commonly the Piedmont, mostly in moist, shady to semi-sunny situations] ..... ***Symphyotrichum phlogifolium***

15 Disc flowers bright yellow; stem leaves (2-) 3-7 (-9) cm long, thick in texture, scabrous, the venation inconspicuous; anthers yellow; pollen yellow; achenes 2.0-3.5 mm long, the trichomes distributed on and between the ribs, mostly > 0.4 mm long, spreading; [collectively widespread in our area, mostly in dry, semi-sunny to sunny situations]

17 Mid-stem leaves mostly 5-7 cm long, separated by internodes of (1-) 1.5-3 (-4) cm at their densest, usually spreading; plants usually 0.8-1.6 m tall; heads mostly 9-12 mm wide ..... ***Symphyotrichum patens var. patens***

17 Mid-stem leaves mostly 3-5 cm long, separated by internodes of (0.5-) 1-2 (-3) cm at their densest, often adnate-ascending; plants usually 0.4-0.8 m tall; heads mostly 7-11 mm wide.

18 Stems and leaves generally eglandular (except sometimes for scattered glands on distal branches), but with dense ascending eglandular hairs; plants usually dull greyish-green, not much darkening when dried; leaves usually with gradual or irregular reduction from base of stem to summit; mid-stem leaves with length/width (2-) 2.5-4 (-4.5), not forming a distinct overlapping cluster; bracts on proximal thirds of peduncles mostly 2-3 (-5) mm wide ..... ***Symphyotrichum patens var. gracile***

18 Stems and leaves with dense to sparse stipitate-glands, with or without eglandular hairs; plants somewhat bluish-waxy, often becoming blackish when dried; leaves abruptly reduced in size with each branching order; mid-stem leaves [directly below inflorescence] with length/width (1.5-) 2-2.5(-3), clustered and overlapping along 10-20 cm; bracts on proximal thirds of peduncles mostly 1-2 (-3) mm wide. ..... ***Symphyotrichum patens var. terranigrum***

Key E - perennial asters with clasping or sheathing leaves [of subgenus *Symphyotrichum*, sections *Symphyotrichum* and *Concinni*]

1 Mid-stem leaves narrowed above the clasping base to an elongate petiolar portion (1/8-1/2 of the blade length) which flares abruptly into an ovate to lanceolate upper portion 10-55 mm wide; stem slightly to strongly zigzag in the upper portion ..... ***Symphyotrichum prenanthoides***

1 Mid-stem leaves linear, lanceolate; stem usually straight (lacking bends alternating at the nodes).

2 Phyllaries appressed (or in some species the outer slightly spreading); plants 0.5-8.5 (12) dm tall.

5 Leaves basally disposed, the largest basal and persistent; largest leaves linear, to 20 cm × 2.5 cm, avg. 10× as long as wide; leaf margins often strongly scabrous; [mainly of the Coastal Plain, of SC and GA west to AR and TX] ..... ***Symphyotrichum attenuatum***

5 Leaves cauline, the largest on the stem; largest leaves narrowly to broadly lanceolate, avg. < 9× as long as wide; leaf margins usually only slightly scabrous; [mainly of inland provinces, of NS west to MB, south to GA, Panhandle FL, MS, LA, and OK].

6 Larger leaves > 5× as long as wide, rarely > 2.5 cm wide, the bases slightly clasping; [NY and KY south to GA, Panhandle FL (Jackson County), and MS] ..... ***Symphyotrichum concinnum***

Key to Map Symbology:

* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable

X : extirpated

6 Larger leaves < 5× as long as wide, often > 2.5 cm wide, the bases strongly clasping; [NS west to MB, south to GA, LA, and OK] ..... ***Symphyotrichum laeve***

2 Phyllaries slightly to distinctly spreading, loose, or recurved-squarrose, some at least foliose; plants (4-) 8-30 dm tall.
10 Stem leaves cuneate or rounded to an only slightly clasping base ..... ***Symphyotrichum elliottii***
10 Stem leaves strongly auriculate-clasping.
11 Upper and lower leaf surfaces nearly the same color; upper stem leaves smaller in size than the midstem leaves ..... ***Symphyotrichum puniceum var. scabricaule***
11 Upper and lower leaf surfaces distinctly different in color (the lower pale green, the upper dark green); upper stem leaves (on branches leading to heads) equal or nearly so in size to mid-stem leaves ..... ***Symphyotrichum puniceum var. puniceum***

Key F - perennial asters with involute phyllaries [of subgenus *Symphyotrichum*, section *Dumosi*, subsection *Porteriani*]

1 Ray flower blades (7-) 9-15 (-19) mm long, blue-violet (rarely white); involucres (4.5-) 5.5-7.1 (-8.5) mm high; [calcareous habitats, especially glades] ..... ***Symphyotrichum kentuckiense***
1 Ray flower blades (3-) 3.8-7.5 (-11) mm long, white (rarely slightly blue or violet); involucres (2.5-) 3.1-5.1 (-6.5) mm high; [various habitats, including glades].
3 Stems sparsely to densely hirsute; leaves pilose ..... ***Symphyotrichum pilosum var. pilosum***
3 Stems glabrous to glabrate; leaves glabrous to glabrate ..... ***Symphyotrichum pilosum var. pringlei***

Key G - perennial asters [of subgenus *Symphyotrichum*, section *Dumosi*, subsections *Divergentes* and *Dumosi*]

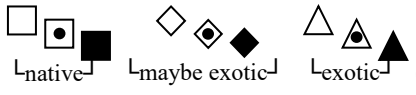
1 Disc corolla lobes ½ - ¾ of the length of the corolla limb (the flared portion above the narrow corolla tube); disc corolla lobes spreading to reflexed.
2 Plants cespitose, with short, branched caudices or short-rhizomatous; abaxial leaf faces glabrous, midveins ± densely pilose (rarely glabrate); ray flowers 8-15 (-23); disc corollas white to cream turning pink to purplish, lobes strongly reflexed (lengths 1/2-3/4 corollas); [wide variety of habitats] ..... ***Symphyotrichum lateriflorum***
2 Plants colonial, long-rhizomatous; abaxial leaf faces and midveins usually sparsely to densely strigose or strigillose, sometimes glabrous (var. glabratum); ray flowers (10-) 15-26; disc corollas cream to light yellow turning purple to brown, lobes spreading (lengths ca. 1/2 corollas); [bottomlands and other wetlands] ..... ***Symphyotrichum ontarionis var. ontarionis***
1 Disc corolla lobes < ½ the length of the corolla limb (the flared portion above the narrow corolla tube); disc corolla lobes usually erect.
3 Peduncles long (at least some > 2 cm long), with numerous small, closely-spaced bracts mostly 1-4 mm long and much smaller than the leaves; plants mostly not strongly rhizomatous (sometimes with multiple stems from short-creeping rhizomes); plants mostly < 10 dm tall.
5 Peduncle bracts, at least lower and middle, mostly spreading or reflexed, oblong to linear-oblong, obtuse to subacute (rarely abruptly mucronate) ..... ***Symphyotrichum dumosum var. dumosum***
5 Peduncle bracts mostly ascending (-appressed), sometimes spreading, oblong-linear to linear-subulate, acute.
6 Cauline leaves 3-7 cm long; branches few; peduncles long; rays 14-17 (-20) ..... ***Symphyotrichum dumosum var. gracilipes***
6 Cauline leaves to 15 cm long; branches abundant; peduncles long, short, or absent; rays 13-25. ..... ***Symphyotrichum dumosum var. subulifolium***
3 Peduncles short (mostly < 2 cm long), sparsely bracteate or with leaves rather than bracts in close proximity to the heads; plants strongly colonial from creeping rhizomes; plants mostly > 10 dm tall;
9 Involucres (2.5-) 3.5-4.5 (-5.5) mm high; rays mostly < 20, usually white (rarely pink); ray blades 3-8 mm long; plants 3-9 (-10) dm tall.
10 Heads densely crowded in spikelike racemes, the peduncles mostly < 7 mm long ..... ***Symphyotrichum racemosum var. racemosum***
10 Heads in loose racemes or scattered on branch ends, the peduncles mostly 10-20 mm long ..... ***Symphyotrichum racemosum var. subdumosum***
9 Involucres 3-7 (-8) mm high; rays mostly > 16, white, pink, or violet; ray blades mostly 6-15 mm long; plants 3-15 (-20) dm tall.
11 Leaves thin, planar; peduncle bracts 1-3 (-5). ..... ***Symphyotrichum lanceolatum var. latifolium***
11 Leaves stiff, margins revolute; peduncle bracts 5-12 or more (except 1-3 in *S. boreale*).
18 Leaf veinlets obscure, or if more conspicuous then the areoles obviously longer than broad.
19 Leaves linear, usually none toothed; plants to 8 dm tall; [bogs, wet pine savannas, FL Panhandle and s. AL] ..... ***Symphyotrichum kralii***
19 Leaves narrowly lanceolate, serrate; plants to 15 dm tall; [wetland and upland habitats, NC to s. FL, west to s. AL] ..... ***Symphyotrichum simmondsii***
18 Leaf veinlets conspicuously reticulate on the lower surface, the areoles nearly isodiametric.
21 Leaves harshly scabrous above ..... ***Symphyotrichum praealtum var. subasper***
21 Leaves glabrous or nearly so above. ..... ***Symphyotrichum praealtum var. praealtum***

Symphyotrichum adnatum (Nuttall) Nesom. SCALE-LEAF ASTER. **Hab:** Longleaf pine sandhills, pine flatwoods, pine rocklands. **Dist:** S. GA south to s. FL, west to se. LA; n. Bahamas. **Syn:** = Fl7, FNA20, K1, K3, K4, WH3, Nesom (1994a); = *Aster adnatus* Nuttall – Bah, S, SE1; = *Lasallea adnata* (Nuttall) Semple & Brouillet – Semple & Brouillet (1980a).

Symphyotrichum attenuatum (Lindley) Semple. GULF COAST SMOOTH ASTER. **Hab:** Open dry woodlands, prairies. **Dist:** SC and GA west to AR and TX. **Phen:** Sep-Oct. **Syn:** = *Symphyotrichum laeve* (Linnaeus) Löve & Löve var. *purpuratum* (Nees) Nesom – FNA20, K1, K3, K4, Nesom (1994a); > *Aster attenuatus* Lindley ex Hooker – G, S; > *Aster purpuratus* Nees – S. NatureServe G5TNR (Not Yet Ranked).

Symphyotrichum bracei (Britton ex Small) Nesom. BRACE'S ASTER. **Hab:** Brackish marshes. **Dist:** Panhandle FL south to s. FL; Bahamas; Cuba. **Phen:** Aug-Dec (-Feb). **Syn:** = K1, K4, Nesom (1994a), Nesom (2005b); = *Aster bracei* Britton ex Small – S, SE1; = *Aster tenuifolius* Linnaeus var. *aphyllus* R.W. Long – Bah; = *Symphyotrichum tenuifolium* (Linnaeus) Nesom var. *aphyllum* (R.W. Long) S.D. Sundberg – FNA20, K3, Sundberg (2004); < *Symphyotrichum tenuifolium* (Linnaeus) Nesom – WH3.

Symphyotrichum chapmanii (Torrey & A. Gray) Semple & Brouillet. CHAPMAN'S ASTER. **Hab:** Pine flatwoods and seepage bogs. **Dist:** Endemic to Panhandle FL and s. AL; reports from Alachua County in the n. peninsula and St. Lucie County much farther south appear to be correctly

Key to Map Symbology: 

* : waif
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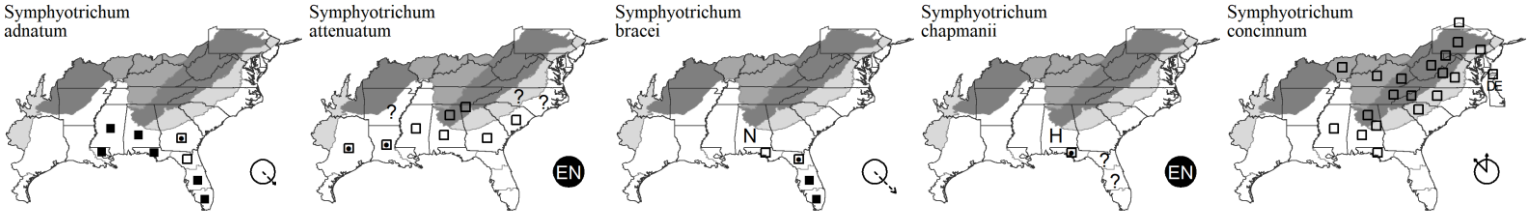
? : questionable
X : extirpated

identified. **Phen:** Late Apr-Jun. **Syn:** = Fl7, FNA20, K3, K4, WH3; = *Aster chapmanii* Torrey & Gray – S, SE1; = *Eurybia chapmanii* (Torrey & Gray) Nesom – K1, Nesom (1994a). NatureServe G2G3 (Imperiled).

Symphyotrichum concinnum (Willdenow) Mohlenbrock. HARMONIOUS ASTER, NARROW-LEAVED SMOOTH ASTER. **Hab:** Dry woodlands over mafic or calcareous rocks. **Dist:** NY and KY south to GA, Panhandle FL (Jackson County), and MS. **Phen:** Sep-Oct. **Syn:** = Il; = *Aster concinnus* Willdenow – C, G, S, SE1; = *Aster laevis* Linnaeus var. *concinnus* (Willdenow) House – RAB, W; = *Symphyotrichum laeve* (Linnaeus) Löve & Löve var. *concinnum* (Willdenow) Nesom – Fl7, FNA20, K1, K3, Pa, Tn, Va, WH3, Nesom (1994b); < *Aster laevis* – F, WV; < *Symphyotrichum laeve* (Linnaeus) Löve & Löve var. *laeve* – K4.



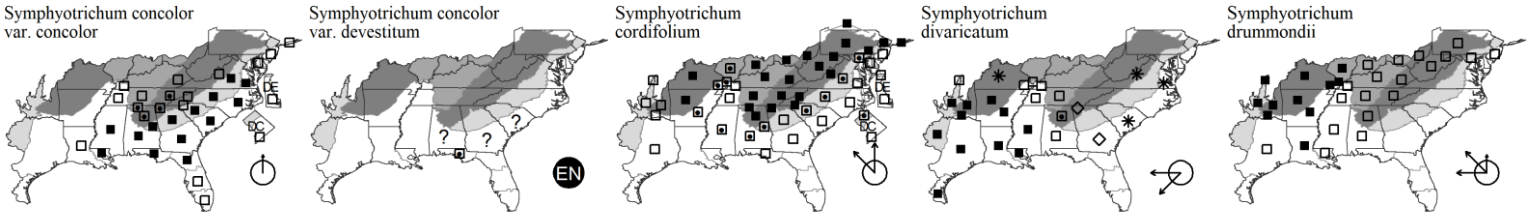
Symphyotrichum concolor (Linnaeus) Nesom *var*. ***concolor***. EASTERN SILVERY ASTER. **Hab:** Longleaf pine sandhills, Piedmont woodlands, forest edges, pine rocklands, roadbanks. **Dist:** MA and NY south to s. FL, west to LA, inland less commonly to TN and KY. Reports of *Symphyotrichum concolor* for the Bahamas are based on *Symphyotrichum lucayanum* (Britton) Nesom. **Phen:** Sep-Oct. **Syn:** = FNA20, K3, K4; = *Symphyotrichum concolor* ssp. *concolor* – Haines (2010); < *Aster concolor* Linnaeus – C, F, G, RAB, S, SE1, W; < *Symphyotrichum concolor* (Linnaeus) Nesom – Fl7, K1, Tn, Va, WH3, Nesom (1994a).

Symphyotrichum concolor (Linnaeus) Nesom *var*. ***devestitum*** (S.F. Blake) Semple. GULF COAST SILVERY ASTER. **Hab:** Pine savannas. **Dist:** Panhandle FL, maybe extending to GA, AL, and SC. **Comm:** See Semple (2004). **Syn:** = FNA20, K3, K4; = *Symphyotrichum concolor* ssp. *devestitum* (S.F. Blake) A. Haines – Haines (2010); < *Aster concolor* Linnaeus – RAB, S, SE1; < *Symphyotrichum concolor* (Linnaeus) Nesom – Fl7, K1, WH3, Nesom (1994a).

Symphyotrichum cordifolium (Linnaeus) Nesom. HEART-LEAVED ASTER, BLUE WOOD ASTER. **Hab:** Rich forests, shaded roadbanks. **Dist:** NB west to ON and e. ND, south to Panhandle FL and ne. TX. See Holmes & Singhurst (2021) for information on Texas occurrence. **Phen:** Sep-Oct. **Syn:** = Ar, Il, K1, K3, K4, Mi, Mo2, NE, Pa, Tn, Va; = *Aster cordifolius* Linnaeus – C, G, S, SE1, W; < *Aster cordifolius* Linnaeus – RAB; > *Aster cordifolius* var. *cordifolius* – F, WV; > *Aster cordifolius* var. *polycephalus* Porter – F; > *Aster cordifolius* var. *racemiflorus* Fernald – F, WV; < *Symphyotrichum cordifolium* (Linnaeus) Nesom – FNA20; > *Symphyotrichum cordifolium* (Linnaeus) Nesom var. *cordifolium* – Nesom (1994a); > *Symphyotrichum cordifolium* (Linnaeus) Nesom var. *polycephalum* (Porter) Nesom – Nesom (1994a); > *Symphyotrichum cordifolium* (Linnaeus) Nesom var. *racemiflorum* (Fernald) Nesom – Nesom (1994a).

Symphyotrichum divaricatum (Nuttall) Nesom. ANNUAL WATER ASTER, MIDWESTERN SALTMARSH ASTER, YARD ASTER. **Hab:** Ponds, swamps, ditches, other wet disturbed areas, including mowed fields, yards, periodically flooded floodplains; eastwards in waste areas near wool-combing mills. **Dist:** TN, MO, e. NE and n. NM south to GA, AL, MS, LA, TX, and Mexico. **Phen:** Aug-Jan. **Tax:** See Nesom (2000). **Syn:** = Il, K1, K3, K4, Va, Nesom (1994a), Nesom (2005b); = *Aster exilis* Elliott – F, RAB, S, misapplied; = *Aster subulatus* Michaux var. *ligulatus* Shinners – NcTx, SE1, Tx; = *Symphyotrichum subulatum* (Michaux) Nesom var. *ligulatum* (Shinners) S.D. Sundberg – Ar, FNA20, Mo2, Tn, Sundberg (2004); < *Aster subulatus* Michaux – GW2.

Symphyotrichum drummondii (Lindley) Nesom. HAIRY HEART-LEAVED ASTER. **Hab:** Mesic to dry forests. **Dist:** PA, OH, MI, WI, MN, and NE, south to MD, WV, TN, AL, MS, and LA (including the Florida Parishes). **Phen:** Aug-Oct. **Syn:** = Il, Mi, Pa, Tn; = *Aster sagittifolius* var. *drummondii* (Lindley) Shinners – F; = *Symphyotrichum drummondii* (Lindley) Nesom var. *drummondii* – Ar, FNA20, K1, K3, K4, Nesom (1994a); < *Aster drummondii* Lindley – C, G, GrPl, Oh3, SE1. NatureServe G5T4T5 (Apparently Secure).



Symphyotrichum dumosum (Linnaeus) Nesom *var*. ***dumosum***. LONG-STALKED ASTER. **Hab:** Old fields, disturbed areas, pastures. **Dist:** NB, WV, IN, IL, OK south to FL and TX. **Phen:** Late Aug-Oct. **Syn:** = K1, Va, Nesom (1994b); > *Aster coridifolius* Michaux – S; < *Aster dumosus* – C, G, GW2, NcTx, Oh3, RAB, SE1, Tx, W; > *Aster dumosus* – S; > *Aster dumosus* var. *coridifolius* (Michaux) Torrey & A. Gray – F, WV; > *Aster dumosus* Linnaeus var. *dumosus* – F; < *Symphyotrichum dumosum* – Ar, Fl7, FNA20, Il, NE, Pa, Tn, WH3; < *Symphyotrichum dumosum* (Linnaeus) Nesom var. *dumosum* – K3, K4. NatureServe G5T3T5 (Apparently Secure).

Symphyotrichum dumosum (Linnaeus) Nesom *var*. ***gracilipes*** (Wiegand) Nesom. **Hab:** Pine savannas. **Dist:** SC south to FL, west to LA. **Phen:** Late Aug-Oct. **Syn:** = K1; = *Aster gracilipes* (Wiegand) Alexander – S; < *Aster dumosus* – GW2, RAB, SE1; < *Symphyotrichum dumosum* – Fl7, FNA20, WH3; < *Symphyotrichum dumosum* (Linnaeus) Nesom var. *dumosum* – K3, K4.

Symphyotrichum dumosum (Linnaeus) Nesom *var*. ***subulifolium*** (Torrey & A. Gray) Nesom. **Hab:** Calcareous prairies, dry clayey sites, {other habitats}. **Dist:** ME south to FL, west to TX. **Phen:** Late Aug-Oct. **Syn:** = K1, Nesom (1994a); = *Aster dumosus* Linnaeus var. *subulaefolius* Torrey & A. Gray – F; < *Aster dumosus* – C, G, GW2, NcTx, RAB, SE1, Tx, W; < *Symphyotrichum dumosum* – Fl7, FNA20, NE, Pa, WH3; < *Symphyotrichum dumosum* (Linnaeus) Nesom var. *dumosum* – K3, K4.

Symphyotrichum elliottii (Torrey & A. Gray) Nesom. SOUTHERN SWAMP ASTER, ELLIOTT'S ASTER. **Hab:** Bogs, swamps, and marshes, mainly in the outer Coastal Plain, on tree bases, hummocks, and stumps in tidal freshwater swamps, especially where salinities may occasionally exceed 5-10 ppt. **Dist:** Se. VA south to s. FL, west to LA. The Jones & Coile (1988) record for n. GA and records in the NC Mountains (Kartesz (2020) are rejected (misidentifications of *S. puniceum*). **Phen:** Late Sep-Nov. **Syn:** = Fl7, FNA20, K1, K3, K4, Va, WH3, Nesom (1994a); = *Aster elliottii* Torrey & A. Gray – C, F, G, GW2, RAB, S, SE1.

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more)

* : waif
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? : questionable

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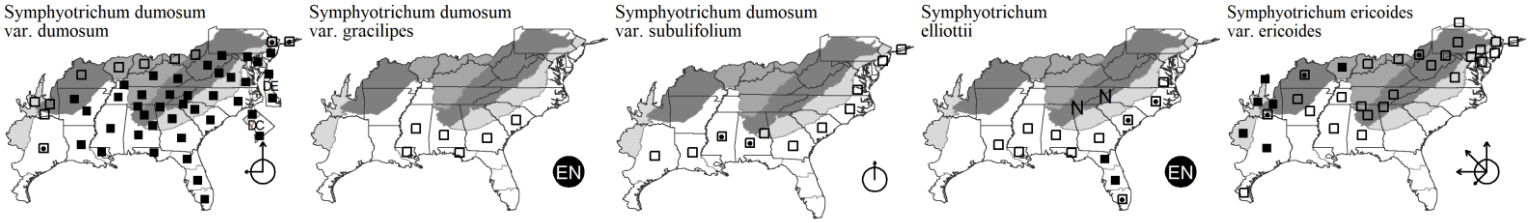
Symphyotrichum ericoides (Linnaeus) Nesom *var.* ***ericoides***. HEATH ASTER, SQUARROSE WHITE ASTER. **Hab:** Limestone glades, prairies, other open, calcareous situations. **Dist:** ME, NL (Labrador), ON, ND, CO, AZ, south to VA, MS, TX, NLE, and COA. **Phen:** (Aug-) Sep-Nov. **Syn:** = Ar, FNA20, K4, NE, Va; = *Aster ericoides* – C, F, GrPl, NcTx, SE1, Tx, W; > *Aster ericoides* Linnaeus var. *ericoides* – G, Oh3; > *Aster ericoides* Linnaeus var. *prostratus* (Kuntze) Blake – G, Oh3; < *Lasallea ericoides* (Linnaeus) Semple & Brouillet – Semple & Brouillet (1980a); < *Symphyotrichum ericoides* – Mi, Pa, Tn; > *Symphyotrichum ericoides* (Linnaeus) Nesom var. *ericoides* – Il, K1, Nesom (1994a); > *Symphyotrichum ericoides* (Linnaeus) Nesom var. *prostratum* (Kuntze) Nesom – Il, K1, Nesom (1994a).



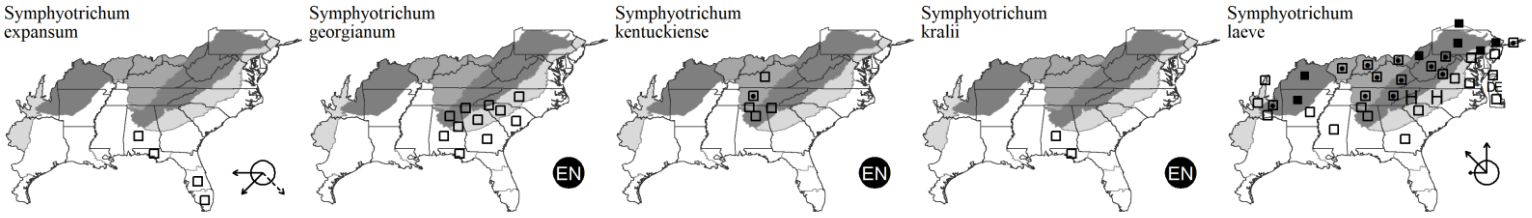
Symphyotrichum expansum (Poeppig ex Sprengel) Nesom. **Hab:** Pond margins, disturbed wet areas. **Dist:** FL Panhandle and peninsula, AL, OK, UT, NV, and CA south through Mexico and Central America to n. South America; West Indies. **Phen:** Jul-Nov (-Jan). **Syn:** = Fl7, K1, K3, K4, WH3, Nesom (1994a), Nesom (2005b); = *Symphyotrichum subulatum* (Michaux) Nesom var. *parviflorum* (Nees) S.D. Sundberg – FNA20, Sundberg (2004). NatureServe GNR (Not Yet Ranked).

Symphyotrichum georgianum (Alexander) Nesom. GEORGIA ASTER. **Hab:** Dry, rocky woodlands, woodland borders, roadbanks, powerline rights-of-way, primarily in places that formerly would have burned and likely been post oak or blackjack oak woodlands or savannas, also in thin soils around granitic flatrocks. **Dist:** Sc. NC south to c. GA and west to c. AL; apparently disjunct on the Coastal Plain of sw. GA and e. Panhandle FL (Leon County). **Phen:** Early Oct-mid Nov (-Jan); Nov-Dec (-Jan). **Syn:** = Fl7, FNA20, K1, K3, K4, WH3, Nesom (1994a); = *Aster georgianus* Alexander – S, Jones (1983); = *Aster patens* Aiton var. *georgianus* (Alexander) Cronquist – SE1; < *Aster patens* – RAB. NatureServe G3 (Vulnerable).

Symphyotrichum kentuckiense (Britton) Medley. MISS PRICE'S ASTER, SADIE'S ASTER. **Hab:** Limestone glades. **Dist:** C. KY south through c. TN to nw. GA and n. AL. **Tax:** Medley (2021a) clarified the application of the names based on the epithet 'priceae' as applying correctly to the hybrid *Symphyotrichum kentuckiense* × *pilosum*, and provided a new combination in *Symphyotrichum* for this species. **Syn:** = Medley (2021a); = *Aster pilosus* Willdenow var. *priceae* (Britton) Cronquist – C, G, SE1, misapplied; = *Symphyotrichum priceae* (Britton) Nesom – FNA20, K1, K3, K4, Tn, Nesom (1994b), misapplied; < *Aster pilosus* – W; < *Aster pilosus* var. *pringlei* A. Gray – F. NatureServe G3G5 (Apparently Secure).

Symphyotrichum kralii Nesom. **Hab:** Drawdown zones of limesink ponds. **Tax:** See Nesom (1997); the name *A. pinifolius* is illegitimate. **Syn:** = K1, Nesom (1997a); = *Aster pinifolius* Alexander in Small – S, Kral (1983a), illegitimate; < *Aster dumosus* – SE1; < *Symphyotrichum kralii* Nesom – K3; < *Symphyotrichum simmondsii* (Small) Nesom – Fl7, FNA20, WH3.

Symphyotrichum laeve (Linnaeus) Á. Löve & D. Löve. SMOOTH BLUE ASTER. **Hab:** Mesic hardwood forests. **Dist:** NS west to MB, south to GA, LA, and OK. **Phen:** Sep-Oct. **Syn:** = Il, Mi; = *Aster laevis* – Oh3; = *Aster laevis* Linnaeus var. *laevis* – C, G, GrPl, RAB, SE1, W; = *Symphyotrichum laeve* (Linnaeus) Löve & Löve var. *laeve* – Ar, FNA20, K1, K3, NE, Pa, Tn, Va, Nesom (1994a); > *Aster falcidens* E.S. Burgess – S; > *Aster laevis* – S; >< *Aster laevis* – F, WV; > *Aster steeleorum* Shinners – F, WV; < *Symphyotrichum laeve* (Linnaeus) Löve & Löve var. *laeve* – K4. NatureServe G5T5 (Secure).



Symphyotrichum lanceolatum (Willdenow) Nesom *var.* ***latifolium*** (Semple & Chmielewski) Nesom. BROAD-LEAVED WHITE PANICLED ASTER. **Hab:** Bottomlands, other moist sites. **Dist:** ME west to MB, south to e. Panhandle FL and TX. **Phen:** Sep-Oct. **Syn:** = Ar, Fl7, FNA20, Il, Mi, Tn, WH3, Nesom (1994a); = *Aster lanceolatus* Willdenow ssp. *lanceolatus* var. *latifolius* Semple & Chmielewski – Semple & Chmielewski (1987); = *Aster lanceolatus* Willdenow var. *simplex* (Willdenow) A. G. Jones – C; = *Aster simplex* var. *simplex* – F, G; = *Symphyotrichum lanceolatum* (Willdenow) Nesom ssp. *lanceolatum* var. *latifolium* (Semple & Chmielewski) Nesom – K1, K3, K4, NE; < *Aster lanceolatus* – W; < *Aster simplex* Willdenow – GW2, RAB.

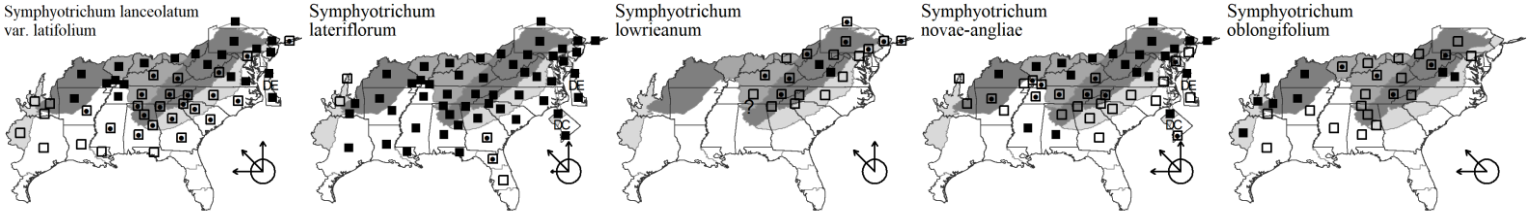
Symphyotrichum lateriflorum (Linnaeus) Á. Löve & D. Löve. STARVED ASTER, GOBLET ASTER. **Hab:** Mesic to dry upland forests and woodlands, swamps, wet pine flatwoods, clearings, old fields, roadsides, other disturbed areas. **Dist:** NB west to MB, south to s. peninsular FL and e. TX. **Phen:** Sep-Nov. **Tax:** Many infrataxa have been recognized in the past, and warrant modern study. **Syn:** = Ar, Fl7, FNA20, Il, K3, K4, Mi, NE, Pa, SE1, Tn, Va, WH3; = *Aster lateriflorus* Linnaeus – C, G, GW2, NcTx, Oh3, RAB, SE1, Tx, W; > *Aster lateriflorus* (Linnaeus) Britton var. *lateriflorus* – F, GrPl; > *Aster lateriflorus* var. *pendulus* (Aiton) E.S. Burgess – F; > *Symphyotrichum lateriflorum* (Linnaeus) Á. Löve & D. Löve var. *angustifolium* (Wiegand) Nesom – K1, Nesom (1994b); > *Symphyotrichum lateriflorum* var. *hirsuticaule* (Lindley ex A.P. de Candolle) Nesom – Nesom (1994b); > *Symphyotrichum lateriflorum* (Linnaeus) Á. Löve & D. Löve var. *horizontale* (Desfontaines) Nesom – K1, Nesom (1994b); > *Symphyotrichum lateriflorum* (Linnaeus) Á. Löve & D. Löve var. *lateriflorum* – K1, Nesom (1994b); > *Symphyotrichum lateriflorum* (Linnaeus) Á. Löve & D. Löve var. *spatelliforme* (E.S. Burgess) Nesom – Nesom (1994b).

Symphyotrichum lowrieanum (Porter) Nesom. SMOOTH HEART-LEAVED ASTER. **Hab:** Mesic to dry-mesic forests. **Dist:** MA, NY, and ON, south to w. VA, w. NC, ne. GA, e. TN, and c. TN. **Phen:** Sep-Oct. **Tax:** Perhaps originating from hybridization of *S. cordifolium* and *S. laeve*. **Syn:** = K1, K4, NE, Pa, Va, Nesom (1994a); = *Aster lowrieanus* T.C. Porter – SE1, W; < *Aster cordifolius* Linnaeus – RAB; < *Aster lowrieanus* T.C. Porter – C, G, Oh3; > *Aster lowrieanus* T.C. Porter – S; > *Aster lowrieanus* var. *lanceolatus* Porter – F, WV; > *Aster lowrieanus* var. *lowrieanus* – WV; >< *Aster lowrieanus* var. *lowrieanus* – F; > *Aster plumarius* E.S. Burgess – S; < *Symphyotrichum cordifolium* (Linnaeus) Nesom – FNA20, K3.

Symphyotrichum novae-angliae (Linnaeus) Nesom. NEW ENGLAND ASTER, MICHAELMAS-DAISY. **Hab:** Wet meadows, bogs, prairies. **Dist:** NS west to MT, south to GA, wc. AL, c. MS, s. AR, OK, and NM. **Phen:** Sep-Oct. **Syn:** = Ar, FNA20, Il, K1, K3, K4, Mi, NE, Pa, Tn, Va, Jones (1983); = *Aster novae-angliae* Linnaeus – C, F, G, GrPl, GW2, Oh3, RAB, S, SE1, W, WV; = *Lasallea novae-angliae* (Linnaeus) Semple & Brouillet – Semple & Brouillet (1980a). NatureServe G5 (Secure).

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Symphyotrichum oblongifolium (Nuttall) Nesom. EASTERN AROMATIC ASTER, SHALE-BARREN ASTER. **Hab:** Rock outcrops and dry woodlands over limestone, calcareous shale, calcareous prairies. **Dist:** NY, WI, MN, and MT, south to sc. VA, w. NC, nc. AL, n. MS, TX, and NM. **Phen:** Late Sep-Nov (-Jan). **Syn:** = Ar, FNA20, Il, K1, K3, K4, Pa, Tn, Va, Nesom (1994a); = *Aster oblongifolius* – C, F, GrPl, NcTx, Oh3, RAB, S, Tx, W; = *Lasallea oblongifolia* (Nuttall) Semple & Brouillet – Semple & Brouillet (1980a); > *Aster oblongifolius* Nuttall var. *angustatus* Shinners – G, SE1; > *Aster oblongifolius* var. *orientis* Shinners – WV. NatureServe G5 (Secure).



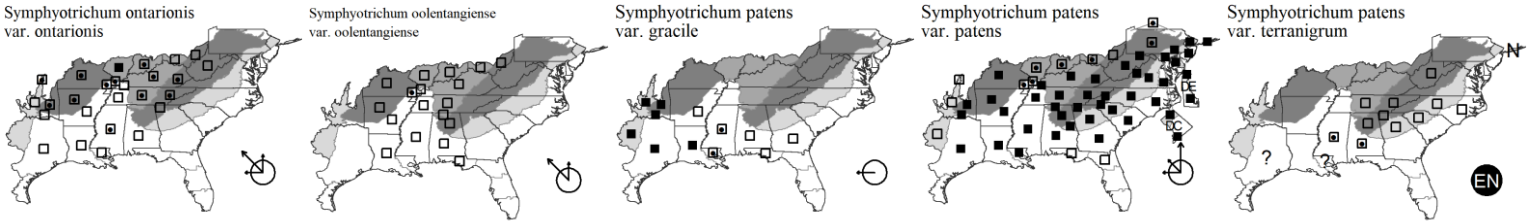
Symphyotrichum ontarionis (Wiegand) Nesom *var*. ***ontarionis***. BOTTOMLAND ASTER. **Hab:** Bottomlands, swamps, bogs. **Dist:** QC, ON, MN, and SD, south to WV, GA, AL, MS, LA, and TX. **Phen:** Aug-Oct. **Tax:** See Nesom (1997) and Brouillet & Labrecque (1997). **Syn:** = Ar, FNA20, K3, K4, Mi, Va; = *Symphyotrichum ontarione* var. *ontarione* – K1, Nesom (1994a), orthographic variant; < *Aster lateriflorus* Linnaeus – RAB; < *Aster ontarionis* Wiegand – C, F, G, GrPl, SE1, W; < *Symphyotrichum ontarionis* – Il, NE, Tn. NatureServe G5T4 (Apparently Secure).

Symphyotrichum oolentangiense (Riddell) Nesom *var*. ***oolentangiense***. AZURE ASTER. **Hab:** Prairies, glades. **Dist:** NY, ON, MN, and SD, south to Panhandle FL and TX. **Phen:** Aug-Nov. **Comm:** Reported for GA (Kartesz 1999) on the basis of Fernald (1950), and also reported for GA in FNA. East to sw. TN (Chester, Wofford, & Kral 1997), AL, and Panhandle FL (Wunderlin & Hansen 2008). **Syn:** = K1, Nesom (1994a); = *Aster azureus* Lindley var. *azureus* – F, Tx; < *Aster azureus* – G, SE1; < *Aster oolentangiensis* – C, GrPl, NcTx; < *Symphyotrichum oolentangiense* – Ar, Fl7, FNA20, K3, K4, Mi, Oh3, WH3; > *Symphyotrichum oolentangiense* var. *laevicaule* (Fernald) Mohlenbrock – Il; > *Symphyotrichum oolentangiense* (Riddell) Nesom var. *oolentangiense* – Il. NatureServe G5T5 (Secure).

Symphyotrichum patens (Aiton) Nesom *var*. ***gracile*** (Hooker) Nesom. **Hab:** Dry woodlands and prairies. **Dist:** Var. *gracile*, as defined more narrowly by R. Jones (1983), ranges east to se. LA, s. MS, and s. AL from a core range in LA, e. and c. TX, and OK. **Phen:** Aug-Nov. **Tax:** Nesom (2006oo) discussed the dubious recognition of this variety. **Syn:** = Ar, FNA20, K1, Mo2; = *Aster patens* var. *gracilis* Hooker – Jones (1983); < *Aster patens* – Tx; < *Aster patens* var. *gracilis* Hooker – C, F, G, NcTx, SE1; < *Lasallea patens* (Aiton) Semple & Brouillet – Semple & Brouillet (1980a); < *Symphyotrichum patens* (Aiton) Nesom var. *patens* – K3, K4.

Symphyotrichum patens (Aiton) Nesom *var*. ***patens***. COMMON CLASPING ASTER. **Hab:** Dry woodlands, longleaf pine sandhills, roadsides, woodland edges, clearings, roadbanks. **Dist:** Var. *patens* ranges from VT and NY west to PA, s. OH, s. IN, s. MO, and se. KS, south to e. GA, ne. FL, Panhandle FL, s. AL, s. MS, s. LA, and sc. TX. **Phen:** Late Aug-early Nov; Oct-Nov. **Syn:** < *Aster patens* – RAB, S, Tx, W; >< *Aster patens* var. *gracilis* Hooker – C, F, G, SE1; < *Aster patens* Aiton var. *patens* – C, F, G, NcTx, Oh3, SE1, WV, Jones (1983); < *Lasallea patens* (Aiton) Semple & Brouillet – Semple & Brouillet (1980a); < *Symphyotrichum patens* – Fl7, Il, Pa, Tn, WH3; < *Symphyotrichum patens* (Aiton) Nesom var. *patens* – Ar, FNA20, K1, K3, K4, Mo2, NE, Va, Nesom (1994a).

Symphyotrichum patens (Aiton) Nesom *var*. ***terranigrum*** J.J.N. Campbell & W.R. Seymour. BLACK BELT CLASPING ASTER. **Hab:** Prairies and woodlands. **Dist:** Distribution centered in the AL-MS Black Belt, but allegedly with scattered occurrences over a more widespread area of the Southeastern United States. **Comm:** See Campbell & Seymour (2014) for detailed information. **Syn:** = K4; < *Aster patens* – RAB, S, W; >< *Aster patens* var. *gracilis* Hooker – C, F, G, SE1; < *Aster patens* Aiton var. *patens* – C, F, G, SE1, WV, Jones (1983); < *Lasallea patens* (Aiton) Semple & Brouillet – Semple & Brouillet (1980a); < *Symphyotrichum patens* – Pa, WH3; < *Symphyotrichum patens* (Aiton) Nesom var. *patens* – FNA20, K1, Nesom (1994a).



Symphyotrichum phlogifolium (Muhlenberg ex Willdenow) Nesom. APPALACHIAN CLASPING ASTER. **Hab:** Mesic, nutrient-rich mixed hardwood forests. **Dist:** NJ and Long Island, NY west to PA, n. OH, and e. IN south to c. VA, c. NC, w. SC, n. GA, and ne. AL, primarily in the Appalachian Mountains and adjacent provinces. **Phen:** Late Aug-mid Oct. **Syn:** = FNA20, Il, K1, K3, K4, Pa, Tn, Va, Nesom (1994a); = *Aster patens* Aiton var. *phlogifolius* (Muhlenberg ex Willdenow) Nees – C, F, G, Oh3, SE1, WV; = *Aster phlogifolius* Muhlenberg ex Willdenow – S, W, Jones (1983); < *Aster patens* – RAB; < *Lasallea patens* (Aiton) Semple & Brouillet – Semple & Brouillet (1980a). NatureServe G5 (Secure).

Symphyotrichum pilosum (Willdenow) Nesom *var*. ***pilosum***. **Hab:** Old fields, disturbed areas, woodland borders. **Dist:** NB west to MN, south to Panhandle FL and TX. **Phen:** Sep-Nov. **Syn:** = Ar, FNA20, Il, K1, K3, K4, Mi, NE, Pa, Va, Nesom (1994a); = *Aster pilosus* Willdenow var. *pilosus* – C, F, G, Oh3, SE1, WV; < *Aster pilosus* – GrPl, RAB, W; < *Symphyotrichum pilosum* – Fl7, Mo2, Tn, WH3. NatureServe G5T5 (Secure).

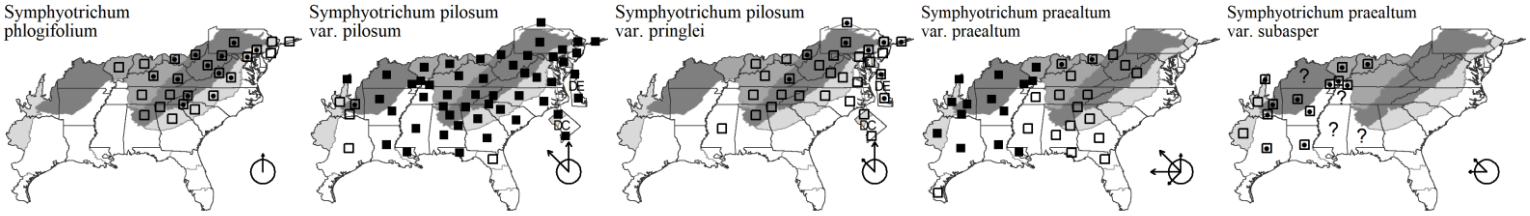
Symphyotrichum pilosum (Willdenow) Nesom *var*. ***pringlei*** (A. Gray) Nesom. **Hab:** Calcareous glades, calcareous barrens, other dry soil areas, especially or only over limestone or other calcareous rocks. **Dist:** NS west to MN, south to GA and TN (Eastern Highland Rim) and MS Black Belt. **Phen:** Sep-Nov. **Tax:** Likely warranting species rank. **Syn:** = FNA20, Il, K1, K3, Mi, NE, Pa, Va, Nesom (1994a); = *Aster pilosus* Willdenow var. *demotus* Blake – RAB, SE1; = *Aster pilosus* var. *pringlei* A. Gray – C; > *Aster pilosus* Willdenow var. *demotus* Blake – F, G, Oh3, WV; > *Aster pilosus* var. *pringlei* A. Gray – F, G, Oh3, WV. NatureServe G5T5 (Secure).

Symphyotrichum praealtum (Poiret) Nesom *var*. ***praealtum***. NET-VEINED ASTER, WILLOWLEAF ASTER. **Hab:** Moist forests over limestone, wooded fens (with *Acer rubrum* and *Fraxinus nigra*). **Dist:** NY, MN, and SD south to Panhandle FL and e. TX. Reported for Giles County, VA. **Phen:** Aug-Oct. **Syn:** = Il, K1, Nesom (1994a); = *Aster praealtus* Poiret var. *praealtus* – F; < *Aster praealtus* Poiret – C, GW2, NcTx, Oh3, W, WV; < *Aster praealtus* Poiret var. *praealtus* – G, GrPl, SE1; > *Aster praealtus* Poiret var. *praealtus* – Tx; > *Aster praealtus* var. *texicola* Wiegand – Tx; < *Symphyotrichum*

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

praealtum (Poiret) Nesom – Ar, Fl7, FNA20, Mi, Mo2, Pa, Tn, WH3; < *Symphyotrichum praealtum* (Poiret) Nesom var. *praealtum* – K3, K3, K4. NatureServe G5T5? (Secure).

Symphyotrichum praealtum (Poiret) Nesom *var*. ***subasper*** (Lindley) Nesom. ROUGH WILLOWLEAF ASTER. **Hab:** Bottomlands, other moist habitats. **Dist:** KY, IN, IL, MO, and OK south to AL and TX. **Phen:** (Sep-) Oct-Nov. **Syn:** = Il; = *Aster praealtus* Poiret var. *subasper* (Lindley) Wiegand – F; = *Symphyotrichum praealtum* (Poiret) Nesom var. *subasperum* (Lindley) Nesom – K1, orthographic variant; < *Aster praealtus* Poiret – NcTx, Tx; < *Symphyotrichum praealtum* (Poiret) Nesom – FNA20; < *Symphyotrichum praealtum* (Poiret) Nesom var. *praealtum* – K3, K4.



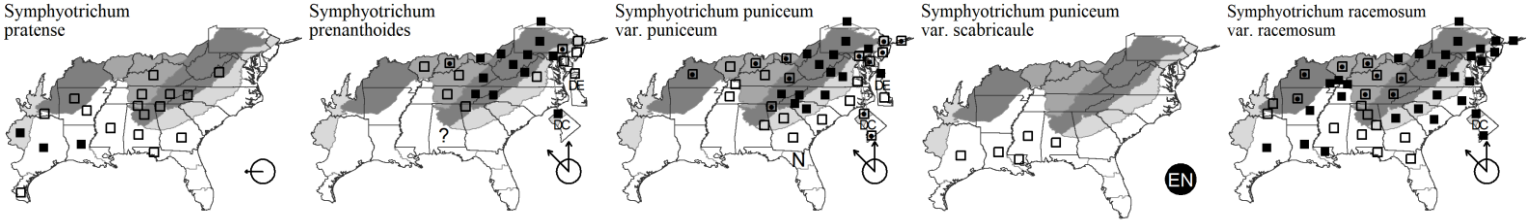
Symphyotrichum pratense (Rafinesque) Nesom. BARRENS SILKY ASTER. **Hab:** Calcareous glades and barrens, prairies. **Dist:** S. AR west to ne. TX and se. OK, south to sc. LA and e. TX; disjunct at scattered localities east of the Mississippi River, as in sw. VA (Ludwig 1999), sw. NC (Kelly & Knapp 2019), c. KY, TN (Chester, Wofford, & Kral 1997), nw. GA, sw. GA, Panhandle FL (Gadsden County), n. and c. AL, and wc. MS. **Phen:** Sep-Nov (-Jan). **Tax:** See Jones, Witsell, & Nesom (2008) for extensive discussion. **Syn:** = Ar, FNA20, K1, K3, K4, Tn, Va, Jones, Witsell, & Nesom (2008), Nesom (1994a); = *Aster phyllolepis* Torrey & A. Gray – SE1; = *Aster pratensis* Rafinesque – NcTx, Tx, Tx; = *Lasallea sericea* (Ventenat) Greene ssp. *pratensis* (Rafinesque) Semple & Brouillet – Semple & Brouillet (1980a); = *Symphyotrichum sericeum* (Ventenat) Nesom var. *microphyllum* (A.P. de Candolle) Wunderlin & B.F. Hansen – Fl7, WH3; < *Aster sericeus* Ventenat – F, G. NatureServe G4? (Apparently Secure).

Symphyotrichum prenanthoides (Muhlenberg ex Willdenow) Nesom. ZIGZAG ASTER. **Hab:** Moist or wet forests, roadbanks, fields. **Dist:** MA, NY, s. ON, and MN, south to w. NC, TN, IL, and IA. **Phen:** Late Aug-Oct. **Syn:** = FNA20, Il, K1, K3, K4, NE, Pa, Tn, Va, Nesom (1994a); = *Aster prenanthoides* Muhlenberg ex Willdenow – C, F, G, Oh3, RAB, S, SE1, W, WV. NatureServe G4G5 (Apparently Secure).

Symphyotrichum puniceum (Linnaeus) Á. Löve & D. Löve *var*. ***puniceum***. PURPLE-STEM ASTER, SWAMP ASTER. **Hab:** Bogs, seeps, ditches, wet meadows. **Dist:** NL (Newfoundland) and NL (Labrador) west to BC, south to GA, AL, MO, and SD. **Phen:** Sep-Oct. **Tax:** Unresolved material from Grayson County, VA, mafic seeps. **Syn:** = K1, K3, K4, NE, Va, Nesom (1994a), Nesom (1997b); = *Aster puniceus* var. *puniceus* – G; ? *Aster conduplicatus* E.S. Burgess – S; < *Aster puniceus* Linnaeus – C, GrPl, GW2, Oh3, RAB, S, SE1, W; > *Aster puniceus* var. *compactus* Fernald – F; > *Aster puniceus* var. *puniceus* – F, WV; < *Symphyotrichum puniceum* – Il, Mi, Pa, Tn.

Symphyotrichum puniceum (Linnaeus) Á. Löve & D. Löve *var*. ***scabricaule*** (Shinners) Nesom. **Hab:** Pineland seepage bogs. **Dist:** AL west to e. TX. **Phen:** Oct. **Syn:** = FNA20, K1, K3, K4, Nesom (1997b); = *Aster scabricaulis* Shinners – Tx; < *Aster puniceus* Linnaeus – C, GW2, S, SE1, W. NatureServe G5T2 (Imperiled).

Symphyotrichum racemosum (Elliott) Nesom *var*. ***racemosum***. SMALL WHITE ASTER. **Hab:** Bottomlands, marshes. **Dist:** ME south to n. FL, west to TX, and inland to OH, IN, IL (?), MO, and OK. **Syn:** = K1, Va, Nesom (1994a); = *Aster vimineus* Lamarck – G, GW2, RAB, SE1, W, misapplied; > *Aster brachypholis* Small – S; < *Aster racemosus* Elliott – C, Oh3; > *Aster racemosus* Elliott – F; > *Aster vimineus* var. *vimineus* – F, misapplied; < *Symphyotrichum racemosum* – Ar, Fl7, FNA20, K3, K4, NE, Pa, Tn, WH3.



Symphyotrichum racemosum (Elliott) Nesom *var*. ***subdumosum*** (Wiegand) Nesom. SMALL WHITE OLDFIELD ASTER. **Dist:** Uncertain distribution. **Phen:** Aug-Oct. **Syn:** = Il, Nesom (1994a); = *Aster vimineus* Lamarck var. *subdumosus* Wiegand – F; < *Aster racemosus* Elliott – C, Oh3; < *Symphyotrichum racemosum* – FNA20, K3, K4, Pa, WH3.

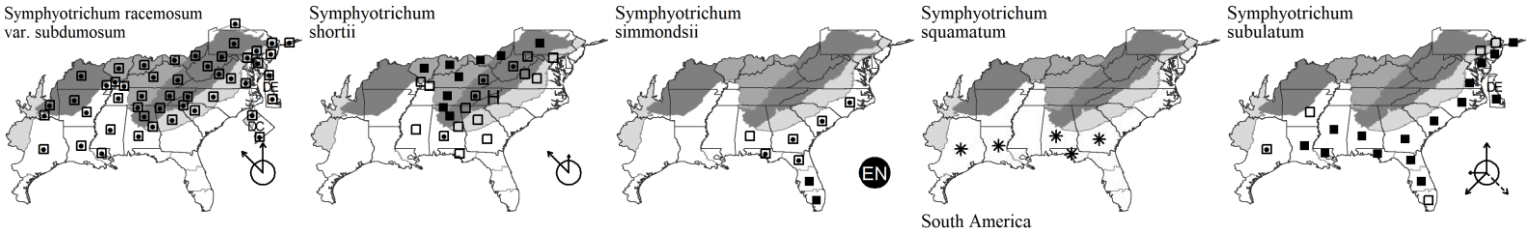
Symphyotrichum shortii (Lindley) Nesom. MIDWESTERN BLUE HEART-LEAVED ASTER, SHORT'S ASTER. **Hab:** Dry, rocky slopes, calcareous hammocks (in FL). **Dist:** PA, s. ON, and MN, south to w. NC, c. GA, Panhandle FL (Gadsden and Jackson counties), MS, and AR. **Phen:** Aug-Oct. **ID Notes:** The lower stem leaves are indeed reminiscent of the leaves of *Asplenium rhizophyllum* (formerly known as *Camptosorus*), explaining one of Small's names for this species. **Syn:** = Fl7, FNA20, Il, K1, K3, K4, Mi, Pa, Tn, Va, WH3, Nesom (1994a); = *Aster shortii* Lindley – C, F, G, Oh3, SE1, WV; > *Aster camptosorus* Small – S; > *Aster shortii* Lindley – S; > *Aster shortii* var. *camptosorus* (Small) D.B. Ward – Ward (2012a). NatureServe G5 (Secure).

Symphyotrichum simmondsii (Small) Nesom. SIMMONDS'S ASTER. **Hab:** Florida wet prairies, wet pine flatwoods, ditches, other moist to wet habitats. **Dist:** Se. NC south to s. FL, west to s. AL. **Phen:** (Nov-) Dec-Feb (-Mar). **Comm:** {not yet keyed}. **Syn:** = K1, K4, Nesom (1994a); = *Aster simmondsii* Small – S; < *Symphyotrichum kralii* Nesom – K3; < *Symphyotrichum simmondsii* (Small) Nesom – Fl7, FNA20, WH3.

* ***Symphyotrichum squamatum*** (Sprengel) Nesom. SOUTH AMERICAN SALT-MARSH ASTER. **Hab:** Disturbed areas (on ballast), escaped to coastal marshes and dunes. **Dist:** Native of South America. AL (Mobile County), FL (Escambia County), LA, TX. **Syn:** = Fl7, K1, K3, K4, WH3, Nesom (1994a), Nesom (2005b); = *Symphyotrichum subulatum* (Linnaeus) Nesom var. *squamatum* (Sprengel) S.D. Sundberg – FNA20, Sundberg (2004); < *Aster subulatus* Michx. var. *cubensis* (DC.) Shinners – SE1. NatureServe G5? (Secure).

Symphyotrichum subulatum (Michaux) Nesom. EASTERN SALTMARSH ASTER. **Hab:** Tidal marshes. **Dist:** S. ME south to ne. FL, Panhandle FL, west to LA. **Phen:** Sep-Nov. **Tax:** See Sundberg (2004). **Syn:** = Fl7, Il, K1, K3, K4, Mi, Va, WH3, Nesom (1994a), Nesom (2005b); = *Aster subulatus* Michaux var. *euroauster* Fernald & Griscom – Tx; = *Aster subulatus* Michaux var. *subulatus* – C, SE1; = *Symphyotrichum subulatum* var. *subulatum* – Ar, FNA20, NE, Sundberg (2004); < *Aster subulatus* Michaux – GW2, Oh3, RAB; > *Aster subulatus* Michaux var. *euroauster* Fernald & Griscom – F; > *Aster subulatus* var. *obtusifolius* Fernald – F, G; > *Aster subulatus* Michaux var. *subulatus* – F, G.

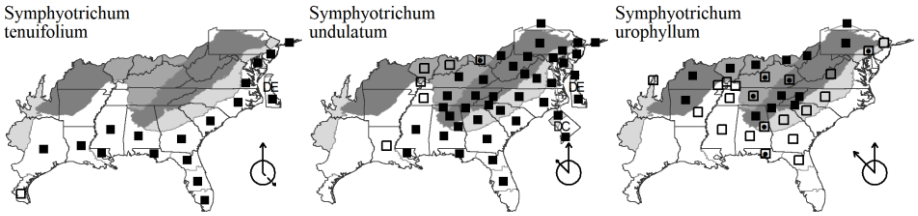
Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



Symphyotrichum tenuifolium (Linnaeus) Nesom. PERENNIAL SALT-MARSH ASTER. **Hab:** Brackish marshes. **Dist:** ME south to c. peninsular FL, west to se. TX. **Phen:** Jun-Nov. **Tax:** See Sundberg (2004). **Syn:** = K1, K4, Va, Nesom (1994a), Nesom (2005b); = *Aster tenuifolius* Linnaeus – C, G, GW2, RAB, SE1; = *Aster tenuifolius* var. *tenuifolius* – Tx; = *Symphyotrichum tenuifolium* var. *tenuifolium* – FNA20, K3, NE, Sundberg (2004); < *Symphyotrichum tenuifolium* (Linnaeus) Nesom – Fl7, WH3. NatureServe G5 (Secure).

Symphyotrichum undulatum (Linnaeus) Nesom. WAVYLEAF ASTER. **Hab:** Dry forests, woodlands, glades, roadbanks. **Dist:** NS west to s. ON, south to c. peninsular FL and LA. **Phen:** Aug-Nov. **Syn:** = Fl7, FNA20, Il, K1, K3, K4, NE, Pa, Tn, Va, WH3, Nesom (1994a); = *Aster undulatus* Linnaeus – C, G, Oh3, RAB, SE1, W; > *Aster asperifolius* E.S. Burgess – S; > *Aster claviger* E.S. Burgess – S; > *Aster corrigiatus* E.S. Burgess – S; > *Aster gracilescens* E.S. Burgess – S; > *Aster linguiformis* E.S. Burgess – S; > *Aster loriformis* (E.S. Burgess) E.S. Burgess – S; > *Aster mohrii* E.S. Burgess – S; > *Aster proteus* E.S. Burgess – S; > *Aster sylvestris* E.S. Burgess – S; > *Aster triangularis* (E.S. Burgess) E.S. Burgess – S; > *Aster truellius* E.S. Burgess – S; > *Aster undulatus* Linnaeus – S; > *Aster undulatus* var. *diversifolius* (Michaux) A. Gray – F; > *Aster undulatus* var. *loriformis* E.S. Burgess – F, WV; > *Aster undulatus* var. *undulatus* – F, WV. NatureServe G5 (Secure).

Symphyotrichum urophyllum (Lindley ex A.P. de Candolle) Nesom. WHITE ARROWLEAF ASTER. **Hab:** Moist to dry forests, fields, and roadbanks. **Dist:** ME west to MN and NE, south to e. Panhandle FL, MS, and OK. **Phen:** Late Aug-Oct. **Syn:** = Ar, Fl7, FNA20, Il, K1, K3, K4, Mi, Mo2, NE, Pa, Tn, Va, WH3, Nesom (1994a); = *Aster sagittifolius* Wedemeyer ex Willdenow – C, G, GrPl, Oh3, RAB, S, SE1, W; = *Aster sagittifolius* var. *sagittifolius* – F. NatureServe G4G5 (Apparently Secure).



Tagetes Linnaeus 1753 (MARIGOLD)

A genus of about 40-50 species, of tropical and warm temperate America. References: SE1; Strother (2006bbb) in FNA21 (2006c).

Unkeyed waifs: *Tagetes lucida*

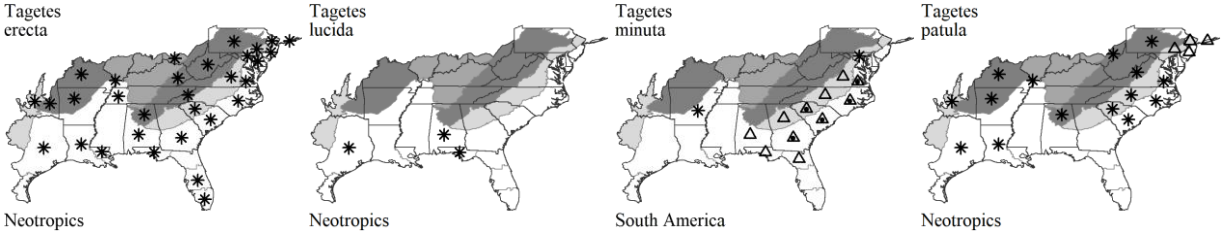
1 Rays inconspicuous, ca. 1-2 mm long; [plant (at least historically) a well-established weed, primarily in the Coastal Plain] ..... ***Tagetes minuta***
1 Rays showy, mostly > 10 mm long; [plant cultivated, rarely occurring as a waif].
2 Peduncles conspicuously swollen and hollow below the flower; involucre 15-20 mm high; achenes 7-10 mm long..... ***Tagetes erecta***
2 Peduncles not conspicuously swollen and hollow below the flower; involucre 10-15 mm high; achenes 4-7 mm long..... ***Tagetes patula***

* ***Tagetes erecta*** Linnaeus. COMMON MARIGOLD, AFRICAN MARIGOLD, AZTEC MARIGOLD, BIG MARIGOLD. **Hab:** Commonly cultivated, rarely persistent or as a waif. **Dist:** Native of Mexico. **Phen:** Jul-Nov. **Syn:** = C, F, Fl7, G, Il, K1, K3, NE, RAB, S, SE1, WH3; < *Tagetes erecta* Linnaeus – Ar, FNA21, K4. NatureServe GNR (Not Yet Ranked).

* ***Tagetes lucida*** Cavanilles. SWEET-SCENTED MARIGOLD. **Hab:** Disturbed areas. **Dist:** Native of Mexico and Central America. **Syn:** = Fl7, K3, K4.

* ***Tagetes minuta*** Linnaeus. MUSTER JOHN HENRY. **Hab:** Sandy fields, pecan orchards, sandy roadsides. **Dist:** Native of South America. **Phen:** Late Sep-Nov. **Syn:** = C, F, Fl7, FNA21, G, K1, K3, NE, RAB, S, SE1, Va, WH3. NatureServe GNR (Not Yet Ranked).

* ***Tagetes patula*** Linnaeus. FRENCH MARIGOLD. **Hab:** Commonly cultivated, rarely persistent or as a waif. **Dist:** Native of Mexico. **Phen:** Jul-Nov. **Syn:** = C, G, K1, K3, NE, RAB, SE1; < *Tagetes erecta* Linnaeus – FNA21, K4.



Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more)

* : waif
EN : endemic
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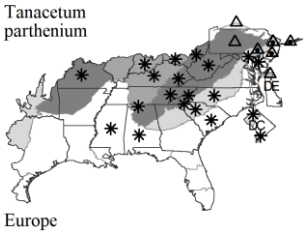


Tanacetum Linnaeus 1753 (TANSY)

A genus of about 150 species, herbs, of north temperate regions, especially the Old World. References: Arriagada & Miller (1997); SE1; Watson (2006a) in FNA19 (2006a).

* ***Tanacetum parthenium*** (Linnaeus) Schultz 'Bipontinus'. FEVERFEW. **Hab:** Disturbed areas. **Dist:** Native of Europe. **Phen:** Jun-Sep. **Syn:** = FNA19, Il, K1, K3, K4, Mi, Pa, Arriagada & Miller (1997); = *Chrysanthemum parthenium* (Linnaeus) Bernhardi – C, F, G, GrPl, Oh3, RAB, SE1, WV; = *Matricaria parthenium* Linnaeus – S. NatureServe GNR (Not Yet Ranked).

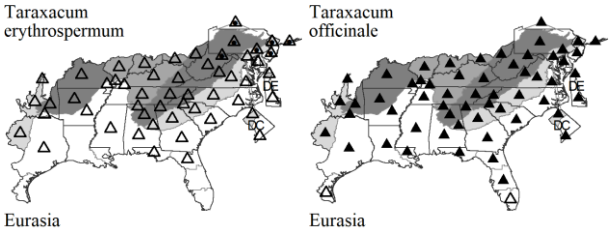
Taraxacum F.H. Wiggers 1780 (DANDELION)

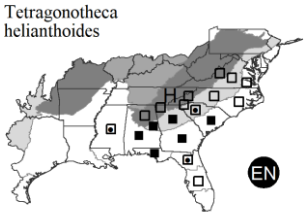
A genus of about 60 species (or as many as 2000 if apomictic microspecies are recognized), herbs, of boreal and temperate regions. There seems little utility in trying to reconcile the numerous European microspecies against our introduced material. References: Brouillet (2006a) in FNA19 (2006a); SE1.

1 Cypselas reddish or purplish at maturity; leaves usually deeply cut throughout their length, the lobes narrow ..... ***Taraxacum erythrospermum***
1 Cypselas brown or tan at maturity; leaves less deeply cut, particularly toward the base..... ***Taraxacum officinale***

* ***Taraxacum erythrospermum*** Andrzejowski ex Besser. RED-SEEDED DANDELION. **Hab:** Roadsides, lawns, pastures, other disturbed sites. **Dist:** Native of Eurasia. **Phen:** Jan-Dec. **Tax:** Brouillet in FNA explains the nomenclatural and taxonomic complexities involved with the various names applied, and the reason for retaining *T. erythrospermum* at this time. **Syn:** = Ar, F, FNA19, Il, K3, K4, Mi, Pa, RAB, Tn, Va, WV; >< *Leontodon erythrospermum* (Andrzejowski) von Eichwald – S; >< *Taraxacum laevigatum* (Willdenow) A.P. de Candolle – C, G, GrPl, K1, NcTx, NE, Oh3, SE1, W; < *Taraxacum officinale* F.H. Wiggers – Fl7.

* ***Taraxacum officinale*** F.H. Wiggers. COMMON DANDELION. **Hab:** Lawns, roadsides, urban areas, pastures, disturbed areas, trailsides, less commonly in a variety of less disturbed habitats. **Dist:** Native of Eurasia. **Phen:** Jan-Dec. **Syn:** = Ar, Bah, C, FNA19, G, GrPl, Il, K3, K4, Mi, NcTx, NE, Oh3, Pa, RAB, SE1, Tn, Va, W, WH3, WV; = *Leontodon taraxacum* Linnaeus – S; < *Taraxacum officinale* F.H. Wiggers – Fl7; > *Taraxacum officinale* ssp. *officinale* – K1; > *Taraxacum officinale* var. *officinale* – F. NatureServe G5T5 (Secure).

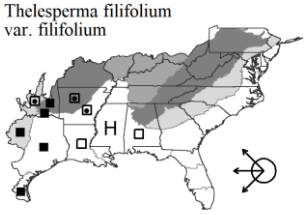




Tetragonotheca Linnaeus 1753 (SQUAREHEAD)

A genus of 4 species, herbs, endemic to se. North America. References: SE1; Strother (2006ww) in FNA21 (2006c); Turner & Dawson (1980).

Tetragonotheca helianthoides Linnaeus. SQUAREHEAD, PINELAND-GINSENG. **Hab:** Longleaf pine sandhills, sandy woodlands, open hammocks, roadsides. **Dist:** Se. VA and e. TN south to c. peninsular FL and s. MS. **Phen:** Apr-Jul. **Syn:** = C, F, Fl7, FNA21, G, K1, K3, K4, RAB, S, SE1, Tn, Va, W, WH3, Turner & Dawson (1980). NatureServe G5 (Secure).



Thelesperma Lessing 1831 (GREENTHREAD)

A genus of 10 or more species, of c. and w. North America, Mexico, and South America. References: Strother (2006zz) in FNA21 (2006c).

Key adapted from Strother (2006zz).

Thelesperma filifolium (Hooker) A. Gray *var.* ***filifolium***. STIFF GREENTHREAD. **Hab:** Prairies, glades, and roadsides over calcareous substrates. **Dist:** AR and OK south to w. LA, s. TX, w. TX, and NLE; disjunct eastward in the Black Belt of MS and on a chalk bluff in Sumter County, wc. AL (Keener 2009). **Phen:** Apr-Jun (-Sep). **Syn:** = GrPl, K3, K4, NcTx, SE1, Tx; < *Thelesperma filifolium* (Hooker) A. Gray – Ar, FNA21, Mo2. NatureServe G4G5T4T5 (Apparently Secure).

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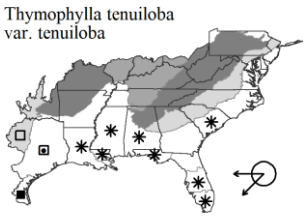
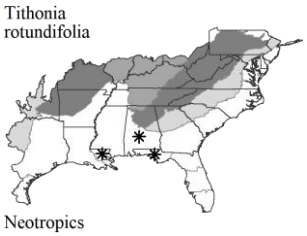


Thymophylla Lagasca y Segura 1816

A genus of about 13 species, herbs and shrubs, of sw. and sc. United States and Mexico. Key modified from Strother (2006c) and Correll and Johnston (1970). References: Strother (2006ddd) in FNA21 (2006c).

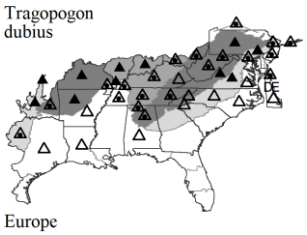
Thymophylla tenuiloba (A.P. de Candolle) Small *var*. ***tenuiloba***. DAHLBERG DAISY, GOLDEN-FLEECE. **Hab:** {TX habitats}, eastwards as an introduction in dry, disturbed areas, waste areas near wool-combing mills. **Dist:** C. TX and s. NM south into Mexico. **Syn:** = FNA21, K1, K3, NcTx, NE; = *Dyssodia tenuiloba* (A.P. de Candolle) B.L. Robinson var. *tenuiloba* – SE1; < *Dyssodia tenuiloba* (A.P. de Candolle) B.L. Robinson – Bah; < *Thymophylla tenuiloba* – Fl7, S, WH3. NatureServe G5T5 (Secure).



Tithonia Desfontaines ex A.L. de Jussieu 1789 (SUNFLOWER-WEED)

A genus of about 11 species, herbs, shrubs, and rarely trees, of sw. United States, Mexico, and Central America. References: La Duke (1982); La Duke (2006) in FNA21 (2006c).

* ***Tithonia rotundifolia*** (Miller) S.F. Blake. CLAVEL DE MUERTO. **Hab:** Disturbed areas, roadsides. **Dist:** Native of Mexico. Reported for AL (Diamond 2014); also reported for Orleans Parish, LA. **Phen:** Nov-Jan. **Syn:** = Fl7, FNA21, K1, K3, K4, WH3, La Duke (1982). NatureServe G5 (Secure).



Tragopogon Linnaeus 1753 (GOAT'S-BEARD)

A genus of about 110 species, herbs, of temperate Eurasia and the Mediterranean region. References: SE1; Soltis (2006) in FNA19 (2006a); Voss (1996).

* ***Tragopogon dubius*** Scopoli. GOAT'S-BEARD, YELLOW SALSIFY. **Hab:** Roadsides, fields, other disturbed places. **Dist:** Native of Europe. **Phen:** Apr-Jul. **Syn:** = Ar, C, FNA19, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, Oh3, Pa, RAB, SE1, Tn, Va, W; < *Tragopogon major* Jacquin – F, WV. NatureServe GNR (Not Yet Ranked).

Trilisa Cassini 1820 (TRILISA)

A genus of 3 species, perennial herbs, endemic to the Southeastern Coastal Plain of North America. The genus name is an anagram of *Liatris*, as is *Litrisa*. Schilling (2011) shows that *Trilisa* and *Litrisa* should be separated from *Carphephorus*. References: Bridges & Orzell (2017b) in Weakley et al (2017); Correa & Wilbur (1969); SE1; DeLaney, Bissett, & Weidenhamer (1999); Nesom (2006hh) in FNA21 (2006c); Orzell & Bridges (2002); Schilling (2011b); Schilling (2011b).

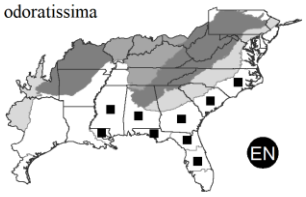
Identification Notes: *Trilisa* can be distinguished from *Carphephorus* by its smaller heads (involucres 3.5-6 mm high vs. 6-15 mm high), fewer phyllaries per head (6-12 vs. 15-40), and lack of shining resin dots on the leaves (*Carphephorus* has numerous resin dots).

1 Stem densely spreading-pubescent; capitulescence a cylindrical thyrsoid panicle; leaves (0.5-) 1-3 (-4) cm wide..... ***Trilisa paniculata***
1 Stem glabrous; capitulescence corymbose, the lateral branches equally or overtopping the central ones; leaves 1-6 (-11) cm wide.
..... ***Trilisa odoratissima***

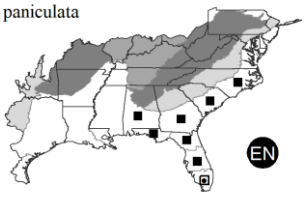
Trilisa odoratissima (J.F. Gmelin) Cassini. DEER'S-TONGUE, VANILLA-LEAF. **Hab:** Moist to mesic pine savannas and flatwoods. **Dist:** Se. NC south to c. peninsular FL and west to e. LA. **Phen:** Late Jun-Oct; Sep-Nov. **Comm:** *T. odoratissima* has the largest leaves of our species of *Carphephorus*, *Trilisa*, and *Litrisa*; its leaves are normally wider than 3 cm, and have a very wide and prominent midrib, usually purple toward the base of the leaf and white toward the tip. This species contains coumarin and gives off a pleasant vanilla odor when drying; it is gathered from the wild and used as a supplementary flavoring in cigarettes. **Syn:** = K4, Bridges & Orzell (2017b) in Weakley et al (2017); = *Carphephorus odoratissimus* – DeLaney, Bissett, & Weidenhamer (1999); = *Carphephorus odoratissimus* (J.F. Gmelin) Herbert var. *odoratissimus* – Fl7, FNA21, K3, WH3, Orzell & Bridges (2002); = *Trilisa odoratissima* var. *odoratissima* – Schilling (2011b); < *Carphephorus odoratissimus* – GW2, K1, SE1, Correa & Wilbur (1969); < *Trilisa odoratissima* (J.F. Gmelin) Cassini – RAB, S.

Trilisa paniculata (J.F. Gmelin) Cassini. TRILISA. **Hab:** Pine savannas and flatwoods. **Dist:** Se. NC south to s. FL, and west to the FL Panhandle and s. AL. **Phen:** Aug-Oct; Sep-Dec. **Comm:** The leaves of this species are reminiscent of *C. odoratissimus*, but are narrower, (0.5-) 1-3 (-4) cm wide, vs. 1-6 (-11) cm wide in *C. odoratissimus*. Sterile *C. paniculatus* can be mistaken for glabrate *C. tomentosus*, which has shorter and broader leaves. **Syn:** = K4, RAB, S, Schilling (2011b); = *Carphephorus paniculatus* (J.F. Gmelin) Herbert – Fl7, FNA21, GW2, K1, K3, SE1, WH3, Correa & Wilbur (1969), DeLaney, Bissett, & Weidenhamer (1999). NatureServe G5 (Secure).

Trilisa odoratissima

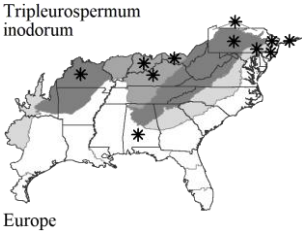


Trilisa paniculata



Tripleurospermum Schultz 'Bipontinus' 1844 (MAYWEED)

Tripleurospermum inodorum



Europe

A genus of about 40 species, annual, biennial, and perennial herbs, of the northern hemisphere. References: Arriagada & Miller (1997); Brouillet (2006c) in FNA19 (2006a).

* ***Tripleurospermum inodorum*** (Linnaeus) Schultz 'Bipontinus'. SCENTLESS CHAMOMILLE, MAYWEED. **Hab:** Disturbed areas, railroad tracks, streets, urban waste areas, also as a ballast waif. **Dist:** Native of Europe. Introduced at scattered locations in North America, such as AL, KY (?), MD (?), NJ, and PA. **Phen:** Jun-Sep. **Syn:** = FNA19, Il, K4, Mi, NE, Pa; = *Matricaria maritima* Linnaeus var. *agrestis* (Knaf) Wilmott – F; = *Tripleurospermum maritimum* (Linnaeus) W.D.J. Koch ssp. *inodorum* (Linnaeus) Applequist – K3; = *Tripleurospermum perforata* (Mérat) M. Lainz – K1, Arriagada & Miller (1997); < *Matricaria maritima* Linnaeus – GrPl, Oh3.

Verbesina Linnaeus 1753 (CROWNBEARD, WINGSTEM, FROSTWEED)

A genus of about 200-300 species, trees, shrubs, and herbs, of tropical, subtropical, and warm temperate America. References: Coleman (1966); SE1; Olsen (1979); Strother (2006oo) in FNA21 (2006c).

1 Stem and lower leaf-surfaces grey strigose-canescent; annuals, 2-10 dm tall, with taproots..... ***Verbesina encelioides***
1 Stem and lower leaf surfaces glabrous or pubescent, but not grey strigose-canescent; perennials, 4-40 dm tall, with fibrous or fleshy-fibrous roots.
  2 Leaves primarily opposite (the uppermost sometimes alternate).
    3 Internodes winged; [collectively widespread].
      ..... ***Verbesina occidentalis***
    3 Internodes not winged; [collectively of sw. GA, s. AL, FL Panhandle, and TX].
      ..... ***Verbesina aristata***
  2 Leaves primarily alternate (the lowermost sometimes opposite).
    7 Heads few, 1-15 (-20) in a compact inflorescence; disc 7-16 mm wide at anthesis; ray flowers (5-) 7-15, yellow; plants 5-12 dm tall.....
      ..... ***Verbesina helianthoides***
    7 Heads numerous, 10-200+ in a dense to open inflorescence; disc 3-15 mm wide at anthesis; ray flowers either absent, or 1-5 and white, or 2-10 and yellow; plants 10-40 dm tall.
      8 Ray florets absent; disk flowers white ..... ***Verbesina walteri***
      8 Ray florets present; disk flowers white or yellow.
        9 Ray flowers and disc flowers yellow..... ***Verbesina alternifolia***
        9 Ray flowers and disc flowers white.
          ..... ***Verbesina virginica var. virginica***

Verbesina alternifolia (Linnaeus) Britton ex Kearney. COMMON WINGSTEM. **Hab:** Alluvial forests, marshes, floodplain pastures. **Dist:** NY and s. ON west to IA, south to Panhandle FL, w. LA, and nc. TX. **Phen:** (Jul-) Aug-Sep (-Oct). **Syn:** = Ar, C, Fl7, FNA21, G, GrPl, GW2, K1, K3, K4, Mi, Mo2, NcTx, NE, Oh3, Pa, RAB, SE1, Tn, Tx, Va, WH3, WV; = *Actinomeris alternifolia* (Linnaeus) Bentham – Il; = *Ridan alternifolia* (Linnaeus) Britton – S. NatureServe G5 (Secure).

Verbesina aristata (Elliott) A. Heller. COASTAL PLAIN CROWNBEARD. **Hab:** Longleaf pine sandhills, swamp margins, dry woodlands. **Dist:** Sw. GA and ne. FL west to FL Panhandle and s. AL. **Comm:** Jun-Aug. **Syn:** = Fl7, FNA21, K1, K3, K4, SE1, WH3; = *Pterophyton aristatum* (Elliott) Alexander – S. NatureServe G4 (Apparently Secure).

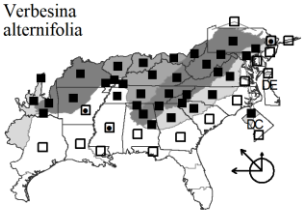
Verbesina encelioides (Cavanilles) Bentham & Hooker f. GOLDEN CROWNBEARD. **Hab:** Fields and disturbed area. **Dist:** NE and TX west to CA, south to Mexico; widely scattered eastwards as an introduction in the se. United States and elsewhere. **Phen:** May-Oct. **Syn:** = Ar, Bah, Fl7, FNA21, K3, K4, Mi, Mo2, NcTx, SE1, Tx; > *Verbesina encelioides* ssp. *encelioides* – GrPl; > *Verbesina encelioides* ssp. *exauriculata* (Robinson & Greenman) J.R. Coleman – GrPl, NE.

Verbesina helianthoides Michaux. OZARK CROWNBEARD. **Hab:** Prairies, oak savannas, glades, dry woodlands over mafic rocks, barrens. **Dist:** OH west to IA and KS, south to c. TN, nw. GA, n. AL, and nc. TX; disjunct in w. NC and e. GA. **Phen:** May-Oct. **Syn:** = Ar, C, F, FNA21, G, GrPl, K1, K3, K4, Mo2, NcTx, Oh3, SE1, Tn, Tx; = *Actinomeris helianthoides* (Michaux) Nuttall – Il; = *Pterophyton helianthoides* (Michaux) Alexander – S. NatureServe G5 (Secure).

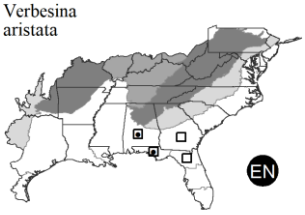
Verbesina occidentalis (Linnaeus) Walter. SOUTHERN CROWNBEARD. **Hab:** Forests, woodlands, pastures, and roadsides, especially abundant in alluvial areas or upslope over mafic or calcareous rocks. **Dist:** MD west to OH and MO, south to Panhandle FL and MS. **Syn:** = C, F, Fl7, FNA21, G, GW2, Il, K1, K3, K4, Oh3, RAB, SE1, Tn, Va, WH3, WV; = *Phaethusa occidentalis* (Linnaeus) Britton – S. NatureServe G5 (Secure).

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

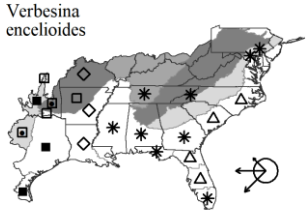
Verbesina alternifolia



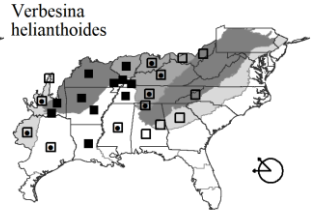
Verbesina aristata



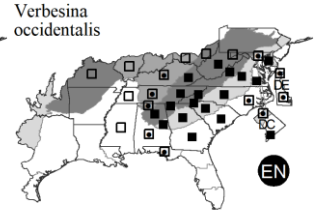
Verbesina encelioides



Verbesina helianthoides



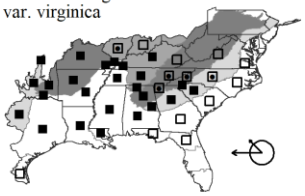
Verbesina occidentalis



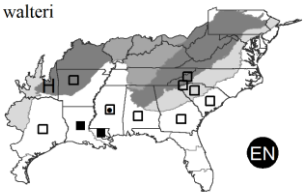
Verbesina virginica Linnaeus *var*. ***virginica***. COMMON FROSTWEED. **Hab:** Moist to dryish forests and woodlands, especially over mafic or calcareous rocks, in Coastal Plain ravines in VA over coquina limestone. **Dist:** Sc. NC (e. VA?) west to e. KS, south to n. FL and c. and s. TX. **Phen:** Jul-Oct. **Tax:** Populations of *V. virginica* from e. VA appear to be substantially disjunct from other populations of either variety. **Syn:** = C, GW2, K1, Mo2, RAB, SE1, Va, Olsen (1979); = *Phaethusa virginica* (Linnaeus) Britton – S; < *Verbesina virginica* – Ar, F, Fl7, FNA21, G, GrPl, Il, K3, K4, NcTx, Oh3, Tn, Tx, WH3. NatureServe G5?T5? (Secure).

Verbesina walteri Shinners. WALTER'S WINGSTEM. **Hab:** Floodplains, low moist forests. **Dist:** Coastal Plain of SC south to GA, west to e. TX; disjunct eastwards in NC, SC, and GA, and northward in the Ouachita Mountains of AR and OK. **Phen:** Late Aug-Sep. **Syn:** = Ar, FNA21, GW2, K1, K3, K4, RAB, SE1; = *Ridan paniculata* (Walter) Small – S. NatureServe G4 (Apparently Secure).

Verbesina virginica var. virginica



Verbesina walteri



Vernonia Schreber 1791 (IRONWEED)

A genus of about 20 species, perennial herbs, of e. and c. North America and n. Mexico; a few species in South America. Traditionally very broadly circumscribed to include about 500 species, trees, shrubs, and herbs, of tropical, subtropical, and warm temperate regions, especially America and Africa; this broader circumscription appears increasingly indefensible. References: Faust (1972); Jones in SE1 (1980); Jones (1982); Siniscalchi et al (2019); Strother (2006l) in FNA19 (2006a); Urbatsch (1972); Ward (2012a).

Identification Notes: Hybrids are frequent between co-occurring species. Only *V.* ×*georgiana* is keyed separately below (because of its distinctive appearance). Others may be recognized by intermediate morphology and ecological / geographic context.

1 Leaves basally disposed (the larger leaves in a basal rosette or in the lower half of the stem, the leaves strongly reduced in size upwards); [mainly Coastal Plain and adjacent areas of inland provinces]
  3 Larger leaves 5-25 mm wide; leaf L:W ratio 3-17.
    ..... ***Vernonia texana***
  3 Larger leaves 2-4 (-8) mm wide; leaf L:W ratio (8-) 12-30 (-60+).
    ..... ***Vernonia angustifolia var. mohrii***
1 Basal rosette absent; [collectively of a wide variety of habitats].
  8 Phyllary tips subulate to filiform, at broadest at least acuminate.
    12 Pappus whitish to yellowish, 30 outer bristles intergrading with 30+ inner bristles; leaf blades 2.5-3.5 (-4)× as long as wide ..... ***Vernonia glauca***
    12 Pappus brown to purple, 20 outer scales contrasting with 30-40+ inner bristles; leaf blades (3.3-) 4-6× as long as wide ..... ***Vernonia noveboracensis***
  8 Phyllary tips acute to rounded (sometimes minutely apiculate), the narrowest short acuminate.
    16 Stems glabrous ..... ***Vernonia flaccidifolia***
    16 Stems hairy.
      17 Leaf undersurfaces scabrous with appressed awl-shaped hairs, with few or no resin glands.
        ..... ***Vernonia gigantea***
      17 Leaf undersurfaces with curled, erect hairs, and with conspicuous resin glands.
        ..... ***Vernonia missurica***

Vernonia angustifolia Michaux *var*. ***mohrii*** S.B. Jones. FLORIDA SANDHILL IRONWEED, FLORIDA SLENDER IRONWEED. **Hab:** Longleaf pine sandhills. **Dist:** Sw. GA and Panhandle FL south to c. peninsular FL and west to s. AL and s. MS. **Syn:** = *Vernonia angustifolia* ssp. *mohrii* (S.B. Jones) S.B. Jones & Faust – K1, SE1; < *Vernonia angustifolia* Michaux – Fl7, FNA19, K3, K4, S, WH3. NatureServe G5TNR (Not Yet Ranked).

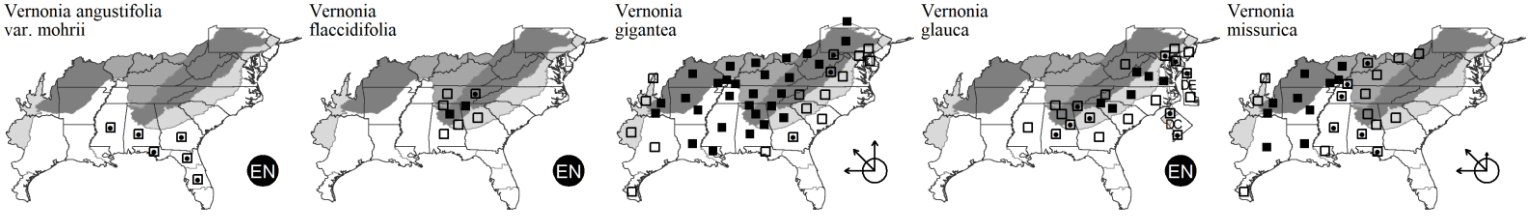
Vernonia flaccidifolia Small. **Hab:** Upland deciduous forests and woodlands, woodland borders. **Dist:** C. and nw. GA, se. TN, and ne. and c. AL (Urbatsch 1972). **Phen:** Jun-Sep. **Syn:** = FNA19, K1, K3, K4, S, SE1, Tn, W, Urbatsch (1972). NatureServe G4 (Apparently Secure).

Vernonia gigantea (Walter) Trelease. COMMON IRONWEED, GIANT IRONWEED. **Hab:** Pastures, bottomlands, streamsides. **Dist:** W. NY, s. MI and e. NE south to SC, FL, and TX. **Phen:** Late Aug-Oct; Aug-Nov. **Syn:** = Ar, GrPl, Mi, NcTx, Pa, Tn, Va, W; = *Vernonia altissima* Nuttall – G, RAB, Tx, WV; = *Vernonia gigantea* (Walter) Trelease ssp. *gigantea* – K1, Mo2, Oh3, SE1, Urbatsch (1972); = *Vernonia gigantea* var. *gigantea* – C; > *Vernonia altissima* Nuttall – S; > *Vernonia altissima* var. *altissima* – F; > *Vernonia altissima* var. *taeniotricha* S.F. Blake – F; < *Vernonia gigantea* (Walter) Trelease – Fl7, FNA19, K3, K4, WH3; > *Vernonia gigantea* (Walter) Trelease – S; > *Vernonia gigantea* var. *gigantea* – Il; > *Vernonia gigantea* var. *taeniotricha* – Il, nomen nudum. NatureServe G5T5 (Secure).

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated

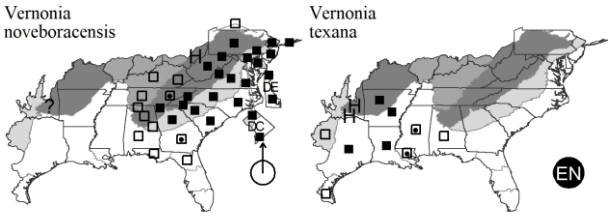
Vernonia glauca (Linnaeus) Willdenow. APPALACHIAN IRONWEED, TAWNY IRONWEED. **Hab:** Pastures, bottomlands, streamsides. **Dist:** NJ and PA south to GA, AL, and MS. **Phen:** Late Jun-Sep; Aug-Oct. **Syn:** = C, F, FNA19, G, K1, K3, K4, NE, Pa, RAB, S, SE1, Va, W, WV. NatureServe G5 (Secure).

Vernonia missurica Rafinesque. MISSOURI IRONWEED. **Hab:** Wet hammocks, prairies, glades. **Dist:** IN, c. TN (Chester, Wofford, & Kral 1997), GA (FNA), and Panhandle FL, west to se. IA, e. KS, OK, and TX. **Phen:** Jul-Sep. **Syn:** = C, F, Fl7, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, Oh3, S, SE1, Tn, Tx, WH3, Faust (1972). NatureServe G4G5 (Apparently Secure).

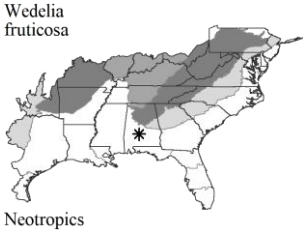


Vernonia noveboracensis (Linnaeus) Michaux. NEW YORK IRONWEED. **Hab:** Pastures, bottomlands, streamsides. **Dist:** MA and NY south to ne. and e. Panhandle FL and AL. **Phen:** Jul-Sep; Aug-Oct. **Syn:** = C, Fl7, FNA19, G, K1, K3, K4, NE, Oh3, Pa, RAB, SE1, Tn, Va, W, WH3, WV; > *Vernonia harperi* Gleason – S; > *Vernonia noveboracensis* (Linnaeus) Michaux – S; > *Vernonia noveboracensis* var. *noveboracensis* – F; > *Vernonia noveboracensis* var. *tomentosa* (Walter) Britton – F. NatureServe G5 (Secure).

Vernonia texana (A. Gray) Small. TEXAS IRONWEED. **Hab:** Longleaf pinelands, {other habitats}. **Dist:** S. MS west to OK and TX. **Phen:** Jun-Aug. **Syn:** = Ar, FNA19, K1, K3, K4, NcTx, S, SE1, Tx. NatureServe G4G5 (Apparently Secure).



Wedelia Jacquin 1760



A genus of about 100-1110 species, annual and perennial herbs and shrubs, in the New World tropics and subtropics and Africa. References: Orchard (2013); Strother (2006pp) in FNA21 (2006c).

* ***Wedelia fruticosa*** Jacquin. **Syn:** = K3; = *Wedelia fructicosa* – Orchard (2013); ? *Wedelia calycina* L.C. Richard – K4. NatureServe GNR (Not Yet Ranked).

Xanthium Linnaeus 1753 (COCKLEBUR)

A genus of about 3-20 or more species, herbs, cosmopolitan (of somewhat uncertain original distribution). References: SE1; Fernald (1946); Löve & Dansereau (1959); Millspaugh & Sherff (1919); Strother (2006ee) in FNA20 (2006b); Tomasello (2018).

Identification Notes: Mature burs are needed for the identification of most species.

1 Leaf axil with a 1-3 cm long, yellow, 3-forked spine; leaf blades lanceolate to ovate, mostly 2-5× as long as wide, cuneate at the base; burs bearing 0-1 apical beak (if 2, then unequal); [section *Acanthoxanthium*].
..... ***Xanthium spinosum***

1 Leaf axil lacking a spine; leaf blades orbicular or broadly ovate, mostly 0.8-1.5× as long as wide, cordate, truncate, rounded, or cuneate at the base; burs bearing 2 equal apical beaks; [section *Xanthium*].
5 Burs generally glabrous or puberulent, usually light tan at maturity; burs 1.0-2.0 (-2.5) cm long (including the beaks); prickles mostly straight, hooked prickles restricted to the upper portion of the bur; beaks straight..... ***Xanthium chinense***
5 Burs generally hirsute, usually brown at maturity; burs up to 3 cm long (including the beaks); prickles uncinate; beaks straight or curved
..... ***Xanthium orientale***

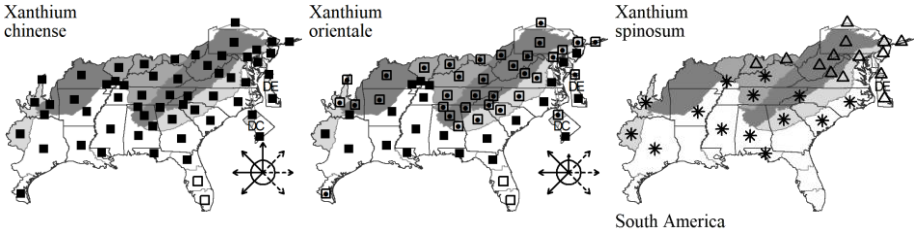
Xanthium chinense P. Miller. COCKLEBUR. **Hab:** Barnyards, pastures, bottomlands, other disturbed areas. **Dist:** Widespread in e. North America, and now nearly cosmopolitan; its original distribution uncertain. Despite the name, this species is likely native to e. North America. **Phen:** Aug-Oct. **Syn:** = Tomasello (2018); = *Xanthium strumarium* Linnaeus ssp. *cavanillesii* (Schouw) D. Löve & Dansereau var. *glabratum* (A.P. de Candolle) Cronquist – Löve & Dansereau (1959); = *Xanthium strumarium* var. *glabratum* (A.P. de Candolle) Cronquist – C, G, GrPl, K1, NE, Oh3, RAB, SE1, W; > *Xanthium chasei* Fernald – F, Il; > *Xanthium chinense* P. Miller – F, Il; > *Xanthium globosum* Shull – F, Il; > *Xanthium inflexum* Mackenzie & Bush – F, Il; < *Xanthium strumarium* Linnaeus – Bah, Fl7, FNA21, GW2, K3, K4, Mi, Mo2, Pa, Tn, Tx, Va, WH3. NatureServe G5T5? (Secure).

Xanthium orientale Linnaeus. **Hab:** Disturbed ground, roadsides, pastures, barnyards. **Dist:** Widespread in e. North America, and now nearly cosmopolitan; the details of its original distribution uncertain. **Phen:** Aug-Oct. **Comm:** Löve. **Syn:** < *Xanthium orientale* Linnaeus – Tomasello (2018); > *Xanthium pensylvanicum* Wallroth – F; < *Xanthium strumarium* Linnaeus – Bah, Fl7, FNA21, GW2, K3, K4, Mi, Mo2, Pa, Tn, Tx, Va, WH3; < *Xanthium strumarium*

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Linnaeus ssp. *cavanillesii* (Schouw) D. Löve & Dansereau var. *cavanillesii* – Löve & Dansereau (1959); < *Xanthium strumarium* var. *canadense* (P. Miller) Torrey & A. Gray – C, G, GrPl, K1, NcTx, NE, Oh3, SE1, W.

* ***Xanthium spinosum*** Linnaeus. SPINY COCKLEBUR. **Hab:** Fields, disturbed ground. **Dist:** Apparently native of South America. **Phen:** Jul-Nov. **Syn:** = GrPl, Il, Mi, Mo2, NcTx, NE, Pa, RAB, Tx, Va, WV; = *Acanthoxanthium spinosum* (Linnaeus) Fourreau – S; = *Xanthium spinosum* var. *spinosum* – Löve & Dansereau (1959); < *Xanthium spinosum* Linnaeus – C, FNA21, K1, K3, K4, SE1; > *Xanthium spinosum* var. *inerme* Bel – F; > *Xanthium spinosum* var. *spinosum* – F.



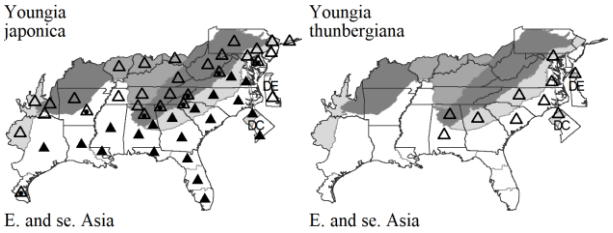
Youngia Cassini 1831 (YOUNGIA)

A genus of about 30-40 species, herbs, of Asia. References: SE1; Spurr (2006) in FNA19 (2006a); Urbatsch, Pruski, & Neubig (2013).

1 Leaves in basal rosettes, with only 0-2 cauline leaves; leaf blades runcinate, the lobes at a 90 degree angle to the midvein or recurved towards the base, the ultimate margins entire, dentate, or with small rounded lobes; longest bristle tips on teeth typically < 1 mm long ..... ***Youngia japonica***
1 Leaves mainly cauline, 4-10+ cauline leaves with internodes > 1 cm long; lobes of leaf blades ascending to spreading, the ultimate margins entire or dentate; longest bristle tips on teeth typically > 1 mm long ..... ***Youngia thunbergiana***

* ***Youngia japonica*** (Linnaeus) A.P. de Candolle. ASIATIC HAWK'S-BEARD, YOUNGIA. **Hab:** Flowerbeds, suburban woodlands, roadsides, disturbed areas, trail edges, hammocks, rocky woodlands, floodplains. **Dist:** Native of se. Asia. Kelley (2021b) reported distribution records in OK. Spreading rapidly in our area, and now moving into minimally-disturbed natural areas. **Phen:** Apr-May. **Syn:** = Bah, K4, Urbatsch, Pruski, & Neubig (2013); < *Crepis japonica* (Linnaeus) Bentham – F, G, RAB, S; < *Youngia japonica* (Linnaeus) A.P. de Candolle – Ar, C, Fl7, FNA19, Il, K1, K3, NcTx, SE1, Tn, Va, WH3.

* ***Youngia thunbergiana*** A.P. de Candolle. YOUNGIA. **Hab:** Roadsides, disturbed areas. **Dist:** Native of e. Asia. **Phen:** Apr-May. **Tax:** Some of the material in our area does not appear to be clearly marked from *Y. japonica*. See Urbatsch, Pruski, & Neubig (2013) for extensive discussion of the taxonomy and nomenclature. **Syn:** = K3, K4, Urbatsch, Pruski, & Neubig (2013); < *Crepis japonica* (Linnaeus) Bentham – F, G, RAB, S; < *Youngia japonica* (Linnaeus) A.P. de Candolle – C, FNA19, K1, SE1, Va, WH3.



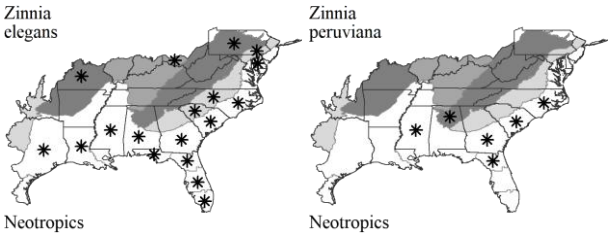
Zinnia Linnaeus 1759 (ZINNIA)

A genus of about 17 species, herbs, of sw. North America south to South America. References: SE1; Smith (2006b) in FNA21 (2006c).

1 Achenes wingless; receptacular bracts (chaff) toothed or erose on the lip ..... ***Zinnia peruviana***
1 Achenes winged; receptacular bracts (chaff) with a differentiated fimbriate lip ..... ***Zinnia elegans***

* ***Zinnia elegans*** Jacquin. GARDEN ZINNIA, ELEGANT ZINNIA. **Hab:** Disturbed areas, commonly cultivated. **Dist:** Native of the New World tropics. **Phen:** May-Nov. **Tax:** *Zinnia elegans* Jacquin 1792 has been nomenclaturally "conserved" against *Zinnia violacea* Cavanilles 1791. **Syn:** = Fl7, K3, K4, S, SE1, WH3; = *Zinnia violacea* Cavanilles – FNA21, K1. NatureServe G5 (Secure).

* ***Zinnia peruviana*** (Linnaeus) Linnaeus. PERUVIAN ZINNIA. **Hab:** Commonly cultivated, rare as a waif in disturbed areas. **Dist:** Native of the New World tropics. **Phen:** May-Nov. **Syn:** = Bah, Fl7, FNA21, K1, K3, K4, SE1, WH3; = *Zinnia pauciflora* Linnaeus – S. NatureServe G5 (Secure).



Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

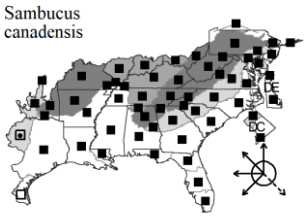
408. VIBURNACEAE Rafinesque 1820 (VIBURNUM FAMILY) [in DIPSACALES]

A family of about 5 genera and about 175-210 species, shrubs, small trees, and herbs (here interpreted as including *Sambucus* and *Viburnum*), mainly of the Northern Hemisphere. There now appears to be little doubt that *Sambucus* and *Viburnum* are more naturally placed in a separate family, in contrast to their traditional placement in the Caprifoliaceae (Backlund & Bittrich in Kadereit & Bittrich 2016; Zhang et al. 2003; Eriksson & Donoghue 1997). The correct name for that segregate family has been in dispute, but the failure of a 'super-conservation' proposal for Adoxaceae means that Viburnaceae is the correct name (Wilson 2016). References: Backlund & Bittrich in Kadereit & Bittrich (2016); Ferguson (1966a); Wilson (2016).

1 Leaves pinnately compound; fruit 3-5-seeded; [subfamily *Adoxoideae*; tribe *Sambuceae*] ..... ***Sambucus***
1 Leaves simple; fruit 1-seeded; [subfamily *Viburnoideae*; tribe *Viburneae*] ..... ***Viburnum***

Sambucus Linnaeus 1753 (ELDERBERRY)

A genus of about 10 species, shrubs, small trees, and rarely a perennial herb, north temperate and subtropical. References: Backlund & Bittrich in Kadereit & Bittrich (2016); Bolli (1994); Ferguson (1966a); Tucker, Seigler, & Ebinger in FNA () (in prep).



Sambucus canadensis Linnaeus. COMMON ELDERBERRY. **Hab:** Bottomland and riparian forests, streambanks, thickets, marshes, swamps, seeps, spring runs, mesic upland forests, pond margins, pastures, fencerows, other disturbed areas. **Dist:** NS west to MB, south to s. FL, TX; montane Mexico and Central America; West Indies. **Phen:** Late Apr-Jul; Jul-Aug. **Tax:** Bolli (1994) treats this taxon as a subspecies of a very broadly defined *S. nigra*. He recognizes six subspecies: ssp. *nigra* in Europe, ssp. *palmensis* (Link) R. Bolli in the Canary Islands, ssp. *maderensis* (Lowe) R. Bolli in Madeira Island, ssp. *canadensis* in eastern North America, Mexico, Central America, and the West Indies, ssp. *cerulea* (Rafinesque) R. Bolli of western North America, and ssp. *peruviana* (Kunth) R. Bolli of South America. I prefer to retain these taxa at the species level, particularly as Bolli states "the geographical races, in the following defined as subspecies, turned out to be the biological units in *Sambucus*". Bolli further discusses three races within what is here called *S. canadensis* (his *S. nigra ssp. canadensis*), one from eastern North America, another from montane Mexico and Central America, and a third from subtropical se. North America and the West Indies; he considers these geographic races to represent "morphological and perhaps genetical" differences, and that "at present, all races are probably interconnected". This variation may be worthy of taxonomic recognition at the varietal level, and these "races" have formerly been considered to be species or varieties. If given varietal recognition, plants of most of our area represent *S. canadensis* var. *canadensis*, while evergreen (or tardily deciduous), bipinnate plants of FL, s. GA, s. AL, s. MS, s. LA, se. TX, and the West Indies represent *S. canadensis* var. *laciniata* A. Gray. The variation is clinal, and bipinnate leaves are seen as far north as coastal NC. **ID Notes:** The leaflets, particularly of young shoots or stunted sprouts, are often variegated. This is one of the first woody plants to leaf out in the spring. **Syn:** = Ar, C, GrPl, GW2, Mi, Pa, RAB, Tn, Va, W, WV, Ferguson (1966a); = *Sambucus canadensis* var. *nigra* – NcTx, name not published; = *Sambucus nigra* Linnaeus ssp. *canadensis* (Linnaeus) R. Bolli – Fl7, K1, K3, K4, NE, WH3, Bolli (1994); > *Sambucus canadensis* Linnaeus – S; > *Sambucus canadensis* var. *canadensis* – F, G, Tx; > *Sambucus canadensis* var. *submollis* Rehder – F, G, Tx; >< *Sambucus nigra* var. *nigra* – Il; >< *Sambucus nigra* var. *submollis* – Il; > *Sambucus simpsonii* Rehder ex Sargent – S.

Viburnum Linnaeus 1753 (VIBURNUM)

Contributed by B.A. Sorrie & A.S. Weakley

A genus of about 160-200 species, shrubs and small trees, largely temperate, and primarily in Asia and North America. There remain a number of taxonomic problems, particularly in the *Viburnum dentatum* complex; the treatment and key for that group is provisional. Dirr (2007) discusses the genus in detail from a horticultural perspective. References: Clement et al (2014); Clement et al (2021); Ferguson (1966a); Floden & Saxton (2020); Landis et al (2021); McAtee (1956); Spriggs et al (2019a); Spriggs et al (2019b); Weckman et al (2002); Winkworth & Donoghue (2005).

Identification Notes: Leaves vary in shape in some taxa more than in others; we have allowed for some of this variation in the key, but readers should expect that some specimens will not key cleanly, especially rapidly-growing vegetative shoots. Petiole length of leaves varies considerably, even with those possessing "short" petioles. However, by measuring only the petioles of the first leaves below an inflorescence one reduces the chances of misidentifications greatly. Warning: even in some of the "long" petioled taxa, one may occasionally encounter unusually short petioles; therefore it is wise to examine several twigs. Density of pubescence and glandularity of leaves, petioles, and inflorescences varies more in some taxa than in others; we have allowed for some of this variation in the key, but readers should expect that some specimens will not key cleanly, especially vegetative shoots. Stipitate glands are usually very short, especially those on leaf veins; a 10× lens may not be adequate to see them clearly. It is our belief, based on thousands of specimens examined and years of fieldwork, that most *Viburnum* tend to lose pubescence, and perhaps glandularity as well, as the season progresses.

1 Leaves (at least the larger and better developed) palmately lobed and veined.
..... ***Viburnum acerifolium***
1 Leaves unlobed and pinnately veined.
4 Lateral veins curving and branching repeatedly through most of their length, not noticeably parallel, the lateral veins becoming obscure in the general pattern of anastamosing veins and not obviously leading to marginal teeth; [section *Lentago*].
5 Leaves entire or with a crenate margin, the teeth < 5 per cm of margin.
6 Leaves 2-5 cm long, obovate or spatulate, widest toward the tip; [of e. SC southward in the Coastal Plain] ..... ***Viburnum obovatum***
6 Leaves 5-12 cm long, generally elliptic or ovate, widest at or below the middle; [collectively widespread and of various habitats].
7 Peduncle (5-) avg. 13 (-25) mm long; leaves undulate-crenulate (or rarely entire); [Mountains and upper Piedmont] ..... ***Viburnum cassinoides***

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

7 Peduncle usually 16-44 mm long; leaves entire (rarely somewhat undulate-crenate); [Coastal Plain, Piedmont, and low elevation boggy sites in the Mountains]
8 Peduncle usually 16-29 mm long; fruits pink to dark blue or black in late Jul-Aug; leaves smaller (usually 10-18 square cm); leaf blade avg. 6.1 × 2.0 cm; leaf apices acuminate to acute ..... ***Viburnum nitidum***
8 Peduncle usually 33-44 mm long; fruits pale green to white in late Jul-Aug (later turning dark blue or black); leaves larger (usually 20-30 square cm); leaf blade avg. 8.3 × 3.8 cm; leaf apices acute to obtuse ..... ***Viburnum nudum***
5 Leaves serrulate, the teeth > 5 per cm of margin.
10 Leaves herbaceous in texture, dull above (sun leaves slightly glossy); petioles and veins (lower surface) glabrous or slightly brown-scurfy; leaves elliptical (widest near the midpoint of the leaf); leaf apex usually acuminate; [widespread in our area, usually in bottomland or other mesic forests] ..... ***Viburnum prunifolium***
10 Leaves somewhat coriaceous in texture, glossy above (as if lacquered); petioles and veins (lower surface) red-scurfy; leaves mostly obovate (wider towards the apex); leaf apex often rounded (but variable); [of c. VA southward, usually in dry to dry-mesic woodlands and forests] ..... ***Viburnum rufidulum***
4 Lateral veins of the leaves nearly straight and prominently parallel for most of their length, many of them forking near the margin, the ultimate veins leading to a tooth.
11 Winter buds consisting of tightly folded leaves uncovered by bud scales; plants strongly and noticeably stellate pubescent, especially on young parts and on the lower leaf surface; fruits red then turning black. ..... ***Viburnum rhytidophyllum***
11 Winter buds covered by bud scales; plants noticeably stellate-pubescent or not; fruits orange, red, or blue-black.
20 Petioles short, those immediately below a cyme ≤ 8 mm long.
21 Cymes stipitate-glandular and pilose; leaf shape broadly ovate to rotund; [endemic to two small areas: Ozark and Ouachita Mountains of s. MO, AR, & e. OK and Appalachian Mountains of n. AL, sc. TN, & nw. GA] ..... ***Viburnum bracteatum***
21 Cymes eglandular (occasionally sparsely glandular), and lacking eglandular hairs; leaf shape ovate; [more widespread] ..... ***Viburnum rafinesqueanum***
20 Petioles longer, those immediately below a cyme ≥ 10 mm long.
22 Cymes stipitate-glandular (occasionally glabrous in *V. deamii*).
23 Leaf bases strongly cordate; [plants usually restricted to limestone substrates].
24 Leaf veins eglandular; leaves glabrate beneath or pubescent in axils; bark not exfoliating ..... ***Viburnum bracteatum***
24 Leaf veins stipitate-glandular; leaves tomentose abaxially (forma *molle*) to glabrate (forma *leiophyllum*); bark of stems and branches exfoliating. ..... ***Viburnum molle***
23 Leaf bases cuneate, truncate, or occasionally subcordate; [plants of various substrates].
25 Stipitate glands absent on petioles and leaf veins; stipules absent ..... ***Viburnum alabamense***
25 Stipitate glands present on petioles and leaf veins; stipules often present. ..... ***Viburnum bracteatum***
22 Cymes eglandular (occasionally glandular in *V. dentatum* and *V. scabrellum*)
27 Petioles glabrous or glabrate; stellate hairs absent on leaves and petioles; hairs on leaf undersides confined to axils and a few veins; leaf shape usually ovate ..... ***Viburnum recognitum***
27 Petioles sparsely to densely stellate pubescent; stellate hairs present on leaf underside and petiole, dense and soft to touch (*V. carolinianum*, *V. scabrellum*, most *V. venosum*) or sparse to moderate (*V. dentatum*, some *V. venosum*); leaf shape various. ..... ***Viburnum scabrellum***

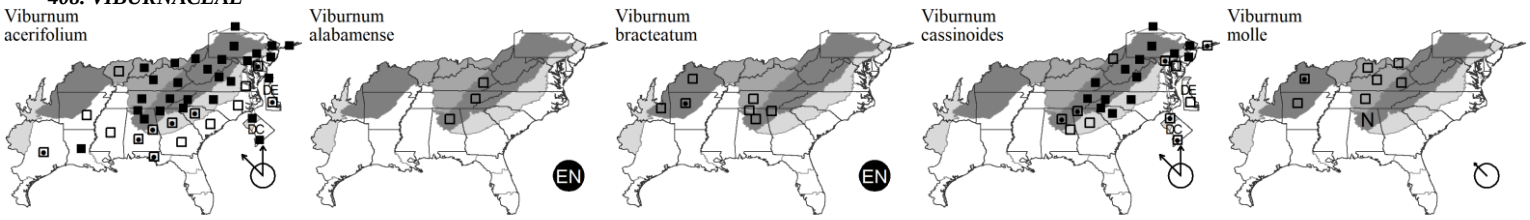
Viburnum acerifolium Linnaeus. MAPLELEAF VIBURNUM, DOCKMACKIE. **Hab:** Mesic to dry forests and woodlands. **Dist:** NB, ON, WI, and ne. IA south to Panhandle FL and e. TX. **Phen:** Late Apr-early Jun; Aug-Oct. **Syn:** = C, Fl7, G, Il, K3, K4, Mi, NE, Pa, RAB, Tn, Va, W, WH3, WV, Ferguson (1966a); > *Viburnum acerifolium* Linnaeus – S; > *Viburnum acerifolium* var. *acerifolium* – F, Tx, McAtee (1956); > *Viburnum acerifolium* var. *densiflorum* (Chapman) McAtee – McAtee (1956); > *Viburnum acerifolium* Linnaeus var. *glabrescens* Rehder – F, Tx, McAtee (1956); > *Viburnum acerifolium* var. *ovatum* (Rehder) McAtee – McAtee (1956); > *Viburnum densiflorum* Chapman – S.

Viburnum alabamense (McAtee) Sorrie. ALABAMA ARROW-WOOD. **Hab:** Sandstone substrates. **Dist:** Restricted to the Lookout Mountain region of ne. AL, in Cullman, DeKalb, and Marshall Counties and recently found to extend northwards into TN (White County; D. Estes, pers. comm., 2013). **Comm:** Closer to *V. dentatum* than to *V. recognitum* due to hairy petioles and broad ovate-rotund leaf shape. See Weakley et al. (2011) for additional information. **Syn:** = Tn; = *Viburnum recognitum* var. *alabamense* McAtee – McAtee (1956); < *Viburnum dentatum* var. *lucidum* Aiton – K2; < *Viburnum recognitum* Fernald – K1, K3, K4.

Viburnum bracteatum Rehder. LIMEROCK ARROW-WOOD. **Hab:** Rocky upland woodlands, bluffs, ledges, stream banks, usually over calcareous rock. **Dist:** Se. TN south to nw. GA and ne. AL; disjunct westward in the Ozark region of s. MO, nw. AR, and e. OK. **Phen:** Late Apr-early May. **Syn:** = Ar, K2, Tn; > *Viburnum bracteatum* Rehder – K1, K3, K4, S, Ferguson (1966a), McAtee (1956); > *Viburnum ozarkense* W.W. Ashe – K1, K3, K4, S, Ferguson (1966a), McAtee (1956).

Viburnum cassinoides Linnaeus. NORTHERN WILD RAISIN, WITHE-ROD, SHAWNEE HAW. **Hab:** Bogs, moist forests, high elevation forests and outcrops, heath balds. **Dist:** NL (Newfoundland), ON, and WI south to n. GA and n. AL. **Phen:** Late May-Jun; Aug-Oct. **Syn:** = F, G, Mi, Pa, RAB, S, Tn, Va, W, WV, Ferguson (1966a), Spriggs et al (2019a); = *Viburnum cassinoides* var. *cassinoides* – McAtee (1956); = *Viburnum nudum* Linnaeus var. *cassinoides* (Linnaeus) Torrey & A. Gray – C, K1, K3, NE; < *Viburnum nudum* Linnaeus – GW2; < *Viburnum nudum* Linnaeus var. *cassinoides* (Linnaeus) Torrey & A. Gray – K4. NatureServe G5T5 (Secure).

Viburnum molle Michaux. SOFT ARROW-WOOD. **Hab:** Mesic bluffs, talus, and steep, forested slopes, usually over calcareous rock. **Dist:** Scattered, discontinuous range (but locally may occur in several contiguous counties) from sw. OH, nc. IN, wc. IL, and se. IA south to sc. TN, nw. AR; disjunct in sw. IA. **Syn:** = Ar, C, F, G, Il, K1, K3, K4, Tn, Ferguson (1966a), McAtee (1956). NatureServe G5 (Secure).



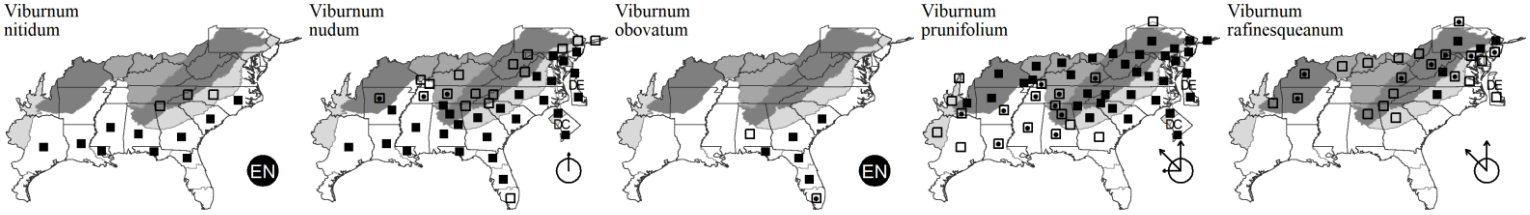
Viburnum nitidum Aiton. **Hab:** Bogs and swamps. **Dist:** Ne. NC (or se. VA?) south to n. FL, west to e. TX; rarely inland, as in w. NC. **Phen:** Apr-Jun. **Tax:** See Spriggs et al. (2019) for detailed information. **Syn:** = Tx, Spriggs et al (2019a); = *Viburnum nudum* L. var. *angustifolium* Torr. & A. Gray – F; > *Viburnum cassinoides* Linnaeus var. *harbisonii* McAtee – McAtee (1956); > *Viburnum cassinoides* Linnaeus var. *nitidum* (Aiton) McAtee – McAtee (1956); < *Viburnum nudum* Linnaeus – Fl7, GW2, RAB, S, Va, W, WH3; < *Viburnum nudum* Linnaeus var. *cassinoides* (Linnaeus) Torrey & A. Gray – K4; < *Viburnum nudum* var. *nudum* – C, K1, K3.

Viburnum nudum Linnaeus. SOUTHERN WILD RAISIN, POSSUMHAW. **Hab:** Bogs, blackwater floodplains, wooded seeps, swamps, margins of ponds and lakes, especially in areas with acidic groundwater influence. **Dist:** RI, CT, and NY south to c. peninsular FL, west to TX, inland to w. NC, TN, w. KY, and AR. **Phen:** Apr-May; Aug-Oct. **Tax:** See Spriggs et al. (2019) for the separation of *V. nitidum* from *V. nudum*. **Syn:** = Ar, Pa, Tn, Tx, McAtee (1956), Spriggs et al (2019a); = *Viburnum nudum* var. *nudum* – F, K4; < *Viburnum nudum* Linnaeus – Fl7, G, GW2, RAB, S, Va, W, WH3, Ferguson (1966a); < *Viburnum nudum* var. *nudum* – C, K1, K3, NE. NatureServe G5T5 (Secure).

Viburnum obovatum Walter. SMALL-LEAF VIBURNUM, WALTER'S VIBURNUM. **Hab:** Alluvial forests, calcareous glades and woodlands. **Dist:** E. SC south to s. FL, west to FL Panhandle and se. AL. **Phen:** Mar-Apr; Sep-Oct. **Syn:** = Fl7, GW2, K1, K3, K4, RAB, WH3, Ferguson (1966a), McAtee (1956); > *Viburnum nashii* Small – S; > *Viburnum obovatum* Walter – S. NatureServe G5 (Secure).

Viburnum prunifolium Linnaeus. BLACK HAW, NANNYBERRY. **Hab:** Bottomland and riparian forests, stream banks, bluffs, mesic upland forests. **Dist:** NY, MI, WI, IA, and KS south to GA, AL, MS, LA, and TX. **Phen:** Mar-Apr; Sep-Oct. **Syn:** = Ar, C, GrPl, Il, K1, K3, K4, Mi, NE, Pa, RAB, S, Tn, Tx, Va, W, WV, Ferguson (1966a), McAtee (1956); > *Viburnum prunifolium* Linnaeus var. *bushii* (Ashe) Palmer & Steyermark – F, G; > *Viburnum prunifolium* var. *prunifolium* – F, G. NatureServe G5 (Secure).

Viburnum rafinesqueanum J.A. Schultes. DOWNY ARROW-WOOD. **Hab:** Dry-mesic to dry woodlands and forests, especially over mafic rocks (but not at all restricted to such sites), less commonly in moister sites, also bluffs, stream banks, and riparian forests. **Dist:** NH, QC and MB south to n. GA, AL, AR, and OK; apparently not yet recorded for SC. **Phen:** Mid Apr-May; Jun-Jul. **Tax:** The correct spelling of the epithet is "rafinesqueanum", not "rafinesquianum". **Syn:** = K4, Va; = *Viburnum rafinesquianum* Bush ex Schneider – Ar, GrPl, K1, K3, Mi, Pa, RAB, S, W, WV, orthographic variant; > *Viburnum affine* Bush ex Schneider var. *affine* – McAtee (1956); > *Viburnum affine* Bush ex Schneider var. *hypomalacum* Blake – McAtee (1956); > *Viburnum rafinesquianum* var. *affine* (Bush ex Schneider) House – C, F, G, Il; > *Viburnum rafinesquianum* var. *rafinesquianum* – C, F, G, Il, NE, Tn, Ferguson (1966a).

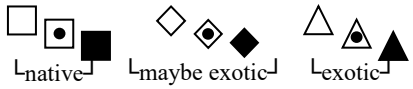


Viburnum recognitum Fernald. SMOOTH ARROW-WOOD. **Hab:** Marshes, moist forests, streambanks. **Dist:** ME, NY, and OH south to e. SC, c. GA, and ne. AL. Most populations reported form further west (IN, IL, WI, MI, MO) are either misidentifications or introductions from horticulture, but material from AR seems to be bonafide and native. Reports from the Gulf Coast are all likely misidentifications of other taxa in the complex (such as *V. scabrellum*). **Phen:** Late Mar-May; Jul-Sep. **Syn:** = F, Il, K1, K3, K4, Pa, Tn, WV; = *Viburnum dentatum* Linnaeus – S, misapplied; = *Viburnum dentatum* var. *lucidum* Aiton – C, G, Mi, NE, RAB, Va; < *Viburnum dentatum* Linnaeus – GW2, W; > *Viburnum recognitum* var. *alabamense* McAtee – McAtee (1956); > *Viburnum recognitum* var. *recognitum* – McAtee (1956).

* ***Viburnum rhytidophyllum*** Hemsley. LEATHERLEAF VIBURNUM. **Hab:** Planted and rarely naturalizing. **Dist:** Native of c. and w. China. First reported for NC by Pittillo & Brown (1988): "naturalized beneath hedges on the campus of Western Carolina University" (Jackson County, NC). Elsewhere escaping at least as far south as KY (Weckman et al. 2002). **Syn:** = Il, K1, K3, K4. NatureServe GNR (Not Yet Ranked).

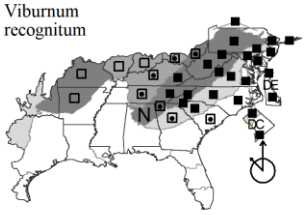
Viburnum rufidulum Rafinesque. SOUTHERN BLACK HAW, RUSTY BLACK-HAW. **Hab:** Dry woodlands, dry-mesic woodlands and forests, glade margins, especially common over calcareous or mafic rocks (but not at all restricted to such sites), less commonly in bottomland forests and on stream banks. **Dist:** C. VA, OH, IL, and KS south to n. peninsular FL, TX, and Mexico (COA). **Phen:** Late Mar-Apr; Sep-Oct. **ID Notes:** The bark is checkered into small tannish-brown plates, reminiscent of *Benthamidia (Cornus) florida*. **Syn:** = Ar, C, F, Fl7, G, GrPl, Il, K1, K3, K4, NcTx, RAB, Tn, Tx, Va, W, WH3, Ferguson (1966a), McAtee (1956); > *Viburnum rufidulum* Rafinesque – S. NatureServe G5 (Secure).

Viburnum scabrellum (Torrey & A. Gray) Chapman. SOUTHERN ARROW-WOOD. **Hab:** Streambanks, marshes, swamps, other moist sites. **Dist:** A Coastal Plain endemic, ranging from se. GA south to c. peninsular FL, west to e. TX; with scattered collections north to ec. GA (Richmond County), ne. AL (Cherokee County), nw. AL (Lamar County), c. MS, and n. LA. **Comm:** Expected in s. AR, but no specimens seen. Specimens of *V. dentatum* from s. SC show signs of hybridization. Mohr (1901) and some other 19th century authors misapplied the name *V. molle* to it. **Syn:** = *Viburnum dentatum* Linnaeus var. *scabrellum* Torrey & A. Gray – Ar, C, Il, Tx; = *Viburnum dentatum* var. *venosum* (Britton) Gleason – G, K1; < *Viburnum dentatum* Linnaeus – Fl7, GW2, K4, W, WH3, Ferguson (1966a); < *Viburnum dentatum* var. *dentatum* – K3, RAB; > *Viburnum scabrellum* var. *ashei* (Bush) McAtee – McAtee (1956); > *Viburnum scabrellum* (Torrey & Gray) Chapman var. *scabrellum* – McAtee (1956); < *Viburnum semitomentosum* (Michaux) Rehder – S, misapplied.

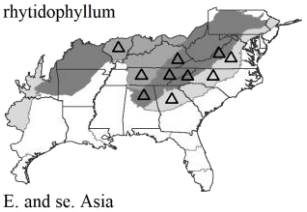
Key to Map Symbology:  (see introduction for more)

* : waif
EN : endemic
H : historic
N : no
P : planted
? : questionable
X : extirpated

Viburnum recognitum



Viburnum rhytidophyllum



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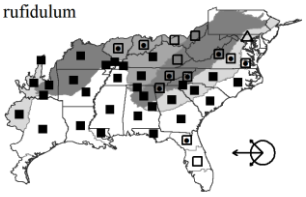
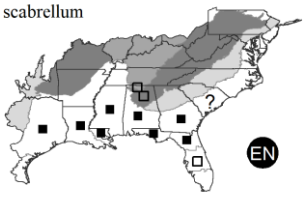
Viburnum rufidulum



Viburnum scabrellum



409a. DIERVILLACEAE Pyck 1998 (BUSH-HONEYSUCKLE FAMILY) [in DIPSACALES]

A family of 2 genera and about 13 species, of n. Eurasia and North America. References: Backlund & Pyck (1998).

Diervilla P. Miller 1754 (BUSH-HONEYSUCKLE)

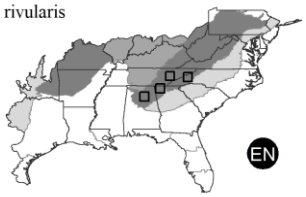
A genus of 3 species, shrubs, of e. North America. References: Ferguson (1966a); Hardin (1968); Hofmann & Bittrich (2016) in Kadereit & Bittrich (2016); Meeler (2018).

2 Branchlets, leaves, pedicels, and calyx densely pubescent; sepal lobes < 2 mm long ..... ***Diervilla rivularis***
2 Branchlets, leaves, pedicels, and calyx glabrous, except for hairs on the twig angles; sepal lobes 2-3 mm long ..... ***Diervilla sessilifolia***

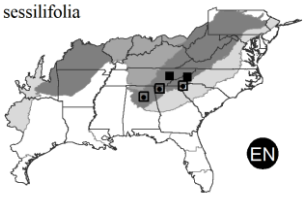
Diervilla rivularis Gattinger. HAIRY SOUTHERN BUSH-HONEYSUCKLE. **Hab:** Rock outcrops, ridges, and streambanks at moderate to high elevations. **Dist:** W. NC (Yancey County) and e. TN south to nw. GA (Jones & Coile 1988) and ne. AL. **Phen:** Jun-Aug; Aug-Oct. **Syn:** = K1, K3, K4, S, Tn, Ferguson (1966a), Hardin (1968); = *Diervilla sessilifolia* Buckley var. *rivularis* (Gattinger) H.E. Ahles – RAB, W. NatureServe G3 (Vulnerable).

Diervilla sessilifolia Buckley. SMOOTH SOUTHERN BUSH-HONEYSUCKLE. **Hab:** Rock outcrops, ridges, landslide scars, trail margins, other rocky open places, streambanks, at moderate to high elevations. **Dist:** Sw. NC and e. TN south to nw. SC, ne. GA, and ne. AL. **Phen:** Jun-Aug; Aug-Oct. **Syn:** = F, K1, K3, K4, S, Tn, Ferguson (1966a), Hardin (1968); = *Diervilla sessilifolia* Buckley var. *sessilifolia* – RAB, W. NatureServe G4? (Apparently Secure).

Diervilla rivularis



Diervilla sessilifolia



409b. CAPRIFOLIACEAE A.L. de Jussieu 1789 (HONEYSUCKLE FAMILY) [in DIPSACALES]

Circumscription of the family is controversial. Various segregate families (or reassignments) of taxa traditionally placed in the Caprifoliaceae have been proposed, including the transfer of *Sambucus* and *Viburnum* to the Adoxaceae, placement of *Diervilla* and *Weigela* in the Diervillaceae (Backlund & Pyck 1998), placement of *Abelia* and *Linnaea* in the Linnaeaceae (Backlund & Pyck 1998; Pyck et al. 2002), and retention of *Lonicera*, *Symphoricarpos*, and *Triosteum* in a much more narrowly circumscribed Caprifoliaceae. Alternatively, all these taxa could be included in the Caprifoliaceae, along with Dipsacaceae and Valerianaceae, as a more broadly circumscribed Caprifoliaceae (APG III 2009). Kadereit & Bittrich (2016) adopt an intermediate solution. References: Backlund & Pyck (1998); Bell (2004); Ferguson (1965); Ferguson (1966a); Hofmann & Bittrich (2016) in Kadereit & Bittrich (2016); Mayer (2016) in Kadereit & Bittrich (2016); Pyck et al (2002); Wang et al (2015); Weberling & Bittrich in Kadereit & Bittrich (2016).

1 Erect herbs; corollas purplish, red, or greenish. ..... ***Triosteum***
1 Shrubs (erect or arching) or woody lianas; corollas white, yellow, red, or pink.
  2 Corolla usually > 10 mm long, bilaterally symmetrical; ovary 2-3-locular ..... ***Lonicera***
  2 Corolla 3-8 mm long, radially symmetrical or nearly so; ovary 4-locular ..... ***Symphoricarpos***

Lonicera Linnaeus 1753 (HONEYSUCKLE)

A genus of about 180 species, shrubs and lianas (woody vines), mainly north temperate. References: Ferguson (1966a); Green (1966); Hofmann & Bittrich (2016) in Kadereit & Bittrich (2016); Rehder (1903); Singhurst, Holmes, & Carr (2021).

1 Flowers in opposite 3-flowered cymules, borne in terminal clusters subtended by connate leaves; corolla red, yellow, orange, or creamy white; twining vine or shrub with vining tendencies (in *L. flava* the "vininess" sometimes not apparent).
  3 Corolla tube (20-) 30-50 mm long; corolla lobes 4-8 mm long, bilaterally symmetrical but not strikingly so; [of a wide variety of habitats, primarily in the Piedmont and Coastal Plain] ..... ***Lonicera sempervirens***
  3 Corolla tube 10-35 mm long; corolla lobes 8-15 mm long, strongly bilaterally symmetrical, unequally divided into 2 lips (4 lobes on the upper side and one lobe on the lower side); [of ridgetops, rocky slopes, granite domes, and bogs of the Mountains, or of areas to the north or west of the primary area].

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

6 Corolla tube 20-35 mm long, symmetrical below; leaves weakly gray-glaucous beneath; [of soil mats on dome outcrops of s. NC, SC, and GA and westward]. ..... ***Lonicera flava***

6 Corolla tube 15-25 mm long, with a swelling near the base on one side; leaves strongly white-glaucous beneath; [of rocky forests, ridgetops, and bogs of n. NC, VA, and northward] ..... ***Lonicera dioica***

1 Flowers in peduncled pairs in the axils of leaves, not subtended by connate leaves; corolla white to pastel pink or yellow; plant an erect shrub or (*L. japonica*) a trailing or climbing vine.

7 Trailing or climbing vine; corolla 30-50 mm long; fruit black at maturity; leaves of vigorous shoots often pinnately lobed ..... ***Lonicera japonica***

7 Upright shrub; corolla 7-25 mm long; fruit red or yellow at maturity; leaves unlobed.

8 Branches with solid and continuous, white pith; [native and exotic species].

12 Branches glabrous; corolla glabrous on the exterior ..... ***Lonicera fragrantissima***

12 Branches retrorsely hispid with reddish-brown hairs; corolla pilose on the exterior ..... ***Lonicera standishii***

8 Branches hollow between the nodes, with tannish pith; [exotic species, many of them seriously invasive and likely to be encountered in natural areas].

13 Peduncles shorter than or equal to the subtending petiole; leaves ovate (broadest near the base) and distinctly long-acuminate..... ***Lonicera maackii***

13 Peduncles longer than the subtending petiole; leaves elongate (broadest near the middle) and obtuse to acute (rarely short-acuminate).

15 Corolla pink (aging to yellow), nearly glabrous on the exterior, barely bulging on one side at the base; leaves thinly pubescent beneath..... ***Lonicera ×bella***

15 Corolla white (aging to yellow), pubescent on the exterior, distinctly bulging on one side at the base; leaves rather densely grayish-pubescent beneath. ..... ***Lonicera morrowii***

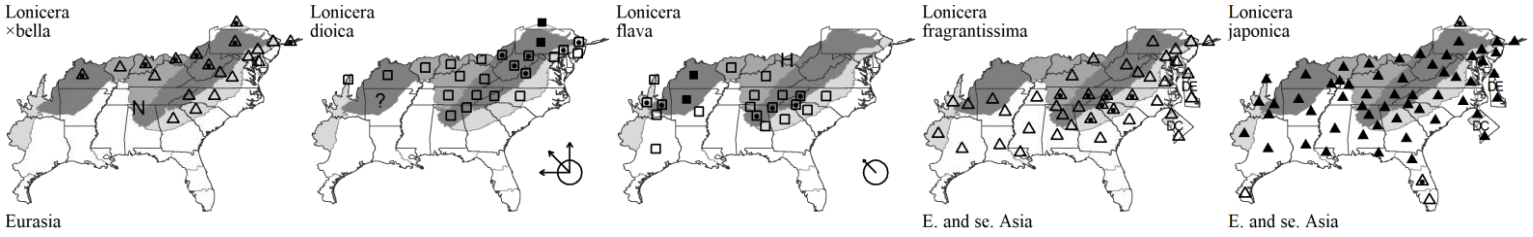
* ***Lonicera ×bella*** Zabel [*Lonicera tatarica* × *morrowii*]. PRETTY HONEYSUCKLE. **Hab:** Forests, woodlands, fencerows, suburban woodlands. **Dist:** Native of Eurasia. **Phen:** Apr-May. **Syn:** = C, F, Il, K1, K3, K4, Mi, Mo2, NE, Pa, RAB, Ferguson (1966a); = *Lonicera bella* – G; = *Lonicera tatarica* × *morrowii* – Rehder (1903).

Lonicera dioica Linnaeus. **Hab:** Seepages, bogs, rocky woods, shrubby mountain bogs at high elevations, rocky ridgetop thickets over amphibolite. **Dist:** MA and QC west to WI, south to NJ, NC, and IN. **Phen:** Jun-Aug; Aug-Sep. **Tax:** Varieties or species have sometimes been maintained based on minor variation of pubescence; it is unlikely that these are taxonomically meaningful. Var. *orientalis* has the lower leaf surfaces, hypanthium, and style hairy (vs. glabrous or nearly so in var. *dioica*). **Syn:** = GrPl, K1, K3, K4, Mi, Mo2, NE, RAB, Tn, Va, W, WV; > *Lonicera dioica* Linnaeus – S, Rehder (1903); > *Lonicera dioica* var. *dioica* – C, F, G, Il, Pa, Ferguson (1966a); > *Lonicera dioica* var. *glaucescens* (Rydberg) Butters – F, Il, Pa, Ferguson (1966a); > *Lonicera dioica* var. *orientalis* – C, G, Pa; > *Lonicera glaucescens* (Rydberg) Rydberg – S, Rehder (1903).

Lonicera flava Sims. YELLOW HONEYSUCKLE. **Hab:** In soil mats around granitic domes, limestone bluffs, rocky woodlands. **Dist:** W. NC, KY, and MO, south to GA, AR, and ne. TX. See Singhurst, Holmes, & Carr (2021) for information on the TX occurrence. **Phen:** Apr-May; Jul-Aug. **Syn:** = Ar, C, G, GrPl, Il, K1, K3, K4, Mo2, RAB, Tn, W, Rehder (1903), Singhurst, Holmes, & Carr (2021); > *Lonicera flava* Sims – F, S; > *Lonicera flava* var. *flava* – Ferguson (1966a); > *Lonicera flava* var. *flavescens* Gleason – Ferguson (1966a); > *Lonicera flavida* Cockerell ex Rehder – F, S. NatureServe G5? (Secure).

* ***Lonicera fragrantissima*** Lindley & Paxton. SWEET-BREATH-OF-SPRING. **Hab:** Forests, woodlands, roadbanks, old house sites, spreading (sometimes aggressively) from horticultural use. **Dist:** Native of China. **Phen:** (Jan-) Feb-early Apr; Apr-May. **Syn:** = Ar, K1, K3, K4, NcTx, Pa, RAB, Tn, Va, Ferguson (1966a), Rehder (1903); = *Xylosteon fragrantissimum* (Lindley & Paxton) Small – S. NatureServe GNR (Not Yet Ranked).

* ***Lonicera japonica*** Thunberg. JAPANESE HONEYSUCKLE. **Hab:** Nearly ubiquitous, especially common in the Piedmont and Coastal Plain and in mesic habitats. **Dist:** Native of e. Asia. **Phen:** (Mar-) Apr-Jun; Aug-Oct. **Comm:** Schweitzer & Larson (1999) report on physiological characteristics that make *L. japonica* a successful invasive species. **Syn:** = Ar, C, Fl7, G, GrPl, GW2, K1, K3, K4, Mi, Mo2, NcTx, NE, Pa, RAB, Tn, Tx, Va, W, WH3, WV, Ferguson (1966a); = *Nintooa japonica* (Thunberg) Sweet – S; > *Lonicera japonica* var. *chinensis* (P.W. Watson) Baker – F, Il, Rehder (1903); > *Lonicera japonica* var. *japonica* – F, Il, Rehder (1903).



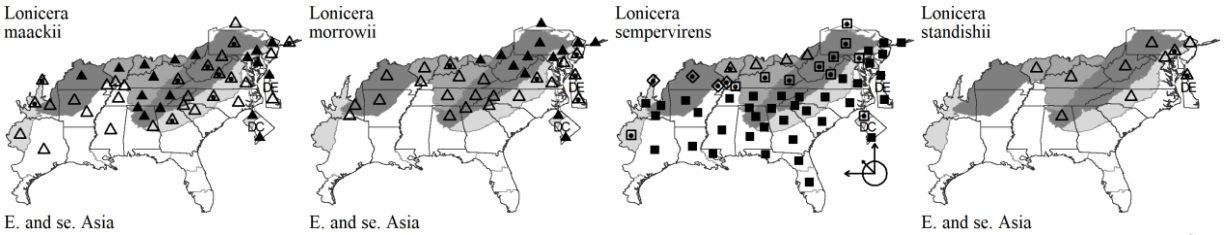
* ***Lonicera maackii*** (Ruprecht) Herder. AMUR HONEYSUCKLE. **Hab:** Suburban woodlands, moist forests, fencerows, especially in areas with circumneutral soils. **Dist:** Native of e. Asia (Korea, China, Japan). This is one of worst "shrub-weeds", aggressively invasive in various parts of eastern North America, as in the vicinity of DC and in calcareous substrate parts of the interior South. **Phen:** May-Jun. **Comm:** See Luken & Thieret (1994) for a detailed account of this species, its discovery, nomenclature, and issues regarding its invasiveness. **Syn:** = Ar, C, GrPl, K1, K3, K4, Mi, Mo2, NcTx, NE, Pa, Tn, Va, Ferguson (1966a), Rehder (1903). NatureServe GNR (Not Yet Ranked).

* ***Lonicera morrowii*** A. Gray. MORROW'S HONEYSUCKLE. **Hab:** Forests, woodlands, old house sites, suburban woodlands. **Dist:** Native of Japan. Seriously invasive in WV, MD, DC, and northward; first reported for NC by Leonard (1971b) and for SC by Hill & Horn (1997). **Phen:** Apr-May; Late Jun-Jul. **Syn:** = Ar, C, Il, K1, K3, K4, Mi, NE, Pa, Tn, Va, W, Rehder (1903); = *Lonicera morrowi* – F, G, WV, orthographic variant. NatureServe GNR (Not Yet Ranked).

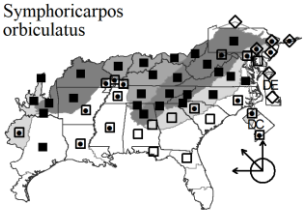
Lonicera sempervirens Linnaeus. CORAL HONEYSUCKLE, TRUMPET HONEYSUCKLE. **Hab:** Dry forests and woodlands, maritime forests. **Dist:** CT to OH and OK, south to c. peninsular FL and TX; and more widely distributed as an escape from cultivation. **Phen:** Mar-Jul (and sporadically to Nov); Jul-Sep. **Comm:** Var. *hirsutula* has sometimes been maintained, differing from var. *sempervirens* in its ciliate leaf margins, pubescent upper leaf surfaces, sometimes glandular hypanthia and stems (vs. glabrous); it is doubtful that these distinctions are taxonomically meaningful. **Syn:** = Ar, Fl7, GrPl, GW2, Il, K3, K4, Mi, Mo2, NcTx, Pa, RAB, Tn, Tx, Va, W, WH3, WV, Ferguson (1966a); = *Phenianthus sempervirens* (Linnaeus) Rafinesque – S; > *Lonicera sempervirens* var. *hirsutula* – C, F, G, K1, Rehder (1903); > *Lonicera sempervirens* var. *minor* Aiton – F; > *Lonicera sempervirens* Linnaeus var. *sempervirens* – C, F, G, K1, NE, Rehder (1903).

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

* ***Lonicera standishii*** Jacques. STANDISH'S HONEYSUCKLE. **Hab:** Forests, woodlands, old home sites. **Dist:** Native of China. Locally abundant and invasive in c. NC (Uwharrie National Forest, Montgomery County, NC). **Phen:** Feb-early Apr; Mar-Apr. **Comm:** Also reported from KY (Jones 2005), se. PA (Rhoads & Klein 1993), and MD (Kartesz 1999). **Syn:** = F, Il, K1, K3, K4, Pa, Rehder (1903). NatureServe GNR (Not Yet Ranked).



Symphoricarpos Duhamel 1755 (SNOWBERRY, CORALBERRY, BUCKBRUSH)



A genus of about 10-17 species, shrubs, of North America and e. Asia. References: Bell & Gonzalez (2019); Ferguson (1966a); Jones (1940).

Symphoricarpos orbiculatus Moench. CORALBERRY, BUCKBRUSH. **Hab:** Moist to dry forests, woodlands, thickets, pastures, and old fields, especially over mafic or calcareous rocks. **Dist:** CT west to IN, MN, and CO, south to Panhandle FL, TX, and Mexico; the original native distribution somewhat uncertain due to cultivation and escapes. Seemingly increasing in VA and behaving aggressively in dry woodlands and barrens over greenstone and diabase. **Phen:** Late Jul-Sep; Sep-Nov (and often persisting well into winter). **Syn:** = C, F, Fl7, G, GrPl, Il, K1, K3, K4, Mi, NcTx, NE, Pa, RAB, Tn, Tx, Va, W, WH3, WV, Ferguson (1966a); = *Symphoricarpos symphoricarpos* (Linnaeus) C. MacMillan – S. NatureServe G5 (Secure).

Triosteum Linnaeus 1753 (HORSE-GENTIAN, FEVERWORT)

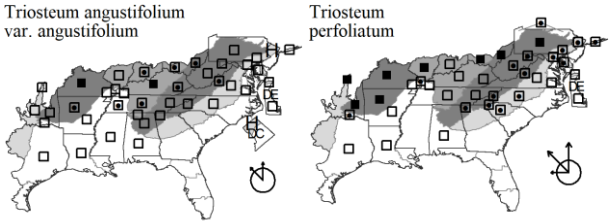
A genus of 6 species, rather woody herbs, of e. Asia (3 species) and e. North America (3 species); the 3 North American species form one clade, the 3 Asian species another (Gould & Donoghue 2000). References: Ferguson (1966a); Gould & Donoghue (2000); Hofmann & Bittrich (2016) in Kadereit & Bittrich (2016).

1 Sepals hispid-cilate on the margins, glabrous or pubescent on the surface; longer (nonglandular) hairs of the stem 1.5-3 mm long; leaves 1.5-6 cm wide; corolla greenish-yellow. ..... ***Triosteum angustifolium var. angustifolium***

1 Sepals pubescent on surface and margins with uniform, short hairs; longer (nonglandular) hairs of the stem 0-3 mm long; leaves 4-15 cm wide; corolla greenish-yellow to purple. ..... ***Triosteum perfoliatum***

Triosteum angustifolium Linnaeus *var*. ***angustifolium***. SMOOTH LESSER HORSE-GENTIAN. **Hab:** Mesic forests, bluffs, outcrops, especially over calcareous or mafic rocks. **Dist:** CT west to ON and MO, south to NC, nw. GA (Jones & Coile 1988), AL, and LA. **Phen:** Apr-May; Jul-Aug. **Syn:** = C, F, G; = *Triosteum angustifolium* – K4, NE; < *Triosteum angustifolium* – Ar, GrPl, Il, K1, K3, Mo2, NcTx, Pa, RAB, S, Tn, Tx, Va, W, WV, Ferguson (1966a).

Triosteum perfoliatum Linnaeus. PERFOLIATE HORSE-GENTIAN. **Hab:** Woodlands and forests in circumneutral soils, particularly those over mafic or calcareous rocks. **Dist:** MA west to MN, south to n. SC, n. GA (Jones & Coile 1988), and OK. **Phen:** Late May-early Jun; Aug-Oct. **Syn:** = Ar, C, F, Il, K1, K3, K4, Mi, Mo2, NE, Pa, RAB, S, Tn, Va, W, WV, Ferguson (1966a); = *Triosteum perfoliatum* var. *perfoliatum* – G, GrPl. NatureServe G5 (Secure).



409c. LINNAEACEAE Backlund 1998 (TWINFLOWER FAMILY) [in DIPSACALES]

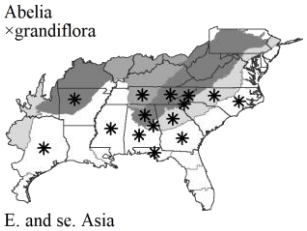
A family of 6-7 genera and 50-60 species, shrubs, of the northern hemisphere, especially e. Asia. References: Christenhusz (2013); Hofmann & Bittrich (2016) in Kadereit & Bittrich (2016); Wang et al (2015).

2 Stamens 5; pedicels and ovaries glabrous or hairy; fruit a capsule. ..... ***Abelia ×grandiflora***

2 Stamens 4; pedicels and ovaries densely bristly-hirsute; fruit a bristly achene ..... ***Kolkwitzia amabilis***

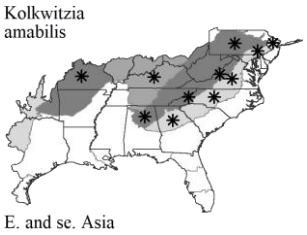
Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Abelia R. Brown 1818 (ABELIA)



A genus of about 30-40 species, shrubs, primarily of s. and e. Asia. Generic circumscription has been controversial, with a radical lumping proposed by Christenhusz (2013), but not widely supported (Wang et al. 2015, and others). We here circumscribe it narrowly. References: Christenhusz (2013); Hofmann & Bittrich (2016) in Kadereit & Bittrich (2016).

* ***Abelia ×grandiflora*** (André) Rehder [*Abelia chinensis* × *uniflora*]. ABELIA. **Hab:** Suburban thickets, commonly planted in our area, sometimes persistent or rarely weakly naturalizing. **Dist:** Horticultural hybrid of *A. chinensis* and *A. uniflora* (the parent species native of China). Reported for AL (Diamond & Woods 2009). Reported for Arkansas (Serviss & Peck 2019). **Syn:** = Fl7, K1, K3, K4, WH3; = *Linnaea ×grandiflora* (André) Christenhusz – Christenhusz (2013); = n/a – RAB.



Kolkwitzia Graebner 1901 (BEAUTYBUSH)

A monotypic genus, a shrub, of c. China. Generic circumscription has been controversial, with a radical lumping proposed by Christenhusz (2013) but not widely supported (Wang et al. 2015, and others). References: Christenhusz (2013); Hofmann & Bittrich (2016) in Kadereit & Bittrich (2016); Wang et al (2015).

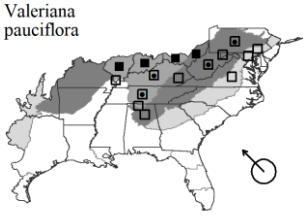
* ***Kolkwitzia amabilis*** Graebner. BEAUTYBUSH. **Hab:** Suburban thickets, disturbed areas, planted as an ornamental shrub, and rarely naturalized from plantings. **Dist:** Native of c. China. **Phen:** Apr-May. **Syn:** = K1, K3, K4, Mi, NE; = *Linnaea amabilis* (Graebner) Christenhusz – Christenhusz (2013). NatureServe GNR (Not Yet Ranked).

409d. VALERIANACEAE Batsch 1802 (VALERIAN FAMILY) [in DIPSACALES]

A family of about 7 genera and 200 species, herbs, of Eurasia and North America.

1 Stem leaves pinnately compound, with 3-21 leaflets ..... ***Valeriana***
1 Stem leaves simple ..... ***Valerianella***

Valeriana Linnaeus 1753 (VALERIAN)



A genus of about 270 species, herbs, shrubs, lianas, and small trees, of temperate North America and Eurasia, s. Africa, and Andean South America. References: Weberling & Bittrich in Kadereit & Bittrich (2016).

Valeriana pauciflora Michaux. PINK VALERIAN, LONG-TUBE VALERIAN. **Hab:** Very nutrient-rich alluvium in floodplain forests, and rich soils of lower slopes. **Dist:** MD, se. PA, and sw. PA, west to s. IL, south to n. VA, sc. TN, KY, and MO. **Phen:** May-Jun; Jun-Jul. **Syn:** = C, F, G, Il, K1, K3, K4, Pa, Tn, Va, W, WV. NatureServe G4 (Apparently Secure).

Valerianella P. Miller 1754 (CORN-SALAD)

A genus of about 60-70 species, herbs, of temperate North America, Eurasia, and n. Africa. Christenhusz, Fay, & Byng (2018) propose combining *Valerianella* into *Valeriana*, a course not taken here. References: Christenhusz, Fay, & Byng (2018); Dyal (1938); Ware (1983); Weberling & Bittrich in Kadereit & Bittrich (2016).

Identification Notes: *Valerianella* species exhibit an interesting set of fruit polymorphisms; the fruit forms in a single species are often strikingly different, and these forms were traditionally regarded as separate taxa. Ware (1983) demonstrated that they were under simple genetic control, and that different fruit forms were found in the same population. Thus, some taxa previously considered distinct are best considered mere fruit types. The fruit consists of three locules, one of which is fertile and dorsal to or more-or-less flanked by the two sterile locules. The sterile locules may be elongate, forming (between them) a groove, or they may be expanded laterally well beyond the width of the fertile locule into flattened or bulbous wings. In *V. locusta*, there is additionally a corky mass on the side of the fertile locule opposite the two sterile locules.

1 Corollas pale lavender to pink; calyx with irregular, ovate projections; leaves lanceolate, tapering to the tip ..... ***Valerianella dentata***
1 Corollas white to pale blue; calyx lacking projections; leaves oblong to spatulate, not tapering for most of their length towards the tip.
  2 Fruit greatly thickened by a corky mass on the back of the fertile locule; corolla pale blue (or white) ..... ***Valerianella locusta***
  2 Fruit lacking a corky mass on the back of the fertile locule; corolla white.
    4 Corolla 1.5-2 mm long, the corolla lobes 0.4-0.8 mm long ..... ***Valerianella radiata***
    4 Corolla 3-5 mm long, the corolla lobes 1-2 mm long ..... ***Valerianella umbilicata***

* ***Valerianella dentata*** (Linnaeus) Pollich. **Hab:** Disturbed areas. **Dist:** Native or Mediterranean Europe. Reported as naturalized in central TN (Kral 1981; Chester et al. 1997), in nc. GA (Jones & Coile 1988), and in AL (Kartesz 1999). **Comm:** {synonymy incomplete}. **Syn:** = K1, K3, K4, Tn; = *Valeriana dentata* (Linnaeus) Allioni – Christenhusz, Fay, & Byng (2018). NatureServe GNR (Not Yet Ranked).

Key to Map Symbology:

←rare ←uncommon ←common (see introduction for more)

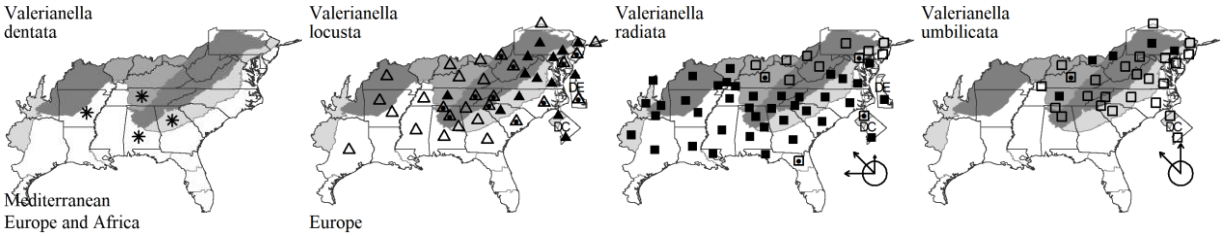
* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable
X : extirpated

* ***Valerianella locusta*** (Linnaeus) Betcke. EUROPEAN CORN-SALAD. **Hab:** Roadsides, moist forests, bottomlands, disturbed areas. **Dist:** Native of Europe. **Phen:** Apr-Jun. **Syn:** = C, Il, K1, K3, K4, Mi, NE, Pa, RAB, S, Tn, Va, WV, Ware (1983); = *Valeriana locusta* Linnaeus – Christenhusz, Fay, & Byng (2018); = *Valerianella olitoria* (Linnaeus) Pollich – F, G, Dyal (1938). NatureServe G5 (Secure).

Valerianella radiata (Linnaeus) Dufresne. **Hab:** Moist forests, bottomlands, disturbed areas. **Dist:** VA, s. IL, and KS, south to n. FL, Panhandle FL, and TX. **Phen:** Apr-May. **Tax:** Ware (1983) raised the question of whether *V. woodsiana* is a distinct taxon; further study is needed. **Syn:** = Ar, C, Fl7, GrPl, K3, K4, NcTx, NE, RAB, Tn, WH3, WV; > *Valeriana valerianella* Christenhusz & Byng – Christenhusz, Fay, & Byng (2018); > *Valeriana woodsiana* (Torrey & A. Gray) Christenhusz & Byng – Christenhusz, Fay, & Byng (2018); > *Valerianella radiata* (Linnaeus) Dufresne – K1, S, Va, Dyal (1938), Ware (1983); > *Valerianella radiata* var. *fernaldii* Dyal – F, G, Tx, Dyal (1938); > *Valerianella radiata* var. *missouriensis* Dyal – F, Il, Dyal (1938); > *Valerianella radiata* var. *radiata* – F, G, Il, Tx, Dyal (1938); > *Valerianella woodsiana* – K1, NcTx, S, Tx, Va, Dyal (1938), Ware (1983).

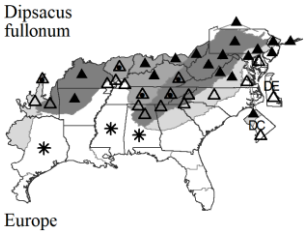
Valerianella umbilicata (Sullivant) Alph. Wood. **Hab:** Moist forests, bottomlands, disturbed areas. **Dist:** S. NY west to IL, south to NC and sc. TN (Chester, Wofford, & Kral 1997). **Phen:** Late Apr-Jun. **Syn:** = K3, K4, Mi, NE, Pa, Tn, Va, Ware (1983); = *Valeriana umbilicata* (Sullivant) Christenhusz & Byng – Christenhusz, Fay, & Byng (2018); > *Valerianella intermedia* Dyal – F, Il, Dyal (1938); > *Valerianella patellaria* (Sullivant ex A. Gray) Wood – F, Il, S, Dyal (1938); > *Valerianella radiata* var. *intermedia* (Dyal) Gleason – G; < *Valerianella umbilicata* (Sullivant) Alph. Wood – C, RAB, WV; > *Valerianella umbilicata* (Sullivant) Alph. Wood – F, G, Il, Dyal (1938).



409e. DIPSACACEAE A.L. de Jussieu 1789 (TEASEL FAMILY) [in DIPSACALES]

A family of about 11 genera and about 350 species, herbs (perennials and biennials) and shrubs, of Eurasia and n. Africa. References: Carlson, Mayer, & Donoghue (2009).

Dipsacus Linnaeus 1753 (TEASEL)



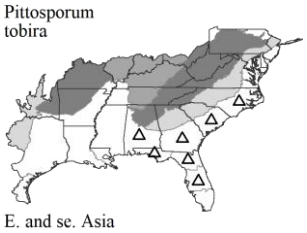
A genus of about 25 species, herbs, of Eurasia. *Dipsacus* begins flowering about halfway up the head, the flowers then opening sequentially toward both the base and the tip of the inflorescence. References: Ferguson & Brizicky (1965); Ferguson (1965); Mayer (2016) in Kadereit & Bittrich (2016); Stace (2010).

* ***Dipsacus fullonum*** Linnaeus. WILD TEASEL, COMMON TEASEL. **Hab:** Roadsides, pastures, disturbed areas. **Dist:** Native of Europe. Recently discovered for GA in Floyd County (T. Govus, pers. comm. 2009). **Phen:** Jul-Sep; Sep-Oct. **Comm:** The inflorescences are frequently collected for crafts and dried arrangements. **Syn:** = Ar, GBI4, Il, K1, K3, K4, Mi, NE, Tn, Va, W, Ferguson (1965); = *Dipsacus sylvestris* Hudson – C, F, G, Pa, RAB, S, WV; < *Dipsacus fullonum* Linnaeus – GrPl.

413. PITTOSPORACEAE R. Brown 1814 (PITTOSPORUM FAMILY) [in APIALES]

A family of about 7-11 genera and 200-250 species, trees, shrubs, and vines, of tropical and warm temperate Old World (mainly Australia and Pacific Islands) (Carolin & Bittrich 2018). References: Carolin & Bittrich (2018) in Kadereit & Bittrich (2018); Judd (1996); Whittemore & McClintock in FNA () (in prep).

Pittosporum Banks ex Gaertner 1788 (PITTOSPORUM)



A genus of about 150-200 species, small trees and shrubs, of tropical and warm temperate Old World (Carolin & Bittrich 2018). References: Carolin & Bittrich (2018) in Kadereit & Bittrich (2018); Judd (1996); Whittemore & McClintock in FNA () (in prep).

* ***Pittosporum tobira*** (Thunberg) W.T. Aiton. JAPANESE PITTOSPORUM, TOBERA, AUSTRALIAN LAUREL. **Hab:** Disturbed maritime forests and maritime forests edges, disturbed hammocks, especially in coastal areas (frequently planted on barrier islands because of its resistance to salt spray, at least persisting and apparently naturalizing). **Dist:** Native of Japan and China. **Comm:** Various cultivars are seen, including ones with variegated leaves. This species is one of the more common landscaping plants used on developed barrier islands. The revolute, obovate to oblanceolate leaves are characteristic. Reported for AL (Dauphin Island, Mobile County) by H. Horne (pers. comm., 2013). **Syn:** = K1, K3, K4, WH3, Judd (1996). NatureServe GNR (Not Yet Ranked).

414. ARALIACEAE A.L. de Jussieu 1789 (GINSENG FAMILY) [in APIALES]

A family of about 40-47 genera and about 1900 species, trees, shrubs, vines, and rarely herbs, mainly tropical in distribution (Plunkett et al. 2018b). *Hydrocotyle* is more closely related to Araliaceae than to Apiaceae, and is transferred here (Nicolas & Plunkett 2009; Chandler & Plunkett 2003). References: Frodin & Govaerts (2003); Graham (1966); Haines (2020a); Plunkett et al (2018b) in Kadereit & Bittrich (2018); Smith (1944); Zuo, Wen, & Zhou (2017).

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more)

* : waif EN : endemic H : historic

N : no P : planted ? : questionable X : extirpated

414. ARALIACEAE

1 Plant a woody vine; [subfamily *Aralioideae*; tribe *Schefflereae*] ..... ***Hedera***
1 Plant an herb, shrub, or tree.
2 Leaves simple, peltate or cordate, roundish (if lobed, with 3-5 rounded lobes), 0.3-10 cm wide; rhizomatous, creeping herbs; [subfamily *Hydrocotyloideae*] ..... ***Hydrocotyle***
2 Leaves either compound with 3-many leaflets or simple and then with 5-15 pointed lobes, > 10 cm wide; herbs, shrubs, or trees.
3 Leaves simple, palmately-lobed; [subfamily *Aralioideae*; tribe *Schefflereae*]. ..... ***Tetrapanax***
3 Leaves compound.
6 Leaves 2-3× compound, at least the final order of division pinnate; leaves either 1 from a subterranean stem or 2-many, alternate on an aboveground stem; inflorescence compound, consisting of (2-) 3-many umbels, either on a separate peduncle from the rhizome or in a terminal panicle or raceme of umbels; fruit purple or black; [subfamily *Aralioideae*; tribe *Aralieae*] ..... ***Aralia***
6 Leaves 1× palmately compound, leaflets 3-7; leaves 3-5 in a whorl at the summit of the stem (*Panax*) or many, clustered on spur shoots (*Eleutherococcus*); inflorescence of a single, simple umbel borne terminally on the stem; fruit red to yellow (*Panax*) or black (*Eleutherococcus*).
8 Leaflets 3 (-5), sessile or subsessile, the petiolules 0-3 mm long; larger leaflets 4-8 cm long, 0.5-2.5 cm wide, averaging about 2.5× as long as wide, the apex obtuse to acute; fruit yellow-green when ripe, longitudinally winged and ribbed in ×-section; petals white (rarely tinged with pink); inflorescence nodding in bud; underground storage organ a spherical tuber ..... ***Nanopanax***
8 Leaflets (3-) 5, petiolulate, the petiolules (7-) 10-25 mm long; larger leaflets 6-15 cm long, 3.5-7 cm wide, averaging about 1.8× as long as wide, the apex acuminate; fruit bright red when ripe, smoothly elliptical in ×-section; petals light green; inflorescence erect in bud; underground storage organ an +/- elongate root, this vertical or horizontal, and sometimes branched ..... ***Panax***

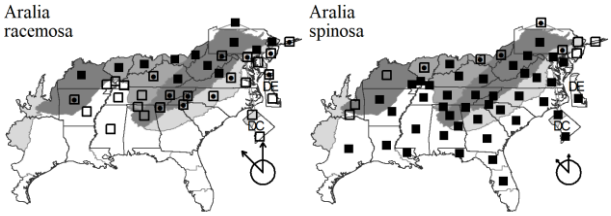
Aralia Linnaeus 1753 (ARALIA)

A genus of about 74 species, herbs, shrubs, vines, and trees, primarily of e. North America, e. Asia, and se. Asia. Wen (1998) has suggested that *A. nudicaulis* may need to be removed from the genus *Aralia* in order to maintain both *Aralia* and *Panax* as monophyletic genera; more recent studies remain equivocal (Wen 2011) or agree with the removal (Zuo, Wen, & Zhou (2017). References: Frodin & Govaerts (2003); Moore, Glenn, & Ma (2009); Plunkett et al (2018b) in Kadereit & Bittrich (2018); Smith (1944); Smith (1982); Wen (1993); Wen (1998); Wen (1998); Wen (2011); Wen et al (1998); Zuo, Wen, & Zhou (2017).

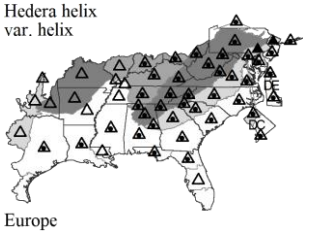
1 Plant a shrub or small tree, 3-6 (-10) m tall, definitely woody; stem armed throughout with prickles, those on the stem stout, broad-based, and distributed to the summit of the stem; leaves usually armed with prickles on the axes and the main veins; [section *Dimorphanthus*] ..... ***Aralia spinosa***
1 Plant an acaulescent herb or stout, suffruticose herb or slightly woody shrub, not at all to somewhat woody at the base; stem unarmed (or in *A. hispida* bristly with thin prickles on the lower stem only); leaves unarmed. ..... ***Aralia racemosa***

Aralia racemosa Linnaeus. SPIKENARD, HUNGRY-ROOT. **Hab:** Rich woodlands, trail margins and roadsides. **Dist:** NB and QC west to MB, MN, and e. SD, south to nw. SC. N. GA, n. AL, n. MS, c. AR, e. KS. **Phen:** Jun-Aug. **Tax:** The related *A. bicrenata* Wooton & Standley (sometimes treated as a subspecies of *A. racemosa* or simply included in it) occurs in AZ, NM, TX, and n. Mexico (Wen 2011). **Syn:** = Ar, C, F, G, GrPl, Il, K4, Mi, Mo2, Pa, RAB, S, Tn, Va, W, Frodin & Govaerts (2003), Smith (1944), Smith (1982), Wen (2011); = *Aralia racemosa* Linnaeus ssp. *racemosa* – K1, K3, NE. NatureServe G5T5 (Secure).

Aralia spinosa Linnaeus. DEVIL'S-WALKING-STICK, HERCULES'S-CLUB, PRICKLY-ASH. **Hab:** Disturbed pocosins and bottomlands, disturbed areas, moist to dry forests and woodlands. **Dist:** NJ west to s. IN, IL, and IA, south to c. peninsular FL and e. TX. **Phen:** Jun-Sep. **Comm:** Smith (1982) discusses the juvenile (prickly) and adult (unarmed) leaf phases of *A. spinosa*. **Syn:** = Ar, C, F, Fl7, G, GW2, Il, K1, K3, K4, Mo2, NE, Pa, RAB, S, Tn, Tx, Va, W, WH3, Frodin & Govaerts (2003), Moore, Glenn, & Ma (2009), Smith (1944), Smith (1982). NatureServe G5 (Secure).



Hedera Linnaeus 1753 (IVY)



A genus of 15 species, lianas, distributed from Mediterranean Europe west to e. Asia (Plunkett et al. 2018b). References: Ackerfield & Wen (2002); Frodin & Govaerts (2003); Graham (1966); Green, Ramsey, & Ramsey (2011); Stace (2010); Staff of the Bailey Hortorium (1976).

Identification Notes: The leaves of *Hedera* are dimorphic, sometimes confusing observers; "juvenile" leaves (those of the sterile branches) are about as wide as long and (in *H. helix*) palmately 3-5-lobed, those of the fertile branches (less commonly seen) are obovate or elliptic.

* ***Hedera helix*** Linnaeus *var. **helix***. COMMON IVY, ENGLISH IVY. **Hab:** Persistent, established, and spreading around old home sites, in suburban woodlands and waste areas. **Dist:** Native of Europe. **Phen:** Jun-Jul. **Comm:** Var. *helix* is diploid, n = 24. Hundreds of cultivars, varying greatly in habit and leaf size, lobing, and marbling are grown; see for instance, Staff of the Bailey Hortorium (1976) for a partial listing and brief descriptions.

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Syn: = Mo2, Graham (1966), Staff of the Bailey Hortorium (1976); = *Hedera helix* ssp. *helix* – Ackerfield & Wen (2002), Frodin & Govaerts (2003), Green, Ramsey, & Ramsey (2011), Stace (2010); < *Hedera helix* – Ar, C, F, Fl7, G, Il, K1, K3, K4, NcTx, Pa, RAB, S, Tn, Va, W, WH3.

Hydrocotyle Linnaeus 1753 (WATER-PENNYWORT)

A genus of about 180 species, perennial and annual herbs, cosmopolitan (especially Australia) (Plunkett et al. 2018b). Molecular analyses have clarified that the affinities of *Hydrocotyle* lie with the Araliaceae rather than the Apiaceae (Downie et al. 1998; Chandler & Plunkett 2004).
References: MC; Plunkett et al (2018b) in Kadereit & Bittrich (2018).

1 Leaves peltate, lacking a sinus extending to the attachment of the petiole.
  2 Inflorescence umbellate; leaves 1-4 (-7) cm wide ..... ***Hydrocotyle umbellata***
  2 Inflorescence verticillate or umbellate-verticillate (when first developing sometimes appearing merely umbellate); leaves 1-15 cm wide.
    3 Inflorescence compound, the main inflorescence axis with nodes which produce verticils or umbels of pedicellate flowers, the inflorescence nodes also producing branches which themselves produce verticils or umbels of flowers; leaves (1-) 4-15 cm wide ..... ***Hydrocotyle bonariensis***
    3 Inflorescence verticillate, all the flowers borne sessile or on pedicels on the unbranched inflorescence axis; leaves 1-6 cm wide.
      4 Flowers and fruits pedicellate, the pedicels 1-10 mm long ..... ***Hydrocotyle tribotrys***
      4 Flowers and fruits sessile or subsessile ..... ***Hydrocotyle verticillata***
1 Leaves not peltate, a sinus extending to the attachment of the petiole.
  5 Central leaf lobe notably more distinct than the other lobes (the sinuses on either side extending 1/3 to 3/4 of the way to the petiolar attachment); stems and petioles fleshy ..... ***Hydrocotyle ranunculoides***
  5 Central leaf lobe not more distinct than the other lobes (the sinuses on either side extending 1/10 to 1/4 the way to the petiolar attachment); stems and petioles filiform.
    7 Leaves 5-lobed, 15-30 mm wide ..... ***Hydrocotyle bowlesioides***
    7 Leaves 7-lobed, 5-13 mm wide ..... ***Hydrocotyle sibthorpioides***

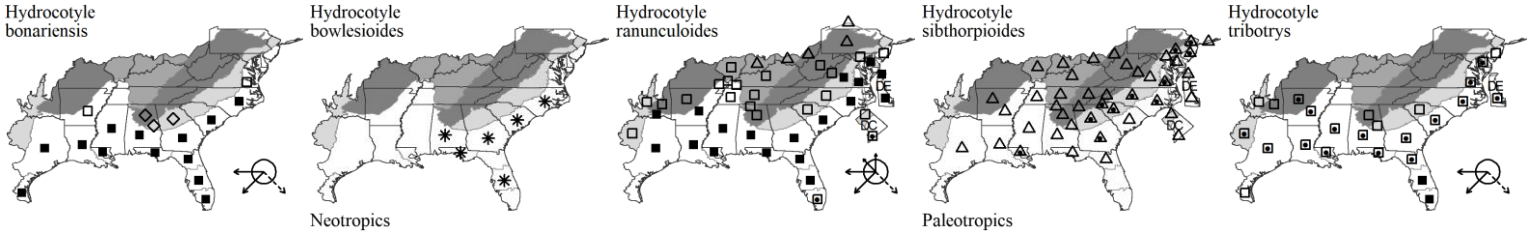
Hydrocotyle bonariensis Lamarck. DUNE PENNYWORT, SOMBRERILLO. **Hab:** Beaches, dunes, and moist sandy areas. **Dist:** Widespread in South and Central America, north in North America to the Southeastern Coastal Plain, se. VA to s. FL and TX and s. AR. **Phen:** Apr-Sep. **Syn:** = Ar, Fl7, GW2, K1, K3, K4, MC, Meso4.1, RAB, S, Tx, Va, WH3. NatureServe G5 (Secure).

* ***Hydrocotyle bowlesioides*** Mathias & Constance. **Hab:** Lawns. **Dist:** Native of Costa Rica and Panama (naturalized in South America, se. United States, and New Zealand). See Anderson (1983) for discussion of the species' occurrence in Thomasville, Thomas Co. GA. See Krings, Newton, & Liles (2017) for the first report for NC (Scotland County). **Comm:** Reported for Panhandle FL (Wunderlin & Hansen 2011). **Syn:** = Fl7, K1, K3, K4, MC, Meso4.1, WH3. NatureServe GNR (Not Yet Ranked).

Hydrocotyle ranunculoides Linnaeus f. SWAMP WATER-PENNYWORT. **Hab:** Stagnant to (less commonly) swiftly flowing waters of swamps pools, backwaters, blackwater streams, sometimes forming floating mats. **Dist:** NY, IL, MO, and KS south to s. FL and se. TX; BC south to CA, AZ, Mexico, central America, and South America. **Phen:** Apr-Jul. **Syn:** = Ar, C, F, Fl7, G, GrPl, GW2, Il, K1, K3, K4, MC, Meso4.1, Mo2, NcTx, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV. NatureServe G5 (Secure).

* ***Hydrocotyle sibthorpioides*** Lamarck. LAWN WATER-PENNYWORT. **Hab:** Lawns, pond margins, cracks between paving stones. **Dist:** Native of Asia and Africa. **Phen:** Mar-Sep. **Comm:** Greatly increasing as a lawn and garden weed. **Syn:** = Ar, C, F, Fl7, G, K1, K3, K4, MC, Pa, RAB, Tn, Va, WH3, WV. NatureServe GNR (Not Yet Ranked).

Hydrocotyle tribotrys Ruiz & Pavón. WATER-PENNYWORT. **Hab:** Swamp forests, pools. **Dist:** Widespread in North, Central, and South America. **Phen:** May-Jul. **Syn:** = *Hydrocotyle prolifera* Kellogg – Ar, K1, K3, K4, Va; = *Hydrocotyle verticillata* Thunberg var. *triradiata* (A. Richard) Fernald – C, G, GW2, MC, NcTx, RAB, Tx, WH3; > *Hydrocotyle australis* Coulter & Rose – S; > *Hydrocotyle canbyi* Coulter & Rose – S; < *Hydrocotyle verticillata* Thunberg – Meso4.1; < *Hydrocotyle verticillata* var. *verticillata* – F.

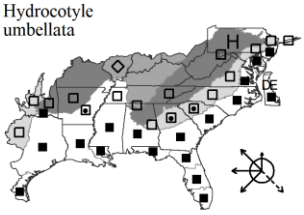


Hydrocotyle umbellata Linnaeus. MARSH WATER-PENNYWORT. **Hab:** Moist areas. **Dist:** Widespread in North, Central, and South America. **Phen:** Apr-Oct. **Syn:** = Ar, Bah, C, F, Fl7, G, GW2, Il, K1, K3, K4, MC, Meso4.1, Mi, NcTx, NE, Pa, RAB, S, Tn, Tx, Va, WH3; < *Hydrocotyle umbellata* Linnaeus – NE. NatureServe G5 (Secure).

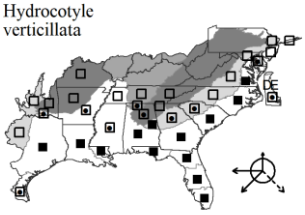
Hydrocotyle verticillata Thunberg. **Hab:** Swamp forests, pools. **Dist:** Widespread in North, Central, and South America. **Phen:** May-Jul. **Syn:** = Ar, Bah, K4, S, Tn, Va; = *Hydrocotyle verticillata* var. *verticillata* – C, Fl7, G, GW2, K1, MC, NcTx, RAB, Tx, WH3; < *Hydrocotyle verticillata* Thunberg – Meso4.1, Mo2; < *Hydrocotyle verticillata* var. *verticillata* – F; > *Hydrocotyle verticillata* var. *verticillata* – K3. NatureServe G5T5 (Secure).

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

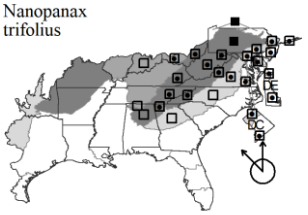
Hydrocotyle umbellata



Hydrocotyle verticillata



Nanopanax trifolius



Nanopanax A. Haines 2020 (DWARF GINSENG)

A monotypic genus, native of eastern North America. *Nanopanax trifolius* has long been seen as a morphological outlier in *Panax*, and recent phylogenetic studies reveal it as sister to the remainder of the genus (Zuo, Wen, & Zhou 2017). The many morphological differences (see *Panax* or Araliaceae key, for instance) warrant its recognition as a separate genus (Haines 2020a). References: Frodin & Govaerts (2003); Haines (2020a); Smith (1944); Zuo, Wen, & Zhou (2017).

Nanopanax trifolius (Linnaeus) A. Haines. DWARF GINSENG. **Hab:** Cove forests, bottomland forests, other nutrient-rich forests. **Dist:** NS and QC west to MN, south to PA, e. VA, c. NC, nc. GA, ec. TN, IN, and IA. **Phen:** Apr-Jun; Aug-Oct. **Syn:** = Haines (2020a); = *Panax trifolium* – C, G, RAB, S, orthographic variant; = *Panax trifolius* Linnaeus – F, K1, K3, K4, Mi, NE, Pa, Tn, Va, W, WV, Frodin & Govaerts (2003), Smith (1944). NatureServe G5 (Secure).

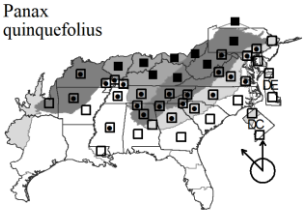
Panax Linnaeus 1753 (GINSENG)

A genus of ca. 14 species, perennial herbs, 16 of e. Asia and 1 of e. North America (Plunkett et al. 2018b; Haines 2020a). Wen & Zimmer (1996) and Choi & Wen (2000) studied the phylogeny of *Panax* using molecular techniques. *P. trifolius* does not appear to be closely related to any of the other species, and is a basal component of the genus -- or separable as a monotypic genus, *Nanopanax* (Haines 2020a), as here done. *P. quinquefolius* is most closely related to *P. ginseng* C.A. Meyer and *P. japonicus* C.A. Meyer. References: Choi & Wen (2000); Frodin & Govaerts (2003); Haines (2020a); Lee & Wen (2004); Liu et al (2018); Plunkett et al (2018b) in Kadereit & Bittrich (2018); Smith (1944); Wen & Zimmer (1996); Zuo, Wen, & Zhou (2017).

1 Leaflets (3-) 5, petiolulate, the petiolules (7-) 10-25 mm long; larger leaflets 6-15 cm long, 3.5-7 cm wide, averaging about 1.8× as long as wide, the apex acuminate; fruit bright red when ripe, smoothly elliptical in ×-section; petals light green; inflorescence erect in bud; underground storage organ an +/- elongate root, this vertical or horizontal, and sometimes branched ..... ***Panax quinquefolius***

1 Leaflets 3 (-5), sessile or subsessile, the petiolules 0-3 mm long; larger leaflets 4-8 cm long, 0.5-2.5 cm wide, averaging about 2.5× as long as wide, the apex obtuse to acute; fruit yellow-green when ripe, longitudinally winged and ribbed in ×-section; petals white (rarely tinged with pink); inflorescence nodding in bud; underground storage organ a spherical tuber ..... ***Nanopanax trifolius***

Panax quinquefolius

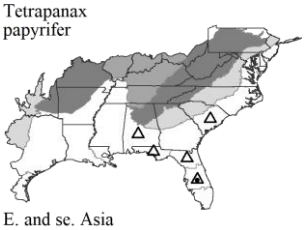


Panax quinquefolius Linnaeus. GINSENG, SANG, AMERICAN GINSENG. **Hab:** Cove forests, mesic hardwood forests, generally in nutrient-rich forests though tending to avoid the richest coves. **Dist:** ME and QC west to MN and SD, south to e. VA, e. NC, nc. SC, sw. GA, s. AL, s. MS, e. LA, and OK. **Phen:** May-Jun; Aug-Oct. **Comm:** *P. quinquefolius* is gathered in quantity throughout its range for the herbal trade; most of the North American harvest is shipped to China, where it is prized for medicinal uses. Dried roots command prices in excess of $1000 per kilogram; in our area, "sang" is a multimillion dollar industry. Formerly abundant and occurring in large populations, *P. quinquefolius* has been reduced in most of its range to small populations of scattered individuals, a classic example of a "predator-prey" relationship. Collection and trade in ginseng is monitored and regulated in most states. In NC, it is illegal for ginseng dealers to buy ginseng from collectors before Sep; this allows the plants to mature fruits prior to collection. Schlessman (1985) discusses the floral biology of *P. quinquefolius*. **Syn:** = Ar, F, Il, K1, K3, K4, Mi, Mo2, Pa, Tn, Va, W, WV, Frodin & Govaerts (2003), Haines (2020a), Smith (1944); = *Panax quinquefolium* Linnaeus – C, G, GrPl, RAB, S, orthographic variant. NatureServe G3G4 (Vulnerable).

Tetrapanax (K. Koch) K. Koch 1859 (RICEPAPER-PLANT)

A monotypic genus, a shrub, of China (Plunkett et al. 2018b). References: Plunkett et al (2018b) in Kadereit & Bittrich (2018); Xiang & Lowry (2007).

Tetrapanax papyrifer



E. and se. Asia

* ***Tetrapanax papyrifer*** (Hooker) K. Koch. RICEPAPER-PLANT. **Hab:** Disturbed forests. **Dist:** Native of Asia. Reported for Beaufort County, SC (Bradley et al. [in prep.]). **Comm:** The source of "rice paper". **Syn:** = Fl7; = *Tetrapanax papyriferus* – K1, K3, WH3, orthographic variant. NatureServe GNR (Not Yet Ranked).

416. APIACEAE Lindley 1836 (CARROT FAMILY) [in APIALES]

A family of about 466 genera and about 3820 species of herbs (rarely shrubs or trees), cosmopolitan, but especially north temperate (Plunkett et al. 2018). *Hydrocotyle* is more closely related to Araliaceae, and has been transferred there (Chandler & Plunkett 2004; Plunkett et al. 2018). References: MC; Plunkett et al (2018a) in Kadereit & Bittrich (2018).

Key to Map Symbology:

←rare ←uncommon ←common (see introduction for more)

* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable

X : extirpated

416. APIACEAE

Identification Notes: The Apiaceae is an easy family to recognize (with some exceptions). These are herbs, typically with a clasping petiole base and often a variously (and often highly) compound leaf, either 1-5× pinnately, palmately, pinnately-ternately, or ternately compound (less commonly simple or phyllodial). The inflorescence is typically a simple or compound umbel (sometimes subcapitate or truly modified into a head) with numerous small flowers. Subtending the inflorescence is (usually) an involucre of individual bracts. If the umbel is compound, rays support umbellets, each of which may be subtended by an involucel of individual bractlets. The ovary is 2-carpellate, with 2 styles at the summit, these often swollen at the base into a stylopodium capping the ovary. The fruit develops into 2 mericarps, united by their faces at the commissure; each mericarp may be terete, flattened dorsally (parallel to the commissure, the commissure therefore broad), or flattened laterally (perpendicular to the commissure, the commissure therefore narrow). Each mericarp has 5 primary ribs, one down the back (the dorsal rib), 2 near each edge near the commissure (the lateral ribs or lateral wings), and 2 in-between (the intermediate ribs). The ribs may be thin and filiform in ×-section, corky, or winged, and they (or the entire outer surface of the mericarp) may also be ornamented with hairs, spines, uncinate prickles, etc.

1 Principal leaves either all simple (though sometimes palmately or pinnately lobed) or those that are basally disposed simple (those on the upper stem sometimes compound)..... ***Key A***
1 Principal leaves all variously compound (small bracteal leaves on the upper stem sometimes reduced and simple).
  2 Leaves 1-palmately or 1-pinnately compound (all leaflets attached to the summit of the petiole or to the primary inflorescence rachis).
    3 Leaves 1-palmately compound, all of the 3-7 leaflets attached to the summit of the petiole..... ***Key B***
    3 Leaves 1-pinnately compound, all of the 3-13 leaflets attached to a primary inflorescence rachis..... ***Key C***
  2 Leaves 2-5× compound.
    4 Leaves 2-4× pinnately or pinnately-ternately compound, the ultimate segments consisting of relatively few (usually < 25), discreet, typically broad (elliptic, ovate, or lanceolate) leaflets..... ***Key D***
    4 Leaves 2-5× pinnately or pinnately-ternately decompound, the ultimate segments either linear (and then flat or angled in ×-section) or broader, but then very many (> 50) and often imperfectly separated from one another..... ***Key E***

Key A - Apiaceae with simple leaves

1 Leaves linear, lanceolate, or oblancolate, > 4× as long as wide.
  2 Leaves phyllodial (hollow, septate, segmented); flowers white or purple; [plants of wetlands].
    3 Umbels simple; leaves spatulate, broader towards the tip, often flattened in ×-section, rounded or obtuse at the apex..... ***Lilaeopsis***
    3 Umbels compound; leaves tapering to a pointed tip, terete in ×-section.
      4 Plants 1-11 dm tall, annuals, sometimes mat-forming and adventiously perennial; fruits 1-3 mm long, with lateral ribs; rays 3-15..... ***Harperella***
      4 Plants 6-24 dm tall, perennials from rhizomes or tubers; fruits 4-9 mm long, with lateral wings; rays 5-20..... ***Tiedemannia***
  2 Leaves "normal" (flat, non-septate, continuous, and in some cases lobed, toothed, or spinose-margined); flowers blue, yellow, white, or whitish-green; [plants of wetlands or uplands].
    5 Flowers borne in involucrate heads; corolla blue or greenish-white..... ***Eryngium***
    5 Flowers in compound umbels; corolla yellow or white.
      6 Stem leaves similar to the basal, all simple; corollas yellow; [alien, of disturbed areas]..... ***Bupleurum***
      6 Stem leaves palmately 3-5-foliolate with linear leaflets, differing from the simple basal leaves; corollas white; [native, of blackland prairies and associated disturbed areas, from AL and TN westward]..... ***Cynosciadium***
1 Leaves orbicular, ovate, or elliptic, < 4× as long as wide.
  7 Leaves orbicular, as wide as or wider than long; base peltate or cordate.
    9 Foliage and fruits (or ovaries) stellate-pubescent or glochidiate; leaves lobed, but otherwise entire; [rare alien]..... ***Bowlesia***
    9 Foliage and fruits (or ovaries) glabrous; leaves toothed, sometimes also lobed; [common natives and aliens]..... ***Araliaceae***
  7 Leaves ovate or elliptic, 1.2-4× as wide as long; base cordate, peltate, or truncate.
    10 Leaves perfoliate; flowers yellow; [rare aliens].
      11 XXXX..... ***Bupleurum rotundifolium***
      11 YYYY..... ***Smyrnium perfoliatum***
    10 Leaves cordate or truncate at the base; flowers white, green, yellow, blue, or purple;
      12 Flowers greenish or blue; leaves all simple (sometimes stem leaves lobed); inflorescence a head or very congested (subcapitate) umbel; [plants of wetland situations, prostrate, creeping, or erect].
        13 Inflorescence a very congested (subcapitate) umbel, with 4-9 flowers; leaves cordate at the base, long-petiolate, the petioles characteristically 2× as long as the leaf..... ***Centella erecta***
        13 Inflorescence a head, with > 20 flowers; leaves cuneate to truncate at the base, sessile to short petiolate, the petioles < 1× as long as the leaf (except *E. prostratum*)..... ***Eryngium***
      12 Flowers yellow or purple; basal leaves simple, stem leaves usually compound; Inflorescence a compound umbel; [erect plants of upland situations].
        14 Fruits (partly to fully mature) with thin-edged wings; flowers yellow or purple; central flower of each umbellet staminate and pedicelled; fruits all pedicelled in all umbellets..... ***Thaspium***
        14 Fruits ribbed (with rounded, cordlike ribs), lacking thin-edged wings; flowers yellow; central flower of each umbellet either staminate and pedicelled, or pistillate and sessile; fruits all pedicelled in some umbellets (those with a staminate central flower), or the central fruit sessile in some umbellets (those with a pistillate central flower)..... ***Zizia***

Key B - Apiaceae with 1-palmate leaves

1 Leaflets narrowly lanceolate or linear, > 8× as long as wide, entire; umbels compound and regular, the rays and pedicels each of relatively uniform lengths; leaves 3-5-foliolate.
..... ***Cynosciadium digitatum***
1 Leaflets ovate, obovate, broadly lanceolate, or broadly oblanceolate, 1-5× as long as wide, serrate or variously incised or cleft; umbels compound and irregular, the rays and/or pedicels of widely varying lengths; leaves 3-7-foliolate.
  3 Rays 3-8, the involucre absent or inconspicuous; umbellets with 3-10 pedicellate perfect flowers; fruits linear-oblong, glabrous; leaves 3-foliolate, the lateral leaflets often 2-parted; corollas white..... ***Cryptotaenia canadensis***

Key to Map Symbology:

* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable
X : extirpated

3 Rays few, the involucre of prominent, broad, foliaceous bracts; umbellets with 3 sessile to subsessile or short-pedicellate perfect flowers and a variable number of pedicellate staminate flowers; fruits ovoid, obovoid, or subglobose, covered with uncinate bristles; leaves palmately 3-7-foliolate, the lateral sometimes 2-parted; corollas greenish-white, yellowish-green, or white..... ***Sanicula***

Key C - Apiaceae with 1-pinnate leaves

2 Leaflets entire or with a few teeth (rarely as many as 7 on each side), these usually near the midpoint of the leaflet; fruits 4-7 mm long; corolla white ..... ***Oxypolis rigidior***

2 Leaflets rather finely toothed (and sometimes also deeply lobed), the teeth evenly disposed along the margins; fruits 1-6 mm long; corolla white or yellow. ..... ***Sium suave***

Key D - Apiaceae with leaves 2-4× pinnately-ternately compound, the ultimate leaflets distinct and relatively broad

1 Leaflets entire. ..... ***Taenidia***

1 Leaflets variously serrate, dentate, and/or incised.
- 3 Plants in flower.
  - 4 Corolla yellow, maroon, or pale creamy yellow.
    - 5 Flowers yellow, maroon, or pale creamy-yellow; central flower of each umbellet staminate and pedicelled; fruits all pedicelled in all umbellets; developing fruits subterete to slightly dorsally compressed, several or all of the ribs with thin-edged wings ..... ***Thaspium***
    - 5 Flowers yellow; central flower of each umbellet either staminate and pedicelled, or pistillate and sessile; fruits all pedicelled in some umbellets (those with a staminate central flower), or the central fruit sessile in some umbellets (those with a pistillate central flower); developing fruits laterally compressed, all of the ribs rounded and cordlike ..... ***Zizia***
  - 4 Corolla white. {Add to keylead 4b: *Ammi majus, Angelica dentata, Apium graveolens var. dulce, Cicuta bolanderi, Cicuta mexicana, Imperatoria ostruthium, Petroselinum crispum*}
    - 6 Ovary hispid or pubescent.
      - 7 Rays 16-25; leaves somewhat coriaceous; leaflet bases often cuneate or obliquely truncate; [plants of dry habitats] ..... ***Angelica***
      - 7 Rays 3-5; leaves thin in texture; leaflet bases rounded, subcordate, or broadly cuneate; [plants of moist forests]..... ***Osmorhiza***
    - 6 Ovary glabrous.
      - 10 Sheaths of the upper leaves dilated, > 1 cm wide when flattened; [plants of moist habitats, from GA northward in the Mountains, extending into adjacent provinces towards the northern edge of our area] ..... ***Angelica***
      - 10 Sheaths of the upper leaves not dilated, < 1 cm wide; [plants either of wetlands or of moist to dry forests].
        - 11 Veins of the leaflets directed to the sinuses; leaflets mostly 2.5-5× as long as wide, acuminate at the tip; [of wetlands]..... ***Cicuta***
        - 11 Veins of the leaflets directed to the tips of the teeth or lobes; leaflets mostly 1.3-1.8× as long as wide, acute to obtuse at the tip; [of moist to dry forests] ..... ***Ligusticum***
- 3 Plants in fruit. {Add to key 3b: *Ammi majus, Apium graveolens var. dulce, Imperatoria ostruthium, Petroselinum crispum,* }
  - 12 Fruit hispid or pubescent (regardless of winging).
    - 13 Fruits 4-6 mm long, hispid across the surfaces; rays 16-25; leaves somewhat coriaceous; leaflet bases often cuneate or obliquely truncate; [plants of dry habitats] ..... ***Angelica***
    - 13 Fruits 18-24 mm long, oblanceolate or linear, appressed-pubescent on the ribs; rays 3-5; leaves thin in texture; leaflet bases rounded, subcordate, or broadly cuneate; [plants of moist forests] ..... ***Osmorhiza***
  - 12 Fruit glabrous (sometimes winged or prominently ribbed as well).
    - 14 Fruits dorsally compressed (strongly to slightly) or subterete, either thin-winged or corky-winged.
      - 16 Rays 12-30; fruits 4-8 mm long; plant 6-20 dm tall; sheaths of the upper leaves dilated, > 1 cm wide when flattened ..... ***Angelica***
      - 16 Rays 5-10; fruits 3-6 mm long; plant 5-10 dm tall; sheaths of the upper leaves not dilated, < 1 cm wide ..... ***Thaspium***
    - 14 Fruits laterally compressed, not winged (except thin-winged in *Ligusticum*).
      - 17 Veins of the leaflets directed to the sinuses; leaflets mostly 2.5-5× as long as wide, acuminate at the tip; [of wetlands] ..... ***Cicuta***
      - 17 Veins of the leaflets either directed to the tips of the teeth or lobes, or reticulating extensively and becoming obscure before reaching the margin; leaflets mostly 1.3-1.8× as long as wide, acute to obtuse at the tip; [of moist to dry forests].
        - 19 Lateral veins of the leaflet parallel and straight, clearly extending to the tip of each tooth; leaflet base often strongly oblique; leaflet margin entire in the lower ¼ to 1/3 ..... ***Ligusticum***
        - 19 Lateral veins of the leaflet arcing, reticulating and becoming obscure before reaching the leaflet margin; leaflet base symmetrical or slightly oblique; leaflet margin toothed to or very close to the base..... ***Zizia***

Key E

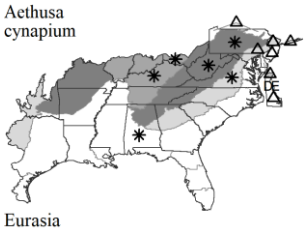
1 Ultimate leaf-segments linear to filiform, the margins parallel.
- 2 Corolla yellow; rays 15-40; plants 5-21 dm tall, annual, biennial, or perennial; [naturalized aromatic culinary herbs of upland situations].
  - 3 Petiolar sheaths of the principal leaves 1-2.5 (-3) cm long; mericarps dorsally flattened, at least the lateral ribs thin-winged; fresh plants with dill odor; annual. ..... ***Anethum graveolens***
  - 3 Petiolar sheaths of the principal leaves 3-10 cm long; mericarps subterete or slightly laterally flattened, the ribs not winged; fresh plants with fennel odor; biennial or perennial..... ***Foeniculum vulgare***
- 2 Corolla white; rays 5-20; plants 1-15 dm tall; annual; [native or naturalized herbs of upland or wetland situations].
  - 4 Mericarps (and ovary) ornamented with pustules, spines, or sharp-pointed projections (in addition to the ribs)..... ***Spermolepis***
  - 4 Mericarps (and ovary) glabrous.
    - 5 Umbels leaf-opposed; umbels simple to compound..... ***Cyclospermum leptophyllum***
    - 5 Umbels terminal or on axillary branches; umbels compound..... ***Ptilimnium***

1 Ultimate leaf segments flat, ovate, elliptic, lanceolate, or irregular, the margins not neatly parallel.
- 6 Plants perennial or biennial (annual in *Daucus pusillus*), 10-30 dm tall (or as short as 3 dm tall in *Daucus* and *Conioselinum*); rays 12-60 (or 5-25 in *Conioselinum*).

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

7 Leaves ¼-½× as wide as long; mericarps (and ovaries) bristled; mericarps 3-5 mm long; rays 10-60 (or more) ..... ***Daucus***
7 Leaves ½-1× as long as wide; mericarps (and ovaries) glabrous; fruits either 4-6 mm or 2-2.5 mm long; rays 5-20. ..... ***Conium***
6 Plants annual (perennial in *Erigenia* and sometimes *Anthriscus*), 0.5-8 (-10) dm tall; rays 1-7 (or to as many as 12 in *Anthriscus* and *Torilis*).
9 Plants perennial from a globose tuber; flowering Feb-Mar; [of rich forests] ..... ***Erigenia bulbosa***
9 Plants annual (or sometimes a short-lived perennial in *Anthriscus*) from fibrous roots; flowering Apr-Jun; [of rich forests and weedy situations].
10 Rays (1-) 3 (-5); mericarps 5.5-10 mm long, glabrous or pubescent with weak appressed hairs ..... ***Chaerophyllum***
10 Rays 3-12; mericarps 3-6 mm long, glabrous or densely bristled with hooked (uncinate) bristles.
11 Mericarps (and ovary) glabrous ..... ***Anthriscus***
11 Mericarps (and ovary) densely beset with hooked (uncinate) bristles
12 Ribs of the mericarp obsolete; rays 3-5 ..... ***Anthriscus***
12 Ribs of the mericarp prominent (paler than the intervals); rays 5-12 ..... ***Torilis***

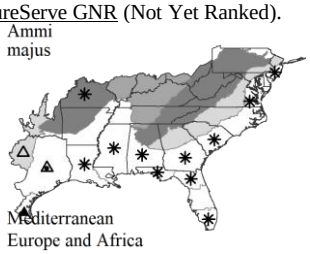
Aethusa Linnaeus 1753



A monotypic genus, an annual herb, of Europe, n. Africa, and w. Asia (Plunkett et al. 2018). References: MC; Plunkett et al (2018a) in Kadereit & Bittrich (2018); GBI3.

* ***Aethusa cynapium*** Linnaeus. FOOL'S-PARSLEY. **Hab:** Disturbed areas. **Dist:** Native of Eurasia. Introduced and naturalized in ne. United States, at least as far south as se. PA (Rhoads & Klein 1993), DE, and Pocahontas County, WV. **Phen:** Jun-Sep. **Comm:** In Europe, several subspecies are often recognized; it is not well-understood how these entities relate to material naturalized in North America and for now we treat the species broadly. **Syn:** = C, F, G, Il, K1, K3, K4, MC, Mi, NE, Pa, WV; > *Aethusa cynapium* ssp. *agrestis* (Wallroth) Dostál – GBI3; > *Aethusa cynapium* ssp. *cynapioides* (M. Bieberstein) Arcangeli – GBI3; > *Aethusa cynapium* ssp. *cynapium* – GBI3; > *Aethusa cynapium* ssp. *gigantea* (Lejeune) P.D. Sell – GBI3. NatureServe GNR (Not Yet Ranked).

Ammi Linnaeus 1753 (BISHOP'S-WEED)

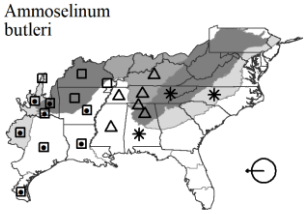


A genus of about 3-4 species, annual or biennial herbs, distributed in Mediterranean Europe. References: MC; Plunkett et al (2018a) in Kadereit & Bittrich (2018).

1 Lower leaves with elliptic to narrowly elliptic segments; fruits 1.5-2 mm long; rays 15-60, not rigid and thickened at maturity; bracts not strongly reflexed in fruit ..... ***Ammi majus***
1 Lower leaves with filiform segments; fruits 2-2.8 mm long; rays up to 150, rigid and thickened at maturity; bracts strongly reflexed in fruit ..... ***Visnaga daucoides***

* ***Ammi majus*** Linnaeus. BULLWORT, GREATER AMMI. **Hab:** Disturbed areas. **Dist:** Native of Mediterranean Europe. **Phen:** Mar-Jun. **Syn:** = Bah, Fl7, K3, K4, MC, Meso4.1, Mo2, NcTx, RAB, S, Tx, WH3. NatureServe GNR (Not Yet Ranked).

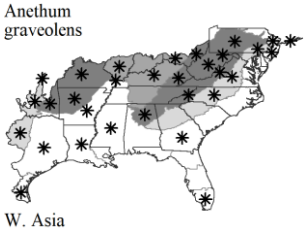
Ammoselinum Torrey & A. Gray 1855 (SAND-PARSLEY)



A genus of 3-4 species, annual herbs, of sc. and sw. North America and temperate s. South America. References: MC; Nesom (2012c); Plunkett et al (2018a) in Kadereit & Bittrich (2018).

Ammoselinum butleri (Engelmann ex S. Watson) Coulter & Rose. BUTLER'S SAND-PARSLEY. **Hab:** Bottomlands and mesic forests; eastwards in lawns, disturbed places. **Dist:** MO and se. KS south through AR and OK to LA and s. TX. Boufford (1977) reported the naturalization of this diminutive midwestern umbel on a grassy, weed-covered slope in NC, and it has since been reported from additional southeastern states, including MS (Bryson 1991) and AL (Keener 2007). **Phen:** Mar-Apr (-May). **Syn:** = Ar, GrPl, GW2, K1, K3, K4, MC, Mo2, NcTx, Tn, Tx, Nesom (2012c); = n/a – RAB. NatureServe G5 (Secure).

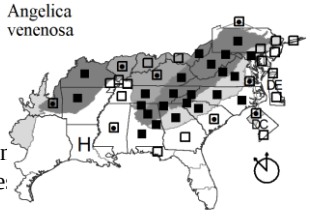
Anethum Linnaeus 1753 (DILL)



A monotypic genus, an annual herb, apparently native to sw. Asia and/or the Mediterranean region (Plunkett et al. 2018). Closely related to *Foeniculum*. References: MC; Plunkett et al (2018a) in Kadereit & Bittrich (2018).

* ***Anethum graveolens*** Linnaeus. DILL, DILLWEED. **Hab:** Roadsides, disturbed areas, abandoned garden plots, a waif from garden use. **Dist:** Native of sw. Asia. **Phen:** Jun-Aug. **Syn:** = Ar, Bah, C, F, Fl7, G, GrPl, Il, K1, K3, K4, MC, Meso4.1, Mi, Mo2, NcTx, NE, Pa, RAB, S, Tx. NatureServe GNR (Not Yet Ranked).

Angelica Linnaeus 1753 (ANGELICA)



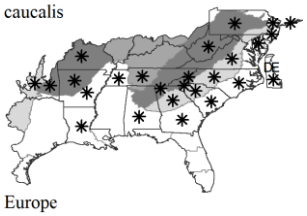
Key to Map Symbology: □ native; ◇ maybe exotic; △ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : plar; ? : que

416. APIACEAE

A genus of about 120 species, perennial herbs of the northern hemisphere. Recent analyses, such as by Liao et al. (2013), suggest that *Angelica* will be divided in the future, with North American species likely placed in a new genus. References: Levin in FNA () (in prep); Liao et al (2013); Liao et al (2021); MC; Plunkett et al (2018a) in Kadereit & Bittrich (2018).

Angelica venenosa (J. Greenway) Fernald. HAIRY ANGELICA, DEADLY ANGELICA, WOODLAND ANGELICA. **Hab:** Dry forests and woodlands, woodland borders, longleaf pine sandhills, hammocks, prairies. **Dist:** MA west to MN, south to Panhandle FL, MS, and AR. **Phen:** May-Aug; Jul-Sep. **Comm:** Populations of this species in dry sandhill communities in the Fall Line Sandhills have a number of peculiar features: basal leaves often borne appressed against the ground, small leaflets, coarse and more equilateral toothing of the leaflets. These populations may be worthy of taxonomic recognition; they need further study. **Syn:** = Ar, C, F, Fl7, G, Il, K1, K3, K4, MC, Mi, Mo2, NE, Pa, RAB, Tn, Va, W, WH3, Levin in FNA () (in prep); = *Angelica venenosa* ssp. *venenosa* – Liao et al (2021); = *Angelica villosa* (Walter) Britton, Sterns, & Poggenburg – S. NatureServe G5 (Secure).

Anthriscus caucalis



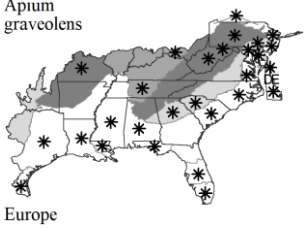
Europe

Anthriscus Persoon 1814 (CHERVIL)

A genus of about 10-20 species, annual, biennial, and perennial herbs, of Eurasia and mountains of Africa. References: MC; Plunkett et al (2018a) in Kadereit & Bittrich (2018); Spalik (1996).

* ***Anthriscus caucalis*** M. Bieberstein. BUR CHERVIL, BUR-PARSLEY. **Hab:** Disturbed areas. **Dist:** Native of Europe. First reported for South Carolina by Hill & Horn (1997) and for GA (Carter, Baker, & Morris 2009). Reported as new to MD and "spreading" in DE (Longbottom, Naczi, & Knapp 2016). **Phen:** Apr-May; May-Jun. **Syn:** = Ar, C, Il, K1, K3, K4, Mo2, Va, Spalik (1996); = *Anthriscus scandicina* Mansfeld – F, G, MC, RAB, illegitimate name and orthographic variant. NatureServe GNR (Not Yet Ranked).

Apium graveolens



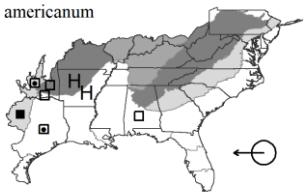
Europe

Apium Linnaeus 1753 (CELERY)

A genus of about 10 species, perennial and biennial herbs, of temperate and subtropical regions, mainly Southern Hemisphere. References: MC; Plunkett et al (2018a) in Kadereit & Bittrich (2018); Ronse et al (2010).

* ***Apium graveolens*** Linnaeus. CELERY. **Hab:** Disturbed areas, escaped or persisting from cultivation. **Dist:** Native of Europe. **Phen:** Jun-Jul; Jul-Aug. **Tax:** Escapes in our area appear to be a reverted wild form, sometimes treated as *A. graveolens* var. *graveolens*. This species occurs in forms or cultivars, which have sometimes been treated as botanical varieties: *A. graveolens* var. *dulce* (P. Miller) A.P. de Candolle (Celery), *A. graveolens* var. *rapaceum* A.P. de Candolle (Celeriac), and others. **Syn:** = C, F, Fl7, G, MC, Meso4.1, Mo2, NE, RAB, Tx, WH3, WV, Ronse et al (2010); = *Celeri graveolens* (Linnaeus) Britton – S; > *Apium graveolens* Linnaeus var. *dulce* (P. Miller) A.P. de Candolle – K1, K3, K4. NatureServe GNRTNR (Not Yet Ranked).

Atrema americanum

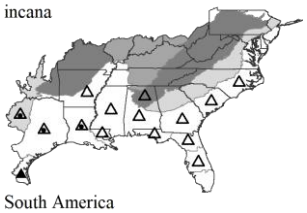


Atrema A.P. de Candolle 1829 (AMERICAN BISHOP)

A monotypic genus, a perennial herb, endemic to sc. United States (Plunkett et al. 2018). References: MC; Nesom in FNA () (in prep); Plunkett et al (2018a) in Kadereit & Bittrich (2018).

Atrema americanum A.P. de Candolle. PRAIRIE BISHOP. **Hab:** Blackland prairies, coastal prairies, rocky slopes. **Dist:** AR and OK south to s. TX; disjunct in AL. **Phen:** Apr-Jun. **Syn:** = K3, Plunkett et al (2018a) in Kadereit & Bittrich (2018), Zhang, Zhang, & Endress (2003); = *Atrema americana* – K4, orthographic variant; = *Bifora americana* (A.P. de Candolle) Bentham & Hooker f. – Ar, K1, K2, MC, NcTx, Tx. NatureServe GNR (Not Yet Ranked).

Bowlesia incana



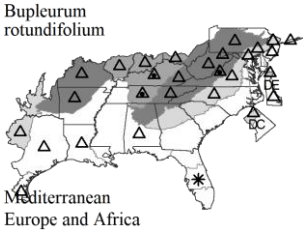
South America

Bowlesia Ruiz & Pavón 1794 (BOWLESIA)

A genus of ca. 15 species, perennial and annual herbs, native of South America and Central America (Plunkett et al. 2018). References: MC; Mathias & Constance (1965); Plunkett et al (2018a) in Kadereit & Bittrich (2018).

* ***Bowlesia incana*** Ruiz & Pavón. **Hab:** Open wet hammocks and bottomlands, suburban woodlands. **Dist:** Native of South America. The native distribution of this species is uncertain. Reported from multiple locations in SC (Bradley et al. [in prep.]). **Phen:** Feb-Jun. **Syn:** = Ar, Fl7, GW2, K1, K3, K4, MC, NcTx, Tx, WH3, Mathias & Constance (1965); = *Bowlesia septentrionalis* Coulter & Rose – S. NatureServe G5 (Secure).

Bupleurum rotundifolium



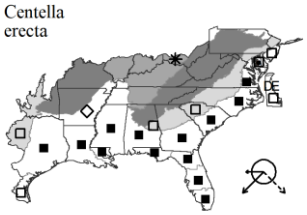
Mediterranean Europe and Africa

Bupleurum Linnaeus 1753 (HARE'S-EAR, THOROUGHWAX)

A genus of about 190 species, annual and perennial herbs, primarily Eurasian (Plunkett et al. 2018). References: MC; Plunkett et al (2018a) in Kadereit & Bittrich (2018); Snogerup & Snogerup (2001).

* ***Bupleurum rotundifolium*** Linnaeus. HARE'S-EAR, THOROUGHWAX. **Hab:** Lawns, disturbed areas, preferring calcareous substrates. **Dist:** Native of Eurasia. **Phen:** Apr-Jul. **Syn:** = Ar, C, F, G, GrPl, Il, K1, K3, K4, MC, Mi, Mo2, NcTx, NE, Pa, RAB, S, Tn, Tx, Va, W, Snogerup & Snogerup (2001); = *Buplerum rotundifolium* – GrPl, orthographic error. NatureServe GNR (Not Yet Ranked).

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



Centella Linnaeus 1764 (CENTELLA, COINLEAF)

A genus of about 45 species, of warm temperate and tropical regions, centered in s. Africa (Plunkett et al. 2018). References: Alqatani et al (2017); MC; Nesom in FNA () (in prep); Plunkett et al (2018a) in Kadereit & Bittrich (2018).

Centella erecta (Linnaeus f.) Fernald. CENTELLA, COINLEAF. **Hab:** Pine savannas, pondshores, ditches, and a wide variety of other moist to wet habitats. **Dist:** S. NJ and DE south to s. FL, west to s. TX; West Indies, Mexico, Central America. **Phen:** May-Sep; Jul-Oct. **Tax:** Sometimes included in *C. asiatica*, which otherwise has an Old World distribution, but Alqatani et al. (2017) found good evidence to treat *C. erecta* and *C. asiatica* as specifically distinct. **Syn:** = Ar, C, F, G, K1, MC, Meso4.1, NcTx, Va, Alqatani et al (2017); = *Centella repanda* (Persoon) Small – S; < *Centella asiatica* (Linnaeus) Urban – Bah, Fl7, GW2, K3, K4, RAB, Tx, WH3, Zhang, Zhang, & Endress (2003).

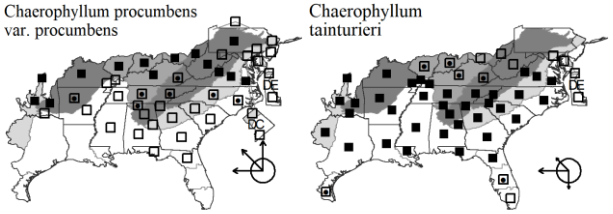
Chaerophyllum Linnaeus 1753 (CHERVIL)

A genus of about 35 species, annual, biennial, and perennial herbs, of north temperate areas (Plunkett et al. 2018). References: MC; Plunkett et al (2018a) in Kadereit & Bittrich (2018).

1 Ribs of fruit broad, the intervals between the ribs much narrower than the ribs; pedicels somewhat club-shaped; stem and leaf surfaces mostly pilose ..... ***Chaerophyllum tainturieri***
1 Ribs of fruit narrow, the intervals between the ribs equal to or wider than the ribs; pedicels mostly uniform in shape; stem and leaf surfaces essentially glabrous. ..... ***Chaerophyllum procumbens var. procumbens***

Chaerophyllum procumbens (Linnaeus) Crantz *var*. ***procumbens***. COMMON SPREADING CHERVIL. **Hab:** Alluvial forests. **Dist:** NY and s. ON to MI, s. WI, and e. NE, south to GA, n. peninsular FL (Alachua County), AR, and OK. **Phen:** Late Mar-Apr; Apr-May. **Syn:** = C, F, G, GrPl, Il, K1, K3, MC, RAB, Va; = *Chaerophyllum procumbens* – S; < *Chaerophyllum procumbens* – Ar, Fl7, GW2, K4, Mi, Mo2, Pa, Tn, W, WH3. NatureServe G5T5 (Secure).

Chaerophyllum tainturieri Hooker. SOUTHERN CHERVIL. **Hab:** Roadsides, disturbed areas, fields. **Dist:** MD west to NE, south to c. peninsular FL, TX, and AZ. **Phen:** Mar-Apr; Apr-May. **Tax:** Var. *tainturieri* (with fruits glabrous) and var. *dasycarpum* (with fruits pubescent) are sometimes distinguished (see synonymy). They have largely overlapping distributions, and seem unlikely to warrant taxonomic status, but need additional study. *C. texanum* Coulter & Rose is reported as a native in the Nashville Basin of TN (Chester, Wofford, & Kral 1997); it is usually now included in *C. tainturieri* (var. *tainturieri*). **Syn:** = Ar, C, Fl7, GW2, Il, K3, K4, Mo2, RAB, Tn, Va, W, WH3; > *Chaerophyllum dasycarpum* (Hooker ex S. Watson) Nuttall ex Small – S; > *Chaerophyllum floridanum* (Coulter & Rose) Bush – S; > *Chaerophyllum tainturieri* var. *dasycarpum* – GrPl, K1, MC, NcTx, Tx; > *Chaerophyllum tainturieri* var. *floridanum* Coulter & Rose – F; > *Chaerophyllum tainturieri* var. *tainturieri* – F, G, GrPl, K1, MC, NcTx, Tx; > *Chaerophyllum teinturièri* – S, orthographic variant; > *Chaerophyllum texanum* Coulter & Rose – F, G, MC.



Cicuta Linnaeus 1753 (WATER-HEMLOCK)

A genus of 8 species, perennial herbs, north temperate in distribution (Plunkett et al. 2018). References: MC; Mulligan (1980); Plunkett et al (2018a) in Kadereit & Bittrich (2018).

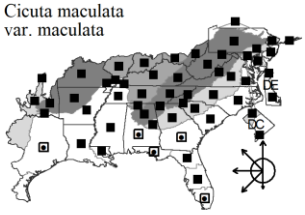
2 Lateral ribs of the commissure flush against one another; leaflets lanceolate, 0.6-3 cm wide ..... ***Cicuta maculata var. maculata***
2 Lateral ribs of the commissure separated by a groove; leaflets ovate, up to 3.5-5 cm wide ..... ***Cicuta mexicana***

Cicuta maculata Linnaeus *var*. ***maculata***. WATER-HEMLOCK. **Hab:** Marshes, bogs, seepages, ditches, swamp forests. **Dist:** NS west to AK, south to FL, CA; Mexico. **Phen:** May-Aug; Jul-Sep. **Tax:** Two other varieties are more northern or western: var. *victorinii* (Fernald) B. Boivin of QC and var. *angustifolia* Hooker of western North America. **Comm:** All parts of the plant, especially the tubers, are dangerously poisonous. **Syn:** = C, F, G, K1, NE, Pa, Va; < *Cicuta maculata* Linnaeus – Ar, Fl7, GW2, Il, MC, Mi, NcTx, RAB, Tn, Tx, W, WH3; > *Cicuta maculata* var. *bolanderi* (S. Watson) G.A. Mulligan – GrPl, Mo2, Mulligan (1980); < *Cicuta maculata* Linnaeus var. *maculata* – K3, K4; > *Cicuta maculata* Linnaeus var. *maculata* – GrPl, Mo2, Mulligan (1980).

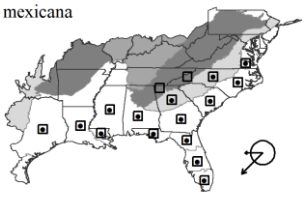
Cicuta mexicana Coulter & Rose. SOUTHERN WATER-HEMLOCK. **Hab:** Marshes, bogs, seepages, ditches, swamp forests, floating vegetation mats. **Dist:** Se. VA (GW), south to FL, and west to TX, south into Mexico (more inland records in our area and westward are of uncertain disposition). **Phen:** May-Aug; Jul-Sep. **Comm:** Though not recognized by Mulligan (1980), this taxon appears to warrant taxonomic recognition. It is a generally coarser plant than *C. maculata*. **Syn:** = GW2, MC, RAB, Tx; = *Cicuta curtissii* Coulter & Rose – S; = *Cicuta maculata* var. *curtissii* (Coulter & Rose) Fernald – F, G; < *Cicuta maculata* Linnaeus – Fl7; < *Cicuta maculata* Linnaeus var. *maculata* – K3, K4, Mulligan (1980).

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Cicuta maculata var. maculata

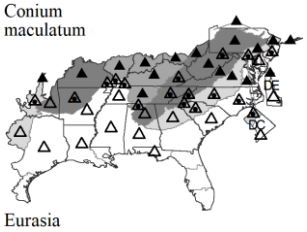


Cicuta mexicana



Conium Linnaeus 1753 (POISON-HEMLOCK)

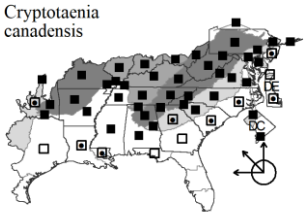
Conium maculatum



A genus of 7 species, biennial herbs, of Eurasia and n. and s. Africa (Plunkett et al. 2018). References: MC; Plunkett et al (2018a) in Kadereit & Bittrich (2018).

* ***Conium maculatum*** Linnaeus. POISON-HEMLOCK. **Hab:** Ditches, roadsides, streambanks, disturbed areas. **Dist:** Native of Eurasia. **Phen:** May-Jun; Jun-Jul. **Comm:** All parts of the plant are highly toxic if ingested, causing respiratory failure in humans and other mammals. **Syn:** = C, F, GrPl, GW2, Il, K1, K3, K4, MC, Meso4.1, Mo2, NE, Pa, RAB, S, Tn, Tx, Va, W, WV. NatureServe G5 (Secure).

Cryptotaenia canadensis

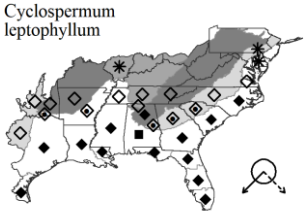


Cryptotaenia A.P. de Candolle 1829 (HONEWORT)

A genus of about 7 species, biennial and perennial herbs, in north temperate areas; polyphyletic as circumscribed (Plunkett et al. 2018). References: MC; Nesom in FNA () (in prep); Plunkett et al (2018a) in Kadereit & Bittrich (2018).

Cryptotaenia canadensis (Linnaeus) A.P. de Candolle. HONEWORT. **Hab:** Moist and nutrient-rich forests (alluvial, bottomland, slope, and cove forests). **Dist:** NB and QC to MB, south to e. GA, sw. GA, Panhandle FL, AL, and TX. **Phen:** May-Jun; Jun-Aug. **Tax:** Closely related to *C. japonica* Hasskarl, which has sometimes been subsumed within it. **Syn:** = Ar, F, Fl7, GrPl, GW2, Il, K1, K3, K4, MC, Mi, Mo2, NcTx, NE, Pa, RAB, Tn, Tx, Va, WH3, WV; = *Deringa canadensis* (Linnaeus) Kuntze – S; < *Cryptotaenia canadensis* (Linnaeus) A.P. de Candolle – C, G. NatureServe G5 (Secure).

Cyclospermum leptophyllum

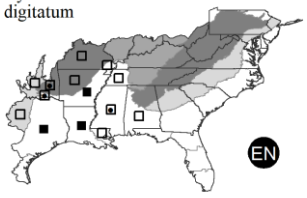


Cyclospermum Lagasca y Segura 1821 (MARSH-PARSLEY)

A genus of 3 species, annual herbs, of tropical and warm temperate America (Plunkett et al. 2018a). Only distantly related to *Apium* and warranting generic status (Ronse et al. 2010). References: MC; Plunkett et al (2018a) in Kadereit & Bittrich (2018); Ronse et al (2010).

Cyclospermum leptophyllum (Persoon) Sprague ex Britton & Wilson. MARSH-PARSLEY. **Hab:** Freshwater marshes, disturbed areas, roadside ditches. **Dist:** Widespread in se. North America, from NC and OK south into tropical America, the native distribution uncertain. **Phen:** Apr-early Jun; Jun-Jul. **Syn:** = Ar, Fl7, K1, K3, K4, Meso4.1, NcTx, Tn, Va, WH3, Ronse et al (2010); = *Apium leptophyllum* (Persoon) F. Mueller ex Bentham – Bah, C, G, GW2, Il, MC, RAB, Tx; ? *Cyclospermum ammi* (Linnaeus) Lagasca y Segura – S. NatureServe G5 (Secure).

Cynosciadium digitatum



Cynosciadium A.P. de Candolle 1829

A monotypic genus, an annual herb, of sc. North America (Plunkett et al. 2018a). References: MC; Plunkett et al (2018a) in Kadereit & Bittrich (2018).

Cynosciadium digitatum A.P. de Candolle. FINGER DOGSHADE. **Hab:** Swampy forests, other wet places, ditches, blackland prairies. **Dist:** IL, sw. TN (Shelby County), and AL west to OK and TX. **Phen:** May-Jun. **Syn:** = Ar, C, F, G, GW2, Il, K1, K3, K4, MC, Mo2, NcTx, S, Tn, Tx. NatureServe G4G5 (Apparently Secure).

Daucus Linnaeus 1753 (WILD CARROT, QUEEN-ANNE'S-LACE)

A genus of about 22-25 species, herbs, of temperate and tropical areas, primarily Old World (Plunkett et al. 2018a). Spooner et al. (2013) suggest a slightly broader circumscription of the genus. Our two species, the European *D. carota* (2n=18) and the apparently native *D. pusillus* (2n=22) are in the two separate clades within the genus (Spooner et al. 2013). References: Arbizu et al (2014); Iorizzo et al (2013); Martínez-Flores et al (2020); MC; Spooner et al (2013).

1 Involucral bracts not scarious-margined, appressed-ascending in fruit; spines of the fruit prominently barbed apically with a set of retrorse barbs; umbel rays 5-26 mm long; umbellets 5-12 flowered; central flower of the umbel white; plant an unbranched (or rarely few-branched) annual.....***Daucus pusillus***

1 Involucral bracts scarious-margined, spreading or reflexed in fruit; spines of fruit not prominently barbed apically; umbel rays 10-65 mm long (at least some in a given inflorescence usually exceeding 30 mm); umbellets (10-) 20-numerous flowered; central flower of the umbel usually dark purple; plant a freely-branched biennial

Key to Map Symbology:

←rare ←uncommon ←common (see introduction for more)

* : waif
EN : endemic
H : historic

N : no
P : planted
? : questionable
X : extirpated

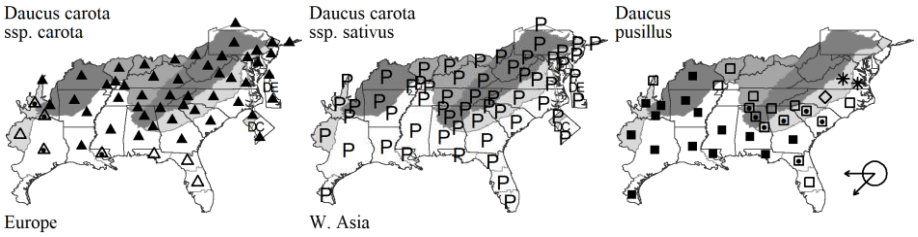
2 Taproot thin, woody; interior taproot color white, tan, or pale yellow; [roadsides, disturbed areas, fields, pastures, etc.]..... ***Daucus carota ssp. carota***

2 Taproot thick, swollen, and fleshy; interior taproot color orange, yellow, purple, red, or white; [garden plants, waifs near gardens]..... ***Daucus carota ssp. sativus***

* ***Daucus carota*** Linnaeus *ssp. **carota***. QUEEN-ANNE'S-LACE, WILD CARROT. **Hab:** Pastures, fields, roadsides, waste places. **Dist:** Native of Europe. **Phen:** May-Sep. **Tax:** The wild carrot or Queen-Anne's-Lace so common through most of our region was introduced independently from western Europe and is best treated as a separate subspecies from the cultivated carrot, which is derived from a central Asian wild relative (Iorizzo et al 2013; Martínez-Flores et al 2020). **Comm:** The cultivated carrot (ssp. *sativus*) has a fleshy taproot rich in carotene; the familiar field weed (ssp. *carota*) has a "carroty" flavor, but the root is woody and tan in color. **Syn:** = Mo2, Iorizzo et al (2013), Martínez-Flores et al (2020); < *Daucus carota* Linnaeus – Ar, C, F, Fl7, G, GrPl, Il, K1, K3, K4, MC, Meso4.1, Mi, NcTx, NE, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV, Arbizu et al (2014), Spooner et al (2013).

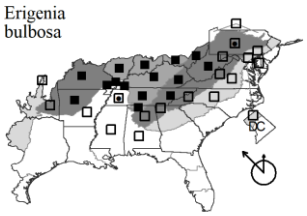
* ***Daucus carota*** Linnaeus *ssp. **sativus*** Schübler & G. von Martens. GARDEN CARROT. **Hab:** Planted as a garden vegetable, and as a short-lived waif around gardens. **Dist:** Originated in central Asia only about 1000 years ago from an ancestor genetically differentiated from *D. carota* ssp. *carota* (Iorizzo et al. 2013). **Tax:** Intrataxon rank seems warranted to emphasize the separate evolutionary clades and history of ssp. *carota* and ssp. *sativus*. **Comm:** The familiar "orange form" was apparently only selected from other cultivated carrots (of purple or yellow color) around 1500 a.d. (Iorizzo et al. 2013). **Syn:** = Mo2, Iorizzo et al (2013), Martínez-Flores et al (2020); < *Daucus carota* Linnaeus – Ar, C, F, Fl7, G, Il, K1, K3, K4, MC, Meso4.1, Mi, NcTx, NE, Pa, RAB, S, Tn, Va, W, WH3, WV, Arbizu et al (2014), Spooner et al (2013).

Daucus pusillus Michaux. AMERICAN QUEEN-ANNE'S-LACE, AMERICAN CARROT, RATTLESNAKEWEED, SEED-TICKS. **Hab:** Rocky prairies, open woodlands, pastures, fields, roadsides, waste places. **Dist:** Widespread in Southeastern United States, north to NC and MO; also distributed on the west coast of North America and south into n. Mexico. It should be expected in the lower Piedmont of NC and in the Coastal Plain of se. VA, which it closely approaches. Robert Wright has collected this species as a waif in Henrico County, VA (R. Wright, 2002, pers. comm.). The native distribution of this species is speculative. **Phen:** Apr-May; May-Jun. **ID Notes:** This native carrot is smaller and less branched than the ubiquitously naturalized *D. carota*, and the involucre held bowl-like under the compound umbel and extending beyond it in flower and to about its edge in fruit is a distinctive gestalt. **Syn:** = Ar, C, F, Fl7, G, GrPl, Il, K1, K3, K4, MC, NcTx, RAB, S, Tn, Tx, W, WH3, Arbizu et al (2014), Spooner et al (2013). NatureServe G5 (Secure).



Erigenia Nuttall 1818 (HARBINGER-OF-SPRING, PEPPER-AND-SALT)

A monotypic genus, a perennial herb, of e. North America (Plunkett et al. 2018a). References: Buddell & Thieret (1985); MC; Nesom in FNA () (in prep).



Erigenia bulbosa (Michaux) Nuttall. HARBINGER-OF-SPRING, PEPPER-AND-SALT, ERIGENIA. **Hab:** Mesic, nutrient-rich forests, either over calcareous substrate or on very rich alluvial deposits (such as riverbanks). **Dist:** S. PA, w. NY, s. ON, c. MI, and se. WI south to w. MD, DC, c. VA, w. VA, nc. NC, w. NC, e. TN, nw. GA, c. AL, n. MS, sw. AR, and se. KS (almost entirely west of the Blue Ridge). Rodgers (1950) stated that *E. bulbosa* was "reported in mtns. of N.C. by Kephart and Hyams", but Radford, Ahles, & Bell (1968) excluded it from the state's flora. *E. bulbosa* has now been documented from both the nc. Piedmont and the Mountains of NC. **Phen:** (Jan-) Feb-May. **Comm:** See Buddell & Thieret (1985) for a very interesting and entertaining account of this plant. **Syn:** = Ar, C, F, G, GrPl, Il, K1, K3, K4, MC, Mi, Mo2, Pa, RAB, S, Tn, Va, W, WV, Buddell & Thieret (1985). NatureServe G5 (Secure).

Eryngium Linnaeus 1753 (ERYNGO)

A genus of about 250 species, herbs, tropical and temperate (Plunkett et al. 2018). References: Bell (1963); Calviño & Downie (2007); Calviño & Levin (2019); Calviño, Martínez, & Downie (2008); Calviño, Martínez, & Downie (2010); MC; Plunkett et al (2018a) in Kadereit & Bittrich (2018).

1 Inflorescence unbranched, the heads solitary on peduncles from the leaf axils of the prostrate to erect stem.
  3 Heads subglobose or hemispherical when fully developed, about as wide as long; bracts subtending the head barely extending beyond the base of the head; main stems leaves linear, narrowly elliptic, narrowly oblanceolate, sometime tricuspid apically ..... ***Eryngium baldwinii***
  3 Heads cylindrical, longer than wide; bracts subtending the head longer than the radius of the head, thus extending conspicuously beyond the base of the head; main stem leaves elliptic, broader than above ..... ***Eryngium prostratum***
1 Inflorescence branched, the heads in a cyme borne terminally on the erect or prostrate stem.
  4 Basal and cauline leaves unlobed (except sometimes the uppermost; note that bracts in the inflorescence are often lobed), 3-100 cm long; leaf margins without coarse spine-tips (finely spinulose in *E. foetidum*).
    6 Blades of basal and lower cauline leaves 3-7 (-10) cm long, acute to obtuse apically, cordate to truncate basally, with a length/width ratio of 1.5-3 (-6)..... ***Eryngium integrifolium***
    6 Blades of basal and lower cauline leaves 10-100 cm long, acuminate to acute apically, clasping basally, with a length/width ratio of 5-50.

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

7 Leaves with primary veins pinnate-reticulate, with or without marginal bristles; flowers blue.
..... ***Eryngium aquaticum***

7 Leaves with primary veins parallel, with marginal bristles; flowers greenish-white.

9 Larger leaves < 1.5 cm wide; marginal bristles in fascicles of 1-3 (-4), those on the lower portion of the leaf usually in fascicles of 2-3 .....
..... ***Eryngium yuccifolium var. synchaetum***

9 Larger leaves > 1.5 cm wide; marginal bristles of leaves solitary
..... ***Eryngium yuccifolium var. yuccifolium***

4 Basal and cauline leaves (all, or at least many of the cauline) definitely deeply lobed into 3 or more divisions, < 10 cm long; leaf lobes tipped with moderately stiff to very stiff spine tips.
..... ***Eryngium campestre***

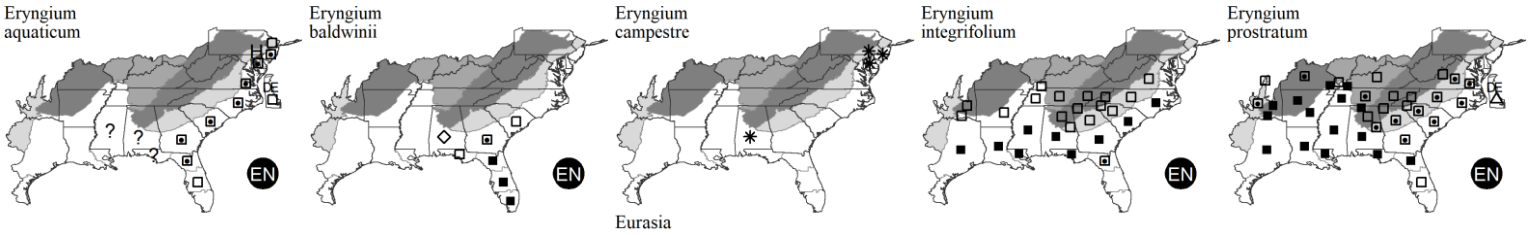
Eryngium aquaticum Linnaeus. MARSH ERYNGO. **Hab:** Tidal freshwater to brackish marshes; slightly inland over calcareous substrates. **Dist:** NJ to ne. FL along the Atlantic coast. **Phen:** Jul-Sep. **Syn:** = *Eryngium aquaticum* Linnaeus var. *aquaticum* – K1, K3, K4, MC, RAB, Va, Bell (1963); = *Eryngium virginianum* Lamarck – S; < *Eryngium aquaticum* Linnaeus – C, F, Fl7, G, GW2, Pa, WH3. NatureServe G4T4 (Apparently Secure).

Eryngium baldwinii Sprengel. **Hab:** Pinelands, temporary pools, ditches, other moist to wet sites. **Dist:** Se. SC and sw. GA south to s. FL. Reported for Mobile County, AL (H. Horne, pers.comm., 2015). **Syn:** = Fl7, GW2, K1, K3, S, WH3, Bell (1963); = *Eryngium baldwini* – MC, orthographic variant. NatureServe G5 (Secure).

* ***Eryngium campestre*** Linnaeus. FIELD ERYNGO. **Hab:** Ballast waif around ports, in AL (Mobile), MD, PA, and NJ (Bell 1963; Kartesz 2020). **Dist:** Native of Eurasia. **Syn:** = K1, K3, K4, MC, Bell (1963). NatureServe GNR (Not Yet Ranked).

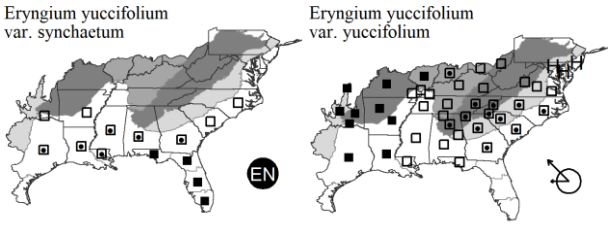
Eryngium integrifolium Walter. SAVANNA ERYNGO. **Hab:** Pine savannas, pine flatwoods, seepages, swamps, wet meadows, other moist, nutrient-poor places. **Dist:** Se. VA (Greensville County) (Belden et al. 2004) and e. NC south to ne. FL and Panhandle FL, west to OK and TX, inland in c. TN. **Phen:** Aug-Oct. **Tax:** Variation within *Eryngium integrifolium* probably warrants taxonomic recognition; it is under study by John Kees, Derick Poindexter, and Alan Weakley. **Syn:** = Ar, Fl7, K1, K3, K4, MC, NcTx, RAB, Tn, Tx, Va, W, WH3, Bell (1963); > *Eryngium integrifolium* Walter – S; > *Eryngium ludovicianum* Morong – S. NatureServe G5 (Secure).

Eryngium prostratum Nuttall ex A.P. de Candolle. CREEPING ERYNGO, SPREADING ERYNGO. **Hab:** Floodplain forests, bogs, pond margins, moist ditches and lawns, other moist, open habitats; definitely native southward, perhaps only rather recently spread to the northern parts of our area. **Dist:** Se. VA south to FL, west to OK and TX. **Phen:** May-Nov. **Syn:** = Ar, C, Fl7, GW2, Il, K1, K3, K4, MC, Mo2, NcTx, RAB, S, Tn, Tx, Va, W, WH3, Bell (1963); > *Eryngium prostratum* var. *disjunctum* Fernald – F, G; > *Eryngium prostratum* var. *prostratum* – F, G. NatureServe G5 (Secure).

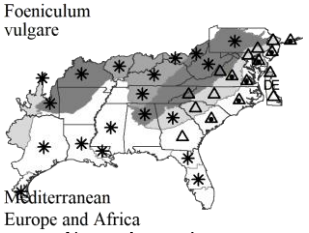


Eryngium yuccifolium Michaux *var*. ***synchaetum*** A. Gray ex Coulter & Rose. SOUTHERN RATTLESNAKE-MASTER. **Hab:** Wet savannas, especially those over calcareous clay soils. **Dist:** A Southeastern Coastal Plain endemic: se. NC to s. FL and west across the Gulf Coastal Plain, the exact range limits obscure. **Phen:** Jun-Aug. **Comm:** The distinction between the two varieties, seemingly clear in NC and elsewhere in states bordering the Atlantic, seems to become less straightforward farther west, as in LA and AR. In NC it has been seen in Pender, Brunswick, Columbus, Bladen, and Robeson counties. **Syn:** = K1, K3, K4, MC, RAB, Tx, Bell (1963); = *Eryngium synchaetum* (A. Gray ex Coulter & Rose) Coulter & Rose – S; < *Eryngium yuccifolium* Michaux – Fl7, GW2, NcTx, WH3. NatureServe G5T5 (Secure).

Eryngium yuccifolium Michaux *var*. ***yuccifolium***. NORTHERN RATTLESNAKE-MASTER. **Hab:** Diabase barrens and glades, olivine barrens, pine savannas, pine flatwoods over loamy or clay soils, prairies, other open sites with at least periodic moisture, generally in sites showing some prairie affinities. **Dist:** Widespread in southeastern and midwestern North America, the exact range limits of the typic variety and var. *synchaetum* somewhat obscure; probably distributed from NJ, OH, s. MI, WI, MN, and NE south to Panhandle FL, AL, MS, n. LA, and e. TX. **Phen:** Jun-Aug. **Syn:** = K1, K3, K4, MC, NE, RAB, Tx, Va, Bell (1963); = *Eryngium aquaticum* Linnaeus – S, misapplied; < *Eryngium yuccifolium* Michaux – Ar, C, F, Fl7, G, GrPl, GW2, Il, Mi, Mo2, NcTx, Tn, W, WH3.



Foeniculum P. Miller 1763 (FENNEL)



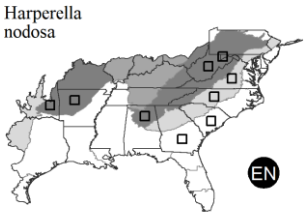
A genus of 4-5 species, perennial and biennial herbs, of Asia and Mediterranean Europe (Plunkett et al. 2018a).
References: MC; Plunkett et al (2018a) in Kadereit & Bittrich (2018).

Key to Map Symbology: └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more) * : waif EN : endemic H : historic N : no P : planted ? : questionable X : extirpated

* ***Foeniculum vulgare*** P. Miller. FENNEL. **Hab:** Fields, dredge spoil, old gardens, waste places, vacant lots, roadsides. **Dist:** Native of Mediterranean Europe. This is the common garden fennel, cultivated for its seeds, leaves, "bulbs" (finocchio), and ornamental appearance (especially bronze forms), widely used in Mediterranean cuisines. **Phen:** May-Aug; Aug-Sep. **Syn:** = Bah, C, F, Fl7, G, Il, K1, K3, K4, MC, Meso4.1, Mi, Mo2, NcTx, NE, RAB, Tn, Tx, Va, W, WH3, WV; = *Foeniculum foeniculum* (Linnaeus) Karsten – S. NatureServe GNR (Not Yet Ranked).

Harperella Rose 1906 (HARPERELLA)

A monotypic genus, an annual (or perennial) herb, of temperate e. North America (Plunkett et al. 2018a). *Harperella* should be (re-)separated from *Ptilimnium.* (Feist & Downie 2008; Feist et al. 2012), as it is sister to a clade comprised of *Tiedemannia* (formerly the quill-leaved taxa of *Oxypolis*) and *Ptilimnium* sensu stricto (with compound leaves). The genus is sometimes considered to contain 3 species, but the characters separating the different populations are not consistent; see additional discussion under *H. nodosa*. References: Easterly (1957); Feist & Downie (2008); Feist et al (2012); Kral (1981a); Kress, Maddox, & Roesel (1994); Maddox & Bartgis (1990); MC; Plunkett et al (2018a) in Kadereit & Bittrich (2018); Rose (1911).



Harperella nodosa Rose. HARPERELLA. **Hab:** Rocky or gravelly riverbeds, upland depression ponds, seepage on granite flatrocks. **Dist:** Disjunct and fragmented in distribution: w. MD, e. WV, VA, and c. NC; SC and c. GA; N. AL; AR and e. OK. **Phen:** Jun-Aug. **Tax:** Three taxa are sometimes recognized, but recent studies (molecular and morphological) show insufficient reliable bases for separating them (Feist et al. 2012; M.A. Feist, 2012, pers. comm.). Earlier work is suggestive, and additional study is needed. The three taxa formerly recognized are *H. vivipara* (leaves 4-12 (-15) cm long; plants 1-5 (-8) dm tall, adventitiously perennial by proliferating from the nodes; rays 1-9 mm long, 2-5 (-9) per inflorescence; pedicels 0.5-2.0 (-2.5) mm long; umbellets with 2-8 flowers) of rocky or gravelly riverbeds in w. MD, e. WV, VA, and c. NC; *H. fluviatilis* (leaves 4-12 (-15) cm long; plants 1-5 (-8) dm tall, adventitiously perennial by proliferating from the nodes; rays 1-9 mm long, 2-5 (-9) per inflorescence; pedicels 0.5-2.0 (-2.5) mm long; umbellets with 6-15 flowers) of rocky or gravelly riverbeds in n. AL, AR, and e. OK; and *H. nodosa* (leaves 8-30 cm long; plants 4-10.5 dm tall, strictly annual, not proliferating from the nodes; rays 10-25 mm long, 6-15 per inflorescence; pedicels 3.0-6.0 mm long) of upland depression ponds in SC and seepage on granite outcrops in GA. See references for additional details and discussion. **Comm:** Belden et al. (2004) provide details on the Virginia occurrence in Aquia Creek, Stafford County. **Syn:** = K4; = *Ptilimnium nodosum* (Rose) Mathias – C, K1, Kral (1981a); > *Harperella fluviatilis* – K3, S, Rose (1911); > *Harperella nodosa* Rose – K3, S, Rose (1911); > *Harperella vivipara* – K3, Va, Rose (1911); > *Ptilimnium fluviatile* (Rose) Mathias – G, GW2, RAB, WV, Easterly (1957); > *Ptilimnium fluviatilis* – MC, orthographic variant; > *Ptilimnium nodosum* (Rose) Mathias – GW2, MC, RAB, Easterly (1957); > *Ptilimnium viviparum* (Rose) Mathias – F, MC.

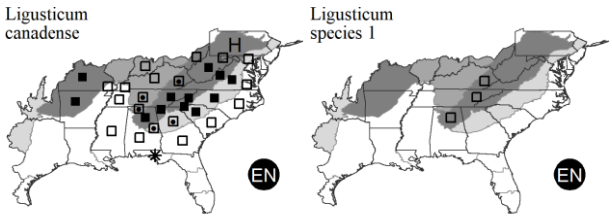
Ligusticum Linnaeus 1753 (LOVAGE)

A genus of 40-50 species, perennial herbs, circumboreal and north temperate. Zhou et al. (2020) and Plunkett et al. (2018a) make clear that *Ligusticum* in this broad circumscription is rampantly polyphyletic, and restrict it to three species widely distributed in Asia, Europe and n. North America. *Ligusticum canadense* awaits an appropriate genus placement. References: MC; Plunkett et al (2018a) in Kadereit & Bittrich (2018); Zhou et al (2020).

Unkeyed taxa: *Ligusticum species 1*

Ligusticum canadense (Linnaeus) Britton. NONDO, ANGELICO, AMERICAN LOVAGE. **Hab:** Moist to dryish, nutrient-rich forests and woodlands. **Dist:** S. PA south to c. GA, AL, and Panhandle FL; also in s. MO and n. AR, centered in the Southern and Central Appalachians and the Ozarks-Ouachitas, but extending considerably into adjacent provinces, and even slightly into the Coastal Plain. **Phen:** Jun-Jul; Aug-Sep. **ID Notes:** A distinctive vegetative character is the straightish and toothless basal portion of each leaflet. **Syn:** = Ar, C, F, Fl7, G, K1, K3, MC, Mo2, Pa, RAB, S, Tn, Va, W, WH3, WV. NatureServe G4 (Apparently Secure).

Ligusticum species 1. SCOUR NONDO. **Hab:** River scours in the Cumberland Plateau. **Dist:** Apparently endemic to river scour areas in the sedimentary Appalachians of n. AL, e. TN, and se. KY. **Tax:** Under study by D. Estes, J. Campbell, M. Medley, and colleagues.



Lilaeopsis Greene 1891 (LILAEOPSIS)

A genus of about 15 species, perennial herbs, warm temperate and tropical, of America, Australia, and New Zealand (Plunkett et al. 2018a). References: Affolter (1985); Bone et al (2011); Hatch & Slack (2008); MC; Plunkett et al (2018a) in Kadereit & Bittrich (2018).

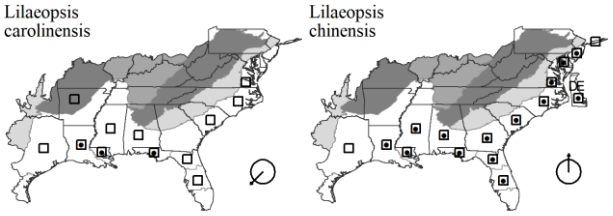
1 Leaves 7-30 (or more) cm long, often spatulate, up to 11 mm wide toward the apex, with (7-) 10-20 transverse septae; peduncles much shorter than the leaves; pedicels 5-10 mm long..... ***Lilaeopsis carolinensis***

1 Leaves 1-5 cm long, linear (rarely spatulate), 1-2 (-5) mm wide, with 4-8 (-10) transverse septae; peduncles about as long as or longer than the leaves; pedicels 3-4 mm long..... ***Lilaeopsis chinensis***

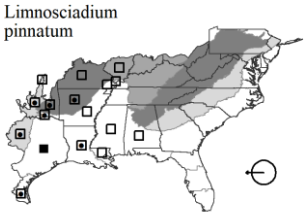
Key to Map Symbology: □ native; ◇ maybe exotic; △ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Lilaeopsis carolinensis Coulter & Rose. CAROLINA LILAEOPSIS, CAROLINA STRAPWORT. **Hab:** Freshwater marshes, pondshores and lakeshores, ditches, interdune ponds, shores of brackish to freshwater estuarine sounds and rivers. **Dist:** Se. VA south to FL and west to e. TX (Hatch & Slack 2008); it is also found in South America (Argentina, Brazil, and Paraguay). **Phen:** May-Jun. **Syn:** = Ar, F, Fl7, GW2, K1, K3, K4, RAB, S, Va, WH3, Affolter (1985); = *Lilaeopsis attenuata* (Hooker & Arnott) Fernald – C, G, MC.

Lilaeopsis chinensis (Linnaeus) Kuntze. MARSH LILAEOPSIS, TIDAL STRAPWORT, FIDDLER-CRAB TURF. **Hab:** Brackish and freshwater tidal marshes, especially in mud-flats in the intertidal zone. **Dist:** NS south to c. peninsular FL and west to se. TX (Brown & Marcus 1998). **Phen:** May-Jun. **Comm:** The epithet "*chinensis*" is a misnomer; the species is native to e. North America and has nothing to do with China. **Syn:** = C, F, Fl7, G, GW2, K1, K3, K4, MC, NE, RAB, Va, WH3, Affolter (1985); = *Lilaeopsis lineata* (Michaux) Greene – S. NatureServe G5 (Secure).



Limnosciadium Mathias & Constance 1941 (DOGSHADE)



A genus of 2 species, annual herbs, of sc. North America (Plunkett et al. 2018a). References: MC; Plunkett et al (2018a) in Kadereit & Bittrich (2018).

Limnosciadium pinnatum (A.P. de Candolle) Mathias & Constance. ARKANSAS DOGSHADE, TANSY DOGSHADE. **Hab:** Pond margins, ditches. **Dist:** S. IL, s. MO, and se. KS, south to wc. AL, MS, LA, and s. TX. **Phen:** May-Jul. **Syn:** = Ar, GrPl, GW2, Il, K3, K4, MC, Mo2, NcTx, Tx; = *Cynosciadium pinnatum* A.P. de Candolle – F. NatureServe G5? (Secure).

Osmorhiza Rafinesque 1819 (SWEET CICELY, WILD CHERVIL)

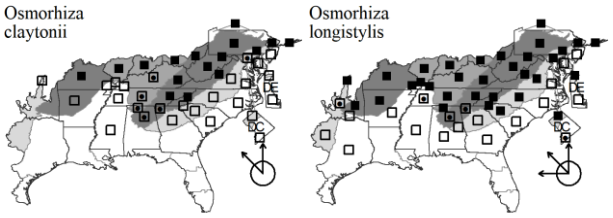
A genus of about 10 species, perennial herbs, of temperate North America, temperate South America, montane tropical Central and South America, and Asia (Wen et al. 2002; Plunkett et al. 2018a). References: Lowry & Jones (1979); MC; Plunkett et al (2018a) in Kadereit & Bittrich (2018); Wen et al (2002).

1 Styles plus stylopodium 0.5-1.5 mm long; flowers 4-7 (-10) per umbellet (including withering staminate flowers); flowers 3-4 mm across; umbellets 3-5 (-6) per umbel, on rays 2-8 (-10) cm long, the umbel therefore relatively uncrowded; roots (and foliage) not at all or only slightly anise-scented, often mildly carrot-scented... ..... ***Osmorhiza claytonii***

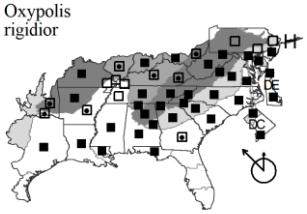
1 Styles plus stylopodium 2.0-3.5 mm long; flowers (6-) 9-18 per umbellet (including withering staminate flowers); flowers 5-6 mm across; umbellets 4-6 (-8) per umbel, on rays 1.5-5.0 (-7.5) cm long, the umbel therefore rather crowded; roots (and foliage) strongly anise- or licorice-scented ..... ***Osmorhiza longistylis***

Osmorhiza claytonii (Michaux) C.B. Clarke. BLAND SWEET CICELY, HAIRY SWEET CICELY. **Hab:** Cove forests, other moist, fertile forests. **Dist:** NS and QC west to SK, south to NC, n. GA, AL, and AR. **Phen:** Apr-May; May-Jun. **Syn:** = Ar, C, F, G, Il, K1, K3, K4, MC, Mi, Mo2, NE, Pa, RAB, Tn, Va, W, Lowry & Jones (1979); = *Osmorhiza claytoni* – GrPl, WV, orthographic variant; = *Osmorrhiza claytonii* – S, orthographic variant. NatureServe G5 (Secure).

Osmorhiza longistylis (Torrey) A.P. de Candolle. ANISE-ROOT, SMOOTH SWEET CICELY. **Hab:** Moist, fertile forests. **Dist:** QC west to SK, south to s. GA, nc. TX, and ne. NM. **Phen:** Apr-May; May-Jun. **Syn:** = Ar, C, F, G, K1, K3, K4, Mi, Mo2, NcTx, NE, Pa, RAB, Tn, Tx, Va, W, Lowry & Jones (1979); = *Osmorrhiza longistylis* – S, misspelling; > *Osmorhiza longistylis* var. *brachycoma* Blake – F, MC, WV; > *Osmorhiza longistylis* var. *longistylis* – F, GrPl, Il, MC, WV; > *Osmorhiza longistylis* var. *villicaulis* Fernald – F, GrPl, Il, MC.



Oxypolis Rafinesque 1825 (DROPWORT, HOG-FENNEL, COWBANE)

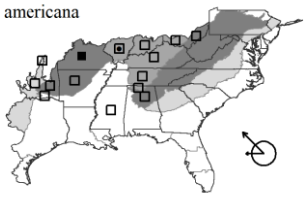


A genus of about 4 species, perennial herbs, of temperate North America (Plunkett et al. 2018a). Based on work of Feist et al. (2012) and Feist & Downie (2008), *Oxypolis* has been limited to the species with compound leaves, distributed in eastern and w. North America. The compound-leaved *Oxypolis* form a clade far-removed within tribe Oenantheae from the quill-leaved *Oxypolis* and *Ptilmnium* and compound-leaved *Ptilimnium*. The 3 taxa of *Oxypolis* with "quill-" or "rachis-leaves" are placed in *Tiedemannia*, endemic to se. United States and the West Indies. References: Feist & Downie (2008); Feist et al (2012); Kral (1981a); MC; Plunkett et al (2018a) in Kadereit & Bittrich (2018); Tucker et al (1983).

Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Oxypolis rigidior (Linnaeus) Rafinesque. COWBANE, PIG-POTATO. **Hab:** Bogs, seepages, swamps, wet meadows, streambanks. **Dist:** NY west to MN and south to n. FL and TX. **Phen:** Aug-Oct; Oct-Nov. **Comm:** Very variable in the size, shape, and toothing/lobing of the leaflets. **Syn:** = Ar, C, Fl7, G, GW2, K1, K3, K4, MC, Mi, Mo2, NcTx, Pa, RAB, Tn, Tx, Va, W, WH3; > *Oxypolis rigidior* (Linnaeus) Rafinesque – S; > *Oxypolis rigidior* var. *ambigua* (Nuttall) Robinson – F, Il, WV; > *Oxypolis rigidior* var. *rigidior* – F, Il, WV; > *Oxypolis turgida* Small – S.

Perideridia americana

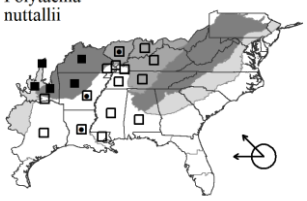


Perideridia Reichenbach 1837

A genus of about 14 species, perennial herbs, mainly of c. and w. North America (Plunkett 2018a). References: MC; Plunkett et al (2018a) in Kadereit & Bittrich (2018); Sun & Downie in FNA () (in prep).

Perideridia americana (Nuttall ex A.P. de Candolle) Reichenbach. EASTERN YAMPAH. **Hab:** Floodplains, oak savannahs, prairies, rocky woodlands, dolomite glades, shale barrens, and open woodlands, usually on limestone but less typically on sandstone. **Dist:** OH, IN, IL, IA, and KS south to ne. AL, nw. AL, wc. MS, n. AR, and OK. **Phen:** Apr-Jul. **Syn:** = Ar, C, F, G, GrPl, K1, K3, K4, MC, Mo2, Tn, Sun & Downie in FNA () (in prep); = *Eulophus americanus* Nuttall ex A.P. de Candolle – S. NatureServe G4 (Apparently Secure).

Polytaenia nuttallii



Polytaenia A.P. de Candolle 1830

A genus of 2 species, perennial herbs, of c. North America (Plunkett et al. 2018a). References: MC; Nesom (2012b); Nesom in FNA () (in prep); Plunkett et al (2018a) in Kadereit & Bittrich (2018).

Polytaenia nuttallii A.P. de Candolle. PRAIRIE-PARSLEY. **Hab:** Dry prairies, glades, open woodlands. **Dist:** MI (formerly) west to NE, south to TX and NM, occurring as a disjunct eastward in prairie-like or glade situations in c. TN (Chester, Wofford, & Kral 1998; Nesom 2012), c. KY, AL, MS, and e. LA (Nesom 2012). **Phen:** Apr-Jun. **Syn:** = Ar, C, F, G, Il, K1, K3, MC, Mi, Mo2, Tn, Tx, Nesom (2012b); = *Pleiotaenia nuttallii* (A.P. de Candolle) Coulter & Rose – S; < *Polytaenia nuttallii* A.P. de Candolle – NcTx.

Ptilimnium Rafinesque 1819 (BISHOPWEED, HARPERELLA)

A genus of 5 species, annual and perennial herbs, temperate, of e. North America (Plunkett et al. 2018a). *Ptilimnium* should be re-split into two genera, *Harperella* and *Ptilimnium*; as *Ptilimnium* (s.s.) with compound leaves is more closely related *Tiedemannia* (formerly *Oxypolis* with quill leaves) than it is to *Harperella* (Feist & Downie 2008; Feist et al. 2012). References: Easterly (1957); Feist & Downie (2008); Feist (2010); Feist et al (2012); Kral (1981a); Kress, Maddox, & Roesel (1994); MC; Plunkett et al (2018a) in Kadereit & Bittrich (2018); Rose (1911); Weakley & Nesom (2004).

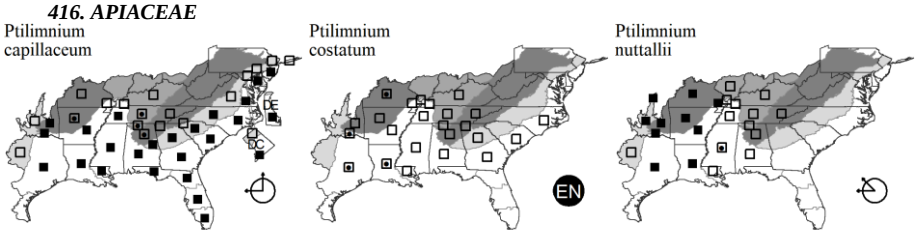
1 Leaves reduced to hollow, linear, nodose-septate quills, consisting of the petiole and leaflet-less rachis, undivided ..... ***Harperella nodosa***
1 Leaves dissected into filiform or linear segments.
  2 Middle and upper stem leaves with petioles papillate on the upper surface; styles (on the fruit) 0.1-0.2 mm long, erect-ascending to spreading; calyx teeth <0.2 mm long, deltoid.
  ..... ***Ptilimnium capillaceum***
  2 Middle and upper stem leaves with petioles not papillate on the upper surface; styles (on the fruit) (0.3-) 0.4-2.0 mm long, spreading to strongly recurved; calyx teeth >0.2 mm long, narrowly triangular.
    4 Midstem leaves with 2-4 (-5) nodes along the rachis, the primary leaf segments usually alternate or opposite at the nodes (not including the node at the apex of the rachis); individual leaf segments often much longer than the rachis; involucral bract segments 1 (-3); stem sometimes slightly thickened at the base but never forming a corm; styles (0.3-) 0.4-0.6 mm long; fruits 1.0-1.9 mm long; dorsal ribs of the fruit thick, rounded; flowering Apr-Jul; fruiting late May-early Aug ..... ***Ptilimnium nuttallii***
    4 Midstem leaves with (6-) 7-16 nodes along the rachis, the primary leaf segments whorled or verticillate at the major nodes; individual leaf segments shorter than the rachis (or rarely as long as in P. texense); involucral bract segments (1-) 3 (-7); stem thickened and rounded at base, forming a globose or slightly elongate corm; styles (0.3-) 0.5-2.0 mm long; fruits 2.2-4.0 mm long; dorsal ribs of the fruit narrow, sharp-edged to blunt; flowering Jul-Oct; fruiting mid Jul-Nov.
    ..... ***Ptilimnium costatum***

Ptilimnium capillaceum (Michaux) Rafinesque. EASTERN BISHOPWEED, ATLANTIC BISHOPWEED. **Hab:** Ditches, marshes, other wet places. **Dist:** MA, NY, and MO south to s. FL and TX. **Phen:** Jun-Aug; Jul-Sep. **Syn:** = Ar, C, F, Fl7, G, GrPl, GW2, K1, MC, Mo2, NcTx, NE, Pa, S, Tn, Tx, Va, W, WH3, Easterly (1957), Weakley & Nesom (2004); < *Ptilimnium capillaceum* (Michaux) Rafinesque – K3, K4, RAB, Feist (2010).

Ptilimnium costatum (Elliott) Rafinesque. BIG BISHOPWEED. **Hab:** Tidal freshwater marshes, wet prairies, bottomland hardwood forests. **Dist:** Se. NC south to GA, and west to IL, MO, and AR (material from LA and TX is of *P. texense*); it is rare and disjunct through much of that range. Reported for Georgetown County, SC (Bradley et al. [in prep.]). **Phen:** Jun-Oct; mid Jul-Oct. **Comm:** It has the potential to be a great deal larger and coarser than any other member of the genus, but individuals will be encountered no larger than a fairly robust plant of *P. ahlesii* or *P. capillaceum*. **Syn:** = Ar, C, F, G, GW2, Il, K1, MC, Mo2, RAB, S, Tn, Easterly (1957), Feist (2010), Feist et al (2012), Weakley & Nesom (2004); < *Ptilimnium costatum* (Elliott) Rafinesque – K3, K4. NatureServe G4 (Apparently Secure).

Ptilimnium nuttallii (A.P. de Candolle) Britton. LACEFLOWER, MIDWESTERN BISHOPWEED. **Hab:** Marshes, ditches, wetlands. **Dist:** KY, MO, and KS south to se. TN (Chester, Wofford, & Kral 1997; Tn Flora Committee 2015), s. AL, s. LA, and e. TX. **Phen:** Apr-Jul; late May-early Aug. **Syn:** = Ar, C, F, G, GrPl, GW2, Il, K1, K3, K4, MC, Mo2, NcTx, S, Tn, Tx, Easterly (1957), Feist (2010), Feist et al (2012), Weakley & Nesom (2004). NatureServe G5? (Secure).

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated



Sanicula Linnaeus 1753 (SANICLE, SNAKEROOT)

A genus of about 41 species, herbs, nearly cosmopolitan (Plunkett et al. 2018). References: MC; Plunkett et al (2018a) in Kadereit & Bittrich (2018); Pryer & Phillippe (1989).

Identification Notes: Identification note: Most *Sanicula* species cannot be reliably determined from sterile plants; fruits or flowers are required for identification. An important character is the length of the styles in relation to the calyx and/or to the bristles on the fruit. In the longer-styled species, the styles are slender and curved outward, sometimes enmeshed in the bristles, but distinctly longer than them or than the calyx. In the shorter-styled species, the styles are straight to slightly curved, shorter than or about as long as the bristles, and more or less included in the calyx. In most species the calyx is inconspicuous, but consists of 5 deltoid to narrowly triangular (or even subulate) calyx lobes, 0.4-2.0 mm long, at the summit of the schizocarp (the fruit).

1 Styles 1.5× or more as long as the calyx; umbellets dimorphic – some contain both perfect and staminate flowers, while others contain staminate flowers only (except sometimes *S. canadensis* var. *grandis*, which may have polygamous umbellets only); larger leaves 3-7-lobed.
  2 Calyx lobes 0.4-0.7 mm long, deltoid, flexible or weak in texture, the apices acute to obtuse; petals yellowish green, much longer than the calyx..... ***Sanicula odorata***
  2 Calyx lobes 0.7-2.0 mm long, narrowly triangular to subulate, rigid in texture, the apices acute-acuminate; petals white or greenish-white, equal to or slightly longer than the calyx.
    3 Styles about 1.5× as long as the calyx, inconspicuously exserted from between the calyx lobes and recurved; umbellets usually polygamous (rarely some staminate only); polygamous umbellets with 6-18 flowers (3 perfect and 3-15 staminate); fruit with a short but distinct pedicel 0.5-1.0 mm long; bases of fruit bristles dilated but not bulbous, often minutely papillose..... ***Sanicula canadensis var. grandis***
    3 Styles > 2× as long as the calyx, conspicuously exserted from the calyx and recurved; umbellets dimorphic, some polygamous and others staminate only; polygamous umbellets with 12-120 flowers (3-4 perfect and the remainder staminate); fruits sessile to subsessile; bases of fruit bristles prominently bulbous, with a minutely warty-reticulate surface pattern ..... ***Sanicula marilandica***
1 Styles shorter than (or rarely as long as) the calyx; umbellets usually monomorphic (all containing both perfect and staminate flowers), with staminate flowers 1-7 per umbellet; larger leaves 3-foliolate (the lateral leaflets often deeply lobed) or rarely 5-foliolate.
  4 Sepals on mature fruit connivent, forming a beak-like structure equaling or usually exceeding the adjacent fruit bristles, the tips of the sepals subulate and incurved; pedicels of staminate flowers 3-8 mm long; [mostly of the Mountains in our area, rarely in the Piedmont of VA]..... ***Sanicula trifoliata***
  4 Sepals on mature fruit somewhat spreading, loose, inconspicuous and immersed in the adjacent fruit bristles, the tips of the sepals acute or narrowly acute, straight; pedicels of staminate flowers 1-2 (-3) mm long; [collectively widespread in our area].
    5 Plant a perennial, from thickened, cordlike roots; umbellets with 7-9 flowers (3 perfect and 4-6 staminate)..... ***Sanicula smallii***
    5 Plant a biennial, from slender, fibrous roots; umbellets with 4-6 flowers (3 perfect and 1-3 staminate).
      6 Basal leaves (3.8-) 4.3- (mean 5.5) -7.0 (-8.1) cm across, thick in texture; leaf teeth stiff, sharp, and prominently whitened, 0.5- (mean 0.7) - 0.8 (-0.9) mm long (measured from tip to darkened base of spine); [of the Coastal Plain in our area] ..... ***Sanicula canadensis var. floridana***
      6 Basal leaves (6.6-) 7.0- (mean 8.5) - 9.2 (-9.7) cm across; leaf teeth weak, hyaline, 0.3- (mean 0.4) -0.5 (-0.6) mm long; [collectively widespread in our area, mostly not in the Coastal Plain south of VA].
        7 Largest leaflet of basal and lower stem leaves < 8 cm long and < 4 cm wide; triads of fruits 7- (mean 8) -9 mm across; plants to 1 m tall; [widespread in distribution]..... ***Sanicula canadensis var. canadensis***
        7 Largest leaflet of basal and lower stem leaves both 5.5- (mean 8.5) - 13.5 cm long (mean 8.5) and also 2.5- (mean 3.5) - 6.0 cm wide; triads of fruits 8- (mean 10) -15 mm across; plants to 2 m tall; [mainly northern and montane in distribution]..... ***Sanicula canadensis var. grandis***

Sanicula canadensis Linnaeus *var.* ***canadensis***. CANADA SANICLE, BLACK SNAKEROOT. **Hab:** Dry-mesic to mesic forests. **Dist:** VT and s. ON west to MN and SD, south to Panhandle FL and e. TX. **Phen:** Apr-May; Jun-Jul. **Syn:** = F, G, Il, Mi, NE, Pa, Pryer & Phillippe (1989); = *Sanicula canadensis* – S; < *Sanicula canadensis* – Ar, C, Fl7, MC, Mo2, NcTx, RAB, Tx, Va, W, WH3, WV; < *Sanicula canadensis* Linnaeus var. *canadensis* – GrPl, K1, K3, K4.

Sanicula canadensis Linnaeus *var.* ***floridana*** (E.P. Bicknell) H. Wolff. FLORIDA SANICLE, FLORIDA SNAKEROOT. **Hab:** Dry-mesic to mesic, sandy forests, often associated with *Fagus grandifolia* (and southward *Magnolia grandiflora*). **Dist:** Se. VA south to c. peninsular FL, west to s. MS, in the Coastal Plain. **Phen:** Apr-May; Jun-Jul. **Tax:** Additional differences between var. *floridana* and var. *canadensis* should be investigated. They may not be worthy of taxonomic differentiation. **Syn:** = F, G; = *Sanicula floridana* E.P. Bicknell – S; < *Sanicula canadensis* – C, Fl7, MC, RAB, Tn, Va, WH3; < *Sanicula canadensis* Linnaeus var. *canadensis* – K1, K3, K4.

Sanicula canadensis Linnaeus *var.* ***grandis*** Fernald. LARGE SANICLE. **Hab:** Dry-mesic to mesic forests. **Dist:** VT and n. NY west to s. ON, WI, se. MN, and n. IA, south to PA, n. WV, n. KY, c. IL, and MO, and in the Mountains (and rarely upper Piedmont) to NC, SC, and (allegedly) AL. **Phen:** Jun-Aug. **Syn:** = F, Il, K1, K3, K4, NE, Pa, Pryer & Phillippe (1989); < *Sanicula canadensis* – C, GrPl, MC, RAB, Tn, Va, W, WV. NatureServe G5T3T5 (Apparently Secure).

Sanicula marilandica Linnaeus. MARYLAND SANICLE, BLACK SNAKEROOT. **Hab:** Mesic to dry-mesic nutrient-rich forests. **Dist:** QC and NL (Newfoundland) west to BC, south to Panhandle FL, se. LA, NM, and WA. **Phen:** May-Jun; Jul-Aug. **Tax:** The Coastal Plain populations (designated as var. *petiolulata* by Fernald) are somewhat disjunct from the main range of distribution, occur in rather different (more acidic) habitats, and warrant additional study. The primary morphological difference indicated by Fernald (1950) is that var. *petiolulata* has "the leaflets of 1 or 2 lower cauline leaves on petiolules 1.5-5 cm long" (vs. sessile or short-petiolulate). **Syn:** = C, Fl7, GrPl, Il, K1, K3, K4, MC, Mi, NE, Pa, RAB, Tn, Va, W,

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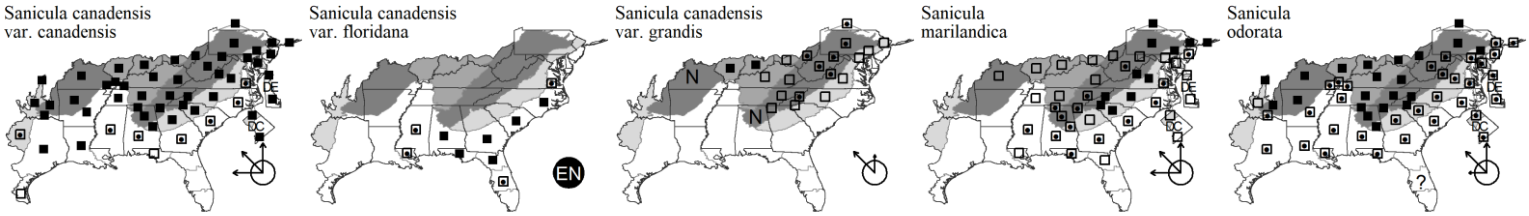
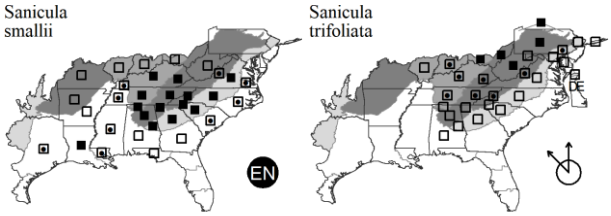
WH3, WV, Pryer & Phillippe (1989); = *Sanicula marylandica* – S, orthographic variant; > *Sanicula marilandica* var. *marilandica* – F, G; > *Sanicula marilandica* var. *petiolulata* Fernald – F, G. NatureServe G5 (Secure).

Sanicula odorata (Rafinesque) K.M. Pryer & L.R. Phillippe. CLUSTERED SANICLE, CLUSTERED SNAKEROOT, YELLOW-FLOWERED SNAKEROOT, FRAGRANT SNAKEROOT. **Hab:** Mesic to dry-mesic nutrient-rich forests. **Dist:** NS and QC west to MN and e. SD, south to Panhandle FL and e. TX. **Phen:** Apr-Jun; Jun-Jul. **Syn:** = Ar, Fl7, Il, K1, K3, K4, Mi, Mo2, NcTx, NE, Pa, Tn, Va, WH3, Pryer & Phillippe (1989); = *Sanicula gregaria* E.P. Bicknell – C, F, G, GrPl, MC, RAB, S, Tx, W, WV.

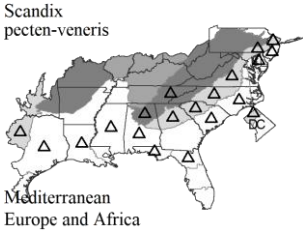


Sanicula smallii E.P. Bicknell. SOUTHERN SANICLE, SMALL'S SANICLE. **Hab:** Mesic to dry-mesic forests. **Dist:** C. VA, sw. VA, s. WV, KY, se. MO, south to Panhandle FL, se. LA, c. LA, and e. TX. **Phen:** Apr-May; May-Jun. **Syn:** = Ar, C, F, Fl7, G, Il, K1, K3, K4, MC, Mo2, RAB, S, Tn, Tx, Va, W, WH3. NatureServe G5 (Secure).

Sanicula trifoliata E.P. Bicknell. BEAKED SANICLE, LARGE-FRUITED SANICLE. **Hab:** Cove forests, other mesic, nutrient-rich forests. **Dist:** QC and VT west to s. WI and se. MN, south to n. VA, w. NC, n. GA, c. TN, c. IL, and ne. IA. **Phen:** May; Jun-Jul. **Syn:** = C, F, G, Il, K1, K3, K4, MC, Mi, Pa, RAB, S, Tn, Va, W, WV, Pryer & Phillippe (1989). NatureServe G4 (Apparently Secure).



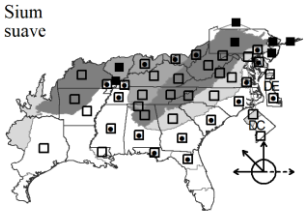
Scandix Linnaeus 1753 (VENUS'-COMB)



A genus of about 10-20 species, annual herbs, temperate, of Eurasia (Plunkett et al. 2018). References: MC; Plunkett et al (2018a) in Kadereit & Bittrich (2018); Plunkett et al (2018a) in Kadereit & Bittrich (2018).

* ***Scandix pecten-veneris*** Linnaeus. VENUS'-COMB, SHEPHERD'S-NEEDLE. **Hab:** Roadsides, fields, disturbed areas. **Dist:** Native of Mediterranean Europe. First reported for TN (Polk County) by Hart, Shaw, & Estes (2012). First reported for LA (Caddo parish) by Kelley (2022). **Phen:** Mar-Apr. **Syn:** = C, Fl7, G, K1, K3, K4, MC, NcTx, NE, RAB, S, Tx, WH3. NatureServe GNR (Not Yet Ranked).

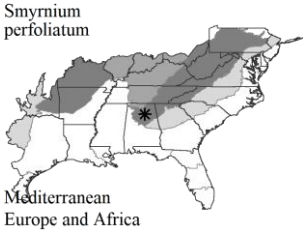
Sium Linnaeus 1753 (WATER-PARSNIP)



A genus of about 9 species, perennial herbs, of the northern hemisphere (Plunkett et al. 2018a). References: MC; Nesom in FNA () (in prep); Plunkett et al (2018a) in Kadereit & Bittrich (2018).

Sium suave Walter. WATER-PARSNIP. **Hab:** Freshwater marshes, brackish marshes, swamp forests, in tidally or seasonally flooded hydrology. **Dist:** NL (Newfoundland) west to AK, south to Panhandle FL, n. peninsular FL, and CA; e. Russia, China, Korea, and Japan. **Phen:** Jun-Aug; Aug-Oct. **Tax:** The taxonomic status of *Sium floridanum* Small, known from se. VA south to GA, needs additional investigation; it is probably just a depauperate shade form. **ID Notes:** The plant can be very coarse, up to 3 m in height and the stem to 5 cm in diameter. Submersed leaves are deeply dissected. **Syn:** = Ar, C, Fl7, GrPl, Il, K1, K3, K4, Mi, Mo2, NcTx, NE, Pa, RAB, Tn, Tx, Va, W, WH3, WV; > *Sium cicutaefolium* Schrank – S; > *Sium floridanum* Small – F, G, GW2, MC, S; > *Sium suave* Walter – F, G, GW2, MC. NatureServe G5 (Secure).

Smyrnium Linnaeus 1753



A genus of ca. 7 species, biennial herbs, native of Europe. References: Plunkett et al (2018a) in Kadereit & Bittrich (2018).

* ***Smyrnium perfoliatum*** Linnaeus. PERFOLIATE ALEXANDERS. **Hab:** Moist forests. **Dist:** Native of Mediterranean Europe. Found in a mesic forest in Cherokee County, AL, apparently introduced via seed in nursery material (Keener 2007). **Syn:** = K4.

Key to Map Symbology: □⊙■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Spermolepis Rafinesque 1825 (SPERMOLEPIS)

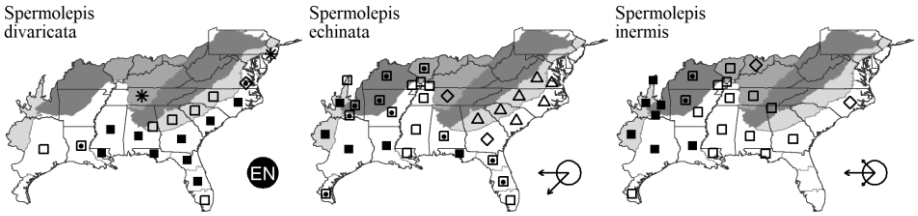
A genus of 5 species, annual herbs, of North America, Argentina, and Hawaii (Plunkett et al. 2018a). References: MC; Nesom (2012c); Plunkett et al (2018a) in Kadereit & Bittrich (2018).

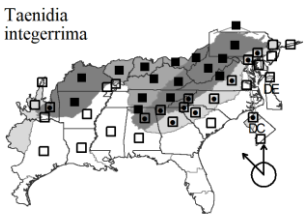
1 Ovary and fruit with hooked bristles..... ***Spermolepis echinata***
1 Ovary and fruit with pointed hairs or rounded tubercles.
2 Ovary and fruit with sharply pointed thick-based, single-celled hairs; primary rays of the umbel widely spreading to weakly ascending, not greatly differing in length ..... ***Spermolepis divaricata***
2 Ovary and fruit with multicellular tubercles, lacking a sharp tip; primary rays of the umbel strongly ascending, differing conspicuously in length ..... ***Spermolepis inermis***

Spermolepis divaricata (Walter) Rafinesque ex Seringe. SOUTHERN SPERMOLEPIS, ROUGHFRUIT SPERMOLEPIS. **Hab:** Sandy roadsides, disturbed areas. **Dist:** VA south to s. FL, west to e. TX. Endemic to our region, though weedy in behavior, and perhaps introduced only in VA. **Phen:** Apr-May; May-Jun. **Syn:** = K4, Nesom (2012c); < *Spermolepis divaricata* (Walter) Rafinesque ex Seringe – Ar, C, Fl7, G, GW2, K1, K3, MC, Mo2, NcTx, RAB, S, Tx, Va, WH3. NatureServe GNR (Not Yet Ranked).

Spermolepis echinata (Nuttall ex A.P. de Candolle) A. Heller. BRISTLEFRUIT SPERMOLEPIS, HOOKED SPERMOLEPIS. **Hab:** Sandy prairies, sandy roadsides and disturbed areas. **Dist:** IL and s. KS south to Mexico (Coahuila and Tamaulipas, other states); more eastern parts of the distribution are of uncertain nativity. **Phen:** Apr; May. **Syn:** = Ar, C, F, Fl7, G, GrPl, Il, K1, K3, MC, Mo2, NcTx, RAB, S, Tn, Tx, WH3, Nesom (2012c). NatureServe GNR (Not Yet Ranked).

Spermolepis inermis (Nuttall ex A.P. de Candolle) Mathias & Constance. WESTERN SPERMOLEPIS. **Hab:** Sandy prairies and open woodlands, calcareous prairies in the Mountains (GA), disturbed areas in the Coastal Plain (NC). **Dist:** IN, IL, IA, MN, and NE south to w. LA, TX, se. NM, and COA; disjunct eastwards in TN G, AL, MS, and e. LA as a native, and also a rare waif (as in e. NC). **Phen:** Apr; May. **Syn:** = Ar, C, F, G, GrPl, Il, K4, MC, Mo2, NcTx, RAB, Tn, Tx, Nesom (2012c); < *Spermolepis inermis* (Nuttall ex A.P. de Candolle) Mathias & Constance – K1, K3; ? *Spermolepis patens* (Nuttall ex A.P. de Candolle) B.L. Robinson – S.





Taenidia (Torrey & A. Gray) Drude 1898 (YELLOW PIMPERNEL)

Contributed by D.B. Poindexter and A.S. Weakley

A genus of 2 species, perennial herbs, of temperate e. North America. Since its naming, *Taenidia montana* has been traditionally separated into a monotypic genus, *Pseudotaenidia*; Cronquist (1982) has suggested that *Pseudotaenidia* be submerged in *Taenidia*. Cronquist's argument that the two monotypes are most closely related to one another is very possibly correct and has been generally followed since, but awaits further assessment with molecular methods. Plunkett et al. (2018) retained *Pseudotaenidia* and *Taenidia* as monotypic genera. References: Cronquist (1982); MC; Plunkett et al (2018a) in Kadereit & Bittrich (2018).

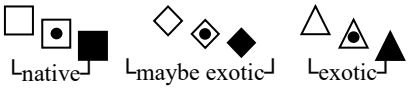
Taenidia integerrima (Linnaeus) Drude. YELLOW PIMPERNEL. **Hab:** In rocky, dry to dry-mesic forests and woodlands over mafic or calcareous rock, such as diabase, amphibolite, calcareous siltstone, calcareous shale, or limestone. **Dist:** QC, ON, MN, and SD south to c. GA, AL, MS, LA, and TX. **Phen:** Apr-May (-Jun); May-Jun. **Syn:** = Ar, C, F, G, GrPl, Il, K1, K3, K4, MC, Mi, Mo2, NE, Pa, RAB, S, Tn, Tx, Va, W, WV, Cronquist (1982), Plunkett et al (2018a) in Kadereit & Bittrich (2018). NatureServe G5 (Secure).

Thaspium Nuttall 1818 (MEADOW-PARSNIP)

A genus of 3-6 species, perennial herbs, temperate, of e. North America (Plunkett et al. 2018a). *Thaspium* and *Zizia* are closely related (sister to one another) and their traditional separation as genera should be re-evaluated. References: Cooperrider (1985); Coulter & Rose (1900); Floden (2019); MC; Plunkett et al (2018a) in Kadereit & Bittrich (2018).

Identification Notes: Because *Thaspium* and *Zizia* are often confused when not in fruit, a combined key emphasizing vegetative characters has been provided; it may also be helpful to use the key to genera, and if a clear answer is obtained, then use the *Thaspium-Zizia* combined key, skipping taxa of the "wrong" genus.

3 Basal leaves at least in part 2-ternate or more divided (with 5 or more leaflets).
4 Leaflets coarsely and rather lacerately serrate or incised, many of the teeth at least 2 mm long as measured on the shorter side; leaflet margins ciliate, not hyaline-whitened; umbel rays 8-10, < 3.5 cm long even in fruit; petals pale to creamy yellow; plant hispidulous to sparsely pubescent.
5 Stem leaves 1-2-ternate, glabrous or glabrate on the lower surface except for the primary veins; corolla golden yellow; peduncles and umbel rays glabrous or papillose-roughened on upper surface; fruits glabrous between and on the wings, mature fruit 5-6 mm long..... ***Thaspium barbinode***

Key to Map Symbology:  └native┘ └maybe exotic┘ └exotic┘ ←rare ←uncommon ←common (see introduction for more)

* : waif; EN : endemic; H : historic

N : no P : planted ? : questionable X : extirpated

5 Stem leaves 2-3-ternate, puberulent on the lower surface on the veins and blade surface; corolla pale yellow to creamy white; peduncles and umbel rays scabrellous on upper surface; fruits scabrellous between and sometimes on several wings, mature fruit 4-5 mm long..... ***Thaspium chapmanii***

4 Leaflets finely to coarsely serrate, but not lacerate or incised, few if any of the teeth > 2 mm long as measured on the shorter side; leaflet margins glabrous and hyaline-whitened; umbel rays mostly either more in number (than 8-10) or longer (than 3.5 cm long); petals golden yellow; plant glabrous.

6 Teeth of the leaflets fine, averaging (4-) 5-10 per cm of margin, acuminate (the 2 sides making an angle of about 45 degrees); umbel rays (8-) 10-18, in fruit 2.5-4 (-5) cm long; basal leaves many-foliolate, the leaflets mostly acuminate; fruit ca. 2× as long as wide..... ***Zizia aurea***

6 Teeth of the leaflets coarse, averaging (1-) 2-3 (-4) per cm of margin, acute to obtuse (the 2 sides making an angle of about 90 degrees); umbel rays 4-10 (-12), the longest to 11 cm long in fruit (some on a plant at least 5 cm long); basal leaves 3-5 (-7)-foliolate, the leaflets mostly rounded to obtuse at the apex; fruit 1-1.5× as long as wide..... ***Zizia trifoliata***

3 Basal leaves simple or 3-foliolate (with 1-3 leaflets).

7 Teeth of the leaflets coarse, averaging 2-3 (-4) per cm of margin, the long side of most of the teeth 2-10 mm long; basal leaves mostly 3-foliolate (or more divided); middle and upper stem leaves equally or more divided than the basal leaves (the most divided leaves usually those of the mid-stem)..... ***Zizia trifoliata***

7 Teeth of the leaflets fine, averaging 4-10 per cm of margin, the long side of most of the teeth 0.5-2 (-4) mm long; basal leaves simple (and cordate) or 3-foliolate; middle and upper stem leaves 3-foliolate (rarely simple).

8 Teeth relatively acute, without a well-developed callous tip and a thickened, translucent border (use 10× magnification); lower portion of stem puberulent, the upper nodes also usually puberulent (use 10×); leaf margins often ciliolate; umbel rays 7-15; flowers golden yellow..... ***Zizia aptera***

8 Teeth relatively obtuse, with a well-developed callous tip and a thickened, translucent border (use 10× magnification); lower portion of stem glabrous, the upper nodes sometimes minutely roughened; leaf margins glabrous and hyaline; umbel rays 4-10 (-11); flowers maroon or golden yellow.

9 Flowers golden yellow; stems and leaves green, rarely purple-tinged ..... ***Thaspium trifoliatum var. aureum***

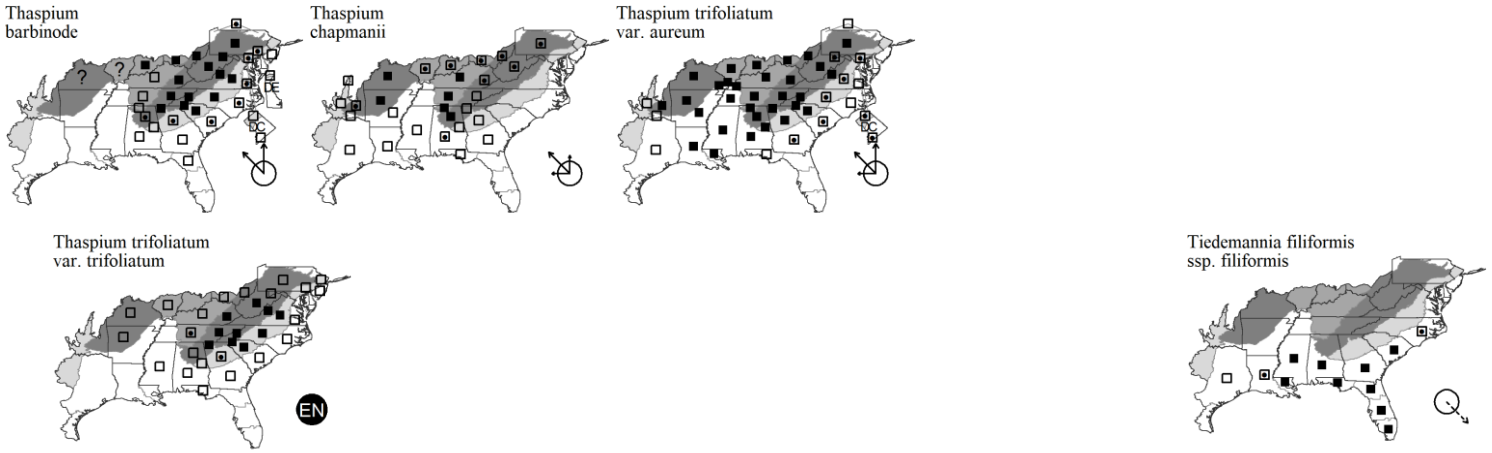
9 Flowers dark maroon; stems and leaves usually purple-tinged ..... ***Thaspium trifoliatum var. trifoliatum***

Thaspium barbinode (Michaux) Nuttall. **Hab:** Moist forests. **Dist:** NY and ON west to IN, south to c. GA and c. AL. **Phen:** Apr-May; Jul-Aug. **Comm:** The hispid, purple-tinged leaf sheath is a useful additional character for this species. **Syn:** = K3, K4, S, Tn, Va, W, Floden (2019); = *Thaspium barbinode* var. *barbinode* – F, Coulter & Rose (1900); < *Thaspium barbinode* (Michaux) Nuttall – C, G, Il, K1, MC, Mo2, Pa, RAB, WH3, WV, Cooperrider (1985). NatureServe G5 (Secure).

Thaspium chapmanii (Coulter & Rose) Small. **Hab:** Calcareous bluffs, dry to mesic forests and woodlands, especially over calcareous substrates, open disturbed sites. **Dist:** Sw. PA, s. ON, s. MI, sw. WI, and s. MN south to Panhandle FL (Jackson County) and e. TX (Houston County). **Phen:** Apr-Jun. **Syn:** = K3, K4, Mi, Tn, Floden (2019); = *Thaspium barbinode* var. *angustifolium* Coulter & Rose – F; < *Thaspium barbinode* (Michaux) Nuttall – C, Fl7, G, GrPl, Il, K1, MC, Mo2, Pa, WH3, WV, Cooperrider (1985); > *Thaspium barbinode* var. *angustifolium* Coulter & Rose – Coulter & Rose (1900); > *Thaspium barbinode* var. *chapmanii* Coulter & Rose – Coulter & Rose (1900).

Thaspium trifoliatum (Linnaeus) A. Gray *var.* ***aureum*** (Linnaeus) Britton. **Hab:** Moist forests. **Dist:** NY west to MN, south to SC, AL, AR, and se. KS. **Phen:** Apr-May; Jul-Aug. **Tax:** Various workers have differed on the characters used to separate two varieties in *T. trifoliatum*. RAB and C separate the two strictly on petal color; F, however, allows var. *aureum* to sometimes have purple petals, seeming to regard the critical differences to be var. *aureum*'s generally more robust size and larger fruits (4.5 mm long vs. 3-4 mm long). It is presently not clear how two varieties should be separated, or, indeed, if varieties are warranted. Though the ranges overlap, var. *aureum* is generally more northern and western, var. *trifoliatum* more southern and eastern. **Syn:** = Ar, K1, K3, K4, S, Coulter & Rose (1900); = *Thaspium trifoliatum* var. *flavum* Blake – C, F, GrPl, Il, MC, Mo2, Pa, RAB, Tn, W, WV, Cooperrider (1985); < *Thaspium trifoliatum* – G, Mi, Va, Floden (2019). NatureServe G5T5 (Secure).

Thaspium trifoliatum (Linnaeus) A. Gray *var.* ***trifoliatum***. PURPLE MEADOW-PARSNIP. **Hab:** Moist forests. **Dist:** NJ, PA, and MO, south to Panhandle FL and LA. **Phen:** Apr-May; Jul-Aug. **Syn:** = Ar, C, F, Il, K1, K3, K4, MC, Mo2, Pa, RAB, S, Tn, W, WV, Cooperrider (1985), Coulter & Rose (1900); = *Thaspium trifoliolatum* var. *trifoliolatum* – NE, misspelling; < *Thaspium trifoliatum* – Fl7, G, Va, WH3. NatureServe G5T5 (Secure).



Tiedemannia A.P. de Candolle 1829 (WATER DROPWORT)

A genus of 2 species and 3 taxa, perennial herbs, of se. United States and the West Indies (Bahamas and Cuba) (Plunkett et al. 2018a). See Feist et al. (2012) for discussion of the relationships of this genus, which is sister to compound-leaved species of *Ptilimnium* (sensu stricto, excluding *Harperella*). References: Feist & Downie (2008); Feist et al (2012); Judd (1982b); Kral (1981c); MC; Plunkett et al (2018a) in Kadereit & Bittrich (2018); Tucker et al (1983).

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

Tiedemannia filiformis (Walter) Feist & S.R. Downie *ssp. **filiformis***. WATER DROPWORT. **Hab:** Wet savannas, sandhill seepages. **Dist:** Se. NC south to s. FL, west to se. TX; West Indies. **Phen:** Jul-Sep; Aug-Oct. **Syn:** = Fl7, K3, K4, Feist et al (2012); = *Oxypolis filiformis* (Walter) Britton – Bah, GW2, K1, MC, NcTx, RAB, S, Tx; = *Oxypolis filiformis* ssp. *filiformis* – WH3, Judd (1982b). NatureServe G5 (Secure).

Torilis Adanson 1763 (HEDGE-PARSLEY, BUR-PARSLEY)

A genus of about 15 species, annual herbs, temperate, of the Old World (Plunkett et al. 2018a). References: Banfi, Galasso, & Soldano (2011); DiTommaso et al (2014); Jury (1996); Jury (2003); MC; Plunkett et al (2018a) in Kadereit & Bittrich (2018).

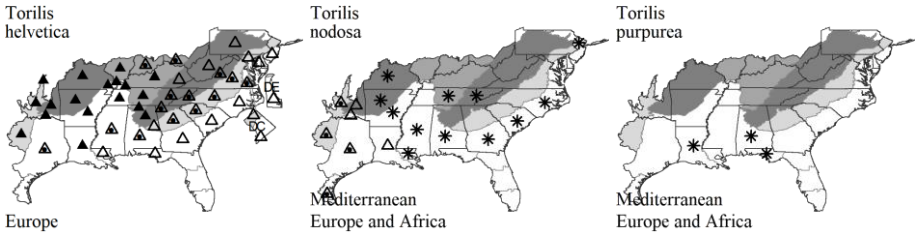
1 Rays reduced or absent, < 5 mm long, the inflorescence therefore compact, appearing like a head; inflorescences opposite the leaves, on peduncles 0-1 (-2) cm long; central schizocarps in each umbellet with both mericarps tuberculate; peripheral schizocarps in each umbellet with only the outer mericarp spiny..... ***Torilis nodosa***

1 Rays and pedicels well-developed, > 5 mm long, the inflorescence therefore open, distinctly and obviously an umbel; inflorescences opposite the leaves and terminal, on peduncles (1-) 3-16 cm long; schizocarps with both mericarps spiny or sometimes with 1 mericarp tuberculate.
3 Rays (2-) 4-12; schizocarps with longest spines slightly antrorsely curved, 0.5-1.0 mm long..... ***Torilis helvetica***
3 Rays 2-3 (-4); schizocarps with longest spines straight, 1.0-1.5 mm long..... ***Torilis purpurea***

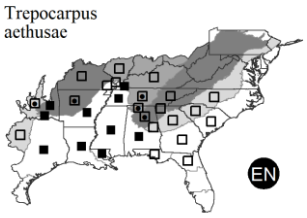
* ***Torilis helvetica*** (Jacquin) C.C. Gmelin. SPREADING BUR-PARSLEY, FIELD HEDGE-PARSLEY. **Hab:** Roadsides, fields, disturbed areas. **Dist:** Native of Mediterranean Europe and n. Africa. Reported as new to DE (Longbottom, Naczi, & Knapp 2016). **Phen:** May-Jun (-Jul). **Tax:** The widely naturalized *Torilis* in eastern North America is not *Torilis arvensis* s.s., or *Torilis arvensis* ssp. *arvensis*, but *Torilis arvensis* ssp. *recta* or (if treated at species rank, as here) *Torilis helvetica*. **Syn:** = Banfi, Galasso, & Soldano (2011); = *Torilis arvensis* ssp. *recta* – Jury (1996), Jury (2003); < *Torilis arvensis* (Hudson) Link – Ar, C, Fl7, GrPl, Il, MC, Mo2, NcTx, RAB, Tn, Va, W, WH3, DiTommaso et al (2014); < *Torilis arvensis* ssp. *arvensis* – K1, K3, K4. NatureServe GNRTNR (Not Yet Ranked).

* ***Torilis nodosa*** (Linnaeus) Gaertner. KNOTTED BUR-PARSLEY. **Hab:** Disturbed areas. **Dist:** Native of Mediterranean Europe. **Phen:** Apr-Jun. **Syn:** = Ar, G, GrPl, K1, K3, K4, MC, Mi, Mo2, NcTx, RAB, S, Tx. NatureServe GNR (Not Yet Ranked).

* ***Torilis purpurea*** (Tenore) Gussone. **Hab:** Disturbed areas. **Dist:** Native of Mediterranean Europe. **Syn:** = Banfi, Galasso, & Soldano (2011); = *Torilis arvensis* (Hudson) Link ssp. *heterophylla* (Gussone) Thellung – K1, K3, K4; = *Torilis arvensis* ssp. *purpurea* – Jury (1996), Jury (2003); < *Torilis arvensis* (Hudson) Link – WH3, DiTommaso et al (2014).



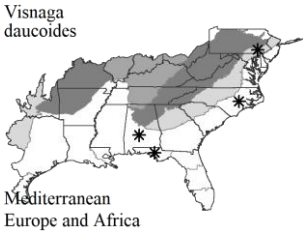
Trepocarpus Nuttall ex A.P. de Candolle 1829 (WHITE-NYMPH)



A monotypic genus, an annual herb, temperate, of se. United States (Plunkett et al. 2018a). References: MC; Nesom in FNA () (in prep); Plunkett et al (2018a) in Kadereit & Bittrich (2018).

Trepocarpus aethusae Nuttall ex A.P. de Candolle. WHITE-NYMPH. **Hab:** Rich moist forests, calcareous glades, sometimes weedy in disturbed soils. **Dist:** Nc. NC south to Panhandle FL and AL, west to e. TX, north in the interior to w. TN, w. KY, AR, and se. OK. **Phen:** May-Jun. **Comm:** Nelson (1993) states that despite "something of a reputation as a rarity", *Trepocarpus* is "a reasonably successful weed". **Syn:** = Ar, C, Fl7, GW2, Il, K1, K3, K4, MC, Mo2, NcTx, RAB, Tn, Tx, WH3. NatureServe G4G5 (Apparently Secure).

Visnaga P. Miller 1754 (BISNAGA)



A genus of 1-2 species, annual or biennial herbs, of the Mediterranean region (Plunkett et al. 2018). References: MC; Plunkett et al (2018a) in Kadereit & Bittrich (2018).

* ***Visnaga daucoides*** Gaertner. BISNAGA, TOOTHPICK-PLANT. **Hab:** On ballast, presumably just a waif. **Dist:** Native of Mediterranean Europe. In our region, known from Pjhiladelphia (PA), Wilmington (NC), Pensacola (FL), and Mobile (AL). **Phen:** May-Jun. **Syn:** = K4; = *Ammi visnaga* (Linnaeus) Lamarck – Fl7, K3, MC, RAB, S, Tx, WH3. NatureServe GNR (Not Yet Ranked).

Zizia W.D.J. Koch 1825 (GOLDEN-ALEXANDERS)

A genus of about 4 species, perennial herbs, temperate, of North America. References: Cooperrider (1985); MC.

[see combined key to *Thaspium* and *Zizia* under *Thaspium*]

Key to Map Symbology: □⊡■ native; ◇◈◆ maybe exotic; △◬▲ exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

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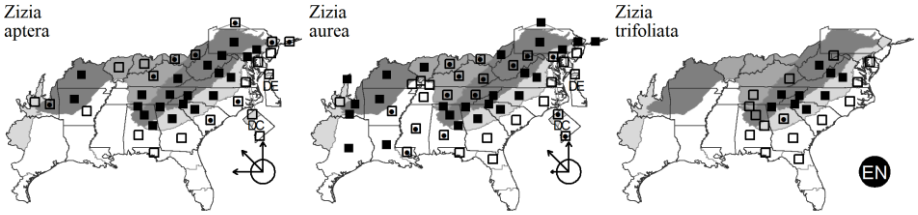
Zizia aptera (A. Gray) Fernald. HEARTLEAF GOLDEN-ALEXANDERS. **Hab:** Prairies, moist forests, forest openings, open woodlands, and woodland edges. **Dist:** NY west to BC, south to GA, Panhandle FL, AR, OK, CO, UT, and OR. **Phen:** Apr-May; Jul-Aug. **Syn:** = Ar, F, Fl7, G, GW2, Il, K1, K3, K4, MC, Mi, Mo2, NE, Pa, RAB, Tn, Va, W, WH3, WV, Cooperrider (1985); = *Zizia cordata* W.D.J. Koch ex A.P. de Candolle – S; > *Zizia aptera* var. *aptera* – C. NatureServe G5 (Secure).

Zizia aurea (Linnaeus) W.D.J. Koch. COMMON GOLDEN-ALEXANDERS. **Hab:** Moist forests, moist prairies. **Dist:** NB west to SK, south to sw. GA, Panhandle FL, and e. TX. **Phen:** Apr-May; Jun-Jul. **Syn:** = Ar, C, F, Fl7, G, GrPl, GW2, Il, K1, K3, K4, MC, Mi, Mo2, NcTx, NE, Pa, RAB, S, Tn, Tx, Va, W, WH3, WV, Cooperrider (1985). NatureServe G5 (Secure).

Zizia trifoliata (Michaux) Fernald. MOUNTAIN GOLDEN-ALEXANDERS. **Hab:** Moist forests, woodlands, and woodland borders. **Dist:** MD, VA, WV, and TN south to n. peninsular FL, Panhandle FL, and c. AL; a report for AR (Kartesz 2010) is false. **Phen:** Apr-May; Jul-Aug. **Syn:** = C, F, Fl7, G, GW2, K1, K3, K4, RAB, Tn, Va, W, WH3, WV; > *Zizia bebbii* (Coulter & Rose) Britton – S; > *Zizia latifolia* Small – MC, S; > *Zizia trifoliata* (Michaux) Fernald – MC.



Key to Map Symbology: native; maybe exotic; exotic; ←rare ←uncommon ←common (see introduction for more); * : waif; EN : endemic; H : historic; N : no; P : planted; ? : questionable; X : extirpated

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Index of Common Names

"Anacharis" *Egeria densa*
"Appalachian Gametophyte" *Vittaria appalachiana*
"Black Alder" *Ilex verticillata*
"Broom Sage" *Andropogon virginicus**
"Clemathy-vine" *Clematis terniflora*
"Elodea" *Egeria densa*
"False Solomon's-seal" *Maianthemum racemosum*
"Fruiting" Quince *Cydonia oblonga*
"Mahogany." *Betula lenta**
"Pin Oak" *Quercus phellos*
"Privy Hedge" *Ligustrum sinense*
"Red Milkweed" *Asclepias rubra*
"Sage Grass" ***Andropogon** virginicus**
"Sedge Grass" *A. virginicus**
"Wandering Jew" ***Tradescantia** pallida*
— *T. zebrina*
{name} *Silphium asperrimum*
'Diamond Frost' ***Euphorbia** graminea*
'Frosted Flakes' *E. graminea*
Aaron's-rod *Thermopsis villosa*
Abelia *Abelia grandiflora*
Acacia, Small's Sweet *Vachellia densiflora*
Achyranthes, Blunt-leaved *Achyranthes aspera**
Aconite-saxifrage *Boykinia aconitifolia*
Acorn Squash *Cucurbita melopepo**
Adam-and-Eve *Aplectrum hyemale*
Addermouth *Pogonia ophioglossoides*
Adder's-mouth, Green *Malaxis unifolia*
Adonis, Autumn *Adonis annua*
African Bristlegrass *Setaria sphacelata*
African Horned Cucumber *Cucumis metulifer*
African Indigo *Indigofera tinctoria*
African Marigold *Tagetes erecta*
African Sickle Bush *Dichrostachys cinerea**
African Swamp-lily *Crinum bulbispermum*
Agalinis, Beautiful ***Agalinis** purpurea*
—, Boynton's *A. georgiana*
—, Common *A. purpurea*
—, Delicate *A. tenella*
—, Gattinger's *A. gattingeri*
—, Georgia *A. georgiana*
—, Green *A. viridis*
—, Harper's *A. harperi*
—, Midwestern *A. gattingeri*
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—, Plukenet's *A. plukenetii*
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Airplane-plant *Chlorophytum comosum*
Akebia, Five-leaf *Akebia quinata*
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Alabama Azalea *Rhododendron alabamense*
Alabama Balm *Dicerandra fumella*
Alabama Beaksedge *Rhynchospora crinipes*
Alabama Black Cherry *Prunus alabamensis*
Alabama Cane *Arundinaria species 1*
Alabama Canebrake Pitcherplant *Sarracenia alabamensis**
Alabama Chinquapin *Castanea alabamensis*
Alabama Croton *Croton alabamensis**
Alabama Evening-primrose *Oenothera heterophylla**
Alabama Forked Toothwort *Cardamine furcata*
Alabama Ginger *Hexastylis speciosa*
Alabama Grapefern *Sceptridium jenmanii*
Alabama Hawthorn ***Crataegus** alabamensis*
—, Smooth *C. teres*
Alabama Heartleaf *Hexastylis speciosa*
Alabama Hedge-nettle *Stachys alabamica*
Alabama Larkspur *Delphinium alabamicum*
Alabama Least Trillium *Trillium pusillum**
Alabama Leatherflower ***Clematis** socialis*
— *C. species 5*
Alabama Lipfern *Myriopteris alabamensis*
Alabama Milkvine *Matelea alabamensis*
Alabama Phlox *Phlox pulchra*
Alabama Pinkroot *Spigelia alabamensis*
Alabama Pitcherplant *Sarracenia alabamensis**
Alabama Skullcap *Scutellaria alabamensis*
Alabama Snow-wreath *Neviusia alabamensis*
Alabama Spinypod *Matelea alabamensis*
Alabama Streak-sorus Fern *Leptogramma burksiorum*
Alabama Supplejack *Berchemia scandens*
Alabama Three-lobed Violet *Viola palmata**
Alabama Warbonnet *Jamesianthus alabamensis*
Alacrancillo *Heliotropium indicum*
Alamo Vine *Distimake dissectus*
Albany Hawthorn ***Crataegus** furtiva*
Albertville Hawthorn *C. mendosa*
Alder, Hazel ***Alnus** serrulata*
—, Smooth *A. serrulata*
—, Tag *A. serrulata*
Alexander Grass ***Urochloa** plantaginea*
—, Small-flowered *U. subquadripara*
Alfalfa *Medicago sativa*
Alfalfa Dodder ***Cuscuta** suaveolens*
—, Bigseed *C. indecora*
Alfalfa, Blue ***Medicago** sativa*
—, Yellow *M. sativa*
Alfalfilla *Melilotus indicus*
Alfileria ***Erodium** cicutarium*
Alfilerillo *E. cicutarium*
Allegheny Barberry *Berberis canadensis*
Allegheny Blackberry *Rubus allegheniensis*
Allegheny Brookfoam *Boykinia aconitifolia*
Allegheny Hawthorn *Crataegus alleghaniensis*
Allegheny Monkeyflower *Mimulus ringens**
Allegheny Phlox *Phlox ovata*
Allegheny-spurge *Pachysandra procumbens*
Alligator-plant *Bryophyllum daigremontianum*
Alligator-weed *Alternanthera philoxeroides*
Allseed, Four-leaved *Polycarpon tetraphyllum**
Allspice, Carolina *Calycanthus floridus*
Alsike Clover *Trifolium hybridum*
Alta Fescue *Lolium arundinaceum*
Alternate-leaf Dogwood *Swida alternifolia*
Alternate-leaved Seedbox *Ludwigia alternifolia*
Alternate-leaved Water-milfoil *Myriophyllum pinnatum*
Althaea *Hibiscus syriacus*
Alumroot, American ***Heuchera** americana*
—, Giant *H. macrorhiza*
—, Interior Low Plateau Grotto *H. missouriensis*
—, Long-flowered *H. longiflora*
—, Rock *H. villosa*
Alyce Clover *Alysicarpus ovalifolius*
Alyssum, Sweet *Lobularia maritima*
—, Yellow *Alyssum alyssoides*
Amamastla Dock *Rumex chrysocarpos*
Amapola Grande *Alcea rosea*
Amaranth, Argentine ***Amaranthus** deflexus*
—, Blood *A. cruentus*
—, Green *A. hybridus**
—, Green *A. powellii*
—, Large-fruit *A. deflexus*
—, Livid *A. blitum**
—, Matweed *A. blitoides*
—, Muricate *A. muricatus*
—, Palmer's *A. palmeri*
—, Powell's *A. powellii*
—, Purple *A. blitum**
—, Purple *A. cruentus*
—, Red *A. cruentus*
—, Redroot *A. retroflexus*
—, Slender *A. viridis*
—, Slim *A. hybridus**
—, Smooth *A. hybridus**
—, Spiny *A. spinosus*
—, Spreading *A. crassipes**
—, Tropical Green *A. viridis*
—, Tumbleweed *A. albus*
Amazon Sprangletop *Dinebra panicoides*
Amberique Bean *Strophostyles helvola*
American Alumroot *Heuchera americana*
American Ash *Fraxinus americana*
American Barberry *Berberis canadensis*
American Basketflower *Plectocephalus americanus*
American Beautyberry *Callicarpa americana*
American Beech *Fagus grandifolia**
American Bittersweet *Celastrus scandens*
American Black Nightshade *Solanum americanum*
American Bluehearts *Buchnera americana*
American Bugleweed *Lycopus americanus*
American Burnweed *Erechtites hieraciifolius*
American Bur-reed *Sparganium americanum*
American Carrot *Daucus pusillus*
American Centaury *Sabatia angularis*
American Chestnut *Castanea dentata*
American Climbing Fern *Lygodium palmatum*
American Columbo *Frasera caroliniensis*
American Cupscale *Sacciolepis striata*
American Dog-violet *Viola labradorica*
American Elm *Ulmus americana**
American Filbert *Corylus americana*
American Frog's-bit *Limnobium spongia*
American Ginseng *Panax quinquefolius*
American Gromwell *Lithospermum latifolium*
American Halfchaff *Cyperus neotropicalis*
American Hart's-tongue Fern *Asplenium scolopendrium**
American Hazelnut *Corylus americana*
American Holly *Ilex opaca*
American Hop-hornbeam *Ostrya virginiana*
American Lipocarpha *Cyperus neotropicalis*
American Lopseed *Phryma leptostachya*
American Lotus-lily *Nelumbo lutea*
American Lovage *Ligusticum canadense*
American Mandrake *Podophyllum peltatum*
American Mistletoe *Phoradendron leucarpum**
American Pennyroyal *Hedeoma pulegioides*
American Penthorum *Penthorum sedoides*
American Persimmon *Diospyros virginiana*
American Pillwort *Pilularia americana*
American Plantain *Plantago rugelii*
American Pondweed *Potamogeton nodosus*
American Queen-Anne's-lace *Daucus pusillus*
American Rattan *Berchemia scandens*
American Royal Fern *Osmunda spectabilis*
American Self-heal *Prunella vulgaris**
American Smoketree *Cotinus obovata*
American Snowbell ***Styrax** americanus**

*Common name applies to a subspecies or variety of this species.

—, Downy *S. americanus**
American Speedwell *Veronica americana*
American Stinging Nettle *Urtica gracilis**
American Storax *Styrax americanus**
American Wahoo *Euonymus atropurpureus*
American Wall-rue *Asplenium ruta-muraria**
American Water-willow *Justicia americana*
American Whitlow-wort *Paronychia americana*
American Wild Lettuce *Lactuca canadensis*
American Wild Plum *Prunus americana*
American Wisteria *Wisteria frutescens**
American-dittany *Cunila origanoides*
Ammi, Greater *Ammi majus*
Amur Honeysuckle *Lonicera maackii*
Amur Peppervine *Ampelopsis glandulosa*
Amur Privet *Ligustrum obtusifolium**
Ancho ***Capsicum*** *annuum**
and many others *C. annuum**
Anemone, Carolina ***Anemone*** *caroliniana*
—, Eastern Prairie *A. berlandieri*
—, Prairie *A. caroliniana*
—, Tall *A. virginiana**
—, Ten-petal *A. berlandieri*
—, Wood *A. quinquefolia*
Angelica, Deadly ***Angelica*** *venenosa*
—, Hairy *A. venenosa*
—, Woodland *A. venenosa*
Angelico *Ligusticum canadense*
Anglepod, Eastern ***Gonolobus*** *suberosus**
—, Western *G. suberosus**
Angle-stem Beaksedge *Rhynchospora caduca*
Anise Horsebalm *Collinsonia anisata*
Anise-root *Osmorhiza longistylis*
Annual Baby's-breath *Gypsophila elegans*
Annual Beardgrass *Polypogon monspeliensis*
Annual Blue-eyed-grass *Sisyrinchium rosulatum*
Annual Bluegrass *Poa annua*
Annual Dune Whitlow-wort *Paronychia baldwinii**
Annual Fimbry *Fimbristylis annua*
Annual Fleabane *Erigeron annuus*
Annual Greenhead Sedge *Cyperus hortensis*
Annual Honesty *Lunaria annua*
Annual Junegrass *Rostraria cristata*
Annual Knawel *Scleranthus annuus**
Annual Koeleria *Rostraria cristata*
Annual Mercury *Mercurialis annua*
Annual Mugwort *Artemisia annua*
Annual Pearlwort *Sagina decumbens*
Annual Phlox *Phlox drummondii**
Annual Rabbitfoot Grass *Polypogon monspeliensis*
Annual Rye-grass *Lolium multiflorum*
Annual Sand Bean *Strophostyles helvola*
Annual Sea-pink *Sabatia stellaris*
Annual Silver Hairgrass *Aira elegans*
Annual Vernal Grass *Anthoxanthum aristatum*
Annual Wall-rocket *Diplotaxis muralis*
Annual Water Aster *Symphyotrichum divaricatum*
Anoda, Spurred *Anoda cristata*
Anomalous Eupatorium *Eupatorium anomalum*
Apalachicola Doll's-daisy *Boltonia apalachicolensis*
Apalachicola Indiangrass *Sorghastrum apalachicolense*
Apalachicola Meadow-beauty *Rhexia parviflora*
Apalachicola Rosemary *Conradina glabra*
Apalachicola Wild Indigo *Baptisia megacarpa*
Apodanthus Daffodil *Narcissus jonquilla*
Appalachian Arrowhead *Sagittaria australis*
Appalachian Astilbe *Astilbe biternata*
Appalachian Beardtongue *Penstemon canescens*
Appalachian Bellflower *Campanula divaricata*
Appalachian Black-cohosh *Actaea rubifolia*
Appalachian Blue Monkshood *Aconitum uncinatum*
Appalachian Clasping Aster *Symphyotrichum phlogifolium*
Appalachian Coneflower *Rudbeckia umbrosa*
Appalachian Deerberry *Vaccinium stamineum**
Appalachian Draba *Draba ramosissima*
Appalachian Dragonhead Pogonia *Cleistesiopsis bifaria*
Appalachian False Goat's-beard *Astilbe biternata*
Appalachian Filmy Fern *Vandenboschia boschiana*
Appalachian Flat-topped White Aster *Doellingeria infirma*
Appalachian Golden-banner *Thermopsis mollis*
Appalachian Goldenrod *Solidago flaccidifolia*
Appalachian Grass-of-Parnassus *Parnassia asarifolia*
Appalachian Indigo-bush *Amorpha glabra*
Appalachian Ironweed *Vernonia glauca*
Appalachian Little Brown Jug *Hexastylis ruthii*
Appalachian Loosestrife *Steironema tonsum*
Appalachian Milk-poison *Ageratina roanensis*
Appalachian Milkwort *Polygala curtissii*
Appalachian Mock-orange *Philadelphus inodorus*
Appalachian Oak-leech *Aureolaria levigata*
Appalachian Parnassia *Parnassia asarifolia*
Appalachian Phacelia *Phacelia dubia**
Appalachian Phlox *Phlox ovata*
Appalachian Pigmy Pipes *Monotropsis odorata*
Appalachian Pinweed *Lechea racemulosa*
Appalachian Quillwort *Isoetes appalachiana*
Appalachian Ragwort *Packera anonyma*
Appalachian Red Pinesap *Hypopitys lanuginosa*
Appalachian Rockcap Fern *Polypodium appalachianum*
Appalachian Rock-pink *Phemeranthus teretifolius*
Appalachian Sandwort *Geocarpon glabrum*
Appalachian Sedge *Carex appalachica*
Appalachian Shoestring Fern *Vittaria appalachiana*
Appalachian Sunflower *Helianthus atrorubens*
Appalachian Trichomanes *Crepidomanes intricatum*
Appalachian Turtlehead *Chelone lyonii*
Appalachian White Snakeroot *Ageratina roanensis*
Appalachian Woodland Sedge *Carex austrolucorum*
Apple Mint *Mentha suaveolens**
Apple, Common *Malus domestica*
—, Soda ***Solanum*** *capsicoides*
—, Tropical Soda *S. viarum*
Apple-of-Peru *Nicandra physalodes*
Arborvitae, Oriental *Platycladus orientalis*
Arbutus, Trailing *Epigaea repens*
Arce *Acer negundo**
Archangel, Purple ***Lamium*** *purpureum*
—, Yellow *L. galeobdolon*
Architectural Sedge *Carex albicans**
Ardisia, Coral *Ardisia crenata*
Argentine Amaranth *Amaranthus deflexus*
Argentine Senna *Senna corymbosa*
Arizona Cypress *Hesperocyparis arizonica*
Arizona Signalgrass *Urochloa arizonica*
Arkansas Dogshade *Limnosciadium pinnatum*
Arkansas Oak *Quercus arkansana*
Arnica, Southeastern *Arnica acaulis*
Aroma *Dichrostachys cinerea**
Arrasa con todo *Gomphrena serrata*
Arrow Bamboo *Pseudosasa japonica*
Arrow-arum, Green ***Peltandra*** *virginica*
—, White *P. sagittifolia*
Arrowfeather ***Aristida*** *purpurascens*
—, Southern *A. tenuispica*
Arrowgrass, Southern *Triglochin striata*
Arrowhead Violet *Viola sagittata*
Arrowhead, Appalachian ***Sagittaria*** *australis*
—, Chapman's *S. chapmanii*
—, Delta *S. platyphylla*
—, Dwarf *S. subulata*
—, Midwestern *S. brevirostra*
Arrowleaf Clover *Trifolium vesiculosum*
Arrowleaf Elephant-ear *Xanthosoma sagittifolium*
Arrowleaf Heartleaf *Hexastylis arifolia*
Arrowleaf Sida *Sida rhombifolia**
Arrowleaf Tearthumb ***Persicaria*** *sagittata*
Arrowvine *P. sagittata*
Arrow-wood, Alabama *Viburnum alabamense*
—, Brazilian *Canna glauca*
—, Downy ***Viburnum*** *rafinesqueanum*
—, Limerock *V. bracteatum*
—, Smooth *V. recognitum*
—, Soft *V. molle*
—, Southern *V. scabrellum*
Artilleryweed *Pilea microphylla*
Arum, Italian *Arum italicum**
Ash, American ***Fraxinus*** *americana*
—, Biltmore *F. biltmoreana*
—, Biltmore White *F. biltmoreana*
—, Blue *F. quadrangulata*
—, Carolina *F. caroliniana*
—, Green *F. pennsylvanica*
—, Pop *F. caroliniana*
—, Pumpkin *F. profunda*
—, Red *F. pennsylvanica*
—, Small's White *F. smallii*
—, Water *F. caroliniana*
—, White *F. americana*
Ashe Hawthorn *Crataegus ashei*
Ashen Hoary-pea *Tephrosia cinerea*
Ashe's Witchgrass *Dichanthelium commutatum**
Ash-leaved Maple *Acer negundo**
Ashy Hydrangea *Hydrangea cinerea*
Ashy Milkweed *Asclepias cinerea*
Ashy Sunflower *Helianthus mollis*
Asian Net-veined Holly Fern *Cyrtomium falcatum*
Asiatic Greenhead Sedge *Cyperus brevifolioides*
Asiatic Hawk's-beard *Youngia japonica*
Asosi *Momordica charantia**
Asparagus ***Asparagus*** *officinalis*
—, Garden *A. officinalis*
Asphodel, Coastal Plain Bog ***Triantha*** *racemosa*
—, Southern Bog *T. racemosa*
Aspidistra *Aspidistra elatior*
Aster, Annual Water ***Symphyotrichum*** *divaricatum*
—, Appalachian Clasping *S. phlogifolium*
—, Appalachian Flat-topped White *Doellingeria infirma*
—, Azure ***Symphyotrichum*** *oolentangiense**
—, Barrens Silky *S. pratense*
—, Black Belt Clasping *S. patens**
—, Blue Wood *S. cordifolium*
—, Bottomland *S. ontarionis**
—, Brace's *S. bracei*
—, Broad-leaved White Panicled *S. lanceolatum**
—, Chapman's *S. chapmanii*
—, Climbing *Ampelaster carolinianus*
—, Common Clasping *Symphyotrichum patens**
—, Common White Heart-leaved *Eurybia divaricata*
—, Cornel-leaf Flat-topped *Doellingeria infirma*
—, Creeping *Eurybia surculosa*
—, Creeping Stiff-leaved *Ionactis repens*
—, Eastern Aromatic ***Symphyotrichum*** *oblongifolium*
—, Eastern Saltmarsh *S. subulatum*
—, Eastern Silvery *S. concolor**
—, Elliott's *S. elliottii*
—, Eryngo-leaved *Eurybia eryngiifolia*
—, Georgia ***Symphyotrichum*** *georgianum*
—, Goblet *S. lateriflorum*
—, Gulf Coast Silvery *S. concolor**
—, Gulf Coast Smooth *S. attenuatum*

*Common name applies to a subspecies or variety of this species.

INDEX OF COMMON NAMES

—, Hairy Heart-leaved *S. drummondii*
—, Harmonious *S. concinnum*
—, Heart-leaved *S. cordifolium*
—, Heath *S. ericoides**
—, Long-stalked *S. dumosum**
—, Low Showy *Eurybia spectabilis*
—, Midwestern Blue Heart-leaved ***Symphyotrichum*** *shortii*
—, Midwestern Saltmarsh *S. divaricatum*
—, Miss Price's *S. kentuckiense*
—, Narrow-leaf White-topped *Sericocarpus linifolius*
—, Narrow-leaved Smooth ***Symphyotrichum*** *concinnum*
—, Net-veined *S. praealtum**
—, New England *S. novae-angliae*
—, Northern Flat-topped White ***Doellingeria*** *umbellata**
—, Northern Tall Flat-topped *D. umbellata**
—, Perennial Salt-marsh *Symphyotrichum tenuifolium*
—, Piedmont Big-leaved *Eurybia jonesiae*
—, Pine-barren *Oclemena reticulata*
—, Pocosin Flat-topped *Doellingeria sericocarpoides*
—, Prairie Grass-leaved *Eurybia hemispherica*
—, Purple-stem ***Symphyotrichum*** *puniceum**
—, Rough Willowleaf *S. praealtum**
—, Sadie's *S. kentuckiense*
—, Scale-leaf *S. adnatum*
—, Shale-barren *S. oblongifolium*
—, Short's *S. shortii*
—, Simmonds's *S. simmondsii*
—, Small White *S. racemosum**
—, Small White Oldfield *S. racemosum**
—, Smooth Blue *S. laeve*
—, Smooth Heart-leaved *S. lowrieanum*
—, South American Salt-marsh *S. squamatum*
—, Southern Flat-topped *Doellingeria sericocarpoides*
—, Southern Pine *Eurybia hemispherica*
—, Southern Swamp *Symphyotrichum elliottii*
—, Southern Tall Flat-topped *Doellingeria sericocarpoides*
—, Squarrose White ***Symphyotrichum*** *ericoides**
—, Starved *S. lateriflorum*
—, Stiff-leaved *Ionactis linariifolia*
—, Stokes *Stokesia laevis*
—, Swamp *Symphyotrichum puniceum**
—, Tartarian *Aster tataricus*
—, Twisted-leaf White-topped *Sericocarpus tortifolius*
—, Upland White *Solidago ptarmicoides*
—, Wavyleaf ***Symphyotrichum*** *undulatum*
—, White Arrowleaf *S. urophyllum*
—, Willowleaf *S. praealtum**
—, Yard *S. divaricatum*
—, Zigzag *S. prenanthoides*
Astilbe, Appalachian *Astilbe biternata*
Asystasia *Asystasia gangetica**
Atamasco-lily, Common ***Zephyranthes*** *atamasco*
—, Florida *Z. simpsonii*
—, Red-margined *Z. simpsonii*
Atlantic Bishopweed *Ptilimnium capillaceum*
Atlantic Blue-eyed-grass *Sisyrinchium atlanticum*
Atlantic Wisteria *Wisteria frutescens**
Aublet's Bogmoss *Mayaca aubletii*
Australian Laurel *Pittosporum tobira*
Australian Waterclover *Marsilea mutica*
Australian-pine, Suckering *Casuarina glauca*
Autumn Adonis *Adonis annua*
Autumn Bentgrass *Agrostis perennans*
Autumn Coralroot *Corallorhiza odontorhiza*
Autumn Fern *Dryopteris erythrosora*
Autumn Silverberry ***Elaeagnus*** *pungens*
Autumn-olive *E. umbellata*
Avens, Cream ***Geum*** *virginianum*
—, Heartleaf *G. vernum*
—, Spring *G. vernum*
—, White *G. canadense*
Awl-fruit Sedge *Carex stipata**
Awned Flatsedge *Cyperus squarrosus**
Awned Meadow-beauty *Rhexia aristosa*
Awnless Brome *Bromus inermis*
Axil-flower, Common ***Mecardonia*** *acuminata**
—, Pond *M. acuminata**
Axillary Goldenrod ***Solidago*** *caesia*
—, Gulf Coast *S. zedia*
Axocatzin *Sida rhombifolia**
Azalea, Alabama ***Rhododendron*** *alabamense*
—, Clammy *R. serrulatum*
—, Clammy *R. viscosum**
—, Cumberland *R. cumberlandense*
—, Early *R. prinophyllum*
—, Flame *R. calendulaceum*
—, Florida Flame *R. austrinum*
—, Piedmont *R. canescens*
—, Pinxterbloom *R. periclymenoides*
—, Plumleaf *R. prunifolium*
—, Red Hills *R. colemanii*
—, Roseshell *R. prinophyllum*
—, Smooth *R. arborescens*
—, Southern Pinxter *R. canescens*
—, Swamp *R. serrulatum*
—, Swamp *R. viscosum**
—, Sweet *R. arborescens*
—, Wild *R. canescens*
—, Wild *R. periclymenoides*
Aztec Marigold *Tagetes erecta*
Azure Aster *Symphyotrichum oolentangiense**
Azure Sage ***Salvia*** *azurea**
—, Prairie *S. azurea**
Baby Jump-up *Mecardonia procumbens*
Baby-blue-eyes, Eastern ***Nemophila*** *aphylla*
—, Small-flower *N. aphylla*
Baby's-breath, Annual *Gypsophila elegans*
Bachelor's-buttons *Cyanus segetum*
Bacopa, Lemon *Bacopa caroliniana*
Bagpod *Sesbania vesicaria*
Bahia Grass *Paspalum notatum*
Bahia Lovegrass *Eragrostis bahiensis*
Bailey's Sedge *Carex baileyi*
Bald Bedstraw *Galium orizabense**
Bald Spikerush *Eleocharis erythropoda*
Bald-cypress *Taxodium distichum*
Balduina, Purple ***Balduina*** *atropurpurea*
—, Sandhill *B. angustifolia*
—, Yellow *B. uniflora*
Baldwin's Flatsedge *Cyperus croceus*
Baldwin's Spikerush *Eleocharis baldwinii*
Baldwin's Beaksedge *Rhynchospora baldwinii*
Baldwin's Milkwort *Polygala balduinii*
Baldwin's Nutrush *Scleria baldwinii*
Baldwin's Yellow-eyed-grass *Xyris baldwiniana*
Balespike Lobelia *Lobelia spicata*
Ball Clover *Trifolium nigrescens*
Ball-moss *Tillandsia recurvata*
Ball-nettle *Solanum carolinense**
Balloon Vine *Cardiospermum halicacabum*
Balm, Alabama *Dicerandra fumella*
—, Common ***Melissa*** *officinalis*
—, Lemon *M. officinalis*
—, Smoky *Dicerandra fumella*
Balsam Ragwort *Packera paupercula**
Balsam, Garden ***Impatiens*** *balsamina*
—, Rose *I. balsamina*
Balsam-apple ***Momordica*** *charantia**
Balsam-pear *M. charantia**
Baltzell's Sedge *Carex baltzellii*
Bamboo, Arrow *Pseudosasa japonica*
—, Black *Phyllostachys nigra*
—, Dwarf *Bambusa multiplex*
—, Fishpole ***Phyllostachys*** *aurea*
—, Giant Timber *P. bambusoides*
—, Golden *P. aurea*
—, Hedge *Bambusa multiplex*
—, Japanese *Reynoutria japonica*
—, Oriental Hedge *Bambusa multiplex*
—, Yellowgroove *Phyllostachys aureosulcata*
Bamboo-vine *Smilax laurifolia*
Banana Floating Heart *Nymphoides aquatica*
Banana Waterlily *Nymphaea mexicana*
Banana, Edible *Musa paradisiaca*
Banderilla Colorado *Salvia coccinea*
Baneberry, White *Actaea pachypoda*
Bantam-buttons *Syngonanthus flavidulus*
Baptisia, Glade Blue *Baptisia aberrans*
Barbara's-buttons, Broadleaf ***Marshallia*** *trinervia*
—, Colonial *M. trinervia*
—, Coosa *M. mohrii*
—, Gulf Coast *M. angustifolia*
—, Piedmont *M. obovata**
—, Spoon-leaved *M. obovata**
Barbed Rattlesnake-root *Nabalus barbatus*
Barberry Hawthorn *Crataegus berberifolia**
Barberry, Allegheny ***Berberis*** *canadensis*
—, American *B. canadensis*
—, Evergreen *B. julianae*
—, Japanese *B. thunbergii*
Barefoot-demon *Soliva sessilis*
Barksdale's Trillium *Trillium sulcatum*
Barley ***Hordeum*** *vulgare*
—, Little *H. pusillum*
—, Mouse *H. murinum**
Barnyard-grass ***Echinochloa*** *crusgalli**
—, Rough *E. muricata**
—, Swamp *E. walteri*
Barratt's Sedge *Carex barrattii*
Barrelhead Blazing-star *Liatris cylindracea*
Barren Brome *Bromus sterilis*
Barrens Dropseed *Sporobolus neglectus*
Barrens Milkweed *Asclepias hirtella*
Barrens Silky Aster *Symphyotrichum pratense*
Barrens St. John's-wort *Hypericum sphaerocarpum*
Bartley's Firmoss *Huperzia bartleyi*
Bartonia, Screwstem ***Bartonia*** *paniculata**
—, Spring *B. verna*
—, Virginia *B. virginica*
—, White *B. verna*
—, Yellow *B. virginica*
Bartram's Rose-gentian *Sabatia decandra*
Bashful Trillium *Trillium catesbyi*
Basil Beebalm ***Monarda*** *clinopodia*
Basil Bergamot *M. clinopodia*
Basil, Scarlet Wild ***Clinopodium*** *coccineum*
—, Slender Wild *C. gracile*
—, Talladega Wild *C. talladeganum*
Basil-thyme *C. calamintha*
Basket Grass *Arthraxon hispidus**
Basket Oak *Quercus michauxii*
Basketflower, American *Plectocephalus americanus*
Basora Prieta *Waltheria indica*
Basswood, Carolina ***Tilia*** *americana**
—, Mountain *T. americana**
—, Southern *T. americana**
—, White *T. americana**
Bastard Oak *Quercus durandii**
Bastard-toadflax, Eastern *Comandra umbellata**
Batis *Batis maritima*
Bay Hops *Ipomoea brasiliensis*
Bay Starvine *Schisandra glabra*
Bay Winders *Ipomoea brasiliensis*
Bay, Bull *Magnolia grandiflora*
—, Loblolly *Gordonia lasianthus*

*Common name applies to a subspecies or variety of this species.

—, Red *Tamala borbonia*
—, Southern Sweet *Magnolia virginiana**
—, Swamp *Tamala palustris*
Baybean *Canavalia rosea*
Bayberry, Dwarf ***Morella** pumila*
—, Evergreen *M. caroliniensis*
—, Odorless *M. inodora*
—, Pocosin *M. caroliniensis*
—, Southern *M. cerifera*
Beach Blanket-flower *Gaillardia pulchella**
Beach Creeping Oxeye *Pascalia glauca*
Beach Morning-glory *Ipomoea imperati*
Beach Vitex *Vitex rotundifolia*
Beach-tea *Croton punctatus*
Beachwort *Batis maritima*
Bead Fern *Onoclea sensibilis*
Beaked Hawkweed *Hieracium gronovii*
Beaked Hazelnut *Corylus cornuta**
Beaked Panic Grass ***Coleataenia** anceps**
—, Small *C. anceps**
Beaked Sanicle *Sanicula trifoliata*
Beaked Spikerush *Eleocharis rostellata*
Beaked Trout Lily *Erythronium rostratum*
Beakgrain, Eastern *Diarrhena americana*
Beaksedge, Alabama ***Rhynchospora** crinipes*
—, Angle-stem *R. caduca*
—, Baldwin's *R. baldwinii*
—, Brownish *R. capitellata*
—, Carey's Horned *R. careyana*
—, Chapman's *R. chapmanii*
—, Clustered *R. glomerata*
—, Coastal *R. pleiantha*
—, Coastal Bog *R. stenophylla*
—, Common Bunched *R. cephalantha**
—, Cymose *R. cymosa*
—, Dwarf *R. pusilla*
—, Elliott's *R. elliottii*
—, Fascicled *R. fascicularis*
—, Feather-bristled *R. oligantha*
—, Fernald's *R. fernaldii*
—, Few-flower *R. rariflora*
—, Fragrant *R. odorata*
—, Fringed *R. ciliaris*
—, Globe *R. globularis*
—, Gray's *R. grayi*
—, Harper's *R. harperi*
—, Harvey's *R. harveyi*
—, Long-beak *R. scirpoides*
—, Loose-headed *R. chalarocephala*
—, Marlins' *R. marliniana*
—, Millet *R. miliacea*
—, Mingled *R. mixta*
—, Narrow-fruit Horned *R. inundata*
—, Narrow-fruited Fascicled *R. distans*
—, Needle *R. capillacea*
—, Nodding *R. inexpansa*
—, Northern White *R. alba*
—, Pagoda *R. compressa*
—, Pineland *R. perplexa*
—, Plumed *R. plumosa*
—, Sandhill *R. megalocarpa*
—, Savanna *R. debilis*
—, Short-beaked *R. nitens*
—, Short-bristle *R. galeana*
—, Short-bristled Horned *R. corniculata*
—, Slender *R. gracilenta*
—, Small Bunched *R. cephalantha**
—, Small-headed *R. microcephala*
—, Small's *R. pinetorum*
—, Southern *R. microcarpa*
—, Southern White *R. macra*
—, Swamp-forest *R. decurrens*
—, Tall Horned *R. macrostachya*
—, Thorne's *R. thornei*
—, Threadleaved *R. filifolia*
—, Torrey's *R. torreyana*
—, Tracy's *R. tracyi*
—, White-seeded *R. divergens*
—, Wright's *R. wrightiana*
Bean, Amberique ***Strophostyles** helvola*
—, Annual Sand *S. helvola*
—, Coral *Erythrina herbacea*
—, Perennial Fuzzy ***Strophostyles** umbellata*
—, Perennial Sand *S. umbellata*
—, Phasey *Macroptilium lathyroides*
—, Sandhill ***Phaseolus** sinuatus*
—, Scarlet Runner *P. coccineus*
—, Slickseed Fuzzy ***Strophostyles** leiosperma*
—, Small-flowered Sand *S. leiosperma*
—, Trailing Fuzzy *S. helvola*
—, Wild ***Phaseolus** polystachios*
—, Wild Kidney *P. polystachios*
Bearcorn *Conopholis americana*
Beard Grass, Eastern ***Gymnopogon** ambiguus*
—, Pineland *G. brevifolius*
Bearded Grass-pink *Calopogon barbatus*
Bearded Milkvetch *Astragalus villosus*
Bearded Sprangletop *Diplachne fascicularis*
Beardflower *Pogonia ophioglossoides*
Beardgrass ***Polypogon** monspeliensis*
—, Annual *P. monspeliensis*
Beardtongue, Appalachian ***Penstemon** canescens*
—, Blue Ridge *P. smallii*
—, Eastern Smooth *P. laevigatus*
—, Eastern White *P. pallidus*
—, Kentucky *P. tenuiflorus*
—, Kral's *P. kralii*
—, Limestone *P. tenuiflorus*
—, Long-sepal *P. calycosus*
—, Nodding *P. laxiflorus*
—, Plateau *P. tenuiflorus*
—, Sandhill *P. australis*
—, Smooth *P. digitalis*
—, Southern *P. australis*
—, Tall White *P. digitalis*
Beargrass *Xerophyllum asphodeloides*
Bearsfoot *Smallanthus uvedalia*
Beautiful Agalinis *Agalinis pulchella*
Beautiful Hawthorn ***Crataegus** pulcherrima**
—, Broad-leaved *C. pulcherrima**
—, Cutleaf *C. incilis*
Beautyberry ***Callicarpa** americana*
—, American *C. americana*
—, Chinese *C. dichotoma*
Beautybush *Kolkwitzia amabilis*
Bedstraw, Bald ***Galium** orizabense**
—, Bluntleaf *G. obtusum**
—, Coastal *G. bermudense*
—, Florida Three-lobed *G. tinctorium**
—, Forest *G. circaezans*
—, Hairy *G. pilosum*
—, Lamarck's *G. divaricatum*
—, Lanceleaf *G. lanceolatum*
—, Licorice *G. circaezans*
—, One-flowered *G. uniflorum*
—, Ozark *G. virgatum*
—, Piedmont *G. pedemontanum*
—, Purple *G. latifolium*
—, Smoothstem *G. orizabense**
—, Stiff Marsh *G. tinctorium**
—, Sweet-scented *G. triflorum*
—, Wall *G. divaricatum*
—, Wall *G. parisiense*
—, Wideleaf *G. latifolium*
Beebalm ***Monarda** didyma*
—, Basil *M. clinopodia*
—, Bradbury *M. bradburiana*
—, White *M. russeliana*
Beech Fern, Broad ***Phegopteris** hexagonoptera*
—, Japanese *P. taiwaniana*
Beech, American *Fagus grandifolia**
—, Blue ***Carpinus** caroliniana**
—, Water *C. caroliniana**
—, White *Fagus grandifolia**
Beechdrops *Epifagus virginiana*
Beefsteak-plant *Perilla frutescens*
Beefwood, Scaly-bark *Casuarina glauca*
Beggar-ticks, Devil's ***Bidens** frondosa*
—, Few-bracted *B. discoidea*
—, Purplestem *B. connata*
—, Strawstem *B. comosa*
—, Tall *B. vulgata*
Begonia, Club ***Begonia** cucullata*
—, Wax *B. cucullata*
Bell Pepper *Capsicum annuum**
Bellflower Leatherflower *Clematis pitcheri**
Bellflower, Appalachian *Campanula divaricata*
—, Tall *Campanulastrum americanum*
Bellow's-beak Sedge *Carex albicans**
Bellwort, Florida ***Uvularia** floridana*
—, Large-flowered *U. grandiflora*
—, Perfoliate *U. perfoliata*
Bengal Dayflower *Commelina benghalensis*
Benny-seed *Sesamum indicum**
Bent Alligator-flag *Thalia geniculata*
Bent Sedge *Carex styloflexa*
Bent Thalia *Thalia geniculata*
Bent White Trillium *Trillium flexipes*
Bent-awn Plume Grass *Erianthus contortus*
Bentgrass, Autumn ***Agrostis** perennans*
—, Black *A. gigantea*
—, Coastal Bog *A. altissima*
—, Colonial *A. capillaris*
—, Creeping *A. stolonifera*
—, Elliott's *A. elliottiana*
—, Rhode Island *A. capillaris*
—, Rough *A. scabra*
—, Small *A. hyemalis*
—, Southern *A. elliottiana*
Bequilla *Sesbania herbacea*
Berg's Panic Grass *Panicum bergii*
Bergamot, Basil ***Monarda** clinopodia*
—, Eastern *M. fistulosa**
—, Lemon *M. citriodora**
—, Pale Wild *M. fistulosa**
Bermuda Grass *Cynodon dactylon*
Besom *Cytisus scoparius*
Bicolor Lespedeza *Lespedeza bicolor*
Biennial Gaura ***Oenothera** filiformis*
— *O. gaura*
Biennial Waterleaf *Hydrophyllum appendiculatum*
Big Bishopweed *Ptilimnium costatum*
Big Blue Lilyturf *Liriope muscari*
Big Bluestem *Andropogon gerardi*
Big Carpetgrass *Axonopus furcatus*
Big Floating Heart *Nymphoides aquatica*
Big Gallberry *Ilex coriacea*
Big Marigold *Tagetes erecta*
Big Paspalum *Paspalum floridanum*
Big Sandspur *Cenchrus myosuroides*
Big Shellbark Hickory *Carya laciniosa*
Big Three-awn *Aristida condensata*
Big-bracted Vervain *Verbena bracteata*
Big-footed Waterclover *Marsilea macropoda*
Big-head Pussytoes *Antennaria parlinii**
Bighead Pygmy-cudweed *Diaperia prolifera**
Bigleaf Grass-of-Parnassus *Parnassia grandifolia*
Bigleaf Magnolia *Magnolia macrophylla*
Bigleaf Pondweed *Potamogeton amplifolius*
Bigleaf Snowbell ***Styrax** grandifolius*
Bigleaf Storax *S. grandifolius*
Bigleaf Witch-hazel *Hamamelis ovalis*
Big-leaved Aster, Piedmont *Eurybia jonesiae*
Bigpod Wild Indigo *Baptisia megacarpa*
Bigroot Morning-glory *Ipomoea pandurata*
Bigseed Alfalfa Dodder *Cuscuta indecora*
Bigseed Forget-me-not *Myosotis macrosperma*

*Common name applies to a subspecies or variety of this species.

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Bigspine Thistle *Cirsium horridulum**
Bigtop Lovegrass *Eragrostis hirsuta*
Big-tree Plum *Prunus mexicana*
Billion-dollar Grass *Echinochloa frumentacea*
Biltmore Ash *Fraxinus biltmoreana*
Biltmore Carrionflower *Smilax biltmoreana*
Biltmore Hawthorn *Crataegus intricata**
Biltmore White Ash *Fraxinus biltmoreana*
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—, Black *F. convolvulus*
—, Catesby's ***Convolvulus*** *catesbyanus*
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—, Field *C. arvensis*
—, Gray *C. equitans*
—, Silver *C. equitans*
—, Texas *C. equitans*
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—, Cherry *B. lenta**
—, Red *B. nigra*
—, River *B. nigra*
—, Sweet *B. lenta**
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Birdbill Spikegrass *Chasmanthium ornithorhynchum*
Birdseed Grass *Phalaris canariensis*
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Bird's-eye Speedwell *Veronica persica*
Birdsfoot-trefoil *Lotus corniculatus*
Bird's-rape *Brassica rapa*
Birthwort, Serpent *Endodeca serpentaria*
Bishop, Prairie *Atrema americanum*
Bishopweed, Atlantic ***Ptilimnium*** *capillaceum*
—, Big *P. costatum*
—, Eastern *P. capillaceum*
—, Midwestern *P. nuttallii*
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Bitter Buttercup *Ranunculus acris*
Bitter Dock *Rumex obtusifolius*
Bitter Ginger *Zingiber zerumbet*
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Bitter Melon *Momordica charantia**
Bitter Milkwort *Polygala polygama*
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Bitter Seabeach Grass *Panicum amarum*
Bitter Stonecrop *Sedum acre*
Bitter-bloom *Sabatia angularis*
Bittercress, Bulbous ***Cardamine*** *bulbosa*
—, Douglass's *C. douglassii*
—, Hairy *C. hirsuta*
—, Hidden *C. occulta*
—, Limestone *C. douglassii*
—, Quaker *C. pensylvanica*
—, Sand *C. parviflora**
Bitternut Hickory *Carya cordiformis*
Bittersweet *Solanum dulcamara*
—, American ***Celastrus*** *scandens*
—, Oriental *C. orbiculatus*
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Black Belt Rosinweed *Silphium confertifolium*
Black Bentgrass *Agrostis gigantea*
Black Bindweed *Fallopia convolvulus*
Black Birch *Betula lenta**
Black Bulrush *Scirpus atrovirens*
Black Chokeberry *Aronia melanocarpa*
Black Death-camas *Stenanthium texanum*
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—, Swamp *N. biflora*
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—, Southern *V. rufidulum*
Black Highbush Blueberry *Vaccinium fuscatum*
Black Horehound *Ballota nigra*
Black Huckleberry *Gaylussacia baccata*
Black Locust *Robinia pseudoacacia*
Black Maple *Acer nigrum*
Black Medick *Medicago lupulina*
Black Mondo *Ophiopogon japonicus*
Black Mustard *Rhamphospermum nigrum*
Black Needle Rush *Juncus roemerianus*
Black Nightshade ***Solanum*** *nigrescens*
—, American *S. americanum*
—, Eastern *S. emulans*
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Black Oatgrass *Piptochaetium avenaceum*
Black Poplar *Populus nigra*
Black Raspberry *Rubus occidentalis*
Black Snakeroot ***Sanicula*** *canadensis**
— *S. marilandica*
Black Titi *Cliftonia monophylla*
Black Walnut *Juglans nigra*
Black Warrior Goldenrod *Solidago arenicola*
Black Willow *Salix nigra*
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Blackbelt Leatherflower *Clematis species 6*
Blackberry, Allegheny ***Rubus*** *allegheniensis*
—, Chesapeake *R. pascuus*
—, Eastern *R. pensilvanicus*
—, European *R. bifrons*
—, Pennsylvania *R. pensilvanicus*
—, Sand *R. cuneifolius*
—, Sawtooth *R. argutus*
—, Smooth *R. canadensis*
—, Thornless *R. canadensis*
—, Topsy *R. pascuus*
Blackberry-lily *Iris domestica*
Blackcap *Rubus occidentalis*
Black-edged Sedge *Carex nigromarginata*
Black-eyed Pea *Vigna unguiculata*
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—, St. John's *R. nitida*
—, Swamp *R. auriculata*
—, Weedy *R. hirta**
—, Woodland *R. hirta**
Black-eyed-Susan Vine *Thunbergia alata*
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Blackfruit Clearweed *Pilea fontana*
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Blackland Coneflower *Rudbeckia terranigrae*
Blackroot ***Pterocaulon*** *pycnostachyum*
—, Wand *P. virgatum*
Blackseed *Sporobolus indicus*
Blackseed Plantain *Plantago rugelii*
Blackseed Speargrass *Piptochaetium avenaceum*
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—, Yaupon *S. cassioides*
Blackstem Spleenwort *Asplenium resiliens*
Blackwater Rose-pink *Sabatia foliosa*
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—, Lowland *C. protrusa*
—, Tennessee *C. tennesseensis*
Bladder Ketmia *Hibiscus trionum*
Bladder Sedge *Carex intumescens**
Bladdernut *Staphylea trifolia*
Bladderpod *Sesbania vesicaria*
—, Duck River ***Paysonia*** *densipila*
—, Lesquereux's *P. lescurii*
—, Lyreleaf *P. lyrata*
Bladderwort, Dwarf ***Utricularia*** *olivacea*
—, Fibrous *U. striata*
—, Flatstem *U. foliosa*
—, Floating *U. radiata*
—, Florida *U. floridana*
—, Greater *U. macrorhiza*
—, Horned *U. cornuta*
—, Inflated *U. inflata*
—, Longspur Creeping *U. biflora*
—, Minute *U. olivacea*
—, Northeastern *U. resupinata*
—, Purple *U. purpurea*
—, Resupinate *U. resupinata*
—, Shortspur Creeping *U. gibba*
—, Slender *U. subulata*
—, Small Swollen *U. radiata*
—, Southern *U. juncea*
—, Swollen *U. inflata*
—, Zigzag *U. subulata*
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—, Common *G. pulchella**
Blaspheme-vine *Smilax laurifolia*
Blazing-star, Barrelhead ***Liatris*** *cylindracea*
—, Cahaba *L. oligocephala*
—, Chapman's *L. chapmanii*
—, Common Elegant *L. elegans**
—, Kral's Elegant *L. elegans**
—, Northern *L. scariosa*
—, Rough *L. aspera*
—, Rydberg's *L. hirsuta*
—, Sandhill *L. secunda*
—, Slender *L. gracilis*
—, Small-head *L. microcephala*
Blessed-thistle *Centaurea benedicta*
— *Silybum marianum*
Blind Eyes *Papaver dubium*
Blonde Lilian *Erythronium albidum*
Blood Amaranth *Amaranthus cruentus*
Blood Milkwort *Polygala sanguinea*
Blood Sage *Salvia coccinea*
Bloodflower *Asclepias curassavica*
Bloodleaf *Iresine rhizomatosa*
Bloodroot *Sanguinaria canadensis*
Bloody Butcher *Trillium cuneatum*
Bloody Dock ***Rumex*** *sanguineus*
Bloody Sorrel *R. sanguineus*
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Blue Ash *Fraxinus quadrangulata*
Blue Beech *Carpinus caroliniana**
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—, Glade *T. brachiatum*
—, Narrowleaf *T. setaceum*
Blue Field-madder *Galium sherardia*
Blue Jasmine *Clematis crispa*
Blue Larkspur *Delphinium carolinianum**
Blue Maiden-cane *Amphicarpum muehlenbergianum*
Blue Mud-Plantain *Heteranthera limosa*
Blue Palmetto *Rhapidophyllum hystrix*
Blue Panic Grass *Panicum antidotale*
Blue Paspalum *Paspalum caespitosum*
Blue Plantain-lily *Hosta ventricosa*
Blue Ridge Beardtongue *Penstemon smallii*
Blue Ridge Golden-banner *Thermopsis villosa*
Blue Running-cedar *Diphasiastrum tristachyum*
Blue Sage *Salvia azurea**
Blue Sandhill Lupine *Lupinus diffusus*
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— *C. glaucodea*
Blue Spikemoss *Lycopodioides uncinatum*
Blue Stokesia *Stokesia laevis*
Blue Twinflower *Dyschoriste oblongifolia*
Blue Vervain *Verbena hastata*
Blue Water-hyssop *Bacopa caroliniana*
Blue Waxweed *Cuphea viscosissima*
Blue Witchgrass *Dichanthelium caerulescens*
Blue Wood Aster *Symphyotrichum cordifolium*
Bluebell, Mexican *Ruellia simplex*
Bluebells, Virginia *Mertensia virginica*

*Common name applies to a subspecies or variety of this species.

Blueberry, Black Highbush ***Vaccinium*** *fuscatum*
—, Darrow's *V. darrowii*
—, Dryland *V. pallidum*
—, Hairy Highbush *V. fuscatum*
—, Hillside *V. pallidum*
—, Mountain Highbush *V. simulatum*
—, Rabbiteye *V. virgatum*
—, Small Cluster *V. tenellum*
—, Southern Dwarf *V. tenellum*
—, Southern Evergreen *V. myrsinites*
—, Southern Highbush *V. formosum*
—, Swamp *V. virgatum*
—, Swamp Highbush *V. formosum*
Blue-eyed-grass, Annual ***Sisyrinchium*** *rosulatum*
—, Atlantic *S. atlanticum*
—, Chalk Belt *S. species 2 [chalk]*
—, Coastal Plain *S. fuscatum*
—, Glade *S. calciphilum*
—, Lawn *S. rosulatum*
—, Least *S. minus*
—, Narrow-leaved *S. angustifolium*
—, Nash's *S. nashii*
—, Needle-tip *S. mucronatum*
—, Pale *S. langloisii*
—, White *S. albidum*
Blue-flower *Stachytarpheta jamaicensis*
Bluegrass *Poa autumnalis*
Bluegrass Lovegrass *Eragrostis minor*
Bluegrass, Annual ***Poa*** *annua*
—, Canada *P. compressa*
—, Chapman's *P. chapmaniana*
—, Flat-stemmed *P. compressa*
—, Forest *P. sylvestris*
—, Kentucky *P. pratensis**
—, Rough *P. trivialis**
—, Texas *P. arachnifera*
—, Woodland *P. sylvestris*
Bluehearts, American ***Buchnera*** *americana*
—, Florida *B. floridana*
—, Plains *B. americana*
—, Prairie *B. americana*
—, Savanna *B. floridana*
Bluejack Oak *Quercus incana*
Blue-sailors *Cichorium intybus*
Bluestem, Big ***Andropogon*** *gerardi*
—, Bog *A. mohrii*
—, Chalky *A. cretaceus*
—, Common Bushy *A. glomeratus*
—, Common Little ***Schizachyrium*** *scoparium**
—, Creeping *S. stoloniferum*
—, Dryland White ***Andropogon*** *capillipes*
—, Elliott's *A. gyrans*
—, Florida *A. arctatus*
—, Gulf Coast *Schizachyrium maritimum*
—, Hairy *Andropogon hirsutior*
—, Hairy Crimson *Schizachyrium hirtiflorum*
—, King Ranch ***Bothriochloa*** *ischaemum**
—, KR *B. ischaemum**
—, Longbeard ***Andropogon*** *longiberbis*
—, Maritime Bushy *A. tenuispatheus*
—, Narrowleaf *A. perangustatus*
—, Nash's *A. subtenuis*
—, Pinehill *Schizachyrium scoparium**
—, Pitted *Bothriochloa pertusa*
—, Purple *Andropogon cretaceus*
—, Seaside Little *Schizachyrium littorale*
—, Shortspike *Andropogon brachystachyus*
—, Silver *Bothriochloa torreyana*
—, Slender *Schizachyrium tenerum*
—, Smooth ***Andropogon*** *virginicus**
—, Splitbeard *A. ternarius*
—, Tawny *A. mohrii*
—, Tracy's *A. tracyi*
—, Wetland White *A. dealbatus*
—, Yellow *Bothriochloa ischaemum**
Bluet, Bosc's *Oldenlandia boscii*
—, Common ***Houstonia*** *caerulea*
—, Creeping *H. procumbens*
—, Diffuse-branched *H. tenuifolia*
—, Glade *H. nigricans**
—, Lanceleaf *H. lanceolata*
—, Midwestern Summer *H. lanceolata*
—, Mountain *H. purpurea*
—, Prairie *H. nigricans**
—, Rose *H. rosea*
—, Roundleaf *H. procumbens*
—, Southern *H. micrantha*
—, Summer *H. purpurea*
—, Tiny *H. pusilla*
Bluevine *Cynanchum laeve*
Bluff Moss *Sedum pulchellum*
Bluff Oak *Quercus austrina*
Blunt Broom Sedge ***Carex*** *tribuloides*
—, Midwestern *C. sangamonensis*
Blunt Panic Grass *Panicum virgatum**
Blunt Spikerush *Eleocharis obtusa*
Bluntleaf Bedstraw *Galium obtusum**
Blunt-leaved Achyranthes *Achyranthes aspera**
Blunt-lobed Cliff Fern *Woodsia obtusa**
Bluntscale Bulrush *Schoenoplectiella purshiana**
Bog Asphodel, Coastal Plain ***Triantha*** *racemosa*
—, Southern *T. racemosa*
Bog Bluestem *Andropogon mohrii*
Bog Bunchflower *Melanthium virginicum*
Bog Goldenaster *Pityopsis oligantha*
Bog Honeycomb-head *Balduina atropurpurea*
Bog Milkweed *Asclepias viridula*
Bog Oat-grass *Danthonia epilis*
Bog Spicebush *Lindera subcoriacea*
Bog Torches *Orontium aquaticum*
Bog Violet *Viola cucullata*
Bog Witchgrass *Dichanthelium lucidum*
Bog Yellow-eyed-grass *Xyris difformis*
Bogbuttons, Common *Lachnocaulon anceps*
Bog-Clubmoss, Foxtail ***Lycopodiella*** *alopecuroides*
—, Prostrate *L. prostrata*
—, Southern *L. appressa*
Bogmoss ***Mayaca*** *fluviatilis*
—, Aublet's *M. aubletii*
Bog-spike *Platanthera nivea*
Bois-d'arc *Maclura pomifera*
Bok-choy *Brassica rapa*
Bonavist *Lablab purpureus*
Boneset *Eupatorium perfoliatum*
Boom's Quillwort *Isoetes boomii*
Boott's Goldenrod *Solidago boottii*
Bosc's Bluet ***Oldenlandia*** *boscii*
Bosc's Mille-graines *O. boscii*
Bosc's Witchgrass *Dichanthelium boscii*
Botón Blanco ***Eclipta*** *prostrata*
Botoncillo *E. prostrata*
Bottle Gourd *Lagenaria siceraria**
Bottlebrush Buckeye *Aesculus parviflora*
Bottlebrush Horsetail *Equisetum arvense*
Bottlebrush Sedge *Carex comosa*
Bottlebrush Three-awn *Aristida spiciformis**
Bottlebrush, Crimson *Melaleuca citrina*
Bottomland Aster *Symphyotrichum ontarionis**
Bottomland Skullcap *Scutellaria nervosa*
Bouchea, Prism *Bouchea prismatica*
Bougainvillea Golden Rain Tree *Koelreuteria bipinnata*
Boulder Fern *Sitobolium punctilobulum*
Bouncing Bet *Saponaria officinalis*
Bow-wood *Maclura pomifera*
Boxwood *Buxus sempervirens*
Boykin's Lobelia *Lobelia boykinii*
Boykinia, Eastern *Boykinia aconitifolia*
Boykin's Milkwort *Polygala boykinii**
Boynton Oak *Quercus boyntonii*
Boynton's Agalinis *Agalinis georgiana*
Boynton's Locust *Robinia hispida**
Boys-and-girls *Mercurialis annua*
Brace's Aster *Symphyotrichum bracei*
Bracken, Eastern ***Pteridium*** *latiusculum*
—, Southern *P. pseudocaudatum*
Bradbury Beebalm *Monarda bradburiana*
Bradford Pear *Pyrus calleryana*
Bradley's Spleenwort *Asplenium bradleyi*
Brahmi *Bacopa monnieri*
Brake, Cretan ***Pteris*** *cretica**
—, Ladder *P. vittata*
—, Spider *P. multifida*
—, White-lined Cretan *P. cretica**
Bramble Fern, Spineless *Hypolepis tenuifolia*
Branched Centaury *Centaurium pulchellum*
Branched Foldwing *Dicliptera brachiata*
Branched Hedge-hyssop *Gratiola ramosa*
Branching Broomrape *Phelipanche ramosa*
Braun's Spikemoss *Lycopodioides braunii*
Brazilian Arrow-wood *Canna glauca*
Brazilian Bristlegrass *Setaria rariflora*
Brazilian Butia *Butia odorata*
Brazilian Cat's-ear *Hypochaeris chillensis*
Brazilian Satintail *Imperata brasiliensis*
Brazilian Vervain *Verbena brasiliensis*
Brazilian Water Grass *Luziola bahiensis*
Brazilian Watermeal *Wolffia brasiliensis*
Brazilian Waterweed *Egeria densa*
Brazilian-pepper *Schinus terebinthifolia*
Brazos Rain-Lily *Zephyranthes chlorosolen*
Bread Wheat *Triticum aestivum*
Bretonica-peluda *Melochia villosa*
Brickellia, Flyr's *Brickellia cordifolia*
Bridal-veil, Tahitian *Gibasis pellucida*
Bridal-wreath Spiraea ***Spiraea*** *prunifolia*
— *S. vanhouttei*
Brintonia *Solidago discoidea*
Bristlefruit Spermolepis *Spermolepis echinata*
Bristleleaf Sedge *Carex eburnea*
Bristleseed Stargrass *Hypoxis wrightii*
Bristly Dewberry *Rubus hispidus*
Bristly Dogtail *Cynosurus echinatus*
Bristly Flatsedge *Cyperus hystricinus*
Bristly Greenbriar ***Smilax*** *hispida**
—, Southern *S. hispida**
Bristly Lady's-thumb *Persicaria longiseta*
Bristly Meadow-beauty *Rhexia aristosa*
Bristly Sandspur *Cenchrus echinatus*
Bristly Sedge *Carex comosa*
Bristly-mallow *Modiola caroliniana*
Bristol Hawthorn ***Crataegus*** *visenda*
Britton's Hawthorn *C. brittonii*
Broad Beech Fern *Phegopteris hexagonoptera*
Broad Loose-flowered Sedge *Carex laxiflora*
Broadleaf Barbara's-buttons *Marshallia trinervia*
Broadleaf Bushy Eupatorium *Eupatorium glaucescens*
Broadleaf Gromwell *Lithospermum latifolium*
Broadleaf Indian-plantain *Arnoglossum ovatum**
Broadleaf Phlox *Phlox amplifolia*
Broadleaf Pink Purslane *Portulaca amilis*
Broadleaf Pondlily *Nuphar advena*
Broadleaf Privet *Ligustrum lucidum*
Broadleaf Puccoon *Lithospermum latifolium*
Broadleaf Rushfoil *Croton willdenowii*
Broadleaf Signal-grass *Urochloa platyphylla*
Broadleaf Waterleaf *Hydrophyllum canadense*
Broadleaf Whitetop Sedge *Rhynchospora latifolia*
Broad-leaved Beautiful Hawthorn *Crataegus pulcherrima**
Broad-leaved Goldenrod *Solidago flexicaulis*
Broad-leaved Hairy Nutrush *Scleria ciliata**
Broad-leaved Plantain *Plantago rugelii*

*Common name applies to a subspecies or variety of this species.

Broad-leaved White Panicled Aster *Symphyotrichum lanceolatum**
Broad-scaled Sedge ***Carex** aureolensis*
Broad-winged Sedge *C. alata*
Brocamelia *Clerodendrum bungei*
Brome Fescue *Festuca bromoides*
Brome, Awnless ***Bromus** inermis*
—, Barren *B. sterilis*
—, Canada *B. pubescens*
—, Common Eastern *B. pubescens*
—, Downy *B. tectorum*
—, Hairy Woodland *B. pubescens*
—, Hungarian *B. inermis*
—, Japanese *B. japonicus*
—, Meadow *B. commutatus*
—, Nottoway River *B. nottowayanus*
—, Poverty *B. sterilis*
—, Satin *B. nottowayanus*
—, Short-branched *B. erectus*
—, Smooth *B. inermis*
—, Virginia *B. nottowayanus*
Bronze Willow-herb *Epilobium coloratum*
Brook Parnassia *Parnassia asarifolia*
Brook-feather *Xanthorhiza simplicissima*
Brooklime *Veronica americana*
Brook-saxifrage *Boykinia aconitifolia*
Brookweed *Samolus parviflorus*
Broom *Cytisus scoparius*
Broom Sedge ***Carex** scoparia*
—, Blunt *C. tribuloides*
—, Midwestern Blunt *C. sangamonensis*
Broom Snakeroot *Amphiachyris dracunculoides*
Broom Snoutbean *Rhynchosia cytisoides*
Broom, Scotch *Cytisus scoparius*
Broomcorn *Sorghum bicolor**
Broomcorn Millet *Panicum miliaceum**
Broomrape, Branching ***Phelipanche** ramosa*
—, Hemp *P. ramosa*
—, One-flowered *Aphyllon uniflorum*
—, Prairie *Myzorrhiza ludoviciana*
Broomsedge *Andropogon virginicus**
Broomweed *Sida ulmifolia*
—, Prairie *Amphiachyris dracunculoides*
Brown Bogbutton *Lachnocaulon minus*
Brown Mustard *Brassica juncea*
Brown Plume Grass *Erianthus coarctatus*
Brown Wide-lip Orchid *Liparis liliifolia*
Brown-fruited Rush *Juncus pelocarpus*
Brown-hair Comb Fern *Ctenitis submarginalis*
Brownish Beaksedge *Rhynchospora capitellata*
Brown's Dock *Rumex brownii*
Brownseed Paspalum *Paspalum plicatulum*
Browntop *Agrostis capillaris*
Browntop Millet ***Urochloa** ramosa*
Browntop Signalgrass *U. fusca**
Brunetta *Hexalectris spicata*
Brunswick Grass *Paspalum nicorae*
Bryson's Sedge *Carex brysonii*
Buckbrush *Symphoricarpos orbiculatus*
Buckeye, Bottlebrush ***Aesculus** parviflora*
—, Chalky *A. glabra**
—, Ohio *A. glabra**
—, Painted *A. sylvatica*
—, Red *A. pavia**
—, Yellow *A. flava*
Buckhorn Plantain ***Plantago** aristata*
— *P. coronopus*
Buckley's Goldenrod *Solidago buckleyi*
Buckley's Hawthorn *Crataegus buckleyi*
Buckroot *Pediomelum canescens*
Buckthorn Bully ***Sideroxylon** lycioides*
Buckthorn Bumelia *S. lycioides*
Buckthorn, Carolina *Frangula caroliniana*
—, Carolina *Sideroxylon lycioides*
—, Lance-leaved *Endotropis lanceolata*
—, Small-flowered *Sageretia minutiflora*
Buckwheat *Fagopyrum esculentum*
—, Climbing ***Fallopia** convolvulus*
—, Common Climbing *F. scandens*
—, Crested Climbing *F. cristata*
—, Japanese *Reynoutria japonica*
Buckwheat-tree *Cliftonia monophylla*
Buckwheat-vine *Brunnichia ovata*
Buffalo Clover *Trifolium reflexum*
Buffalo-bur ***Solanum** rostratum*
Buffalo-bur Nightshade *S. rostratum*
Buffalo-nut *Pyrularia pubera*
Buffelgrass *Cenchrus ciliaris*
Bugle, Carpet *Ajuga reptans*
Bugleweed, American ***Lycopus** americanus*
—, Narrowleaf *L. angustifolius*
—, Stalked *L. rubellus*
—, Virginia *L. virginicus*
Bulblet Bladder Fern ***Cystopteris** bulbifera*
Bulblet Fern *C. bulbifera*
Bulbous Adder's-tongue *Ophioglossum crotalophoroides*
Bulbous Bittercress *Cardamine bulbosa*
Bulbous Buttercup *Ranunculus bulbosus*
Bulbous Canary-grass *Phalaris aquatica*
Bulbous Wood-rush *Luzula bulbosa*
Bulbous Yellow-eyed-grass *Xyris platylepis*
Bull Bay *Magnolia grandiflora*
Bull mallow *Malva nicaeensis*
Bull Paspalum *Paspalum boscianum*
Bull Thistle ***Cirsium** horridulum**
— *C. vulgare*
Bullace *Prunus domestica*
Bullace Grape *Muscadinia rotundifolia**
Bullbriar *Smilax rotundifolia*
Bull-nettle *Cnidoscolus stimulosus*
Bullwort *Ammi majus*
Bully, Buckthorn ***Sideroxylon** lycioides*
—, Eastern Gum *S. lanuginosum**
—, Florida *S. reclinatum**
—, Georgia *S. thornei*
Bulrush, Black *Scirpus atrovirens*
—, Bluntscale *Schoenoplectiella purshiana**
—, California ***Schoenoplectus** californicus*
—, Canby's *S. etuberculatus*
—, Delta *S. deltarum*
—, Drooping ***Scirpus** lineatus*
—, Georgia *S. georgianus*
—, Giant ***Schoenoplectus** californicus*
—, Great *S. acutus**
—, Great *S. tabernaemontani*
—, Hardstem *S. acutus**
—, Keeled *Isolepis carinata*
—, New England *Bolboschoenus novae-angliae*
—, Nodding *Scirpus pendulus*
—, River *Bolboschoenus fluviatilis*
—, Rufous *Scirpus pendulus*
—, Saltmarsh *Bolboschoenus robustus*
—, Softstem ***Schoenoplectus** tabernaemontani*
—, Southern *S. californicus*
—, Swamp *S. etuberculatus*
—, Water *S. subterminalis*
—, Woodland ***Scirpus** expansus*
—, Woolgrass *S. cyperinus*
—, Woolly *S. cyperinus*
Bumelia, Buckthorn ***Sideroxylon** lycioides*
—, Eastern Gum *S. lanuginosum**
—, Smooth *S. reclinatum**
—, Swamp *S. thornei*
—, Thorne's *S. thornei*
Bunchflower, Bog ***Melanthium** virginicum*
—, Crisped *M. hybridum*
—, Mountain *M. parviflorum*
—, Ozark *M. woodii*
—, Virginia *M. virginicum*
Bunch-flowered Daffodil *Narcissus tazetta*
Bunch-moss *Tillandsia recurvata*
Bundleflower, Common *Desmanthus illinoensis*
Bur Chervil *Anthriscus caucalis*
Bur Gherkin *Cucumis anguria**
Bur Mallow *Urena lobata*
Bur Medick *Medicago minima*
Bur Oak *Quercus macrocarpa**
Bur-clover, Downy ***Medicago** minima*
—, Smooth *M. polymorpha*
—, Spotted *M. arabica*
Bur-cucumber *Sicyos angulatus*
Burdock Clover *Trifolium lappaceum*
Burdock, Common ***Arctium** minus*
—, Great *A. lappa*
Burford Holly *Ilex cornuta*
Burhead, Creeping *Echinodorus cordifolius*
Burmannia, Violet ***Burmannia** biflora*
—, White *B. capitata*
Bur-marigold, Nodding ***Bidens** cernua*
—, Showy *B. laevis*
Burnet, Fodder ***Poterium** sanguisorba**
—, Garden *P. sanguisorba**
—, Salad *P. sanguisorba**
Burning Bush *Euonymus atropurpureus*
Burning Nettle *Urtica urens*
Bur-Parsley *Anthriscus caucalis*
—, Knotted ***Torilis** nodosa*
—, Spreading *T. helvetica*
Bur-reed, American *Sparganium americanum*
Burweed *Triumfetta semitriloba*
—, Carpet ***Soliva** stolonifera*
—, Field *S. sessilis*
—, Lawn *S. sessilis*
Bush Hawthorn *Crataegus intricata**
Bush Vetch *Lathyrus venosus*
Bush's Sedge *Carex bushii*
Bush-clover ***Lespedeza** capitata*
—, Slender *L. virginica*
—, Thunberg's *L. thunbergii*
Bush-honeysuckle, Hairy Southern ***Diervilla** rivularis*
—, Smooth Southern *D. sessilifolia*
Bushkiller *Causonis japonica*
Bushy Knapweed *Centaurea stoebe**
Bushy Knotweed *Polygonum prolificum*
Bushy Naiad *Najas gracillima*
Bushy Wallflower *Erysimum repandum*
Butia, Brazilian *Butia odorata*
Butler's Sand-Parsley *Ammoselinum butleri*
Butler's Quillwort *Isoetes butleri*
Butter-and-Eggs *Linaria vulgaris*
Buttercup *Narcissus pseudonarcissus*
—, Bitter ***Ranunculus** acris*
—, Bulbous *R. bulbosus*
—, Carolina *R. septentrionalis*
—, Creeping *R. repens*
—, Cursed *R. sceleratus**
—, Early *R. fascicularis*
—, Early Wood *R. abortivus*
—, Hairy *R. hispidus*
—, Hairy *R. sardous*
—, Hispid *R. hispidus*
—, Hooked *R. recurvatus**
—, Kidneyleaf *R. abortivus*
—, Rock *R. micranthus*
—, Roughseed *R. muricatus*
—, Sardinian *R. sardous*
—, Small-flowered *R. micranthus*
—, Small-flowered *R. parviflorus*
—, St. Martin's *R. marginatus**
—, Tall *R. acris*
—, Thick-root *R. fascicularis*
Butterfly Pea *Clitoria mariana**
—, Spurred *Centrosema virginianum**
Butterfly-bush, Lindley's ***Buddleja** lindleyana*
—, Orange-eye *B. davidii*
Butternut *Juglans cinerea*

*Common name applies to a subspecies or variety of this species.

INDEX OF COMMON NAMES

Butterprint *Abutilon theophrasti*
Butterweed *Packera glabella*
Butterwort, Chapman's ***Pinguicula*** *planifolia*
—, Clearwater *P. primuliflora*
—, Small *P. pumila*
—, Yellow *P. lutea*
Button Medick *Medicago orbicularis*
Buttonbush *Cephalanthus occidentalis*
Buttonweed, Harper's ***Diodia*** *harperi*
—, Large *D. virginiana*
—, Smooth ***Spermacoce*** *glabra*
—, Woodland *S. remota*
Buzzard Grass *Heteropogon melanocarpus*
Cabbage Palmetto *Sabal palmetto*
Cabbage, Chinese *Brassica rapa*
Cadillo *Cenchrus echinatus*
Caesarweed *Urena lobata*
Cahaba Blazing-star *Liatris oligocephala*
Cahaba Daisy Fleabane *Erigeron dolomiticola*
Cahaba Lily *Hymenocallis coronaria*
Cahaba Paintbrush *Castilleja kraliana*
Cahaba Prairie-clover *Dalea cahaba*
Cahaba Torch *Liatris oligocephala*
Calabash Gourd *Lagenaria siceraria**
Calamint, Georgia ***Clinopodium*** *georgianum*
—, Lesser *C. calamintha*
—, Scarlet *C. coccineum*
Calamus, European *Acorus calamus*
Caley Pea *Lathyrus hirsutus*
Calico-bush *Kalmia latifolia*
California Bulrush *Schoenoplectus californicus*
California Privet *Ligustrum ovalifolium*
California-poppy *Eschscholzia californica**
Callery Pear *Pyrus calleryana*
Calliopsis *Coreopsis tinctoria**
Caltrop *Tribulus terrestris*
—, Greater *Kallstroemia maxima*
Caltrops *Centaurea calcitrapa*
Calusa Grape *Vitis shuttleworthii*
Camas Lily, Eastern *Camassia scilloides*
Camellia *Camellia japonica*
—, Mountain *Stewartia ovata*
—, Sasanqua *Camellia sasanqua*
—, Silky *Stewartia malacodendron*
Campernelle Jonquil *Narcissus odorus*
Camphor Pluchea *Pluchea camphorata*
Camphortree *Camphora officinarum*
Camphorweed *Heterotheca subaxillaris*
— *Pluchea camphorata*
—, Nashville *Heterotheca camporum**
—, Wing-stem ***Pluchea*** *sagittalis*
—, Yucatan *P. yucatanensis*
Campion, Fringed ***Silene*** *catesbyi*
—, Rose *S. coronaria*
—, Starry *S. stellata*
—, Sticky *S. noctiflora*
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Canada Brome *Bromus pubescens*
Canada Columbine *Aquilegia canadensis*
Canada Enchanter's-nightshade *Circaea canadensis*
Canada Frostweed *Crocanthemum canadense*
Canada Hemlock *Tsuga canadensis*
Canada Lily *Lilium canadense*
Canada Milkvetch *Astragalus canadensis**
Canada Rockcress *Borodinia canadensis*
Canada Rockrose *Crocanthemum canadense*
Canada Sanicle *Sanicula canadensis**
Canada St. John's-wort *Hypericum canadense*
Canada Sunrose *Crocanthemum canadense*
Canada Thistle *Cirsium arvense*
Canada Waterleaf *Hydrophyllum canadense*
Canada Whitlow-wort *Paronychia canadensis*
Canadian Rush *Juncus canadensis*
Canary Island Date Palm *Phoenix canariensis*
Canary-grass ***Phalaris*** *canariensis*
—, Bulbous *P. aquatica*
—, Carolina *P. caroliniana*
—, Reed *P. arundinacea*
Canby's Bulrush *Schoenoplectus etuberculatus*
Cancer-root *Aphyllon uniflorum*
Cancer-weed *Salvia lyrata*
Candyroot *Polygala nana*
Cane, Alabama ***Arundinaria*** *species 1*
—, Giant *A. gigantea*
—, Hill *A. appalachiana*
—, River *A. gigantea*
—, Small *A. tecta*
—, Switch *A. tecta*
Canebrake Sedge *Carex austrodeflexa*
Canna, Common Garden ***Canna*** *generalis*
—, Golden *C. flaccida*
—, Yellow *C. flaccida*
Canola *Brassica napus*
Canteloupe *Cucumis melo**
Cape Gooseberry *Physalis peruviana*
Caper Spurge *Euphorbia lathyris*
Capeweed *Phyla nodiflora*
Capitate Croton *Croton capitatus*
Cardinal Flower *Lobelia cardinalis**
Cardinal-spear *Erythrina herbacea*
Careless ***Amaranthus*** *australis*
Careless-weed *A. palmeri*
Carey's Horned Beaksedge *Rhynchospora careyana*
Carey's Sedge *Carex careyana*
Caribbean Everlasting *Gamochaeta antillana*
Caribbean Finger-grass *Eustachys caribaea*
Caribbean Miterwort *Mitreola petiolata*
Carolina Allspice *Calycanthus floridus*
Carolina Anemone *Anemone caroliniana*
Carolina Ash *Fraxinus caroliniana*
Carolina Basswood *Tilia americana**
Carolina Bog Clubmoss *Pseudolycopodiella caroliniana*
Carolina Buckthorn *Frangula caroliniana*
— *Sideroxylon lycioides*
Carolina Buttercup *Ranunculus septentrionalis*
Carolina Canary-grass *Phalaris caroliniana*
Carolina Clover *Trifolium carolinianum*
Carolina Crane's-Bill *Geranium carolinianum*
Carolina Desert-chicory *Pyrrhopappus carolinianus*
Carolina Draba *Tomostima reptans*
Carolina Fimbry *Fimbristylis caroliniana*
Carolina Fluffgrass *Tridens carolinianus*
Carolina Foxtail Grass *Alopecurus carolinianus*
Carolina Goldentop *Euthamia caroliniana*
Carolina Green-and-gold *Chrysogonum repens*
Carolina Hickory *Carya carolinae-septentrionalis*
Carolina Holly *Ilex ambigua*
Carolina Horse-nettle *Solanum carolinense**
Carolina Indigo *Indigofera caroliniana*
Carolina Jessamine *Gelsemium sempervirens*
Carolina Jointgrass *Mnesithea cylindrica*
Carolina Larkspur *Delphinium carolinianum**
Carolina Laurel Cherry *Prunus caroliniana*
Carolina Leaf-flower *Phyllanthus caroliniensis*
Carolina Lilaeopsis *Lilaeopsis carolinensis*
Carolina Lily *Lilium michauxii*
Carolina Lovegrass *Eragrostis pectinacea**
Carolina Mahogany *Melia azedarach*
Carolina Matrimony-vine *Lycium carolinianum*
Carolina Milkweed *Asclepias cinerea*
Carolina Moonseed *Nephroia carolina*
Carolina Nutrush *Scleria pauciflora**
Carolina Phlox *Phlox carolina*
Carolina Piriqueta *Piriqueta caroliniana*
Carolina Ponyfoot *Dichondra carolinensis*
Carolina Quillwort *Isoetes valida*
Carolina Red Maple *Acer rubrum**
Carolina Rose *Rosa carolina**
Carolina Rosinweed *Silphium compositum**
Carolina Sea-lavender *Limonium carolinianum*
Carolina Sedge ***Carex*** *caroliniana*
—, South *C. austrocaroliniana*
Carolina Shagbark Hickory *Carya carolinae-septentrionalis*
Carolina Spinypod *Matelea carolinensis*
Carolina Spring-beauty *Claytonia caroliniana*
Carolina Strapwort *Lilaeopsis carolinensis*
Carolina Sunrose *Crocanthemum carolinianum*
Carolina Supplejack *Berchemia scandens*
Carolina Thistle *Cirsium carolinianum*
Carolina Triodia *Tridens carolinianus*
Carolina Vervain *Verbena carnea*
Carolina Vetch *Vicia caroliniana*
Carolina Water-hyssop *Bacopa caroliniana*
Carolina Wild-petunia *Ruellia caroliniensis*
Carolina Willow *Salix caroliniana*
Carolina Wood-rush *Luzula acuminata**
Carolina-poppy *Argemone albiflora**
Carpenter's Ground-cherry *Calliphysalis carpenteri*
Carpet Bugle *Ajuga reptans*
Carpet Burweed *Soliva stolonifera*
Carpet Grass *Stenotaphrum secundatum*
Carpet Witchgrass *Dichanthelium chamaelonche*
Carpetgrass, Big ***Axonopus*** *furcatus*
—, Common *A. fissifolius*
—, Southern *A. compressus*
—, Tropical *A. compressus*
Carpetweed *Mollugo verticillata*
Carrionflower, Biltmore ***Smilax*** *biltmoreana*
—, Common *S. herbacea*
—, Downy *S. pulverulenta*
—, Huger's *S. hugeri*
—, Midwestern *S. lasioneura*
—, Smooth *S. herbacea*
Cassava, Graham's *Manihot grahamii*
Cassena *Ilex cassine*
Cast-iron Plant *Aspidistra elatior*
Castor-bean ***Ricinus*** *communis*
Castor-oil Plant *R. communis*
Cat Grape *Vitis palmata*
Cat's-whiskers *Gynandropsis gynandra*
Catalina *Euphorbia heterophylla*
Catalpa, Northern ***Catalpa*** *speciosa*
—, Southern *C. bignonioides*
Catawba Rhododendron *Rhododendron catawbiense*
Catbells *Baptisia perfoliata*
Catbird Grape *Vitis palmata*
Catbriar ***Smilax*** *bona-nox**
—, Maritime *S. bona-nox**
Catchfly Cutgrass *Leersia lenticularis*
Catchfly, Common ***Silene*** *gallica*
—, Eastern Fringed *S. catesbyi*
—, Forked *S. dichotoma**
—, Garden *Atocion armeria*
—, Mountain ***Silene*** *ovata*
—, Night-flowering *S. noctiflora*
—, Pineland *Polanisia tenuifolia*
—, Royal ***Silene*** *regia*
—, Sleepy *S. antirrhina*
—, Small-flowered *S. gallica*
—, Sweet William *Atocion armeria*
Catesby's Bindweed *Convolvulus catesbyanus*
Catesby's Lily *Lilium catesbyi*
Catesby's Trillium *Trillium catesbyi*
Catmint ***Nepeta*** *cataria*
Catnip *N. cataria*
Cat's-ear, Brazilian ***Hypochaeris*** *chillensis*
—, Smooth *H. glabra*
—, Spotted *H. radicata*
Cat's-foot *Pseudognaphalium obtusifolium*
Cat's-tail *Phleum pratense**
Cattail Sedge ***Carex*** *frankii*
— *C. typhina*

*Common name applies to a subspecies or variety of this species.

—, Golden *C. aureolensis*
Cattail, Common *Typha latifolia*
—, Dwarf *Acalypha herzogiana*
—, Hybrid ***Typha** angustifolia*
—, Narrowleaf *T. angustifolia*
—, Southern *T. domingensis*
Cayenne *Capsicum annuum**
Cayenne Jasmine *Catharanthus roseus*
Ceanothus, Midwestern ***Ceanothus** americanus**
—, Northeastern *C. americanus**
—, Sandhill *C. microphyllus*
—, Southeastern *C. americanus**
Cebolleta *Zephyranthes chlorosolen*
Cedar Glade Daisy Fleabane *Erigeron allisonii*
Cedar Glade Prairie-clover *Dalea foliosa*
Cedar Glade Spikerush *Eleocharis bifida*
Cedar Glade St. John's-wort *Hypericum frondosum*
Cedar, Coastal Red ***Juniperus** silicicola*
—, Eastern Red *J. virginiana*
—, Panhandle White *Chamaecyparis thyoides**
—, Southern Red *Juniperus silicicola*
—, White *Melia azedarach*
Cedar-glade Rock-pink *Phemeranthus calcaricus*
Celandine-poppy *Stylophorum diphyllum*
Celery *Apium graveolens*
Celery-leaf Crowfoot *Ranunculus sceleratus**
Celosia *Celosia argentea*
Cenecilla *Trianthema portulacastrum*
Centaury, American *Sabatia angularis*
—, Branched ***Centaurium** pulchellum*
—, Lesser *C. pulchellum*
—, Slender *C. tenuiflorum*
Centella *Centella erecta*
Centipede Grass *Eremochloa ophiuroides*
Century-plant *Agave americana**
Cerasee *Momordica charantia**
Ceylon Pouzolzia *Pouzolzia zeylanica*
Chaff-flower, Japanese *Achyranthes japonica**
Chaffseed *Schwalbea americana*
Chaffweed *Centunculus minimus*
Chain Fern, Netted *Lorinseria areolata*
—, Virginia *Anchistea virginica*
Chairmaker's Rush *Schoenoplectus pungens**
Chalice Phlox *Phlox amoena*
Chalk Belt Blue-eyed-grass *Sisyrinchium species 2 [chalk]*
Chalk Maple *Acer leucoderme*
Chalky Bluestem *Andropogon cretaceus*
Chalky Buckeye *Aesculus glabra**
Chamber Bitter *Emblica urinaria*
Chameleon-plant *Houttuynia cordata*
Chamomile, Corn *Anthemis arvensis*
—, False ***Matricaria** chamomilla*
—, German *M. chamomilla*
—, Moroccan *Cladanthus mixtus*
—, Stinking *Anthemis cotula*
Chaneyroot *Smilax hispida**
Changing Forget-me-not *Myosotis discolor*
Chapman Oak *Quercus chapmanii*
Chapman's Bluegrass *Poa chapmaniana*
Chapman's Sage *Salvia chapmanii*
Chapman's Arrowhead *Sagittaria chapmanii*
Chapman's Aster *Symphyotrichum chapmanii*
Chapman's Beaksedge *Rhynchospora chapmanii*
Chapman's Blazing-star *Liatris chapmanii*
Chapman's Butterwort *Pinguicula planifolia*
Chapman's Holly *Ilex longipes*
Chapman's Three-awn *Aristida simpliciflora*
Chapman's Triodia *Tridens chapmanii*
Chapman's Umbrella-sedge *Fuirena longa*
Chapman's Yellow-eyed-grass *Xyris chapmanii*
Charlock ***Rhamphospermum** arvense*
— *R. nigrum*
—, Corn *R. arvense*
—, Jointed ***Raphanus** raphanistrum**
—, White *R. raphanistrum**
—, White *Sinapis alba**
Charming Sedge *Carex blanda*
Chaste-tree ***Vitex** agnus-castus*
—, Chinese *V. negundo*
—, Roundleaf *V. rotundifolia*
Chattahoochee Trillium *Trillium decipiens*
Cheat ***Bromus** secalinus*
—, Downy *B. tectorum*
Cheatgrass *B. sterilis*
— *B. tectorum*
Checkerberry *Gaultheria procumbens*
Cheeses ***Malva** neglecta*
— *M. sylvestris*
Cherokee Rose *Rosa laevigata*
Cherokee Sedge *Carex cherokeensis*
Cherry Birch *Betula lenta**
Cherry Elaeagnus *Elaeagnus multiflora*
Cherry Plum *Prunus cerasifera*
Cherry Silverberry *Elaeagnus multiflora*
Cherry, Alabama Black ***Prunus** alabamensis*
—, Bird *P. serotina**
—, Carolina Laurel *P. caroliniana*
—, Eastern Wild Black *P. serotina**
—, Formosan *P. campanulata*
—, Taiwan *P. campanulata*
—, Yoshino *P. yedoensis*
Cherrybark Oak *Quercus pagoda*
Chervil, Bur *Anthriscus caucalis*
—, Common Spreading***Chaerophyllum** procumbens**
—, Southern *C. tainturieri*
Chesapeake Blackberry *Rubus pascuus*
Chestnut, American ***Castanea** dentata*
—, Chinese *C. mollissima*
Chick Pea *Cicer arietinum*
Chickasaw Plum *Prunus angustifolia*
Chickasaw Rose *Rosa bracteata*
Chicken Grape *Vitis vulpina*
Chickenfoot Grass *Eustachys caribaea*
Chickenspike *Sphenoclea zeylanica*
Chickweed, Common *Stellaria media*
—, Forked *Paronychia canadensis*
—, Giant ***Stellaria** pubera*
—, Great *S. pubera*
—, Jagged *Holosteum umbellatum**
—, Lesser ***Stellaria** pallida*
—, Star *S. pubera*
—, West Indian *Drymaria cordata**
Chicory *Cichorium intybus*
Chigger-weed *Anthemis cotula*
Childing Pink *Petrorhagia prolifera*
Chile *Capsicum annuum**
China Fleece-vine *Fallopia baldschuanica*
Chinaberry *Melia azedarach*
China-fir *Cunninghamia lanceolata*
China-jute *Abutilon theophrasti*
Chinaroot *Smilax hispida**
Chinese Beautyberry *Callicarpa dichotoma*
Chinese Cabbage *Brassica rapa*
Chinese Chaste-tree *Vitex negundo*
Chinese Chestnut *Castanea mollissima*
Chinese Chives *Allium tuberosum*
Chinese Date *Ziziphus jujuba*
Chinese Elm *Ulmus parvifolia*
Chinese Firethorn *Pyracantha fortuneana*
Chinese Holly *Ilex cornuta*
Chinese Jujube *Ziziphus jujuba*
Chinese Lespedeza *Lespedeza cuneata*
Chinese Mahonia *Mahonia bealei*
Chinese Mustard *Brassica juncea*
Chinese Parasol-tree *Firmiana simplex*
Chinese Pistachio *Pistacia chinensis*
Chinese Privet *Ligustrum sinense*
Chinese Rose *Rosa chinensis*
Chinese Silver Grass *Miscanthus sinensis*
Chinese Spindle-tree *Euonymus fortunei*
Chinese Tallow-tree *Triadica sebifera*
Chinese Violet *Asystasia gangetica**
Chinese Wisteria *Wisteria sinensis*
Chinese Yam *Dioscorea polystachya*
Chinquapin Oak ***Quercus** muehlenbergii*
—, Dwarf *Q. prinoides*
Chinquapin, Alabama ***Castanea** alabamensis*
—, Common *C. pumila*
—, Ozark *C. ozarkensis*
Chintúl *Cyperus articulatus*
Chives, Chinese *Allium tuberosum*
Chloris, Showy *Chloris virgata*
Chocolate-vine *Akebia quinata*
Chocolate-weed *Melochia corchorifolia*
Choctaw Spiderlily *Hymenocallis choctawensis*
Chokeberry, Black ***Aronia** melanocarpa*
—, Purple *A. prunifolia*
—, Red *A. arbutifolia*
Christmas Fern *Polystichum acrostichoides*
Christmas Holly ***Ilex** aquifolium*
— *I. opaca*
Christmas Mistletoe *Phoradendron leucarpum**
Christmas-berry *Lycium carolinianum*
Christmasberry Tree *Schinus terebinthifolia*
Chrysanthemum, Corn *Glebionis segetum*
—, Garden *Chrysanthemum indicum*
—, Garland *Glebionis coronaria*
Church's Wild-rye *Elymus churchii*
Ciliate Meadow-beauty *Rhexia petiolata*
Cinnamon Fern *Osmundastrum cinnamomeum*
Cinnamon Vine *Dioscorea polystachya*
Cinquefoil, Rough ***Potentilla** norvegica*
—, Sulphur *P. recta*
Citron *Citrus medica*
Citron Melon *Citrullus amarus*
Citron Rain-lily *Zephyranthes citrina*
Clammy Azalea ***Rhododendron** serrulatum*
— *R. viscosum**
Clammy Cuphea *Cuphea viscosissima*
Clammy Goosefoot *Dysphania pumilio*
Clammy Ground-cherry *Physalis heterophylla*
Clammy Hedge-hyssop *Gratiola neglecta*
Clammy Locust *Robinia viscosa*
Clammyweed, Slenderleaf *Polanisia tenuifolia*
Clary, Wild *Salvia verbenaca*
Clasping Coneflower *Dracopis amplexicaulis*
Clasping Heliotrope *Heliotropium amplexicaule*
Clasping Milkweed *Asclepias amplexicaulis*
Clasping Roundleaf Eupatorium *Eupatorium cordigerum*
Clasping Water-horehound *Lycopus amplectens*
Clasping-leaf pondweed *Potamogeton perfoliatus*
Clasping-leaf St. John's-wort *Hypericum gymnanthum*
Clavel de Muerto *Tithonia rotundifolia*
Clavel de Pozo *Eclipta prostrata*
Clay-pan Muhly *Muhlenbergia glabrifloris*
Clearwater Butterwort *Pinguicula primuliflora*
Clearweed, Blackfruit ***Pilea** fontana*
—, Greenfruit *P. pumila*
—, Lesser *P. fontana*
Cleavers *Galium aparine*
Clematis, Marsh ***Clematis** crispa*
—, Sweet Autumn *C. terniflora*
—, Yam-leaved *C. terniflora*
Cleome *Tarenaya species 1*
—, Yellow *Corynandra viscosa**
Cliff Fern, Blunt-lobed *Woodsia obtusa**
Cliff-brake, Purple ***Pellaea** atropurpurea*
—, Smooth *P. glabella**
Climbing Aster *Ampelaster carolinianus*
Climbing Buckwheat ***Fallopia** convolvulus*
—, Common *F. scandens*
—, Crested *F. cristata*
Climbing Dogbane *Thyrsanthella difformis*
Climbing Euonymus *Euonymus fortunei*

*Common name applies to a subspecies or variety of this species.

INDEX OF COMMON NAMES

Climbing Fern, American ***Lygodium*** *palmatum*
—, Japanese *L. japonicum*
Climbing Fetterbush *Pieris phillyreifolia*
Climbing Fig *Ficus pumila*
Climbing Hempweed ***Mikania*** *scandens*
—, Heartleaf *M. cordifolia*
Climbing Hydrangea *Hydrangea barbara*
Climbing Nightshade *Solanum dulcamara*
Climbing Prairie Rose *Rosa setigera*
Climbing-magnolia *Schisandra glabra*
Cloak Fern, Southwestern *Astrolepis integerrima*
Clover, Alsike *Trifolium hybridum*
—, Alyce *Alysicarpus ovalifolius*
—, Arrowleaf ***Trifolium*** *vesiculosum*
—, Ball *T. nigrescens*
—, Buffalo *T. reflexum*
—, Burdock *T. lappaceum*
—, Carolina *T. carolinianum*
—, Crimson *T. incarnatum*
—, Dutch *T. repens*
—, Hop *T. campestre*
—, Ladino *T. repens*
—, Lappa *T. lappaceum*
—, Large Hop *T. aureum*
—, Little Hop *T. dubium*
—, Low Hop *T. dubium*
—, Narrowleaf *T. angustifolium*
—, Persian *T. resupinatum*
—, Prickly *T. echinatum*
—, Rabbitfoot *T. arvense*
—, Red *T. pratense*
—, Reversed *T. resupinatum*
—, Rose *T. hirtum*
—, Rough *T. scabrum*
—, Subterranean *T. subterraneum*
—, White *T. repens*
—, Wild White *T. carolinianum*
—, Yellow *T. aureum*
Club Begonia *Begonia cucullata*
Clubmoss, Carolina Bog *Pseudolycopodiella caroliniana*
—, Featherstem *Lycopodiella prostrata*
—, Florida Bog *Pseudolycopodiella species 1*
—, Nodding *Palhinhaea cernua*
—, Rock *Huperzia porophila*
—, Running *Lycopodium clavatum*
—, Shining *Huperzia lucidula*
—, Slender *Pseudolycopodiella caroliniana*
—, Staghorn *Palhinhaea cernua*
Cluster Bushmint *Hyptis alata**
Cluster Fescue *Festuca paradoxa*
Clustered Beaksedge *Rhynchospora glomerata*
Clustered Green Dock *Rumex conglomeratus*
Clustered Poppy-mallow *Callirhoe triangulata*
Clustered Sanicle ***Sanicula*** *odorata*
Clustered Snakeroot *S. odorata*
Clustered Yellowtops *Flaveria trinervia*
Clusterleaf Tick-trefoil *Hylodesmum glutinosum*
Coamecatl *Antigonon leptopus*
Coarse Vervain *Verbena xutha*
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Coastal American Hornbeam *Carpinus caroliniana**
Coastal Beaksedge *Rhynchospora pleiantha*
Coastal Bedstraw *Galium bermudense*
Coastal Bog Beaksedge *Rhynchospora stenophylla*
Coastal Bog Bentgrass *Agrostis altissima*
Coastal Dog-fennel *Eupatorium compositifolium*
Coastal Doghobble *Leucothoe axillaris*
Coastal Dropseed *Sporobolus virginicus*
Coastal Fetterbush *Eubotrys racemosus*
Coastal Ground-cherry *Physalis angustifolia*
Coastal Indigo *Indigofera miniata*
Coastal Lovegrass *Eragrostis refracta*
Coastal Morning-glory *Ipomoea cordatotriloba**
Coastal Pellitory *Parietaria praetermissa*
Coastal Plain Bindweed *Convolvulus limnophilus*
Coastal Plain Black-eyed Susan *Rudbeckia hirta**
Coastal Plain Blue-eyed-grass *Sisyrinchium fuscatum*
Coastal Plain Bog Asphodel *Triantha racemosa*
Coastal Plain Bristlegrass *Setaria corrugata*
Coastal Plain Crownbeard *Verbesina aristata*
Coastal Plain Cutleaf Coneflower *Rudbeckia laciniata**
Coastal Plain Dewberry *Rubus trivialis*
Coastal Plain Elephant's-foot *Elephantopus nudatus*
Coastal Plain Gentian *Gentiana catesbyi*
Coastal Plain Lettuce *Lactuca graminifolia**
Coastal Plain Oxeye *Heliopsis gracilis*
Coastal Plain Puccoon *Lithospermum caroliniense*
Coastal Plain Rattlebox *Crotalaria purshii*
Coastal Plain Sedge *Carex crebriflora*
Coastal Plain Sida *Sida elliottii**
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Coastal Plain Sunflower-everlasting *Heliopsis gracilis*
Coastal Plain Tickseed-sunflower *Bidens mitis*
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Coastal Plain Water-willow *Justicia ovata*
Coastal Plain Willow *Salix caroliniana*
Coastal Plain Wireplant *Stipulicida setacea*
Coastal Plain Yellow-eyed-grass *Xyris ambigua*
Coastal Prickly Pear *Opuntia stricta**
Coastal Red Cedar *Juniperus silicicola*
Coastal Rose-pink *Sabatia calycina*
Coastal Sand Spurge *Euphorbia exserta*
Coastal Sandspur *Cenchrus incertus*
Coastal Swamp Goldenrod *Solidago latissimifolia*
Coastal Sweet-pepperbush *Clethra alnifolia*
Coastal Tall Thistle *Cirsium nuttallii*
Coastal Virgin's-bower *Clematis catesbyana*
Coastal White-alder *Clethra alnifolia*
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Cockroachberry *Solanum capsicoides*
Cockscomb *Celosia argentea*
Cock's-eggs *Salpichroa origanifolia*
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Cockspur Hawthorn ***Crataegus*** *crus-galli**
—, Narrowleaf *C. crus-galli**
Cocograss *Cyperus rotundus*
Coco-Yam *Colocasia esculenta*
Coffee Senna ***Senna*** *occidentalis*
Coffeeweed *S. obtusifolia*
Coffee-weed *Sesbania herbacea*
Cogongrass *Imperata cylindrica*
Coinleaf *Centella erecta*
Cola de Mico *Heliotropium curassavicum**
Colic-root, Golden ***Aletris*** *aurea*
—, Mealy *A. farinosa*
—, Northern White *A. farinosa*
—, Southern White *A. obovata*
—, Yellow *A. lutea*
Collins's Sedge *Carex collinsii*
Colocynth *Citrullus colocynthis*
Colombian Watermeal *Wolffia columbiana*
Colombian Waxweed *Cuphea carthagenensis*
Colonial Barbara's-buttons *Marshallia trinervia*
Colonial Bentgrass *Agrostis capillaris*
Colonial Dwarf-dandelion *Krigia dandelion*
Colorín *Erythrina herbacea*
Columbine, Canada ***Aquilegia*** *canadensis*
—, Eastern *A. canadensis*
Columbo, American *Frasera caroliniensis*
Columnar Prairie Coneflower *Ratibida columnifera*
Colza *Brassica napus*
Comandra, Eastern *Comandra umbellata**
Comb Fern, Brown-hair *Ctenitis submarginalis*
Comb Seymeria ***Seymeria*** *pectinata**
Combleaf Blacksenna *S. pectinata**
Combs Panic Grass *Coleataenia longifolia**
Comfort-root *Hibiscus aculeatus*
Comfrey, Common *Symphytum officinale*
—, Garden *Cynoglossum officinale*
—, Southern Wild *Andersonglossum virginianum*
Common Agalinis *Agalinis purpurea*
Common Agrimony *Agrimonia gryposepala*
Common Apple *Malus domestica*
Common Atamasco-lily *Zephyranthes atamasco*
Common Axil-flower *Mecardonia acuminata**
Common Balm *Melissa officinalis*
Common Bird's-foot Violet *Viola pedata**
Common Black-cohosh *Actaea racemosa*
Common Blanket-flower *Gaillardia pulchella**
Common Blue Cohosh *Caulophyllum thalictroides*
Common Blue Curls *Trichostema dichotomum*
Common Blue Violet *Viola sororia**
Common Bluet *Houstonia caerulea*
Common Bogbuttons *Lachnocaulon anceps*
Common Bottlebrush Grass *Elymus hystrix**
Common Bristly Locust *Robinia hispida**
Common Brome Sedge *Carex bromoides**
Common Bunched Beaksedge *Rhynchospora cephalantha**
Common Bundleflower *Desmanthus illinoensis*
Common Burdock *Arctium minus*
Common Bushy Bluestem *Andropogon glomeratus*
Common Carpetgrass *Axonopus fissifolius*
Common Carrionflower *Smilax herbacea*
Common Catchfly *Silene gallica*
Common Cattail *Typha latifolia*
Common Chess *Bromus secalinus*
Common Chickweed *Stellaria media*
Common Chinquapin *Castanea pumila*
Common Clasping Aster *Symphyotrichum patens**
Common Climbing Buckwheat *Fallopia scandens*
Common Comfrey *Symphytum officinale*
Common Cosmos *Cosmos bipinnatus*
Common Cottonweed *Froelichia floridana**
Common Cup-plant *Silphium perfoliatum*
Common Cutleaf Coneflower *Rudbeckia laciniata**
Common Daisy *Leucanthemum vulgare*
Common Dandelion *Taraxacum officinale*
Common Dawnflower *Stylisma patens*
Common Dayflower *Commelina communis*
Common Deerberry *Vaccinium stamineum**
Common Dewberry *Rubus flagellaris*
Common Dodder *Cuscuta gronovii*
Common Dog-fennel *Eupatorium capillifolium*
Common Dwarf St. John's-wort *Hypericum mutilum**
Common Eastern Brome *Bromus pubescens*
Common Eastern Coneflower *Rudbeckia fulgida*
Common Eastern Pinesap *Hypopitys species 3*
Common Eastern Prickly-pear *Opuntia cespitosa*
Common Eastern Wild-rye *Elymus virginicus*
Common Elderberry *Sambucus canadensis*
Common Elegant Blazing-star *Liatris elegans**
Common Elephant's-foot *Elephantopus tomentosus*
Common Evening-primrose *Oenothera biennis*
Common Flax *Linum usitatissimum*
Common Flowering Quince *Chaenomeles speciosa*
Common Forked Whitlow-wort *Paronychia fastigiata**
Common Frostweed *Verbesina virginica**
Common Garden Canna *Canna generalis*
Common Germander *Teucrium canadense**
Common Ghost-pipe *Monotropa uniflora*
Common Golden-Alexanders *Zizia aurea*

*Common name applies to a subspecies or variety of this species.

Common Grass-pink *Calopogon tuberosus**
Common Greenbriar *Smilax rotundifolia*
Common Groundnut *Apios americana*
Common Groundpine *Dendrolycopodium obscurum*
Common Hairgrass *Avenella flexuosa*
Common Hairsedge *Bulbostylis capillaris**
Common Hairy Coreopsis *Coreopsis pubescens**
Common Horseweed *Erigeron canadensis*
Common Ironweed *Vernonia gigantea*
Common Ivy *Hedera helix**
Common Jack-in-the-pulpit *Arisaema triphyllum*
Common Jacquemontia *Jacquemontia tamnifolia*
Common Jujube *Ziziphus jujuba*
Common Juniper *Juniperus communis**
Common Lantana *Lantana strigocamara*
Common Lespedeza *Kummerowia striata*
Common Little Bluestem *Schizachyrium scoparium**
Common Mallow ***Malva** neglecta*
— *M. sylvestris*
Common Marigold *Tagetes erecta*
Common Marsh St. John's-wort *Triadenum virginicum*
Common Marsh-pink *Sabatia angularis*
Common Mermaid-weed *Proserpinaca palustris*
Common Milk-poison *Ageratina altissima*
Common Milkweed *Asclepias syriaca*
Common Morning-glory *Ipomoea purpurea*
Common Mouse-ear *Cerastium fontanum**
Common Mugwort *Artemisia vulgaris*
Common Mullein *Verbascum thapsus**
Common Naiad *Najas guadalupensis**
Common New Jersey Tea *Ceanothus americanus**
Common October-flower *Polygonella polygama*
Common Partridge-pea *Chamaecrista fasciculata**
Common Pawpaw *Asimina triloba*
Common Pear *Pyrus communis*
Common Periwinkle *Vinca minor*
Common Peruvian-daisy *Galinsoga quadriradiata*
Common Pimpernel *Anagallis arvensis*
Common Plantain *Plantago major*
Common Pokeweed *Phytolacca americana*
Common Poppy ***Papaver** rhoeas*
— *P. somniferum*
Common Privet *Ligustrum vulgare*
Common Purslane *Portulaca oleracea*
Common Purslane Speedwell *Veronica peregrina**
Common Quince *Cydonia oblonga*
Common Ragweed *Ambrosia artemisiifolia*
Common Rattlebox *Crotalaria sagittalis*
Common Reed *Phragmites australis*
Common Rockcap Fern *Polypodium virginianum*
Common Roseling *Cuthbertia rosea*
Common Rough Fleabane *Erigeron strigosus**
Common Roundleaf Eupatorium *Eupatorium rotundifolium*
Common Running-Cedar *Diphasiastrum digitatum*
Common Rush *Juncus effusus**
Common Sandspur *Cenchrus longispinus*
Common Sensitive-plant *Chamaecrista nictitans**
Common Shagbark Hickory *Carya ovata*
Common Shepherd's Purse *Capsella bursa-pastoris*
Common Shorthusk *Brachyelytrum erectum*
Common Silverbell *Halesia tetraptera*
Common Smartweed ***Persicaria** hydropiper*
— *P. pensylvanica*
Common Smooth Rockcress *Borodinia laevigata*
Common Snapdragon *Antirrhinum majus*
Common Sneezeweed *Helenium autumnale*
Common Sow-thistle *Sonchus oleraceus*
Common Spikerush *Eleocharis palustris*
Common Spreading Chervil *Chaerophyllum procumbens**
Common Stargrass *Hypoxis hirsuta*
Common Starwort *Stellaria pubera*
Common Stork's-Bill *Erodium cicutarium*
Common Sunflower *Helianthus annuus*
Common Tall Meadowrue *Thalictrum pubescens*
Common Teasel *Dipsacus fullonum*
Common Ten-angled Pipewort *Eriocaulon decangulare**
Common Three-lobed Coneflower *Rudbeckia triloba**
Common Threesquare *Schoenoplectus pungens**
Common Toadflax *Linaria canadensis*
Common Two-wing Silverbell *Halesia diptera**
Common Vervain *Verbena hastata*
Common Vetch *Vicia sativa**
Common Wafer-ash *Ptelea trifoliata**
Common Water-primrose ***Ludwigia** hexapetala*
Common Water-purslane *L. palustris*
Common Water-starwort *Callitriche heterophylla**
Common Waterweed *Elodea canadensis*
Common Wax-myrtle *Morella cerifera*
Common White Heart-leaved Aster *Eurybia divaricata*
Common White Snakeroot *Ageratina altissima*
Common Wild Ginger *Asarum canadense*
Common Wild Quinine *Parthenium integrifolium**
Common Wild-petunia *Ruellia caroliniensis*
Common Wingstem *Verbesina alternifolia*
Common Winter-cress *Barbarea vulgaris*
Common Woodreed *Cinna arundinacea*
Common Woodsia *Woodsia obtusa**
Common Yellow Thistle *Cirsium horridulum**
Common Yellow Wood-sorrel *Oxalis stricta*
Compact Dodder *Cuscuta compacta*
Compact Grape-hyacinth *Muscari botryoides*
Compass-plant *Silphium laciniatum*
Coneflower, Appalachian ***Rudbeckia** umbrosa*
—, Blackland *R. terranigrae*
—, Clasping *Dracopis amplexicaulis*
—, Coastal Plain Cutleaf *Rudbeckia laciniata**
—, Columnar Prairie *Ratibida columnifera*
—, Common Cutleaf ***Rudbeckia** laciniata**
—, Common Eastern *R. fulgida*
—, Common Three-lobed *R. triloba**
—, Drooping *Ratibida pinnata*
—, Eastern Purple ***Echinacea** purpurea*
—, Glade *E. simulata*
—, Globular Prairie ***Ratibida** pinnata*
—, Grey-headed *R. pinnata*
—, Pale Purple *Echinacea pallida*
—, Pineywoods ***Rudbeckia** heliopsidis*
—, Pinnate-leaf *R. triloba**
—, Prairie Purple *Echinacea simulata*
—, Sunfacing ***Rudbeckia** heliopsidis*
—, Woolly *R. mollis*
Confederate Daisy *Helianthus porteri*
Confederate Jasmine *Trachelospermum jasminoides*
Confederate Spiderwort *Tradescantia paludosa*
Confederate-vine *Antigonon leptopus*
Congo Jute *Urena lobata*
Congress Grass *Parthenium hysterophorus*
Conjurer's-nut *Nestronia umbellula*
Consumption-weed *Baccharis halimifolia*
Coolwort *Pilea pumila*
Coontail *Ceratophyllum demersum*
Coosa Barbara's-buttons *Marshallia mohrii*
Coosa Threeway Sedge *Dulichium species 1*
Copal Tree *Ailanthus altissima*
Copper Iris *Iris fulva*
Copperleaf, Big-seeded ***Acalypha** deamii*
—, Cuban *A. setosa*
—, Foxtail *A. alopecuroidea*
—, Hop-hornbeam *A. ostryifolia*
—, Rhombic *A. rhomboidea*
—, Rough-pod *A. ostryifolia*
—, Shortstalk *A. gracilens*
—, Slender *A. gracilens*
—, Two-seeded *A. deamii*
—, Virginia *A. virginica*
Copperlily, Rio Grande *Zephyranthes tubispatha*
Coppery St. John's-wort *Hypericum denticulatum*
Coral Ardisia *Ardisia crenata*
Coral Bean *Erythrina herbacea*
Coral Greenbriar *Smilax walteri*
Coral Honeysuckle *Lonicera sempervirens*
Coralbeads *Nephroia carolina*
Coralberry *Ardisia crenata*
— *Symphoricarpos orbiculatus*
Corallina ***Antigonon** leptopus*
Corallita *A. leptopus*
Coralroot, Autumn *Corallorhiza odontorhiza*
—, Crested *Hexalectris spicata*
—, Spring *Corallorhiza wisteriana*
Coralvine *Antigonon leptopus*
Cordgrass, Giant ***Spartina** cynosuroides*
—, Gulf *S. spartinae*
—, Marsh-hay *S. patens*
—, Saltmarsh *S. alterniflora*
—, Small Saltmeadow *S. patens*
—, Smooth *S. alterniflora*
Coreopsis, Common Hairy ***Coreopsis** pubescens**
—, Ketona *C. grandiflora**
—, Large-flowered *C. grandiflora**
—, Lobed *C. auriculata*
—, Longstalk *C. lanceolata*
—, Lookout Mountain *C. pulchra*
—, Plains *C. tinctoria**
—, Savanna *C. linifolia*
—, Seepage *C. gladiata*
—, Stone Mountain *C. grandiflora**
—, Swamp *C. nudata*
—, Tall *C. tripteris*
—, Texas *C. basalis*
—, Threadleaf *C. verticillata*
—, Woodland *C. major*
Corkwood *Stillingia aquatica*
Corn *Zea mays**
Corn Chamomile *Anthemis arvensis*
Corn Charlock *Rhamphospermum arvense*
Corn Chrysanthemum *Glebionis segetum*
Corn Crowfoot *Ranunculus arvensis*
Corn Marigold *Glebionis segetum*
Corn Poppy *Papaver rhoeas*
Corn Speedwell *Veronica arvensis*
Corn Spurrey *Spergula arvensis*
Cornbind *Convolvulus arvensis*
Corn-campion *Agrostemma githago**
Corncob Sedge *Carex granularis*
Corncockle *Agrostemma githago**
Cornel, Pagoda *Swida alternifolia*
Cornel-leaf Flat-topped Aster *Doellingeria infirma*
Cornflower *Cyanus segetum*
Corn-gromwell *Buglossoides arvensis**
Corn-salad, European *Valerianella locusta*
Coromandel *Asystasia gangetica**
Correhuela de los Doce *Distimake dissectus*
Corydalis, Mealy ***Corydalis** crystallina*
—, Short-spurred *C. flavula*
—, Southern *C. halei*
Cosmos, Common ***Cosmos** bipinnatus*
—, Orange *C. sulphureus*
Cottage Pink *Dianthus plumarius**
Cotton Gum *Nyssa aquatica*
Cotton, Short-staple ***Gossypium** hirsutum*
—, Upland *G. hirsutum*
Cotton-rose *Diaperia prolifera**
Cotton-thistle *Onopordum acanthium**
Cottonweed, Common ***Froelichia** floridana**
—, Slender *F. gracilis*
Cottonwood, Eastern ***Populus** deltoides**
—, Swamp *P. heterophylla*

*Common name applies to a subspecies or variety of this species.

Country Belle *Salvia coccinea*
Cow Catcher *Proboscidea louisiana**
Cow Cress *Lepidium campestre*
Cowbane *Oxypolis rigidior*
Cow-cockle ***Gypsophila** vaccaria*
Cow-herb *G. vaccaria*
Cowpea ***Vigna** unguiculata*
—, Wild *V. luteola*
Cowslip, Virginia *Mertensia virginica*
Cow-soapwort *Gypsophila vaccaria*
Crab Grass, Dwarf ***Digitaria** serotina*
—, Northern *D. sanguinalis*
—, Smooth *D. ischaemum*
—, Southern *D. ciliaris*
Crabapple, Sweet ***Malus** coronaria*
—, Wild *M. angustifolia*
—, Wild *M. coronaria*
Crabweed *Fatoua villosa*
Crackleberry *Gaylussacia baccata*
Crag-jangle *Heuchera villosa*
Cranefly Orchid *Tipularia discolor*
Crane's-bill, Carolina ***Geranium** carolinianum*
—, Cutleaf *G. dissectum*
—, Dove's-foot *G. molle*
—, Small-flowered *G. pusillum*
—, Texas *G. texanum*
Crape-myrtle *Lagerstroemia indica*
Crawe's Sedge *Carex crawei*
Crawford's Ragwort ***Packera** crawfordii*
Crawford's Groundsel *P. crawfordii*
Cream Avens *Geum virginianum*
Cream Violet *Viola striata*
Creamflower Tick-trefoil *Desmodium ochroleucum*
Creamy Wild Indigo *Baptisia bracteata*
Creeping Aster *Eurybia surculosa*
Creeping Bentgrass *Agrostis stolonifera*
Creeping Bluestem *Schizachyrium stoloniferum*
Creeping Bluet *Houstonia procumbens*
Creeping Burhead *Echinodorus cordifolius*
Creeping Buttercup *Ranunculus repens*
Creeping Cactus *Opuntia drummondii*
Creeping Charlie *Glechoma hederacea*
— *Lysimachia nummularia*
— *Tradescantia zebrina*
Creeping Cucumber *Melothria pendula*
Creeping Dayflower *Commelina diffusa*
Creeping Eryngo *Eryngium prostratum*
Creeping Foxglove *Asystasia gangetica**
Creeping Frogfruit *Phyla nodiflora*
Creeping Indigo *Indigofera spicata*
Creeping Jenny *Convolvulus arvensis*
— *Lysimachia nummularia*
Creeping Lady's-sorrel *Oxalis corniculata*
Creeping Lespedeza *Lespedeza repens*
Creeping Lilyturf *Liriope spicata*
Creeping Lovegrass ***Eragrostis** hypnoides*
— *E. reptans*
Creeping Molasses-grass *Melinis repens**
Creeping Oxeye *Sphagneticola trilobata*
—, Beach *Pascalia glauca*
Creeping Rush *Juncus repens*
Creeping Seedbox *Ludwigia repens*
Creeping Smartweed *Persicaria longiseta*
Creeping Spotflower *Acmella repens*
Creeping Stiff-leaved Aster *Ionactis repens*
Creeping Vervain *Glandularia canadensis*
Creeping Yellow Cress *Rorippa sylvestris*
Cresta de Gallo *Celosia argentea*
Crested Climbing Buckwheat *Fallopia cristata*
Crested Coralroot *Hexalectris spicata*
Crested Fringed Orchid *Platanthera cristata*
Crested Goosefoot *Dysphania cristata*
Crested Greenhead Sedge *Cyperus metzii*
Crested Sedge *Carex cristatella*
Cretan Brake ***Pteris** cretica**
—, White-lined *P. cretica**
Crimean Snowdrop *Galanthus plicatus**
Crimson Bottlebrush *Melaleuca citrina*
Crimson Clover *Trifolium incarnatum*
Crimson Pitcherplant *Sarracenia leucophylla*
Crinkleroot *Cardamine diphylla*
Crisped Bunchflower *Melanthium hybridum*
Crookneck Squash *Cucurbita melopepo**
Croomia *Croomia pauciflora*
Cross-vine *Bignonia capreolata*
Croton, Alabama ***Croton** alabamensis**
—, Capitate *C. capitatus*
—, Dyer's *Chrozophora tinctoria*
—, Elliott's ***Croton** elliottii*
—, Gulf *C. punctatus*
—, Healing *C. argyranthemus*
—, Lindheimer's *C. lindheimeri*
—, Michaux's *C. michauxii*
—, Northern *C. glandulosus**
—, One-seed *C. monanthogynus*
—, Pondshore *C. elliottii*
—, Sand *C. glandulosus**
—, Sandhill *C. argyranthemus*
—, Silver *C. argyranthemus*
—, Silverleaf *C. punctatus*
—, Texas *C. texensis*
—, Tooth-leaved *C. glandulosus**
—, Willdenow's *C. willdenowii*
—, Woolly *C. capitatus*
Crow Poison *Nothoscordum bivalve*
Crowfoot Grass *Dactyloctenium aegyptium*
Crowfoot Sedge *Carex crus-corvi*
Crowfoot, Celery-leaf ***Ranunculus** sceleratus**
—, Corn *R. arvensis*
—, Hooked *R. recurvatus**
—, Stickseed *R. parviflorus*
—, White Water *R. longirostris*
—, Yellow Water *R. flabellaris*
Crown Grass, Curtis's ***Paspalum** praecox**
—, Early *P. praecox**
—, Horsetail *P. fluitans*
—, Pitchfork *P. bifidum*
—, Seashore *P. vaginatum*
Crownbeard, Coastal Plain ***Verbesina** aristata*
—, Golden *V. encelioides*
—, Ozark *V. helianthoides*
—, Southern *V. occidentalis*
Crown-daisy *Glebionis coronaria*
Crown-vetch *Securigera varia*
Crow-poison ***Stenanthium** densum*
— *S. texanum*
Cruise's Goldenaster *Chrysopsis cruiseana*
Crunchweed *Rhamphospermum arvense*
Cuban Copperleaf *Acalypha setosa*
Cuban Purple Wood-sorrel *Oxalis intermedia*
Cuban-bulrush *Cyperus blepharoleptos*
Cucumber *Cucumis sativus*
Cucumber Magnolia ***Magnolia** acuminata**
—, Showy *M. acuminata**
Cucumber, African Horned *Cucumis metulifer*
—, Creeping *Melothria pendula*
—, Squirting *Ecballium elaterium*
Cucumber-leaf Sunflower *Helianthus debilis**
Cucumber-tree ***Magnolia** acuminata**
—, Yellow *M. acuminata**
Cudweed, Elegant ***Gamochaeta** impatiens*
—, Silvery *G. argyrinea*
—, White-cloaked *G. chionesthes*
Culantrillo *Adiantum capillus-veneris*
Cultivated Flax *Linum usitatissimum*
Cultivated Purslane *Portulaca grandiflora*
Cultivated Strawberry *Fragaria ananassa**
Culver's-physic ***Veronicastrum** virginicum*
Culver's-root *V. virginicum*
Cumberland Azalea *Rhododendron cumberlandense*
Cumberland Mock-orange *Philadelphus hirsutus*
Cumberland Oak-leech *Aureolaria patula*
Cumberland River Vervain *Glandularia species 1*
Cumberland Rose-gentian *Sabatia capitata*
Cumberland Rosinweed *Silphium brachiatum*
Cumberland Sandreed *Calamovilfa arcuata*
Cumberland Sedge *Carex cumberlandensis*
Cumberland Spurge *Euphorbia mercurialina*
Cumberland Woodmint *Blephilia subnuda*
Cuphea, Clammy *Cuphea viscosissima*
Cupid's-shaving-brush *Emilia fosbergii*
Cupscale, American ***Sacciolepis** striata*
—, Indian *S. indica*
Cupseed *Calycocarpum lyonii*
Curled Pondweed *Potamogeton crispus*
'Curly Dan' *Danthonia spicata*
Curly Dock *Rumex crispus**
Curly Pondweed *Potamogeton crispus*
Curlyleaf Yucca *Yucca filamentosa*
Cursed Buttercup *Ranunculus sceleratus**
Curtis's Crown Grass *Paspalum praecox**
Curtis's Goldenrod *Solidago curtisii*
Curtis's Spurge *Euphorbia curtisii*
Curtiss's Dropseed *Sporobolus curtissii*
Curtiss's Stargrass *Hypoxis curtissii*
Curtiss's Three-awn *Aristida curtissii*
Curtiss's Yellow-eyed-grass *Xyris curtissii*
Curve-leaf Yucca *Yucca recurvifolia*
Cutgrass, Catchfly *Leersia lenticularis*
—, Giant *Zizaniopsis miliacea*
—, Rice ***Leersia** oryzoides*
—, Southern *L. hexandra*
—, Virginia *L. virginica*
—, White *L. virginica*
Cuthbert's Onion *Allium cuthbertii*
Cutleaf Beautiful Hawthorn *Crataegus incilis*
Cutleaf Crane's-bill *Geranium dissectum*
Cutleaf Dead-nettle *Lamium dissectum*
Cutleaf Evening-primrose *Oenothera laciniata*
Cutleaf Goosefoot *Dysphania multifida*
Cut-leaf Grape Fern *Sceptridium dissectum*
Cutleaf Mignonette *Reseda lutea*
Cutleaf Spleenwort *Asplenium abscissum**
Cutleaf Toothwort *Cardamine concatenata*
Cutleaf Water-milfoil *Myriophyllum pinnatum*
Cymose Beaksedge *Rhynchospora cymosa*
Cynanchum, Marsh *Pattalias paluster*
Cynthia, Twin-flowered *Krigia biflora**
Cypress Spurge *Euphorbia cyparissias*
Cypress-knee Sedge ***Carex** decomposita*
Cypress-swamp Sedge *C. joorii*
Cypress-vine *Ipomoea quamoclit*
Cypressweed *Eupatorium capillifolium*
Daffodil *Narcissus pseudonarcissus*
Daffodil Garlic *Allium neapolitanum*
Daffodil, Apodanthus ***Narcissus** jonquilla*
—, Bunch-flowered *N. tazetta*
—, Hoop-petticoat *N. bulbocodium*
—, Nonesuch *N. incomparabilis*
—, Paper-white *N. papyraceus*
—, Pheasant's-eye *N. poeticus*
—, Star *N. intermedius*
Dahlberg Daisy *Thymophylla tenuiloba**
Dahoon *Ilex cassine*
Daisy Fleabane, Cahaba ***Erigeron** dolomiticola*
—, Cedar Glade *E. allisonii*
Dakota Vervain *Glandularia bipinnatifida**
Dalea, Foxtail ***Dalea** leporina*
—, Hare's-foot *D. leporina*
Dallis Grass *Paspalum dilatatum**
Damask Rose *Rosa damascena*
Dame's Rocket *Hesperis matronalis*
Damson *Prunus domestica*
Dandelion, Common ***Taraxacum** officinale*
—, Red-seeded *T. erythrospermum*
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—, Hairy *G. tomentosa*
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*Common name applies to a subspecies or variety of this species.

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Dark Indigo-bush *Amorpha nitens*
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Darrow's Blueberry *Vaccinium darrowii*
Dasheen *Colocasia esculenta*
Date Palm, Canary Island *Phoenix canariensis*
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—, Southern *S. humistrata*
—, Water *S. aquatica*
Dayflower, Bengal ***Commelina** benghalensis*
—, Common *C. communis*
—, Creeping *C. diffusa*
—, Erect *C. erecta**
—, Indian *C. caroliniana*
—, Sand *C. erecta**
—, Virginia *C. virginica*
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—, Tawny *H. fulva*
—, Yellow *H. lilioasphodelus*
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—, Henbit *L. amplexicaule**
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—, Red *L. purpureum*
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Deceptive Spinypod *Matelea decipiens*
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—, Common *R. flagellaris*
—, Southern *R. trivialis*
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—, Naked-stem *M. nudiflora*
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Dixie Rose-mallow; Confederate Rose-mallow *Hibiscus mutabilis*
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—, Bloody *R. sanguineus*
—, Brown's *R. brownii*
—, Clustered Green *R. conglomeratus*
—, Curly *R. crispus**
—, Fiddle *R. pulcher*
—, Florida *R. floridanus*
—, Heartwing *R. hastatulus*
—, Pale *R. altissimus*
—, Paraguayan *R. paraguayensis*
—, Peachleaf *R. altissimus*
—, Red *R. acetosella**
—, Red-veined *R. sanguineus*
—, Swamp *R. verticillatus*
—, Tall *R. altissimus*
—, Tropical *R. obovatus*
—, Wild *R. hastatulus*
—, Wood *R. sanguineus*
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Dockmackie *Viburnum acerifolium*
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—, Bigseed Alfalfa *C. indecora*
—, Common *C. gronovii*
—, Compact *C. compacta*
—, Field *C. campestris*
—, Fringed *C. suaveolens*
—, Glandular *C. obtusiflora**
—, Harper's *C. harperi*
—, Hazel *C. coryli*
—, Japanese *C. japonica*
—, Lucerne *C. suaveolens*
—, Prairie *C. campestris*
—, Pretty *C. indecora*
—, Swamp *C. gronovii*
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—, Hemp ***Apocynum** cannabinum*
—, Spreading *A. androsaemifolium*
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—, Coastal ***Eupatorium** compositifolium*
—, Common *E. capillifolium*
—, Limesink *E. leptophyllum*
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—, Finger *Cynosciadium digitatum*
—, Tansy *Limnosciadium pinnatum*
Dogtail, Bristly ***Cynosurus** echinatus*
—, Rough *C. echinatus*
Dog-tongue *Eriogonum tomentosum*
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—, Eastern Roughleaf *S. asperifolia*
—, Flowering *Benthamidia florida*
—, Midwestern Roughleaf ***Swida** drummondii*
—, Pagoda *S. alternifolia*
—, Silky *S. amomum*
—, Southern Swamp *S. foemina*
Dollarleaf Snoutbean ***Rhynchosia** reniformis*
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—, Southern *B. diffusa**
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Dooryard Knotweed *Polygonum aviculare**
Dorothy Perkins Rose *Rosa lucieae*
Dotted Duckmeat *Landoltia punctata*
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Douglass's Bittercress *Cardamine douglassii*
Dove's-foot Crane's-bill *Geranium molle*
Doveweed *Croton glandulosus**
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Downy American Snowbell *Styrax americanus**
Downy Arrow-wood *Viburnum rafinesqueanum*
Downy Brome *Bromus tectorum*
Downy Bur-clover *Medicago minima*
Downy Carrionflower *Smilax pulverulenta*
Downy Cheat ***Bromus** tectorum*
Downy Chess *B. tectorum*
Downy Danthonia *Danthonia sericea*
Downy Goldenrod ***Solidago** petiolaris**
— *S. puberula*
Downy Ground-cherry *Physalis pubescens*
Downy Hawthorn ***Crataegus** mollis**
—, Southern *C. mollis**
Downy Lobelia *Lobelia puberula*
Downy Maiden Fern *Christella dentata*
Downy Oak-leech *Aureolaria virginica*
Downy Phlox *Phlox pilosa**
Downy Rattlesnake-orchid *Goodyera pubescens*
Downy Serviceberry *Amelanchier arborea*
Downy Shield Fern *Christella dentata*
Downy Solomon's-seal *Polygonatum pubescens*
Downy Sweet-pepperbush *Clethra tomentosa*
Downy Trailing Lespedeza *Lespedeza procumbens*
Downy White-alder *Clethra tomentosa*
Downy Wild-rye *Elymus villosus**
Downy Woodmint *Blephilia ciliata*
Draba, Appalachian *Draba ramosissima*
—, Carolina *Tomostima reptans*
—, Shortpod *Abdra brachycarpa*
—, Wedgeleaf *Tomostima cuneifolia*
Drooping Bulrush *Scirpus lineatus*
Drooping Coneflower *Ratibida pinnata*
Drooping Forked-fern *Dicranopteris flexuosa*
Drooping Sedge *Carex prasina*
Drooping Star-of-Bethlehem *Ornithogalum nutans*
Dropseed, Barrens ***Sporobolus** neglectus*
—, Coastal *S. virginicus*
—, Curtiss's *S. curtissii*
—, Drummond's *S. compositus**
—, Ozark *S. ozarkanus*
—, Pineywoods *S. junceus*
—, Poverty *S. vaginiflorus*
—, Rough *S. clandestinus*
—, Sand *S. cryptandrus*
—, Sandhill *S. junceus*
—, Seashore *S. virginicus*
—, Tall *S. compositus**
—, West Indian *S. jacquemontii*
—, Wireleaf *S. teretifolius*
Dropwort, Water *Tiedemannia filiformis**
Drumheads ***Polygala** cruciata*
—, Northern *P. aquilonia*
Drummond Phlox *Phlox drummondii**
Drummond's Dropseed *Sporobolus compositus**
Drummond's Maple ***Acer** rubrum**
Drummond's Red Maple *A. rubrum**
Drummond's Flatsedge *Cyperus drummondii*
Drummond's Hedeoma *Hedeoma drummondii**
Drummond's Skullcap *Scutellaria drummondii**
Drummond's St. John's-wort *Hypericum drummondii*
Drummond's Yellow-eyed-grass *Xyris drummondii*
Dryland Blueberry *Vaccinium pallidum*
Dryland White Bluestem *Andropogon capillipes*

*Common name applies to a subspecies or variety of this species.

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Drymary *Drymaria cordata**
Duck River Bladderpod *Paysonia densipila*
Duckmeat, Dotted *Landoltia punctata*
Duckweed, Greater *Spirodela polyrhiza*
—, Least ***Lemna** minuta*
—, Lesser *L. aequinoctialis*
—, Little *L. obscura*
—, Pale *L. valdiviana*
—, Red *L. turionifera*
—, Turion *L. turionifera*
Dull Meadow-beauty *Rhexia mariana**
Dune Finger-grass *Eustachys petraea*
Dune Greenbriar *Smilax auriculata*
Dune Ground-cherry *Physalis walteri*
Dune Hairgrass *Muhlenbergia sericea*
Dune Marsh-elder *Iva imbricata*
Dune Nightshade *Solanum pseudogracile*
Dune Pennywort *Hydrocotyle bonariensis*
Dune Prickly-pear *Opuntia drummondii*
Dune Sandspur *Cenchrus tribuloides*
Dune Three-awn *Aristida tuberculosa*
Durand's Oak ***Quercus** durandii**
Durand's White Oak *Q. durandii**
Dutch Clover *Trifolium repens*
Dutch-lily *Tulipa sylvestris*
Dutchman's Britches *Dicentra cucullaria*
Dutchman's-pipe ***Isotrema** macrophyllum*
—, Woolly *I. tomentosum*
Dwarf Arrowhead *Sagittaria subulata*
Dwarf Bamboo *Bambusa multiplex*
Dwarf Bayberry *Morella pumila*
Dwarf Beaksedge *Rhynchospora pusilla*
Dwarf Bladderwort *Utricularia olivacea*
Dwarf Blueberry, Southern *Vaccinium tenellum*
Dwarf Bristly Locust *Robinia nana*
Dwarf Cape-gooseberry *Physalis grisea*
Dwarf Cattail *Acalypha herzogiana*
Dwarf Chinquapin Oak *Quercus prinoides*
Dwarf Crab Grass *Digitaria serotina*
Dwarf Crested Iris *Iris cristata*
Dwarf Dangleberry *Gaylussacia nana*
Dwarf Filmy Fern *Didymoglossum petersii*
Dwarf Flowering Almond *Prunus glandulosa*
Dwarf Ginseng *Nanopanax trifolius*
Dwarf Glasswort *Salicornia bigelovii*
Dwarf Goat's-rue *Tephrosia mohrii*
Dwarf Hackberry *Celtis pumila*
Dwarf Hawthorn *Crataegus munda*
Dwarf Horse-nettle *Solanum pumilum*
Dwarf Iris, Upland *Iris verna**
Dwarf Larkspur *Delphinium tricorne*
Dwarf Live Oak *Quercus minima*
Dwarf Milkwort *Polygala nana*
Dwarf Morning-glory, Silky ***Evolvulus** sericeus**
—, Silver *E. sericeus**
—, Slender *E. alsinoides*
Dwarf Mouse-ear *Cerastium pumilum*
Dwarf Palmetto *Sabal minor*
Dwarf Prairie Willow *Salix occidentalis*
Dwarf Rotala *Rotala rotundifolia*
Dwarf Saltwort *Salicornia bigelovii*
Dwarf Serviceberry *Amelanchier spicata*
Dwarf Skullcap *Scutellaria parvula*
Dwarf Smilax *Smilax pumila*
Dwarf Snapdragon *Chaenorhinum minus**
Dwarf Spikerush *Eleocharis parvula*
Dwarf Stinging Nettle *Urtica chamaedryoides*
Dwarf Sundew *Drosera brevifolia*
Dwarf Umbrella-sedge *Fuirena pumila*
Dwarf Upland Willow *Salix occidentalis*
Dwarf Wax-myrtle *Morella pumila*
Dwarf Wild-petunia *Ruellia ciliosa*
Dwarf Witchgrass *Dichanthelium strigosum**
Dwarf-burhead *Helanthium tenellum*
Dwarf-dandelion, Colonial ***Krigia** dandelion*
—, Opposite-leaf *K. cespitosa*
—, Orange *K. biflora**
—, Virginia *K. virginica*
Dyebush *Symplocos tinctoria*
Dyer's Croton *Chrozophora tinctoria*
Dyschoriste, Pineland *Dyschoriste oblongifolia*
Eardrop-vine *Brunnichia ovata*
Eared Goldenrod *Solidago auriculata*
Eared Redstem *Ammannia auriculata*
Earleaf Foxglove *Agalinis auriculata*
Earleaf Umbrella-tree *Magnolia fraseri*
Early Azalea *Rhododendron prinophyllum*
Early Black-cohosh *Actaea racemosa*
Early Buttercup *Ranunculus fascicularis*
Early Crown Grass *Paspalum praecox**
Early Forget-me-not *Myosotis verna*
Early Goldenrod *Solidago juncea*
Early Meadowrue *Thalictrum dioicum*
Early Saxifrage *Micranthes virginiensis*
Early Wild-rye *Elymus macgregorii**
Early Winter-cress *Barbarea verna*
Early Wood Buttercup *Ranunculus abortivus*
Earth-almond *Cyperus esculentus**
Earthsmoke *Fumaria officinalis*
East Florida Lantana *Lantana depressa**
East Indian Holly Fern, Simpler *Arachniodes simplicior*
East Indian Hygrophila ***Hygrophila** polysperma*
East Indian Swampweed *H. polysperma*
Easter Lily *Lilium longiflorum*
Eastern Agave *Agave virginica*
Eastern Anglepod *Gonolobus suberosus**
Eastern Aromatic Aster *Symphyotrichum oblongifolium*
Eastern Baby-blue-eyes *Nemophila aphylla*
Eastern Bastard-toadflax *Comandra umbellata**
Eastern Beakgrain *Diarrhena americana*
Eastern Beard Grass *Gymnopogon ambiguus*
Eastern Bergamot *Monarda fistulosa**
Eastern Bishopweed *Ptilimnium capillaceum*
Eastern Black Nightshade *Solanum emulans*
Eastern Blackberry *Rubus pensilvanicus*
Eastern Blackfoot Quillwort *Isoetes melanopoda**
Eastern Blue Monkshood *Aconitum uncinatum*
Eastern Blue-eyed Grass *Sisyrinchium atlanticum*
Eastern Blue-eyed-Mary *Collinsia verna*
Eastern Box Elder *Acer negundo**
Eastern Boykinia *Boykinia aconitifolia*
Eastern Bracken *Pteridium latiusculum*
Eastern Butterflyweed *Asclepias tuberosa**
Eastern Camas Lily *Camassia scilloides*
Eastern Columbine *Aquilegia canadensis*
Eastern Comandra *Comandra umbellata**
Eastern Cottonwood *Populus deltoides**
Eastern Doll's-daisy *Boltonia asteroides**
Eastern False-aloe *Agave virginica*
Eastern Few-fruited Sedge *Carex oligocarpa*
Eastern Figwort *Scrophularia marilandica*
Eastern Flameleaf Sumac *Rhus copallinum**
Eastern Flowering Spurge *Euphorbia corollata*
Eastern Fox Sedge *Carex triangularis*
Eastern Fringed Catchfly *Silene catesbyi*
Eastern Goat's-beard *Aruncus dioicus**
Eastern Gray Goldenrod *Solidago nemoralis**
Eastern Green-eyes *Berlandiera pumila**
Eastern Gum Bully ***Sideroxylon** lanuginosum**
Eastern Gum Bumelia *S. lanuginosum**
Eastern Hawthorn *Crataegus macrosperma*
Eastern Hemlock *Tsuga canadensis*
Eastern Horsemint *Monarda punctata**
Eastern Kuhnia *Brickellia eupatorioides*
Eastern Lousewort *Pedicularis canadensis*
Eastern Mannagrass *Glyceria septentrionalis*
Eastern Mapleleaf-raspberry *Rubacer odoratum*
Eastern Mayhaw *Crataegus aestivalis*
Eastern Mosquito Fern *Azolla caroliniana*
Eastern Narrowleaf Sedge *Carex amphibola*
Eastern Narrowleaf Seedbox *Ludwigia linearis**
Eastern Needlegrass *Piptochaetium avenaceum*
Eastern Ninebark *Physocarpus opulifolius**
Eastern Oxeye *Heliopsis helianthoides**
Eastern Paintbrush *Castilleja coccinea*
Eastern Pearlwort *Sagina decumbens*
Eastern Poison Ivy *Toxicodendron radicans**
Eastern Prairie Anemone *Anemone berlandieri*
Eastern Prairie Blue Wild Indigo *Baptisia aberrans*
Eastern Prairie Marbleseed *Lithospermum parviflorum*
Eastern Prairie-Turnip *Pediomelum canescens*
Eastern Purple Coneflower *Echinacea purpurea*
Eastern Rabbit-tobacco *Pseudognaphalium obtusifolium*
Eastern Red Cedar *Juniperus virginiana*
Eastern Red Maple *Acer rubrum**
Eastern Redbud *Cercis canadensis*
Eastern Rose-mallow *Hibiscus moscheutos*
Eastern Roughleaf Dogwood *Swida asperifolia*
Eastern Saltmarsh Aster *Symphyotrichum subulatum*
Eastern Sensitive-briar *Mimosa microphylla*
Eastern Serviceberry *Amelanchier canadensis*
Eastern Shooting Star *Primula meadia*
Eastern Silvery Aster *Symphyotrichum concolor**
Eastern Skeleton Grass *Gymnopogon ambiguus*
Eastern Slender Toothwort *Cardamine angustata*
Eastern Smooth Beardtongue *Penstemon laevigatus*
Eastern Solomon's-plume *Maianthemum racemosum*
Eastern Star Sedge *Carex radiata*
Eastern Stargrass *Hypoxis hirsuta*
Eastern Sunflower-everlasting *Heliopsis helianthoides**
Eastern Swamp Milkweed *Asclepias incarnata**
Eastern Thousandleaf *Achillea gracilis*
Eastern Western-daisy *Astranthium integrifolium*
Eastern White Beardtongue *Penstemon pallidus*
Eastern White Pine *Pinus strobus*
Eastern Wild Black Cherry *Prunus serotina**
Eastern Willow-herb *Epilobium coloratum*
Eastern Winged Sumac *Rhus copallinum**
Eastern Woodland Sedge *Carex blanda*
Eastern Yampah *Perideridia americana*
Eastern Yarrow *Achillea gracilis*
Eaton's Ladies'-tresses *Spiranthes eatonii*
Eaton's Witchgrass *Dichanthelium spretum*
Ebony Sedge *Carex eburnea*
Ebony Spleenwort *Asplenium platyneuron*
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Eddo *Colocasia esculenta*
Edible Banana *Musa paradisiaca*
Edible Fig *Ficus carica*
Edible Quince *Cydonia oblonga*
Eelgrass ***Vallisneria** americana*
—, Large *V. neotropicalis*
Eggert's Sunflower *Helianthus eggertii*
Eggs-and-Bacon *Lotus corniculatus*
Eglantine Rose *Rosa rubiginosa**
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Elderberry, Common *Sambucus canadensis*
Election Pink ***Rhododendron** periclymenoides*
— *R. prinophyllum*
Elegant Cudweed *Gamochaeta impatiens*
Elegant Hair Grass *Aira elegans*
Elegant Witchgrass *Dichanthelium mundum*
Elegant Zinnia *Zinnia elegans*
Elephant Garlic *Allium ampeloprasum*
Elephant Grass *Cenchrus purpureus*
Elephant-ear, Arrowleaf *Xanthosoma sagittifolium*

*Common name applies to a subspecies or variety of this species.

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Elephant's-foot, Leafy ***Elephantopus*** *carolinianus*
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Elf-orpine *Diamorpha smallii*
Elliott's Bluestem *Andropogon gyrans*
Elliott's Sedge *Carex elliottii*
Elliott's Aster *Symphyotrichum elliottii*
Elliott's Beaksedge *Rhynchospora elliottii*
Elliott's Bentgrass *Agrostis elliottiana*
Elliott's Croton *Croton elliottii*
Elliott's Hairsedge *Bulbostylis coarctata*
Elliott's Lovegrass *Eragrostis elliottii*
Elliott's Rush *Juncus elliottii*
Elliott's Yellow-eyed-grass *Xyris elliottii*
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—, Chinese *U. parvifolia*
—, Florida *U. americana**
—, Lacebark *U. parvifolia*
—, Red *U. rubra*
—, September *U. serotina*
—, Slippery *U. rubra*
—, White *U. americana**
—, Winged *U. alata*
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—, Smooth *S. delicatula*
Emerald-fern *Asparagus aethiopicus*
Empress Tree *Paulownia tomentosa*
Enchanter's-nightshade, Canada *Circaea canadensis*
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Engelmann's Spikerush *Eleocharis engelmannii*
Engelmann's Hawthorn *Crataegus berberifolia**
Engler's Bogbutton *Lachnocaulon engleri*
English Daisy *Bellis perennis*
English Holly *Ilex aquifolium*
English Ivy *Hedera helix**
English Pea *Pisum sativum*
English Plantain *Plantago lanceolata*
English Rye-grass *Lolium perenne*
Entangled Hawthorn *Crataegus intricata**
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— *D. anthelmintica*
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Erect Dayflower *Commelina erecta**
Erect Knotweed *Polygonum erectum*
Erect Milkpea *Galactia erecta*
Erect Snoutbean *Rhynchosia tomentosa*
Erect Spiderling *Boerhavia erecta*
Erect-leaved Witchgrass *Dichanthelium erectifolium*
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Ernest's Spiderwort *Tradescantia ernestiana*
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—, Field *E. campestre*
—, Marsh *E. aquaticum*
—, Savanna *E. integrifolium*
—, Spreading *E. prostratum*
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Ettercap *Pogonia ophioglossoides*
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—, Broadleaf Bushy *E. glaucescens*
—, Clasping Roundleaf *E. cordigerum*
—, Common Roundleaf *E. rotundifolium*
—, Hyssopleaf *E. hyssopifolium*
—, Inland Roundleaf *E. pubescens*
—, Lanceleaf *E. lancifolium*
—, Late *E. serotinum*
—, Mohr's *E. mohrii*
—, Narrowleaf Bushy *E. linearifolium*
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—, Ragged ***Eupatorium*** *pilosum*
—, Roughleaf *E. scabridum*
—, Savanna *E. leucolepis*
—, Sessile-leaf *E. sessilifolium**
—, Snowy White *E. petaloideum*
—, Torrey's *E. torreyanum*
—, Twisted *E. linearifolium*
—, Wedgeleaf *E. glaucescens*
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Eurasian Water-milfoil *Myriophyllum spicatum*
European Black Nightshade *Solanum nigrum*
European Blackberry *Rubus bifrons*
European Calamus *Acorus calamus*
European Corn-salad *Valerianella locusta*
European Field Pansy *Viola arvensis*
European Heliotrope *Heliotropium europaeum*
European Lily-of-the-Valley *Convallaria majalis*
European Mock-orange *Philadelphus coronarius*
European Plum *Prunus domestica*
European Sea-rocket *Cakile maritima**
European Squirrel-tail Fescue *Festuca bromoides*
European St. John's-wort *Hypericum perforatum*
European Stinging Nettle *Urtica dioica**
European Vervain *Verbena officinalis*
European White Willow *Salix alba*
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—, Common *O. biennis*
—, Cutleaf *O. laciniata*
—, Garden *O. glazioviana*
—, Midwestern *O. pilosella*
—, Nodding *O. nutans*
—, Seabeach *O. humifusa*
—, Showy Ragged *O. grandis*
—, Spach's *O. spachiana*
—, Spreading *O. humifusa*
—, Stemless *O. triloba*
—, White *O. speciosa*
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Evergreen Bayberry *Morella caroliniensis*
Evergreen Woodfern *Dryopteris intermedia*
Everlasting Pea *Lathyrus latifolius*
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—, Narrow-leaf Purple *G. calviceps*
—, Pennsylvania *G. pensylvanica*
—, Single-stemmed *G. simplicicaulis*
—, Spoonleaf Purple *G. purpurea*
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Fairy-footprints *Houstonia procumbens*
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False Corn-flag *Gladiolus communis*
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—, Fragrant *N. gracile*
False Goat's-beard, Appalachian *Astilbe biternata*
False Hop Sedge *Carex lupuliformis*
False Nutsedge *Cyperus strigosus*
False Pennyroyal *Trichostema brachiatum*
False Rue-anemone *Enemion biternatum*
False-boneset, Flyr's *Brickellia cordifolia*
False-dandelion *Pyrrhopappus carolinianus*
False-grape *Ampelopsis cordata*
False-mallow *Sida spinosa*
—, Hairy *Malvastrum hispidum*
False-pimpernel *Centunculus minimus*
—, Malaysian *Torenia crustacea*
—, Yellowseed *Lindernia dubia**
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Fameflower, Limestone *Phemeranthus calcaricus*
Fan Ground-Pine *Diphasiastrum digitatum*
Fancy Fern *Dryopteris intermedia*
Fanleaf Yellow-eyed-grass *Xyris flabelliformis*
Fanwort *Cabomba caroliniana*
Farkleberry *Vaccinium arboreum*
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Feather Lovegrass *Eragrostis amabilis*
Feather Windmill-grass *Chloris virgata*
Featherbells *Stenanthium gramineum**
Feather-bristled Beaksedge *Rhynchospora oligantha*
Featherfoil *Hottonia inflata*
Feather-geranium *Dysphania botrys*
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Fern Pondweed *Potamogeton robbinsii*
Fernald's Beaksedge *Rhynchospora fernaldii*
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—, European Squirrel-tail *F. bromoides*
—, Meadow *Lolium pratense*
—, Nodding ***Festuca*** *subverticillata*
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—, Rat-tail *F. myuros*
—, Red *F. rubra*
—, Southern Six-weeks *F. octoflora**
—, Squirrel-tail *F. sciurea*
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Fetterbush, Climbing *Pieris phillyreifolia*
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—, Shining *Lyonia lucida*
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Few-flower Milkweed *Asclepias lanceolata*
Few-flowered Nutrush *Scleria oligantha*
Few-flowered Tick-trefoil *Hylodesmum pauciflorum*
Few-flowered Witchgrass *Dichanthelium oligosanthes*
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Fibrous-rooted Sedge *Carex communis*
Fiddle Dock *Rumex pulcher*
Fiddleleaf ***Nama*** *jamaicensis*
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Fiddleleaf Tobacco *Nicotiana repanda*
Fiddleleaf, Ovate *Hydrolea ovata*
Fiddler's Spurge *Euphorbia heterophylla*
Fiddler-crab Turf *Lilaeopsis chinensis*
Field Bindweed *Convolvulus arvensis*
Field Burweed *Soliva sessilis*
Field Cress *Lepidium campestre*
Field Dodder *Cuscuta campestris*
Field Eryngo *Eryngium campestre*
Field Garlic *Allium vineale*
Field Hedge-Parsley *Torilis helvetica*

*Common name applies to a subspecies or variety of this species.

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Field Pennycress *Thlaspi arvense*
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—, Garden *F. carica*
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—, Dwarf *Didymoglossum petersii*
—, Gorge *Hymenophyllum tayloriae*
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—, Carolina *F. caroliniana*
—, Flatrock *F. brevivaginata*
—, Hairy *F. puberula*
—, Harper's *F. perpusilla*
—, Marsh *F. castanea*
—, Slender *F. autumnalis*
—, Tricky *F. decipiens*
Finger Dogshade *Cynosciadium digitatum*
Finger-grass, Caribbean ***Eustachys** caribaea*
—, Dune *E. petraea*
—, Feather *Chloris virgata*
—, Florida ***Eustachys** floridana*
—, Four-spike *E. neglecta*
—, Saltmarsh *E. glauca*
—, Weeping *E. distichophylla*
Finger-rot *Cnidoscolus stimulosus*
Finzel's Heartleaf *Hexastylis finzelii*
Fire-on-the-mountain *Euphorbia cyathophora*
Fire-pink ***Silene** virginica**
—, Roundleaf *S. rotundifolia*
—, Sandstone *S. rotundifolia*
Firespike *Odontonema cuspidatum*
Firethorn, Chinese ***Pyracantha** fortuneana*
—, Formosan *P. koidzumii*
—, Narrowleaf *P. angustifolia*
—, Scarlet *P. coccinea*
Fireweed *Erechtites hieraciifolius*
—, Mexican *Bassia scoparia*
Firmoss, Bartley's ***Huperzia** bartleyi*
—, Rock *H. porophila*
—, Shining *H. lucidula*
Fishleaf ***Houttuynia** cordata*
Fishmint *H. cordata*
Fish-on-a-Stringer *Chasmanthium latifolium*
Fishpole Bamboo *Phyllostachys aurea*
Five-fingers, Old-field ***Potentilla** simplex*
—, Running *P. canadensis*
—, Sulphur *P. recta*
Five-leaf ***Akebia** quinata*
Five-leaf Akebia *A. quinata*
Five-leaves, Large *Isotria verticillata*
Five-lobe St. John's-wort *Hypericum lobocarpum*
Five-lobe-cucumber *Cayaponia quinqueloba*
Fivespot *Nemophila maculata*
Flaccid Nutrush *Scleria flaccida*
Flag, Red ***Iris** fulva*
—, Slender Blue *I. prismatica*
—, Southern Blue *I. virginica*
—, Water *I. pseudacorus*
—, Yellow *I. pseudacorus*
Flame Azalea ***Rhododendron** calendulaceum*
—, Florida *R. austrinum*
Flameflower *Macranthera flammea*
Flamegold *Koelreuteria henryi*
Flamelily *Gloriosa superba*
Flannel-plant *Verbascum thapsus**
Flat-branched Tree-clubmoss *Dendrolycopodium obscurum*
Flatleaf pondweed *Potamogeton robbinsii*
Flatrock Fimbry *Fimbristylis brevivaginata*
Flatrock Onion *Allium speculae*
Flatrock Panic Grass *Panicum philadelphicum**
Flatrock Phacelia *Phacelia maculata*
Flatrock Pimpernel *Lindernia monticola*
Flatrock Rush *Juncus georgianus*
Flatrock Sundrops *Oenothera fruticosa**
Flat-spiked Sedge *Carex planispicata*
Flatstem Bladderwort *Utricularia foliosa*
Flat-stemmed Bluegrass *Poa compressa*
Flattened Spikerush *Eleocharis compressa**
Flat-topped Aster, Cornel-leaf ***Doellingeria** infirma*
—, Northern Tall *D. umbellata**
—, Pocosin *D. sericocarpoides*
—, Southern *D. sericocarpoides*
—, Southern Tall *D. sericocarpoides*
Flatwood Spurge *Euphorbia inundata**
Flatwoods Fluffgrass *Tridens ambiguus*
Flatwoods Plum *Prunus umbellata*
Flatwoods Rattlesnake-root *Nabalus barbatus*
Flatwoods St. John's-wort *Hypericum microsepalum*
Flax, Common ***Linum** usitatissimum*
—, Cultivated *L. usitatissimum*
—, Florida Yellow *L. floridanum**
—, Grooved Yellow *L. sulcatum*
—, Harper's Grooved *L. harperi*
—, Red *L. grandiflorum*
—, Ridgestem Yellow *L. striatum*
—, Spring Hill *L. macrocarpum*
—, Spurge *Thymelaea passerina*
—, Texas Yellow ***Linum** curtissii*
—, Virginia Yellow *L. virginianum*
—, Yellow-fruited Yellow *L. floridanum**
Flaxleaf Seedbox *Ludwigia linifolia*
Flaxleaf Sida *Sida linifolia*
Flaxleaf Sundrops *Oenothera linifolia*
Fleshy Milkweed *Asclepias humistrata*
Fleur-de-Lys *Iris germanica*
Flexible Sasa-grass *Microstegium vimineum*
Flixweed *Descurainia sophia*
— *Diplotaxis tenuifolia*
Floating Bladderwort *Utricularia radiata*
Floating Heart, Banana ***Nymphoides** aquatica*
—, Big *N. aquatica*
—, Little *N. cordata*
—, Yellow *N. peltata*
Floating Mannagrass *Glyceria septentrionalis*
Floating Orchid *Habenaria repens*
Floating Primrose-willow *Ludwigia peploides**
Florida Atamasco-lily *Zephyranthes simpsonii*
Florida Bellwort *Uvularia floridana*
Florida Betony *Stachys floridana*
Florida Bladderwort *Utricularia floridana*
Florida Blue Curls *Trichostema species 2*
Florida Bluehearts *Buchnera floridana*
Florida Bluestem *Andropogon arctatus*
Florida Bog Clubmoss *Pseudolycopodiella species 1*
Florida Bully *Sideroxylon reclinatum**
Florida Cottonseed *Froelichia floridana**
Florida Deerberry *Vaccinium stamineum**
Florida Dock *Rumex floridanus*
Florida Elm *Ulmus americana**
Florida Finger-grass *Eustachys floridana*
Florida Flame Azalea *Rhododendron austrinum*
Florida Goat's-rue *Tephrosia florida*
Florida Grape *Vitis simpsonii*
Florida Hammock Sandmat *Euphorbia ophthalmica*
Florida Hawthorn *Crataegus quaesita**
Florida Hedge-hyssop *Gratiola floridana*
Florida Hoarypea *Tephrosia florida*
Florida Horsebalm *Collinsonia punctata*
Florida Ladies'-tresses *Spiranthes floridana*
Florida Lantana ***Lantana** depressa**
—, East *L. depressa**
Florida Lobelia *Lobelia floridana*
Florida Maple *Acer floridanum*
Florida Mayhaw *Crataegus rufula*
Florida Milkpea *Galactia floridana*
Florida Milk-vetch *Astragalus obcordatus*
Florida Panhandle Spiderlily *Hymenocallis choctawensis*
Florida Paspalum *Paspalum floridanum*
Florida Peanut-grass *Amphicarpum muehlenbergianum*
Florida Pellitory *Parietaria floridana*
Florida Prickly-pear *Opuntia austrina*
Florida Rosemary *Ceratiola ericoides*
Florida Rosinweed *Silphium compositum**
Florida Sandhill Ironweed *Vernonia angustifolia**
Florida Sanicle *Sanicula canadensis**
Florida Sedge *Carex floridana*
Florida Skeletonplant *Lygodesmia aphylla*
Florida Slender Ironweed *Vernonia angustifolia**
Florida Snakeroot *Sanicula canadensis**
Florida Soapberry *Sapindus marginatus*
Florida Spurge *Euphorbia floridana*
Florida Star-anise *Illicium floridanum*
Florida Sunflower *Helianthus floridanus*
Florida Three-lobed Bedstraw *Galium tinctorium**
Florida Tick-trefoil *Desmodium floridanum*
Florida Toadflax *Linaria floridana*
Florida Wild Yam *Dioscorea floridana*
Florida Willow *Salix floridana*
Florida Yellow Flax *Linum floridanum**
Florida Yellow-eyed-grass *Xyris floridana*
Florist's Gayfeather *Liatris spicata*
Flowering Dogwood *Benthamidia florida*
Flowering Plum *Prunus cerasifera*
Flowering Quince, Common *Chaenomeles speciosa*
Flowering Straw *Lygodesmia aphylla*
Flower-of-an-Hour *Hibiscus trionum*
Fluellen, Female ***Kickxia** spuria*
—, Male *K. elatine*
—, Round-leaved *K. spuria*
—, Sharp-leaved *K. elatine*
Fluffgrass, Carolina ***Tridens** carolinianus*
—, Flatwoods *T. ambiguus*
—, Longspike *T. strictus*
Fly-away Grass *Agrostis scabra*
Fly-poison *Amianthium muscitoxicum*
Flyr's Brickellia ***Brickellia** cordifolia*
Flyr's False-boneset *B. cordifolia*
Fodder Burnet *Poterium sanguisorba**
Fodder Vetch *Vicia villosa**
Foldwing, Branched *Dicliptera brachiata*
Foolish-weed *Fatoua villosa*
Fool's-Parsley *Aethusa cynapium*
Forest Bedstraw *Galium circaezans*
Forest Bluegrass *Poa sylvestris*
Forest Hawthorn *Crataegus iracunda**
Forest Pea *Lathyrus venosus*
Forest Phacelia *Phacelia bipinnatifida*
Forest Sunflower *Helianthus decapetalus*
Forestiera, Glade ***Forestiera** ligustrina*
—, Swamp *F. acuminata*
Forget-me-not, Bigseed ***Myosotis** macrosperma*
—, Changing *M. discolor*
—, Early *M. verna*
—, Garden *M. sylvatica*

*Common name applies to a subspecies or variety of this species.

—, Spring *M. verna*
—, True *M. scorpioides*
Forked Catchfly *Silene dichotoma**
Forked Chickweed *Paronychia canadensis*
Forked Rush *Juncus dichotomus*
Forked Witchgrass *Dichanthelium dichotomum**
Fork-tip Three-awn ***Aristida** dichotoma*
Forktip Three-awn *A. basiramea*
Formosa Lily *Lilium formosanum*
Formosan Cherry *Prunus campanulata*
Formosan Firethorn *Pyracantha koidzumii*
Forsythia, Greenstem ***Forsythia** viridissima*
—, Weeping *F. suspensa*
Fortune's Net-veined Holly Fern *Cyrtomium fortunei*
Four-angle Sabatia *Sabatia quadrangula*
Four-flowered Loosestrife *Steironema quadriflorum*
Fourleaf Milkweed *Asclepias quadrifolia*
Fourleaf Vetch *Vicia acutifolia*
Four-leaved Allseed *Polycarpon tetraphyllum**
Four-spike Finger-grass *Eustachys neglecta*
Four-spike Heliotrope *Euploca procumbens*
Fowl Mannagrass *Glyceria striata**
Fox Grape *Vitis labrusca*
Fox Sedge ***Carex** vulpinoidea*
—, Eastern *C. triangularis*
—, Soft *C. conjuncta*
Foxglove Dragonhead ***Physostegia** digitalis*
Foxglove Obedient-plant *P. digitalis*
Foxglove, Creeping *Asystasia gangetica**
—, Earleaf *Agalinis auriculata*
—, Mullein *Dasistoma macrophyllum*
Foxtail Bog-Clubmoss *Lycopodiella alopecuroides*
Foxtail Copperleaf *Acalypha alopecuroidea*
Foxtail Dalea *Dalea leporina*
Foxtail Grass, Carolina ***Alopecurus** carolinianus*
—, Slender *A. myosuroides*
Foxtail-millet *Setaria italica*
Fragrant Beaksedge *Rhynchospora odorata*
Fragrant False Garlic *Nothoscordum gracile*
Fragrant Flatsedge *Cyperus odoratus**
Fragrant Ladies'-tresses *Spiranthes odorata*
Fragrant Rabbit-tobacco *Pseudognaphalium obtusifolium*
Fragrant Snakeroot *Sanicula odorata*
Fragrant Sumac ***Rhus** aromatica**
—, Midwestern *R. aromatica**
Frank's Sedge ***Carex** frankii*
—, Southern *C. aureolensis*
Fraser Magnolia *Magnolia fraseri*
Fraser's Loosestrife *Lysimachia fraseri*
Free-flowered Waterweed *Elodea nuttallii*
Freeman's Trillium *Trillium species 3*
French Marigold *Tagetes patula*
French Rocket *Erucastrum gallicum*
French Rose *Rosa gallica*
French Tamarisk *Tamarix gallica*
French-mulberry *Callicarpa americana*
French's Shooting-star *Primula frenchii*
Frenchweed *Thlaspi arvense*
Fresno de Guajuco *Acer negundo**
Fringed Beaksedge *Rhynchospora ciliaris*
Fringed Campion *Silene catesbyi*
Fringed Dodder *Cuscuta suaveolens*
Fringed Greenbriar *Smilax bona-nox**
Fringed Loosestrife *Steironema ciliatum*
Fringed Meadow-beauty *Rhexia petiolata*
Fringed Orchid, Crested ***Platanthera** cristata*
—, Golden *P. cristata*
—, Green *P. lacera*
—, Large White *P. conspicua*
—, Ragged *P. lacera*
—, Yellow *P. ciliaris*
Fringed Stargrass *Hypoxis juncea*
Fringed Yellow-eyed-grass *Xyris fimbriata*
Fringeleaf Paspalum *Paspalum setaceum**
Fringeleaf Ruellia *Ruellia humilis*
Fringeless Orchid, Golden ***Platanthera** integra*
—, Purple *P. peramoena*
—, White *P. integrilabia*
—, Yellow *P. integra*
Fringe-tree *Chionanthus virginicus*
Frisolillo *Aeschynomene rudis*
Frogfruit, Creeping ***Phyla** nodiflora*
—, Marsh *P. lanceolata*
—, Northern *P. lanceolata*
Frog's-bit, American *Limnobium spongia*
Frost Grape *Vitis vulpina*
Frosted Hawthorn *Crataegus pruinosa**
Frostweed, Canada *Crocanthemum canadense*
—, Common *Verbesina virginica**
Fruitful Hawthorn *Crataegus frugiferans*
Fumitory *Fumaria officinalis*
Fuzzy Bean, Perennial ***Strophostyles** umbellata*
—, Slickseed *S. leiosperma*
—, Trailing *S. helvola*
Fuzzy Sedge *Carex hirsutella*
Gaillardia, Prairie ***Gaillardia** aestivalis**
—, Sandhill *G. aestivalis**
—, Yellow Prairie *G. aestivalis**
—, Yellow Sandhill *G. aestivalis**
Gajarghass *Parthenium hysterophorus*
Galax *Galax urceolata*
Gallant Soldier *Galinsoga quadriradiata*
Gallberry, Big ***Ilex** coriacea*
—, Little *I. glabra*
—, Sweet *I. coriacea*
Gallitos *Tillandsia recurvata*
Gall-of-the-earth *Nabalus serpentaria*
Gama Grass *Tripsacum dactyloides**
Gaping Panic Grass *Steinchisma hians*
Garbanzo *Cicer arietinum*
Garden Asparagus *Asparagus officinalis*
Garden Balsam *Impatiens balsamina*
Garden Burnet *Poterium sanguisorba**
Garden Carrot *Daucus carota**
Garden Catchfly *Atocion armeria*
Garden Chrysanthemum *Chrysanthemum indicum*
Garden Comfrey *Cynoglossum officinale*
Garden Evening-primrose *Oenothera glazioviana*
Garden Fig *Ficus carica*
Garden Forget-me-not *Myosotis sylvatica*
Garden Four-o'clock *Mirabilis jalapa**
Garden Impatiens *Impatiens walleriana*
Garden Larkspur *Delphinium ajacis*
Garden Lettuce *Lactuca sativa*
Garden Maidenhair *Adiantum hispidulum*
Garden Pansy *Viola wittrockiana*
Garden Pea *Pisum sativum*
Garden Petunia *Petunia atkinsiana*
Garden Phlox *Phlox paniculata*
Garden Pink *Dianthus plumarius**
Garden Purslane *Portulaca oleracea*
Garden Radish *Raphanus sativus*
Garden Sage *Salvia officinalis*
Garden Strawberry *Fragaria ananassa**
Garden Vervain *Glandularia hybrida*
Garden Zinnia *Zinnia elegans*
Gardenia *Gardenia jasminoides*
Garland Chrysanthemum *Glebionis coronaria*
Garlic Mustard *Alliaria petiolata*
Garlic, Daffodil ***Allium** neapolitanum*
—, Elephant *A. ampeloprasum*
—, False *Nothoscordum bivalve*
—, Field *Allium vineale*
—, Fragrant False ***Nothoscordum** gracile*
—, Grace *N. bivalve*
—, Hedge *Alliaria petiolata*
—, Naples ***Allium** neapolitanum*
—, Oriental *A. tuberosum*
—, White *A. neapolitanum*
Garter-pink *Silene antirrhina*
Gattinger's Panic Grass *Panicum philadelphicum**
Gattinger's Agalinis *Agalinis gattingeri*
Gattinger's Hawthorn *Crataegus pruinosa**
Gattinger's Prairie-clover *Dalea gattingeri*
Gayfeather, Florist's *Liatris spicata*
Gentian Pinkroot *Spigelia gentianoides*
Gentian, Coastal Plain ***Gentiana** catesbyi*
—, Soapwort *G. saponaria*
—, Striped *G. villosa*
Georgia Agalinis *Agalinis georgiana*
Georgia Aster *Symphyotrichum georgianum*
Georgia Bully *Sideroxylon thornei*
Georgia Bulrush *Scirpus georgianus*
Georgia Calamint *Clinopodium georgianum*
Georgia Hackberry *Celtis pumila*
Georgia Holly *Ilex longipes*
Georgia Milkwort *Polygala leptostachys*
Georgia Nutrush *Scleria georgiana*
Georgia Oak *Quercus georgiana*
Georgia Phacelia *Phacelia dubia**
Georgia Rockcress *Arabis georgiana*
Georgia Rush *Juncus georgianus*
Georgia Skullcap *Scutellaria glabriuscula*
Georgia Sunrose *Crocanthemum georgianum*
Geranium, Texas ***Geranium** texanum*
—, Wild *G. maculatum*
German Chamomile *Matricaria chamomilla*
German Iris *Iris germanica*
Germander, Common ***Teucrium** canadense**
—, Southern *T. canadense**
Gholson's Sedge *Carex gholsonii*
Ghostpipe *Aphyllon uniflorum*
Giant Alumroot *Heuchera macrorhiza*
Giant Blue Iris *Iris giganticaerulea*
Giant Bulrush *Schoenoplectus californicus*
Giant Cane *Arundinaria gigantea*
Giant Chickweed *Stellaria pubera*
Giant Cordgrass *Spartina cynosuroides*
Giant Cutgrass *Zizaniopsis miliacea*
Giant Foxtail-grass ***Setaria** faberi*
— *S. magna*
Giant Green Foxtail *S. viridis**
Giant Ironweed *Vernonia gigantea*
Giant Ladies'-tresses *Spiranthes praecox*
Giant Parramatta Grass *Sporobolus fertilis*
Giant Phlox *Phlox carolina*
Giant Plume Grass *Erianthus giganteus*
Giant Ragweed *Ambrosia trifida**
Giant Ratstail Grass *Sporobolus pyramidalis*
Giant Reed *Arundo donax*
Giant Salvinia *Salvinia molesta*
Giant Sedge *Carex gigantea*
Giant Spiral Orchid *Spiranthes longilabris*
Giant Taro *Alocasia macrorrhizos*
Giant Timber Bamboo *Phyllostachys bambusoides*
Giant-hyssop, Lavender ***Agastache** foeniculum*
—, Yellow *A. nepetoides*
Gill-over-the-ground *Glechoma hederacea*
Ginger, Alabama *Hexastylis speciosa*
—, Bitter *Zingiber zerumbet*
—, Common Wild *Asarum canadense*
—, Wild *Ctenium aromaticum*
Ginger-lily, White *Hedychium coronarium*
Ginkgo *Ginkgo biloba*
Ginseng ***Panax** quinquefolius*
—, American *P. quinquefolius*
—, Dwarf *Nanopanax trifolius*
Ginster *Cytisus scoparius*
Girdle-pod *Mitracarpus hirtus*
Glade Blue Baptisia *Baptisia aberrans*
Glade Blue Curls *Trichostema brachiatum*
Glade Blue Wild Indigo *Baptisia aberrans*

*Common name applies to a subspecies or variety of this species.

INDEX OF COMMON NAMES

Glade Blue-eyed-grass *Sisyrinchium calciphilum*
Glade Bluet *Houstonia nigricans**
Glade Coneflower *Echinacea simulata*
Glade Fern *Diplaziopsis pycnocarpa*
Glade Forestiera *Forestiera ligustrina*
Glade Knotweed *Duravia species 2*
Glade Larkspur *Delphinium carolinianum**
Glade Milkweed *Asclepias viridiflora*
Glade Mountain Houstonia *Houstonia lanceolata*
Glade Rayless-Goldenrod *Bigelowia nuttallii*
Glade Rushfoil *Croton willdenowii*
Glade Skullcap *Scutellaria leonardii*
Glade St. John's-wort ***Hypericum*** *dolabriforme*
—, Cedar *H. frondosum*
Glade Wild Quinine *Parthenium auriculatum*
Glandular Dodder *Cuscuta obtusiflora**
Glandular Sundrops *Oenothera fruticosa**
Glasswort, Dwarf ***Salicornia*** *bigelovii*
—, Perennial *S. ambigua*
—, Woody *S. ambigua*
Globe Beaksedge *Rhynchospora globularis*
Globe Flatsedge *Cyperus echinatus*
Globe-amaranth *Gomphrena globosa*
Globe-fruited Seedbox *Ludwigia sphaerocarpa*
Globular Prairie Coneflower *Ratibida pinnata*
Glory-bower, Harlequin ***Clerodendrum*** *trichotomum**
Glorybower, Rose *C. bungei*
Glory-lily *Gloriosa superba*
Glossy Privet *Ligustrum lucidum*
Glossy-seed Stargrass *Hypoxis sessilis*
Goat's-foot *Ipomoea brasiliensis*
Goatbush *Ageratum conyzoides*
Goatgrass, Jointed *Aegilops cylindrica*
Goat's-beard *Tragopogon dubius*
—, Appalachian False *Astilbe biternata*
—, Eastern *Aruncus dioicus**
Goat's-rue, Dwarf ***Tephrosia*** *mohrii*
—, Sprawling *T. chrysophylla*
—, Virginia *T. virginiana*
Goatweed ***Croton*** *capitatus*
— *C. lindheimeri*
Goat-weed *Scoparia dulcis*
Goblet Aster *Symphyotrichum lateriflorum*
Godfrey's Goldenaster *Chrysopsis godfreyi*
Godfrey's Sandwort *Sabulina paludicola*
Godfrey's Sedge *Carex godfreyi*
Golden Bamboo *Phyllostachys aurea*
Golden Canna *Canna flaccida*
Golden Carpet *Sedum acre*
Golden Cattail Sedge *Carex aureolensis*
Golden Club *Orontium aquaticum*
Golden Colic-root *Aletris aurea*
Golden Crest *Lophiola aurea*
Golden Crownbeard *Verbesina encelioides*
Golden Dead-nettle *Lamium galeobdolon*
Golden Fringed Orchid ***Platanthera*** *cristata*
Golden Fringeless Orchid *P. integra*
Golden Groundsel *Packera aurea*
Golden Meadow-beauty *Rhexia lutea*
Golden Polypody *Phlebodium aureum*
Golden Ragwort *Packera aurea*
Golden Rain Tree ***Koelreuteria*** *paniculata*
—, Bougainvillea *K. bipinnata*
Golden St. John's-wort *Hypericum frondosum*
Golden Thistle *Scolymus hispanicus*
Golden Waterclover *Marsilea macropoda*
Golden-Alexanders, Common ***Zizia*** *aurea*
—, Heartleaf *Z. aptera*
—, Mountain *Z. trifoliata*
Golden-aster, Maryland *Chrysopsis mariana*
Golden-banner, Appalachian ***Thermopsis*** *mollis*
—, Blue Ridge *T. villosa*
Golden-fleece *Thymophylla tenuiloba**
Goldenglow *Rudbeckia laciniata**
Goldenrod, Appalachian ***Solidago*** *flaccidifolia*
—, Axillary *S. caesia*
—, Black Warrior *S. arenicola*
—, Boott's *S. boottii*
—, Broad-leaved *S. flexicaulis*
—, Buckley's *S. buckleyi*
—, Coastal Swamp *S. latissimifolia*
—, Curtis's *S. curtisii*
—, Dixie *S. brachyphylla*
—, Downy *S. petiolaris**
—, Downy *S. puberula*
—, Eared *S. auriculata*
—, Early *S. juncea*
—, Eastern Gray *S. nemoralis**
—, Elmleaf *S. ulmifolia*
—, Graceful *S. gracillima*
—, Gulf Coast Axillary *S. zedia*
—, Hackberry-leaf *S. rugosa**
—, Hairy *S. hispida**
—, Hairy Pineywoods *S. fistulosa*
—, Heartleaved *S. sphacelata*
—, Leafy Pineywoods *S. tortifolia*
—, Leavenworth's *S. leavenworthii*
—, Licorice *S. odora*
—, Limestone *S. sphacelata*
—, Midwestern Bold *S. rigida*
—, Narrowleaf Showy *S. rigidiuscula*
—, Noble *S. speciosa*
—, Northern Roughleaf *S. patula*
—, Piedmont Pale *S. pallescens*
—, Piedmont Wand *S. austrina*
—, Porter's *S. porteri*
—, Rough *S. radula*
—, Showy *S. speciosa*
—, Smooth *S. gigantea*
—, Smooth Elmleaf *S. delicatula*
—, Southeastern Bold *S. jacksonii*
—, Southern Bog *S. gracillima*
—, Southern Roughleaf *S. salicina*
—, Southern Seaside *S. mexicana*
—, Southern Tall *S. altissima**
—, Tall *S. altissima**
—, Vasey's *S. vaseyi*
—, Wand *S. virgata*
—, Woody *Chrysoma pauciflosculosa*
—, Wrinkle-leaf ***Solidago*** *rugosa**
—, Zigzag *S. flexicaulis*
Golden-saxifrage *Chrysosplenium americanum*
Goldenseal *Hydrastis canadensis*
Goldentop, Carolina ***Euthamia*** *caroliniana*
—, Gulf Coast *E. scabra*
—, Narrowhead *E. leptocephala*
Goldenweed, Wax *Prionopsis ciliata*
Goldfoot Fern *Phlebodium aureum*
Goldie's Woodfern *Dryopteris goldieana*
Gold-moss *Sedum acre*
Goose Grass *Eleusine indica*
Gooseberry, Cape *Physalis peruviana*
—, Granite ***Ribes*** *curvatum*
—, Prickly *R. cynosbati*
Goosefoot, Clammy ***Dysphania*** *pumilio*
—, Crested *D. cristata*
—, Cutleaf *D. multifida*
—, Desert *Chenopodium pratericola*
—, Keeled *Dysphania carinata*
—, Narrowleaf *Chenopodium pratericola*
—, Nettleleaf *Chenopodiastrum murale*
—, Oakleaf *Oxybasis glauca*
—, Scented *Dysphania multifida*
—, Stinking ***Chenopodium*** *vulvaria*
—, Woodland *C. standleyanum*
Gooseweed *Sphenoclea zeylanica*
Gopher-apple *Geobalanus oblongifolius*
Gopherweed *Baptisia perfoliata*
Gordonia *Gordonia lasianthus*
Gorge Filmy Fern *Hymenophyllum tayloriae*
Gorge Rhododendron *Rhododendron minus*
Gourd, Bottle ***Lagenaria*** *siceraria**
—, Calabash *L. siceraria**
—, Ornamental ***Cucurbita*** *melopepo**
—, Ornamental *C. pepo*
—, Texas *C. melopepo**
Grace Garlic *Nothoscordum bivalve*
Graceful Goldenrod *Solidago gracillima*
Graceful Sedge *Carex gracillima*
Graham's Cassava *Manihot grahamii*
Grama, Side-oats *Bouteloua curtipendula**
Granite Flatsedge *Cyperus granitophilus*
Granite Gooseberry *Ribes curvatum*
Grape Fern, Cut-leaf *Sceptridium dissectum*
Grape, Bullace *Muscadinia rotundifolia**
—, Calusa ***Vitis*** *shuttleworthii*
—, Cat *V. palmata*
—, Catbird *V. palmata*
—, Chicken *V. vulpina*
—, Florida *V. simpsonii*
—, Fox *V. labrusca*
—, Frost *V. vulpina*
—, Graybark *V. cinerea*
—, Munson *Muscadinia rotundifolia**
—, Mustang ***Vitis*** *mustangensis*
—, Pigeon *V. cinerea*
—, Possum *V. baileyana*
—, Red *V. palmata*
—, Riverbank *V. riparia*
—, Silverleaf *V. aestivalis**
—, Summer *V. aestivalis**
—, Winter *V. vulpina*
Grape-hyacinth ***Muscari*** *neglectum*
—, Compact *M. botryoides*
—, Tassel *M. comosum*
Grass Fern *Vittaria graminifolia*
Grass Pink *Dianthus plumarius**
Grassbur *Cenchrus incertus*
Grassleaf Spurge *Euphorbia graminea*
Grassleaf Yellow-eyed-grass *Xyris baldwiniana*
Grassleaf Yellow-loosestrife *Steironema gramineum*
Grass-leaved Ladies'-tresses *Spiranthes praecox*
Grass-leaved Rush ***Juncus*** *marginatus*
—, Large *J. biflorus*
Grass-lily *Crinum bulbispermum*
Grassnut *Arachis glabrata*
Grass-of-Parnassus, Appalachian ***Parnassia*** *asarifolia*
—, Bigleaf *P. grandifolia*
—, Kidney-leaved *P. asarifolia*
Grass-pink, Bearded ***Calopogon*** *barbatus*
—, Common *C. tuberosus**
—, Many-flowered *C. multiflorus*
—, Oklahoma *C. oklahomensis*
—, Pale *C. pallidus*
Graveyard Spurge *Euphorbia cyparissias*
Gray Bindweed *Convolvulus equitans*
Gray Ground-cherry *Physalis grisea*
Gray Mouse-ear *Cerastium brachypetalum*
Gray Rosemary *Conradina canescens*
Gray She-oak *Casuarina glauca*
Gray Sunflower *Helianthus mollis*
Gray Vervain *Verbena canescens*
Gray Willow *Salix cinerea*
Gray's Sedge *Carex grayi*
Graybark Grape *Vitis cinerea*
Gray-leaved Yellow-eyed-grass *Xyris serotina*
Gray's Beaksedge *Rhynchospora grayi*
Greasy Grass *Tridens flavus*
Great Blue Lobelia *Lobelia siphilitica*
Great Bulrush ***Schoenoplectus*** *acutus**
— *S. tabernaemontani*
Great Burdock *Arctium lappa*
Great Chickweed *Stellaria pubera*
Great Indian-plantain *Arnoglossum reniforme*

*Common name applies to a subspecies or variety of this species.

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Great Nettle *Urtica dioica**
Great Plains Flatsedge *Cyperus lupulinus**
Great Plains Ladies'-tresses *Spiranthes magnicamporum*
Great Plains Wild-rye *Elymus canadensis**
Great Waterleaf *Hydrophyllum appendiculatum*
Great White Trillium *Trillium grandiflorum*
Great Yam *Dioscorea alata*
Great Yellow Wood-sorrel *Oxalis grandis*
Greater Ammi *Ammi majus*
Greater Bladderwort *Utricularia macrorhiza*
Greater Caltrop *Kallstroemia maxima*
Greater Duckweed *Spirodela polyrhiza*
Greater Periwinkle *Vinca major*
Greater Poverty Rush *Juncus anthelatus*
Greater Straw Sedge *Carex normalis*
Greatleaf Sida *Sida cordifolia*
Green Adder's-mouth *Malaxis unifolia*
Green Agalinis *Agalinis viridis*
Green Amaranth ***Amaranthus** hybridus**
— *A. powellii*
—, Tropical *A. viridis*
Green Antelope-horn *Asclepias viridis*
Green Arrow-arum *Peltandra virginica*
Green Ash *Fraxinus pennsylvanica*
Green Bristlegrass *Setaria viridis**
Green Dragon *Arisaema dracontium*
Green Flatsedge *Cyperus pseudovegetus*
Green Fringed Orchid *Platanthera lacera*
Green Hawthorn ***Crataegus** viridis**
—, Lanceleaf *C. viridis**
Green Milkweed ***Asclepias** hirtella*
— *A. viridiflora*
—, Little *A. viridula*
Green Parrot's-feather *Myriophyllum pinnatum*
Green Pitcherplant *Sarracenia oreophila*
Green Sedge, Southern Dark *Carex oblita*
Green Silkyscale *Anthenantia villosa*
Green Vivian *Caulophyllum thalictroides*
Green-and-gold, Carolina ***Chrysogonum** repens*
—, Gulf Coast *C. australe*
Greenbriar, Bristly ***Smilax** hispida**
—, Common *S. rotundifolia*
—, Coral *S. walteri*
—, Dune *S. auriculata*
—, Fringed *S. bona-nox**
—, Laurel-leaf *S. laurifolia*
—, Southern Bristly *S. hispida**
—, Whiteleaf *S. glauca*
Greene's Sedge *Carex bullata**
Green-eyes, Eastern *Berlandiera pumila**
Green-flowered Peppergrass *Lepidium densiflorum*
Green-fly Orchid *Epidendrum conopseum*
Greenfruit Clearweed *Pilea pumila*
Greenhaw *Crataegus viridis**
Greenish-white Sedge *Carex albolutescens*
Greenstem Forsythia *Forsythia viridissima*
Greenthread, Stiff *Thelesperma filifolium**
Green-violet *Cubelium concolor*
Grey-headed Coneflower *Ratibida pinnata*
Gripeweed *Emblica urinaria*
Gromwell, American ***Lithospermum** latifolium*
—, Broadleaf *L. latifolium*
Grooved Yellow Flax *Linum sulcatum*
Grooved-stem Indian-plantain *Arnoglossum sulcatum*
Grotto-felt *Crepidomanes intricatum*
Ground Juniper *Juniperus communis**
Ground Laurel *Epigaea repens*
Ground-cedar *Diphasiastrum tristachyum*
Ground-cherry, Carpenter's *Calliphysalis carpenteri*
—, Clammy ***Physalis** heterophylla*
—, Coastal *P. angustifolia*
—, Downy *P. pubescens*
—, Dune *P. walteri*
—, Gray *P. grisea*
—, Longleaf *P. longifolia**
—, Ochlockonee *Solanum perplexum*
—, Sandhill ***Physalis** arenicola*
—, Smallflower *P. cinerascens**
—, Smooth *P. angulata*
—, Toothleaf *P. cordata*
—, Virginia *P. virginiana*
—, Walter's *P. walteri*
Ground-ivy *Glechoma hederacea*
Groundnut, Common ***Apios** americana*
—, Kentucky *A. priceana*
Ground-oak *Geobalanus oblongifolius*
Groundpine, Common *Dendrolycopodium obscurum*
Groundsel *Senecio vulgaris*
Groundsel Tree *Baccharis halimifolia*
Groundsel, Crawford's ***Packera** crawfordii*
—, Golden *P. aurea*
—, Northern Meadow *P. paupercula**
—, Prairie *P. plattensis*
—, Roundleaf *P. obovata*
—, Smooth *P. glabella*
—, Woolly *P. dubia*
Guinea Grass *Megathyrsus maximus*
Guinea Millet *Urochloa deflexa*
Guinea-bead *Salicornia ambigua*
Gulf Bluestar *Amsonia glaberrima*
Gulf Coast Axillary Goldenrod *Solidago zedia*
Gulf Coast Barbara's-buttons *Marshallia angustifolia*
Gulf Coast Beach Sunflower *Helianthus debilis**
Gulf Coast Bluestem *Schizachyrium maritimum*
Gulf Coast Goldentop *Euthamia scabra*
Gulf Coast Green-and-gold *Chrysogonum australe*
Gulf Coast Melon *Cucumis melo**
Gulf Coast Noseburn *Tragia smallii*
Gulf Coast Phlox *Phlox pilosa**
Gulf Coast Rabbit-tobacco *Diaperia verna**
Gulf Coast Sea-rocket *Cakile constricta*
Gulf Coast Silvery Aster ***Symphyotrichum** concolor**
Gulf Coast Smooth Aster *S. attenuatum*
Gulf Coast Spikerush *Eleocharis cellulosa*
Gulf Coast Sunrose *Crocanthemum arenicola*
Gulf Cordgrass *Spartina spartinae*
Gulf Croton *Croton punctatus*
Gulf Little Brown Jug *Hexastylis callifolia*
Gulf Skullcap *Scutellaria glabriuscula*
Gulf Spikemoss *Lycopodioides ludovicianum*
Gulf Swampweed *Hygrophila lacustris*
Gulf Vervain *Verbena xutha*
Gum, Black ***Nyssa** sylvatica*
—, Cotton *N. aquatica*
—, Red *Liquidambar styraciflua*
—, Sour ***Nyssa** sylvatica*
—, Swamp Black *N. biflora*
—, Sweet *Liquidambar styraciflua*
—, Tupelo ***Nyssa** aquatica*
—, Water *N. biflora*
Gumbo *Abelmoschus esculentus*
Gumweed, Narrow-leaf *Grindelia lanceolata*
Gyandotte Beauty *Synandra hispidula*
Hackberry, Dwarf ***Celtis** pumila*
—, Georgia *C. pumila*
—, Iguana *C. iguanaea*
—, Northern *C. occidentalis*
—, Small's *C. smallii*
—, Southern *C. laevigata*
Hackberry-leaf Goldenrod *Solidago rugosa**
Hair Grass, Elegant ***Aira** elegans*
—, Silver *A. caryophyllea*
Hair-awn Muhly *Muhlenbergia capillaris*
Hairgrass *Agrostis hyemalis*
— *Muhlenbergia capillaris*
—, Annual Silver *Aira elegans*
—, Common *Avenella flexuosa*
—, Dune ***Muhlenbergia** sericea*
—, Savanna *M. expansa*
—, Wavy *Avenella flexuosa*
Hairless Witchgrass *Dichanthelium strigosum**
Hairsedge, Common ***Bulbostylis** capillaris**
—, Elliott's *B. coarctata*
—, Old World *B. barbata*
—, Savanna *B. ciliatifolia*
—, Ware's *B. warei*
Hairy Angelica *Angelica venenosa*
Hairy Bedstraw *Galium pilosum*
Hairy Bittercress *Cardamine hirsuta*
Hairy Bluestem *Andropogon hirsutior*
Hairy Buttercup ***Ranunculus** hispidus*
— *R. sardous*
Hairy Chess *Bromus commutatus*
Hairy Crimson Bluestem *Schizachyrium hirtiflorum*
Hairy Dangleberry *Gaylussacia tomentosa*
Hairy False-mallow *Malvastrum hispidum*
Hairy Fimbry *Fimbristylis puberula*
Hairy Goldenrod *Solidago hispida**
Hairy Heart-leaved Aster *Symphyotrichum drummondii*
Hairy Highbush Blueberry *Vaccinium fuscatum*
Hairy Indigo *Indigofera hirsuta*
Hairy Jute *Corchorus hirtus*
Hairy Lespedeza *Lespedeza hirta**
Hairy Lipfern *Myriopteris lanosa*
Hairy Maiden Fern *Christella hispidula*
Hairy Meadow-beauty *Rhexia nashii*
Hairy Mock-orange ***Philadelphus** hirsutus*
— *P. pubescens*
Hairy Mountain-mint *Pycnanthemum pilosum*
Hairy Needle-leaved Witch Grass *Dichanthelium filiramum*
Hairy New Jersey Tea *Ceanothus americanus**
Hairy Nutrush ***Scleria** ciliata**
—, Broad-leaved *S. ciliata**
Hairy Phlox *Phlox amoena*
Hairy Pinesap *Hypopitys lanuginosa*
Hairy Pineywoods Goldenrod *Solidago fistulosa*
Hairy Pinweed ***Lechea** mucronata*
—, Southern *L. pulchella**
Hairy Seedbox ***Ludwigia** hirtella*
— *L. pilosa*
Hairy Signalgrass *Urochloa piligera*
Hairy Skullcap *Scutellaria elliptica**
Hairy Smartweed *Persicaria hirsuta*
Hairy Solomon's-seal *Polygonatum pubescens*
Hairy Southern Bush-honeysuckle *Diervilla rivularis*
Hairy Spiderwort *Tradescantia hirsuticaulis*
Hairy Squareflower *Paronychia erecta**
Hairy St. John's-wort *Hypericum setosum*
Hairy Sunflower *Helianthus hirsutus*
Hairy Sweet Cicely *Osmorhiza claytonii*
Hairy Tare *Vicia hirsuta*
Hairy Umbrella-sedge *Fuirena squarrosa*
Hairy Vetch *Vicia villosa**
Hairy Wafer-ash *Ptelea trifoliata**
Hairy Waterclover *Marsilea vestita*
Hairy Waterleaf *Hydrophyllum macrophyllum*
Hairy Wicky *Kalmia hirsuta*
Hairy Wild Indigo *Baptisia hirsuta*
Hairy Wild-petunia *Ruellia humilis*
Hairy Woodland Brome *Bromus pubescens*
Hairy Woodmint *Blephilia hirsuta*
Hairy Yellow Forest Violet *Viola pubescens*
Hairy-leaved Sedge *Carex hirsutella*
Hairyseed Crown-grass *Paspalum pubiflorum**
Halberd-leaf Violet *Viola hastata*
Halberd-leaved Marsh-mallow *Hibiscus laevis*
Halberd-leaved Yellow Violet *Viola hastata*
Hammock Sedge *Carex fissa**

*Common name applies to a subspecies or variety of this species.

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Hammock Spiderlily *Hymenocallis occidentalis**
Handsome Harry *Rhexia virginica*
Harbinger-of-spring *Erigenia bulbosa*
Hard Grass *Parapholis incurva*
Hard Maple ***Acer*** *saccharum**
—, Southern *A. saccharum**
Hardhack *Spiraea tomentosa*
Hardstem Bulrush *Schoenoplectus acutus**
Hardy Orange *Citrus trifoliata*
Hardy Tapioca *Manihot grahamii*
Harebell, Southern *Campanula divaricata*
Hare's-ear *Bupleurum rotundifolium*
Hare's-ear Mustard *Conringia orientalis*
Hare's-foot Dalea *Dalea leporina*
Harlequin Glory-bower *Clerodendrum trichotomum**
Harmonious Aster *Symphyotrichum concinnum*
Harper's Sedge *Carex leptalea**
Harperella *Harperella nodosa*
Harper's Agalinis *Agalinis harperi*
Harper's Beaksedge *Rhynchospora harperi*
Harper's Buttonweed *Diodia harperi*
Harper's Dodder *Cuscuta harperi*
Harper's Fimbry *Fimbristylis perpusilla*
Harper's Grooved Flax *Linum harperi*
Harper's Heartleaf *Hexastylis harperi*
Harper's Seedbox *Ludwigia maritima*
Harper's St. John's-wort *Hypericum harperi*
Harper's Trout Lily *Erythronium americanum**
Harper's Wild-buckwheat *Eriogonum harperi*
Harsh Vervain *Verbena scabra*
Hartford Fern *Lygodium palmatum*
Harvestbells *Gentiana saponaria*
Harvey's Beaksedge *Rhynchospora harveyi*
Haw, Black *Viburnum prunifolium*
—, Parsley *Crataegus marshallii*
—, Shawnee ***Viburnum*** *cassinoides*
—, Southern Black *V. rufidulum*
Hawksbeard, Smallflower *Crepis pulchra*
Hawkweed, Beaked ***Hieracium*** *gronovii*
—, Maryland *H. marianum*
—, Veiny *H. venosum*
Hawthorn, Aiken ***Crataegus*** *dispar*
—, Alabama *C. alabamensis*
—, Albany *C. furtiva*
—, Albertville *C. mendosa*
—, Allegheny *C. alleghaniensis*
—, Ashe *C. ashei*
—, Barberry *C. berberifolia**
—, Beautiful *C. pulcherrima**
—, Biltmore *C. intricata**
—, Bristol *C. visenda*
—, Britton's *C. brittonii*
—, Broad-leaved Beautiful *C. pulcherrima**
—, Buckley's *C. buckleyi*
—, Bush *C. intricata**
—, Cockspur *C. crus-galli**
—, Cutleaf Beautiful *C. incilis*
—, Downy *C. mollis**
—, Dwarf *C. munda*
—, Eastern *C. macrosperma*
—, Engelmann's *C. berberifolia**
—, Entangled *C. intricata**
—, Florida *C. quaesita**
—, Forest *C. iracunda**
—, Frosted *C. pruinosa**
—, Fruitful *C. frugiferans*
—, Gattinger's *C. pruinosa**
—, Green *C. viridis**
—, Hillside *C. collina*
—, Jacksonville *C. quaesita**
—, Lake Ella *C. lassa**
—, Lanate *C. lassa**
—, Lance's *C. lancei*
—, Lanceleaf Green *C. viridis**
—, Little Red *C. intricata**
—, Littlehip *C. spathulata*
—, Mississippi *C. florens*
—, Mohr's *C. mohrii*
—, Narrowleaf Cockspur *C. crus-galli**
—, Neat *C. munda*
—, Ocala *C. lassa**
—, Oneflower *C. uniflora*
—, Parsley *C. marshallii*
—, Pear *C. calpodendron*
—, Ravenel's *C. ravenelii*
—, Red Mountain *C. venusta*
—, Rome *C. aemula*
—, Sand Barren *C. quaesita**
—, Sandhill *C. lassa**
—, Sargent's *C. sargentii*
—, Sister *C. sororia*
—, Smooth Alabama *C. teres*
—, Southern Downy *C. mollis**
—, Southern Mountain *C. austromontana*
—, Straw-fruited *C. intricata**
—, Sunny *C. aprica*
—, Threeflower *C. triflora*
—, Valley Head *C. austromontana*
—, Valley Head *C. ignava*
—, Washington *C. phaenopyrum*
—, Weeping *C. lacrimata*
Hay-scented Fern *Sitobolium punctilobulum*
Hazel Alder *Alnus serrulata*
Hazel Dodder *Cuscuta coryli*
Hazelnut, American ***Corylus*** *americana*
—, Beaked *C. cornuta**
Healing Croton *Croton argyranthemus*
Heart's-ease *Persicaria maculosa*
Heartleaf Avens *Geum vernum*
Heartleaf Climbing Hempweed *Mikania cordifolia*
Heartleaf Four-o'clock *Mirabilis nyctaginea*
Heartleaf Golden-Alexanders *Zizia aptera*
Heartleaf Nettle *Urtica chamaedryoides*
Heartleaf Noseburn *Tragia cordata*
Heartleaf Peppervine *Ampelopsis cordata*
Heartleaf Pickerelweed *Pontederia cordata**
Heartleaf Plantain *Plantago cordata*
Heartleaf Pondweed *Potamogeton pulcher*
Heartleaf Ragwort *Packera aurea*
Heartleaf Sandmat *Euphorbia cordifolia*
Heartleaf Skullcap *Scutellaria ovata**
Heartleaf Tick-trefoil *Hylodesmum glutinosum*
Heartleaf, Alabama ***Hexastylis*** *speciosa*
—, Arrowleaf *H. arifolia*
—, Finzel's *H. finzelii*
—, Harper's *H. harperi*
—, Large-flower *H. shuttleworthii*
—, Variable-leaf *H. heterophylla*
Heart-leaved Aster *Symphyotrichum cordifolium*
—, Common White *Eurybia divaricata*
—, Hairy ***Symphyotrichum*** *drummondii*
—, Midwestern Blue *S. shortii*
—, Smooth *S. lowrieanum*
Heartleaved Goldenrod *Solidago sphacelata*
Heart-leaved Hedge-nettle *Stachys cordata*
Heart-leaved Umbrella-wort *Mirabilis nyctaginea*
Heart-leaved Willow *Salix eriocephala*
Heart's-a-bustin' (-with-love) *Euonymus americanus*
Heartseed *Cardiospermum halicacabum*
Heartwing Dock *Rumex hastatulus*
Heath Aster *Symphyotrichum ericoides**
Heath, Sand *Ceratiola ericoides*
Hedeoma, Drummond's *Hedeoma drummondii**
Hedge Bamboo ***Bambusa*** *multiplex*
—, Oriental *B. multiplex*
Hedge Garlic *Alliaria petiolata*
Hedge Mustard *Sisymbrium officinale*
Hedge-apple *Maclura pomifera*
Hedgeflower *Lantana strigocamara*
Hedgehog Grass *Cenchrus echinatus*
Hedge-hyssop, Branched ***Gratiola*** *ramosa*
—, Clammy *G. neglecta*
—, Florida *G. floridana*
—, Limestone *G. quartermaniae*
—, Pineland *Sophronanthe hispida*
—, Quarterman's ***Gratiola*** *quartermaniae*
—, Round-fruit *G. virginiana*
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—, Short's ***Gratiola*** *viscidula*
—, Sticky *G. brevifolia*
—, Virginia *G. virginiana*
—, Viscid *G. viscidula*
Hedge-nettle, Alabama ***Stachys*** *alabamica*
—, Heart-leaved *S. cordata*
—, Nelson's *S. nelsonii*
—, Nuttall's *S. nuttallii*
—, Smooth *S. tenuifolia*
Hedge-Parsley, Field *Torilis helvetica*
He-huckleberry *Lyonia ligustrina**
Helicopter Trillium *Trillium stamineum*
Heliotrope, Clasping *Heliotropium amplexicaule*
—, Delicate *Euploca tenella*
—, European *Heliotropium europaeum*
—, Four-spike *Euploca procumbens*
—, India ***Heliotropium*** *indicum*
—, Seaside *H. curassavicum**
—, Violet *H. amplexicaule*
Heller's Rabbit-tobacco *Pseudognaphalium helleri*
Hellfetter *Smilax hispida**
Hemlock, Canada ***Tsuga*** *canadensis*
—, Eastern *T. canadensis*
Hemp *Cannabis sativa*
Hemp Broomrape *Phelipanche ramosa*
Hemp Dogbane *Apocynum cannabinum*
Hemp, Sunn *Crotalaria juncea*
Hempleaf Ragwort *Senecio brasiliensis**
Hen's Eyes *Ardisia crenata*
Henbit ***Lamium*** *amplexicaule**
Henbit Dead-nettle *L. amplexicaule**
Henry's Stone-oak *Lithocarpus henryi*
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—, Sharp-lobed *H. acutiloba*
Herb Mercury *Mercurialis annua*
Herb Sophia *Descurainia sophia*
Herb-of-grace *Bacopa monnieri*
Herb-of-the-cross *Verbena officinalis*
Hercules'-club *Zanthoxylum clava-herculis*
Hercules's-club *Aralia spinosa*
Heron's-Bill *Erodium cicutarium*
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—, Savanna *H. aculeatus*
—, Scarlet *H. coccineus*
—, Showy *H. laevis*
—, Swamp *H. grandiflorus*
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—, Bitternut *C. cordiformis*
—, Carolina *C. carolinae-septentrionalis*
—, Carolina Shagbark *C. carolinae-septentrionalis*
—, Common Shagbark *C. ovata*
—, Kingnut *C. laciniosa*
—, Mockernut *C. tomentosa*
—, Nutmeg *C. myristiciformis*
—, Pale *C. pallida*
—, Pignut *C. glabra*
—, Red *C. ovalis*
—, Sand *C. pallida*
—, Water *C. aquatica*
—, White *C. tomentosa*
Hidden Bittercress *Cardamine occulta*
Hidden-flowered Witchgrass *Dichanthelium cryptanthum*
Hierba de Cristo *Lantana urticoides*
Hierba de Jabali *Croton punctatus*

*Common name applies to a subspecies or variety of this species.

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Hierba del Caballo *Calyptocarpus vialis*
Hierba del Pájaro *Anagallis arvensis*
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Highbelia *Lobelia spicata*
High-tide Bush *Baccharis halimifolia*
Hill Cane *Arundinaria appalachiana*
Hillside Blueberry *Vaccinium pallidum*
Hillside Hawthorn *Crataegus collina*
Hirsute Huckleberry *Gaylussacia mosieri*
Hirsute Sedge *Carex complanata*
Hispid Buttercup *Ranunculus hispidus*
Hispid Starbur *Acanthospermum hispidum*
Hitchcock's Sedge *Carex hitchcockiana*
Hoary Plantain *Plantago virginica*
Hoary Puccoon *Lithospermum canescens*
Hoary Scurfpea *Pediomelum canescens*
Hoary Tick-trefoil *Desmodium canescens*
Hoary Vervain *Verbena stricta*
Hog Millet *Panicum miliaceum**
Hog Plum *Prunus umbellata*
Hog-peanut *Amphicarpaea bracteata**
Hogweed *Ambrosia artemisiifolia*
—, Smooth ***Boerhavia*** *erecta*
—, Spreading *B. diffusa*
Hogwort *Croton capitatus*
Hollow-stem Joe-pye-weed *Eutrochium fistulosum*
Holly Fern, Asian Net-veined ***Cyrtomium*** *falcatum*
—, Fortune's Net-veined *C. fortunei*
—, Simpler East Indian *Arachniodes simplicior*
Holly, American ***Ilex*** *opaca*
—, Burford *I. cornuta*
—, Carolina *I. ambigua*
—, Chapman's *I. longipes*
—, Chinese *I. cornuta*
—, Christmas *I. aquifolium*
—, Christmas *I. opaca*
—, English *I. aquifolium*
—, Georgia *I. longipes*
—, Mountain *I. montana*
—, Myrtle *I. myrtifolia*
—, Sarvis *I. amelanchier*
Holly-grape *Mahonia bealei*
Hollyhock *Alcea rosea*
Honesty, Annual *Lunaria annua*
Honewort *Cryptotaenia canadensis*
Honey Locust *Gleditsia triacanthos*
Honeycomb-head, Bog ***Balduina*** *atropurpurea*
—, Purple *B. atropurpurea*
—, Sandhill *B. angustifolia*
—, Savanna *B. uniflora*
Honeydew *Cucumis melo**
Honeyshuck *Gleditsia triacanthos*
Honeysuckle, Amur ***Lonicera*** *maackii*
—, Coral *L. sempervirens*
—, Japanese *L. japonica*
—, Morrow's *L. morrowii*
—, Pretty *L. bella*
—, Standish's *L. standishii*
—, Trumpet *L. sempervirens*
—, Yellow *L. flava*
Honeyvine *Cynanchum laeve*
Hooked Bristlegrass *Setaria verticillata*
Hooked Buttercup ***Ranunculus*** *recurvatus**
Hooked Crowfoot *R. recurvatus**
Hooked Spermolepis *Spermolepis echinata*
Hooker's Milkwort *Polygala hookeri*
Hoop-petticoat Daffodil *Narcissus bulbocodium*
Hop Clover ***Trifolium*** *campestre*
—, Large *T. aureum*
—, Little *T. dubium*
—, Low *T. dubium*
Hop Sedge ***Carex*** *lupulina*
—, False *C. lupuliformis*
Hop-hornbeam Copperleaf *Acalypha ostryifolia*
Hop-hornbeam, American *Ostrya virginiana*
Hops, Bay *Ipomoea brasiliensis*
—, Japanese ***Humulus*** *japonicus*
—, Midwestern *H. pubescens*
Horehound Motherwort *Chaiturus marrubiastrum*
Horehound, Black *Ballota nigra*
—, White *Marrubium vulgare*
Hornbeam, Coastal American ***Carpinus*** *caroliniana**
—, Inland American *C. caroliniana**
Horned Bladderwort *Utricularia cornuta*
Horned Pondweed *Zannichellia palustris*
Horse Mint *Mentha longifolia**
Horsebalm, Anise ***Collinsonia*** *anisata*
—, Florida *C. punctata*
—, Northern *C. canadensis*
—, Southern *C. anisata*
—, Whorled *C. verticillata*
Horse-bean *Parkinsonia aculeata*
Horsebriar *Smilax rotundifolia*
Horsechestnut *Aesculus hippocastanum*
Horse-gentian, Perfoliate ***Triosteum*** *perfoliatum*
—, Smooth Lesser *T. angustifolium**
Horse-herb *Calyptocarpus vialis*
Horse-nettle, Carolina ***Solanum*** *carolinense**
—, Dwarf *S. pumilum*
—, White *S. elaeagnifolium*
Horse-purslane *Trianthema portulacastrum*
Horsesugar *Symplocos tinctoria*
Horsetail Crown Grass *Paspalum fluitans*
Horsetail Spikerush *Eleocharis equisetoides*
Horsetail, Bottlebrush ***Equisetum*** *arvense*
—, Ferriss's *E. ferrissii*
—, Field *E. arvense*
Horseweed, Common ***Erigeron*** *canadensis*
—, Many-flowered *E. floribundus*
—, South American *E. bonariensis*
—, Southern *E. pusillus*
Hound's-tongue *Cynoglossum officinale*
Houstonia, Glade Mountain *Houstonia lanceolata*
Howe's Sedge *Carex howei*
Hubbard Squash *Cucurbita maxima*
Huckleberry, Black ***Gaylussacia*** *baccata*
—, Hirsute *G. mosieri*
—, Mosier's *G. mosieri*
—, Southern Dwarf *G. dumosa*
Huger's Carrionflower *Smilax hugeri*
Huguenot Fern *Pteris multifida*
Huisache *Vachellia densiflora*
Hummingbird-flower *Macranthera flammea*
Hummock Sedge *Carex joorii*
Hungarian Brome *Bromus inermis*
Hungarian Millet *Setaria italica*
Hungarian Vetch *Vicia pannonica*
Hungerweed *Ranunculus arvensis*
Hungry-root *Aralia racemosa*
Huntsville Vasevine *Clematis morefieldii*
Hurricane Lily *Lycoris radiata**
Husk-tomato *Physalis pubescens*
Hyacinth, Water *Oshuna crassipes*
—, Wild *Camassia scilloides*
Hyacinth-bean *Lablab purpureus*
Hybrid Asian Wisteria *Wisteria formosa*
Hybrid Cattail *Typha angustifolia*
Hydrangea, Ashy ***Hydrangea*** *cinerea*
—, Climbing *H. barbara*
—, Northern Wild *H. arborescens*
—, Oakleaf *H. quercifolia*
—, Smooth *H. arborescens*
—, Southern Wild *H. cinerea*
Hydrilla *Hydrilla verticillata*
Hygro ***Hygrophila*** *polysperma*
Hygrophila, East Indian *H. polysperma*
Hyssopleaf Eupatorium *Eupatorium hyssopifolium*
Hyssopleaf Goldenaster *Chrysopsis hyssopifolia*
Hyssopleaf Sandmat *Euphorbia hyssopifolia*
Iguana Hackberry *Celtis iguanaea*
Illinois Pondweed *Potamogeton illinoensis*
Impatiens, Garden *Impatiens walleriana*
Incognito Lined Sedge ***Carex*** *ignota*
Incognito Sedge *C. ignota*
India Heliotrope *Heliotropium indicum*
India Lovegrass *Eragrostis pilosa**
Indian Cucumber-root *Medeola virginiana*
Indian Cupscale *Sacciolepis indica*
Indian Dayflower *Commelina caroliniana*
Indian Mustard *Brassica juncea*
Indian Paspalum *Paspalum scrobiculatum*
Indian Pipes *Monotropa uniflora*
Indian Sandbur *Cenchrus biflorus*
Indian Strawberry *Potentilla indica*
Indian Yellow-cress *Rorippa indica*
Indian-apple ***Datura*** *innoxia*
— *D. wrightii*
Indian-banana *Asimina triloba*
Indian-cherry *Frangula caroliniana*
Indian-chickweed *Mollugo verticillata*
Indiangrass, Apalachicola ***Sorghastrum*** *apalachicolense*
—, Lopsided *S. secundum*
—, Open *S. apalachicolense*
—, Slender *S. elliottii*
—, Yellow *S. nutans*
Indian-hemp *Apocynum cannabinum*
Indian-midden Morning-glory *Ipomoea macrorhiza*
Indian-olive *Nestronia umbellula*
Indian-paint *Lithospermum canescens*
Indian-pennywort *Bacopa monnieri*
Indian-physic, Midwestern ***Gillenia*** *stipulata*
—, Mountain *G. trifoliata*
Indian-pink *Spigelia marilandica*
Indian-plantain, Broadleaf ***Arnoglossum*** *ovatum**
—, Great *A. reniforme*
—, Grooved-stem *A. sulcatum*
—, Pale *A. atriplicifolium*
—, Savanna *A. ovatum**
—, Variable-leaf *A. diversifolium*
—, Western *A. plantagineum*
Indian-shot *Canna indica*
Indian-tobacco *Lobelia inflata*
Indigo, African *Indigofera tinctoria*
—, Apalachicola Wild ***Baptisia*** *megacarpa*
—, Bigpod Wild *B. megacarpa*
—, Carolina ***Indigofera*** *caroliniana*
—, Coastal *I. miniata*
—, Creamy Wild *Baptisia bracteata*
—, Creeping *Indigofera spicata*
—, Eastern Prairie Blue Wild ***Baptisia*** *aberrans*
—, Glade Blue Wild *B. aberrans*
—, Hairy *Indigofera hirsuta*
—, Hairy Wild *Baptisia hirsuta*
—, Mountain *Amorpha glabra*
—, Narrow-pod White Wild ***Baptisia*** *albescens*
—, Panhandle Wild *B. hirsuta*
—, Spiked Wild *B. albescens*
—, Thick-pod White Wild *B. alba*
—, Trailing *Indigofera spicata*
Indigo-bush, Appalachian ***Amorpha*** *glabra*
—, Dark *A. nitens*
—, Piedmont *A. schwerinii*
—, Shining *A. nitens*
—, Tall *A. fruticosa*
Indigo-weed *Sesbania herbacea*
Inflated Bladderwort *Utricularia inflata*
Inkberry *Ilex glabra*
Inkroot *Limonium carolinianum*
Inland American Hornbeam *Carpinus caroliniana**
Inland Roundleaf Eupatorium *Eupatorium pubescens*
Inland Rush *Juncus interior*
Inland Water-hemp *Amaranthus tuberculatus*

*Common name applies to a subspecies or variety of this species.

INDEX OF COMMON NAMES

Innocence ***Houstonia*** *caerulea*
— *H. procumbens*
Interior Bushy St. John's-wort *Hypericum interior*
Interior Low Plateau Grotto Alumroot *Heuchera missouriensis*
Interrupted Fern *Claytosmunda claytoniana*
Iris, Copper ***Iris*** *fulva*
—, Dwarf Crested *I. cristata*
—, German *I. germanica*
—, Giant Blue *I. giganticaerulea*
—, Japanese *I. ensata*
—, Lamance *I. brevicaulis*
—, Prairie *I. savannarum*
—, Savanna *I. tridentata*
—, Short-stemmed *I. brevicaulis*
—, Siberian *I. sibirica*
—, Slender Blue *I. prismatica*
—, Upland Dwarf *I. verna**
—, Zigzag *I. brevicaulis*
Irish Potato *Solanum tuberosum*
Irisleaf Yellow-eyed-grass *Xyris iridifolia*
Ironweed, Appalachian ***Vernonia*** *glauca*
—, Common *V. gigantea*
—, Florida Sandhill *V. angustifolia**
—, Florida Slender *V. angustifolia**
—, Giant *V. gigantea*
—, Missouri *V. missurica*
—, New York *V. noveboracensis*
—, Tawny *V. glauca*
—, Texas *V. texana*
Ironwood *Ostrya virginiana*
Isopyrum *Enemion biternatum*
Italian Arum *Arum italicum**
Italian Millet *Setaria italica*
Italian Plumeless-thistle *Carduus pycnocephalus**
Italian Rye-grass *Lolium multiflorum*
Itch Grass *Rottboellia cochinchinensis*
Ivy *Kalmia latifolia*
—, Common *Hedera helix**
—, Eastern Poison *Toxicodendron radicans**
—, English *Hedera helix**
Ivyleaf Morning-glory *Ipomoea hederacea*
Ivyleaf Speedwell ***Veronica*** *hederifolia*
—, Small *V. sublobata*
Ivy-leaf Thoroughwort *Chromolaena ivifolia*
Ivy-leaf Toadflax *Cymbalaria muralis*
Jaborosa *Jaborosa integrifolia*
Jackbean ***Canavalia*** *ensiformis*
—, Seaside *C. rosea*
Jack-in-the-pulpit, Common***Arisaema*** *triphyllum*
—, Small *A. pusillum*
—, Southern *A. quinatum*
Jackson-briar *Smilax smallii*
Jacksonville Hawthorn *Crataegus quaesita**
Jacksonville Violet *Viola chalcosperma*
Jacob's-ladder *Euphorbia heterophylla*
—, Spreading *Polemonium reptans**
Jacquemontia, Common *Jacquemontia tamnifolia*
Jagged Chickweed *Holosteum umbellatum**
Jalapeño *Capsicum annuum**
Jamaica Vervain *Stachytarpheta jamaicensis*
Jamaica Weed *Nama jamaicensis*
Jamaican Crabgrass *Digitaria horizontalis*
James's Sedge *Carex jamesii*
Japanese Bamboo *Reynoutria japonica*
Japanese Barberry *Berberis thunbergii*
Japanese Beech Fern *Phegopteris taiwaniana*
Japanese Brome *Bromus japonicus*
Japanese Buckwheat *Reynoutria japonica*
Japanese Chaff-flower *Achyranthes japonica**
Japanese Chess *Bromus japonicus*
Japanese Cleyera *Ternstroemia gymnanthera*
Japanese Climbing Fern *Lygodium japonicum*
Japanese Dodder *Cuscuta japonica*
Japanese Honeysuckle *Lonicera japonica*
Japanese Hops *Humulus japonicus*
Japanese Iris *Iris ensata*
Japanese Jasmine *Jasminum mesnyi*
Japanese Knotweed *Reynoutria japonica*
Japanese Lady Fern *Deparia petersenii*
Japanese Lawngrass *Zoysia japonica*
Japanese Lovegrass *Eragrostis amabilis*
Japanese Millet ***Echinochloa*** *esculenta*
— *E. frumentacea*
Japanese Painted Fern *Anisocampium niponicum*
Japanese Pittosporum *Pittosporum tobira*
Japanese Privet *Ligustrum japonicum*
Japanese Red Shieldfern *Dryopteris erythrosora*
Japanese Shore Juniper *Juniperus conferta*
Japanese Spindle-tree *Euonymus japonicus*
Japanese Spiraea *Spiraea japonica*
Japanese Stilt-grass *Microstegium vimineum*
Japanese Tassel-fern *Polystichum polyblepharum*
Japanese Wisteria *Wisteria floribunda*
Japanese-clover *Kummerowia striata*
Japanese-grass *Microstegium vimineum*
Japanese-hawthorn *Rhaphiolepis umbellata*
Japanese-medlar *Eriobotrya japonica*
Japanese-rose *Kerria japonica*
Jersey Pine *Pinus virginiana*
Jerusalem Artichoke *Helianthus tuberosus*
Jerusalem Thorn *Parkinsonia aculeata*
Jerusalem-Cherry *Solanum pseudocapsicum*
Jerusalem-oak *Dysphania botrys*
Jetbead *Rhodotypos scandens*
Jewels-of-Opar *Talinum paniculatum*
Jewelweed, Orange ***Impatiens*** *capensis*
—, Yellow *I. pallida*
Jim Hill Mustard *Sisymbrium altissimum*
Jimsonweed *Datura stramonium*
Job's-tears *Coix lacryma-jobi*
Joee *Stachytarpheta jamaicensis*
Joe-pye-weed, Hollow-stem ***Eutrochium*** *fistulosum*
—, Purple-node *E. purpureum**
Johnny-jump-ip ***Viola*** *rafinesquei*
Johnny-jump-up *V. tricolor*
Johnson Grass *Sorghum halepense*
Joint Paspalum *Paspalum distichum*
Jointed Charlock *Raphanus raphanistrum**
Jointed Goatgrass *Aegilops cylindrica*
Jointgrass, Carolina ***Mnesithea*** *cylindrica*
—, Pitted *M. tessellata*
—, Smooth *M. tuberculosa*
—, Wrinkled *M. rugosa*
Jointvetch, Southern *Aeschynomene indica*
—, Sticky *Ctenodon viscidulus*
Jointweed, Sandhill ***Polygonella*** *fimbriata*
—, Southern *P. americana*
Jo-Jo *Soliva sessilis*
Jonquil ***Narcissus*** *jonquilla*
—, Campernelle *N. odorus*
—, Star *N. intermedius*
—, Sweet-scented *N. odorus*
Joor's Sedge *Carex joorii*
Joyweed, Sessile *Alternanthera sessilis*
Jujube, Chinese ***Ziziphus*** *jujuba*
—, Common *Z. jujuba*
Jumpseed *Persicaria virginiana*
Junegrass *Bromus tectorum*
— *Poa pratensis**
—, Annual *Rostraria cristata*
—, Prairie *Koeleria macrantha*
Jungle-rice *Echinochloa colonum*
Juniper, Common ***Juniperus*** *communis**
—, Ground *J. communis**
—, Japanese Shore *J. conferta*
—, Mountain *J. communis**
Juniperleaf *Polypremum procumbens*
Juno’s Tears *Verbena officinalis*
Justiceweed *Eupatorium leucolepis*
Jute *Corchorus aestuans*
—, Congo *Urena lobata*
—, Hairy ***Corchorus*** *hirtus*
—, Orinoco *C. hirtus*
—, Red *C. hirtus*
Kalahari Christmas Tree *Dichrostachys cinerea**
Kalmiella *Kalmia hirsuta*
Kansas-thistle *Solanum rostratum*
Kariba Weed *Salvinia molesta*
Kashmir-bouquet *Clerodendrum bungei*
Kearney's Witch-alder *Fothergilla parvifolia*
Keeled Bulrush *Isolepis carinata*
Keeled Goosefoot *Dysphania carinata*
Kenilworth-ivy *Cymbalaria muralis*
Kentucky Beardtongue *Penstemon tenuiflorus*
Kentucky Bluegrass *Poa pratensis**
Kentucky Coffee-tree *Gymnocladus dioicus*
Kentucky Groundnut *Apios priceana*
Kentucky Mahogany *Gymnocladus dioicus*
Kentucky Skullcap *Scutellaria elliptica**
Kentucky Yellow Lady's-slipper *Cypripedium kentuckiense*
Kerria *Kerria japonica*
Ketona Coreopsis ***Coreopsis*** *grandiflora**
Ketona Tickseed *C. grandiflora**
Ketona Yellow-eyed-grass *Xyris spathifolia*
Kidney Bean, Wild *Phaseolus polystachios*
Kidney Sedge *Carex reniformis*
Kidneyleaf Buttercup *Ranunculus abortivus*
Kidneyleaf Mud-Plantain *Heteranthera reniformis*
Kidney-leaved Grass-of-Parnassus *Parnassia asarifolia*
Kidneyweed *Dichondra micrantha*
Kill-cow *Eleocharis tenuis**
King Ranch Bluestem *Bothriochloa ischaemum**
King Solomon's-seal *Polygonatum biflorum**
Kingnut Hickory *Carya laciniosa*
King-of-the-Meadow *Thalictrum pubescens*
King-root *Plantago cordata*
Kiss-me-over-the-garden-gate *Persicaria orientalis*
Kiss-me-quick *Portulaca pilosa*
Klamath-weed *Hypericum perforatum*
Knapweed, Bushy ***Centaurea*** *stoebe**
—, Spotted *C. stoebe**
Knawel ***Scleranthus*** *annuus**
—, Annual *S. annuus**
Knotgrass *Paspalum distichum*
— *Scleranthus annuus**
—, Red *Polygonum patulum*
—, Sand *Paspalum vaginatum*
Knotroot Bristlegrass *Setaria parviflora*
Knotted Bur-Parsley *Torilis nodosa*
Knotted Spikerush *Eleocharis interstincta*
Knotweed ***Polygonum*** *aviculare**
—, Bushy *P. prolificum*
—, Dooryard *P. aviculare**
—, Erect *P. erectum*
—, Glade *Duravia species 2*
—, Japanese *Reynoutria japonica*
—, Longfruit ***Polygonum*** *prolificum*
—, Needle-leaf *P. aviculare**
—, Pink-head *Persicaria capitata*
—, Prolific ***Polygonum*** *prolificum*
—, Seabeach *P. glaucum*
—, Slender *Duravia species 2*
—, Virginia *Persicaria virginiana*
Kochia *Bassia scoparia*
Koeleria, Annual *Rostraria cristata*
Korean Lawngrass *Zoysia japonica*
Korean Lespedeza ***Kummerowia*** *stipulacea*
Korean-clover *K. stipulacea*
KR Bluestem *Bothriochloa ischaemum**
Kral’s Beardtongue *Penstemon kralii*

*Common name applies to a subspecies or variety of this species.

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Kral's Elegant Blazing-star *Liatris elegans**
Kral's Sedge *Carex kraliana*
Kudzu *Pueraria montana**
Kunth's Maiden Fern *Pelazoneuron kunthii*
Kunth's Witchgrass *Dichanthelium consanguineum*
Lace Lovegrass *Eragrostis capillaris*
Lacebark Elm *Ulmus parvifolia*
Laceflower *Ptilimnium nuttallii*
Lacegrass ***Eragrostis*** *capillaris*
— *E. frankii*
Lace-lip Ladies'-tresses *Spiranthes laciniata*
Ladder Brake *Pteris vittata*
Ladies' False Fleabane *Pulicaria arabica*
Ladies'-eardrops *Brunnichia ovata*
Ladies'-tresses, Eaton's ***Spiranthes*** *eatonii*
—, Florida *S. floridana*
—, Fragrant *S. odorata*
—, Giant *S. praecox*
—, Grass-leaved *S. praecox*
—, Great Plains *S. magnicamporum*
—, Lace-lip *S. laciniata*
—, Little *S. tuberosa*
—, Longhorn *S. longilabris*
—, Marsh *S. odorata*
—, Nodding *S. cernua*
—, Oval *S. ovalis**
—, Shining *S. lucida*
—, Southern Slender *S. lacera**
—, Spring *S. vernalis*
Ladino Clover *Trifolium repens*
Lady Fern, Japanese *Deparia petersenii*
—, Southern *Athyrium asplenioides*
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—, Bristly *P. longiseta*
Lady's-slipper, Kentucky Yellow ***Cypripedium*** *kentuckiense*
—, Large Yellow *C. parviflorum**
—, Pink *C. acaule*
—, Small Yellow *C. parviflorum**
—, White *C. candidum*
Lake Cress *Rorippa aquatica*
Lake Ella Hawthorn *Crataegus lassa**
Lamance Iris *Iris brevicaulis*
Lamarck's Bedstraw *Galium divaricatum*
Lamb's-quarters *Chenopodium album**
Lanate Hawthorn ***Crataegus*** *lassa**
Lance's Hawthorn *C. lancei*
Lanceleaf Bedstraw *Galium lanceolatum*
Lanceleaf Bluet *Houstonia lanceolata*
Lanceleaf Eupatorium *Eupatorium lancifolium*
Lanceleaf Green Hawthorn *Crataegus viridis**
Lanceleaf Loosestrife *Steironema lanceolatum*
Lanceleaf Pickerelweed *Pontederia cordata**
Lanceleaf Ragweed *Ambrosia bidentata*
Lanceleaf Rattlebox *Crotalaria lanceolata*
Lanceleaf Rose-gentian *Sabatia difformis*
Lanceleaf Scurfpea *Orbexilum onobrychis*
Lanceleaf Trillium *Trillium lancifolium*
Lanceleaf Violet *Viola lanceolata*
Lance-leaved Buckthorn *Endotropis lanceolata*
Langlois's Violet *Viola langloisii*
Lantana, Common ***Lantana*** *strigocamara*
—, East Florida *L. depressa**
—, Florida *L. depressa**
—, Texas *L. urticoides*
—, Trailing *L. montevidensis*
Lappa Clover *Trifolium lappaceum*
Large Buttonweed *Diodia virginiana*
Large Death-camas *Zigadenus glaberrimus*
Large Eelgrass *Vallisneria neotropicalis*
Large Five-leaves *Isotria verticillata*
Large Grass-leaved Rush *Juncus biflorus*
Large Hop Clover *Trifolium aureum*
Large Path Rush *Juncus anthelatus*
Large Sanicle *Sanicula canadensis**
Large Sea-Purslane *Sesuvium portulacastrum*
Large Solomon's-seal *Polygonatum biflorum**
Large Spikerush *Eleocharis macrostachya*
Large Spotted St. John's-wort *Hypericum pseudomaculatum*
Large Stalk-grain Sedge *Carex stipata**
Large Thyme-leaved Sandwort *Arenaria serpyllifolia*
Large Toadshade *Trillium cuneatum*
Large Twayblade *Liparis liliifolia*
Large Water-celery *Vallisneria neotropicalis*
Large White Fringed Orchid *Platanthera conspicua*
Large Whorled Pogonia *Isotria verticillata*
Large Witch-alder *Fothergilla major*
Large Yellow Lady's-slipper *Cypripedium parviflorum**
Large Yellow Vetch *Vicia grandiflora*
Largebracted Plantain *Plantago aristata*
Large-bracted Tick-trefoil *Desmodium cuspidatum*
Large-flower Heartleaf *Hexastylis shuttleworthii*
Largeflower Milkweed *Asclepias connivens*
Largeflower Rose-gentian *Sabatia grandiflora*
Large-flowered Bellwort *Uvularia grandiflora*
Large-flowered Coreopsis *Coreopsis grandiflora**
Large-flowered Gaura *Oenothera filiformis*
Large-flowered Hibiscus *Hibiscus grandiflorus*
Large-flowered Rock-pink *Phemeranthus mengesii*
Large-flowered Trillium *Trillium grandiflorum*
Large-fruit Amaranth *Amaranthus deflexus*
Large-fruited Sanicle *Sanicula trifoliata*
Large-headed Rush *Juncus megacephalus*
Large-leaf Rose-gentian *Sabatia macrophylla**
Largeleaf Wireweed *Polygonella macrophylla*
Large-tubercled Spikerush *Eleocharis tuberculosa*
Larkspur, Alabama ***Delphinium*** *alabamicum*
—, Blue *D. carolinianum**
—, Carolina *D. carolinianum**
—, Dwarf *D. tricorne*
—, Garden *D. ajacis*
—, Glade *D. carolinianum**
—, Limestone *D. carolinianum**
—, Ozark *D. carolinianum**
—, Prairie *D. carolinianum**
—, Rocket *D. ajacis*
—, Tennessee *D. carolinianum**
Late Eupatorium *Eupatorium serotinum*
Late Meadowrue *Thalictrum pubescens*
Latin American Mock-vervain *Glandularia tenera*
Laurel Oak ***Quercus*** *laurifolia*
—, Sand *Q. hemisphaerica*
Laurel-leaf Greenbriar *Smilax laurifolia*
Lavender Giant-hyssop *Agastache foeniculum*
Lavender Lady *Carphephorus pseudoliatris*
Lawn Blue-eyed-grass *Sisyrinchium rosulatum*
Lawn Burweed *Soliva sessilis*
Lawn Orchid *Zeuxine strateumatica*
Lawn Water-pennywort *Hydrocotyle sibthorpioides*
Lawnflower *Calyptocarpus vialis*
Lax Panic Grass *Steinchisma laxum*
Lazy Sedge *Carex pigra*
Leaf Mustard *Brassica juncea*
Leafcup *Smallanthus uvedalia*
—, Tennessee ***Polymnia*** *laevigata*
—, White-flowered *P. canadensis*
Leaf-flower, Carolina *Phyllanthus caroliniensis*
—, Mascarene Island *Moeroris tenella*
Leafy Elephant's-foot *Elephantopus carolinianus*
Leafy Meadow Phlox *Phlox maculata**
Leafy Pineywoods Goldenrod *Solidago tortifolia*
Leafy Pondweed *Potamogeton foliosus**
Leafy Prairie-clover *Dalea foliosa*
Leantree *Carpinus caroliniana**
Least Blue-eyed-grass *Sisyrinchium minus*
Least Duckweed *Lemna minuta*
Leatherbark *Dirca palustris*
Leatherleaf Mahonia *Mahonia bealei*
Leatherleaf Viburnum *Viburnum rhytidophyllum*
Leather-root *Orbexilum simplex*
Leatherwood *Dirca palustris*
Leathery Rush *Juncus coriaceus*
Leavenworth's Sedge *Carex leavenworthii*
Leavenworth's Tickweed *Coreopsis leavenworthii*
Leavenworth's Goldenrod *Solidago leavenworthii*
Lechillo *Carpinus caroliniana**
Leconte's Violet *Viola affinis*
LeConte's Thistle *Cirsium lecontei*
Leechbrush *Nestronia umbellula*
Leek, Wild ***Allium*** *ampeloprasum*
—, Wild *A. tricoccum*
Lemon Bacopa *Bacopa caroliniana*
Lemon Balm *Melissa officinalis*
Lemon Bergamot *Monarda citriodora**
Lemon Day-lily *Hemerocallis lilioasphodelus*
Lemon-scented Trillium *Trillium luteum*
Lemon-yellow Goldenaster *Heterotheca camporum**
Lentil Vetch *Vicia tetrasperma*
Leopard Lily *Lilium catesbyi*
Leopard's-bane *Arnica acaulis*
Leopard-lily *Iris domestica*
Lepuropetalon *Lepuropetalon spathulatum*
Lespedeza, Bicolor ***Lespedeza*** *bicolor*
—, Chinese *L. cuneata*
—, Common *Kummerowia striata*
—, Creeping ***Lespedeza*** *repens*
—, Downy Trailing *L. procumbens*
—, Hairy *L. hirta**
—, Korean *Kummerowia stipulacea*
—, Narrow-leaved ***Lespedeza*** *angustifolia*
—, Round-headed *L. capitata*
—, Sericea *L. cuneata*
—, Shrubby *L. bicolor*
—, Silvery *L. hirta**
—, Smooth Trailing *L. repens*
—, Velvety *L. stuevei*
—, Violet *L. frutescens*
—, Virginia *L. virginica*
—, Wand *L. violacea*
Lesquereux's Bladderpod *Paysonia lescurii*
Lesser Calamint *Clinopodium calamintha*
Lesser Canary Grass *Phalaris minor*
Lesser Centaury *Centaurium pulchellum*
Lesser Chickweed *Stellaria pallida*
Lesser Clearweed *Pilea fontana*
Lesser Duckweed *Lemna aequinoctialis*
Lesser Peruvian-daisy *Galinsoga parviflora**
Lesser Quaking Grass *Briza minor*
Lesser Swine-cress *Lepidium didymum*
Lesser Toadflax *Chaenorhinum minus**
Lettuce, American Wild ***Lactuca*** *canadensis*
—, Bitter *L. virosa*
—, Coastal Plain *L. graminifolia**
—, Garden *L. sativa*
—, Prickly *L. serriola*
—, Red Wood *L. hirsuta*
—, Showy Blue *Mulgedium oblongifolium*
—, Water *Pistia stratiotes*
—, Western Blue *Mulgedium oblongifolium*
—, Willowleaf ***Lactuca*** *saligna*
—, Woodland *L. floridana*
Leucospora *Leucospora multifida*
Leverwood *Ostrya virginiana*
Lewis's Loosestrife *Steironema species 1*
Licorice Bedstraw *Galium circaezans*
Licorice Goldenrod *Solidago odora*
Licorice-weed *Scoparia dulcis*

*Common name applies to a subspecies or variety of this species.

INDEX OF COMMON NAMES

Liedown Grass *Schizachyrium tenerum*
Lighthipe's Phlox *Phlox lighthipei*
Lightning-rod-plant *Leonotis nepetifolia**
Lilac Tasselflower *Emilia sonchifolia**
Lilac, Persian *Melia azedarach*
Lilacbell *Ipomoea muricata*
Lilaeopsis, Carolina ***Lilaeopsis** carolinensis*
—, Marsh *L. chinensis*
Lilies *Thalia geniculata*
Lily, Beaked Trout *Erythronium rostratum*
—, Cahaba *Hymenocallis coronaria*
—, Canada ***Lilium** canadense*
—, Carolina *L. michauxii*
—, Catesby's *L. catesbyi*
—, Dimpled Trout *Erythronium umbilicatum**
—, Easter *Lilium longiflorum*
—, Eastern Camas *Camassia scilloides*
—, Formosa *Lilium formosanum*
—, Harper's Trout *Erythronium americanum**
—, Hurricane *Lycoris radiata**
—, Leopard *Lilium catesbyi*
—, Magic *Lycoris squamigera*
—, Michaux's ***Lilium** michauxii*
—, Michigan *L. michiganense*
—, Milk-and-wine *Crinum bulbispermum*
—, November ***Lilium** longiflorum*
—, Panhandle *L. iridollae*
—, Philippine *L. philippinense*
—, Pine *L. catesbyi*
—, Pot-o'-gold *L. iridollae*
—, Quamash *Camassia scilloides*
—, Red Spider *Lycoris radiata**
—, Royal ***Lilium** regale*
—, Superb *L. superbum*
—, Surprise *Lycoris radiata**
—, Tiger ***Lilium** lancifolium*
—, Turk's-cap *L. superbum*
—, White Trout *Erythronium albidum*
Lily-of-the-valley Vine *Salpichroa origanifolia*
Lily-of-the-valley, European *Convallaria majalis*
—, Pampas *Salpichroa origanifolia*
Lily-royal *Lilium superbum*
Lilyturf, Big Blue ***Liriope** muscari*
—, Creeping *L. spicata*
Lime, Ogeechee *Nyssa ogeche*
Lime-barren Sandwort ***Sabulina** muscorum*
— *S. patula*
Lime-bluff Vervain *Glandularia species 1*
Limerock Arrow-wood *Viburnum bracteatum*
Limerock Milkvine *Matelea obliqua*
Limeseep Parnassia *Parnassia grandifolia*
Limesink Dog-fennel *Eupatorium leptophyllum*
Limestone Adder's-tongue *Ophioglossum engelmannii*
Limestone Beardtongue *Penstemon tenuiflorus*
Limestone Bittercress *Cardamine douglassii*
Limestone Fameflower *Phemeranthus calcaricus*
Limestone Forest Sedge *Carex superata*
Limestone Goldenrod *Solidago sphacelata*
Limestone Hedge-hyssop *Gratiola quartermaniae*
Limestone Larkspur *Delphinium carolinianum**
Limestone Meadow Sedge ***Carex** granularis*
Limestone Purple Sedge *C. purpurifera*
Limestone Ruellia ***Ruellia** strepens*
Limestone Wild-petunia *R. strepens*
Limnodea *Limnodea arkansana*
Linaza *Linum usitatissimum*
Lindheimer's Croton *Croton lindheimeri*
Lindheimer's Beeblossom *Oenothera lindheimeri*
Lindheimer's Witchgrass *Dichanthelium acuminatum**
Lindley's Butterfly-bush *Buddleja lindleyana*
Lined Sedge ***Carex** striatula*
—, Incognito *C. ignota*
Linn *Tilia americana**
Lion's-ears *Leonotis nepetifolia**
Lion's-foot *Nabalus serpentaria*
Lion's-tail *Leonurus cardiaca*
Lipfern, Alabama ***Myriopteris** alabamensis*
—, Hairy *M. lanosa*
—, Smooth *M. alabamensis*
—, Woolly *M. tomentosa*
Liriope *Liriope muscari*
Little Barley *Hordeum pusillum*
Little Bluestem, Common ***Schizachyrium** scoparium**
—, Seaside *S. littorale*
Little Brown Jug ***Hexastylis** arifolia*
—, Appalachian *H. ruthii*
—, Gulf *H. callifolia*
Little Duckweed *Lemna obscura*
Little Floating Heart *Nymphoides cordata*
Little Gallberry *Ilex glabra*
Little Green Milkweed *Asclepias viridula*
Little Hop Clover *Trifolium dubium*
Little Ladies'-tresses *Spiranthes tuberosa*
Little Lovegrass *Eragrostis minor*
Little Milkpea *Galactia minor*
Little Mouse-ear *Cerastium semidecandrum*
Little Passionflower *Passiflora lutea*
Little Pearl-twist *Spiranthes tuberosa*
Little Plantain *Plantago pusilla*
Little Prickly-pear *Opuntia drummondii*
Little Red Hawthorn *Crataegus intricata**
Little River Water-plantain *Sagittaria secundifolia*
Little Silverbell *Halesia carolina*
Little Snoutbean *Rhynchosia minima*
Little Sundrops *Oenothera perennis*
Little-bell *Ipomoea triloba*
Littlehip Hawthorn *Crataegus spathulata*
Little-leaf Milkwort *Polygala brevifolia*
Littleleaf Titi *Cyrilla parvifolia*
Little-people *Lepuropetalon spathulatum*
Little-tooth Sedge *Carex microdonta*
Live Oak ***Quercus** virginiana*
—, Dwarf *Q. minima*
—, Sand *Q. geminata*
Live-for-ever *Hylotelephium telephium*
Liverleaf, Round-lobed ***Hepatica** americana*
—, Sharp-lobed *H. acutiloba*
Livid Amaranth *Amaranthus blitum**
Lizard's-tail *Saururus cernuus*
Lizardtail Gaura *Oenothera curtiflora*
Llima *Sida cordifolia*
Lloyd's St. John's-wort *Hypericum lloydii*
Lobed Barren Strawberry *Waldsteinia lobata*
Lobed Coreopsis *Coreopsis auriculata*
Lobed Spleenwort *Asplenium pinnatifidum*
Lobe-headed Rush *Juncus scirpoides**
Lobelia, Balespike ***Lobelia** spicata*
—, Boykin's *L. boykinii*
—, Downy *L. puberula*
—, Florida *L. floridana*
—, Great Blue *L. siphilitica*
—, McVaugh's *L. rogersii*
—, Nuttall's *L. nuttallii*
—, Pale *L. appendiculata*
—, Pale Spiked *L. spicata*
—, Shortleaf *L. brevifolia*
—, Southern *L. amoena*
—, White *L. paludosa*
Loblolly Bay *Gordonia lasianthus*
Loblolly Pine *Pinus taeda*
Locust, Black ***Robinia** pseudoacacia*
—, Boynton's *R. hispida**
—, Clammy *R. viscosa*
—, Common Bristly *R. hispida**
—, Dwarf Bristly *R. nana*
—, Honey *Gleditsia triacanthos*
—, Sandhill Bristly *Robinia nana*
—, Water *Gleditsia aquatica*
Log Fern *Dryopteris celsa*
Lombardy Poplar *Populus nigra*
London-rocket *Sisymbrium irio*
Long Lovegrass *Eragrostis elongata*
Long's Rush *Juncus longii*
Long-beak Beaksedge *Rhynchospora scirpoides*
Longbeard Bluestem *Andropogon longiberbis*
Longbristle Smartweed *Persicaria longiseta*
Long-flower Tobacco *Nicotiana longiflora*
Long-flowered Alumroot *Heuchera longiflora*
Long-fringed Sedge *Carex crinita**
Longfruit Knotweed *Polygonum prolificum*
Long-headed Poppy *Papaver dubium*
Longhorn Ladies'-tresses *Spiranthes longilabris*
Longleaf Ground-cherry *Physalis longifolia**
Longleaf Milkweed *Asclepias longifolia*
Longleaf Pine *Pinus palustris*
Longleaf Pondweed *Potamogeton nodosus*
Longleaf Spikegrass *Chasmanthium sessiliflorum**
Longleaf Sunflower *Helianthus longifolius*
Longleaf Three-awn *Aristida palustris*
Long-leaved Panic Grass *Coleataenia longifolia**
Long-ligule Witchgrass *Dichanthelium longiligulatum*
Long-moss *Tillandsia usneoides*
Long's Sedge *Carex longii*
Long-sepal Beardtongue *Penstemon calycosus*
Long-sepaled Yellow-eyed-grass *Xyris longisepala*
Longspike Fluffgrass ***Tridens** strictus*
Longspike Tridens *T. strictus*
Long-spiked Slender Woodland Sedge *Carex digitalis**
Longspur Creeping Bladderwort *Utricularia biflora*
Long-spurred Violet *Viola rostrata*
Longstalk Coreopsis *Coreopsis lanceolata*
Longstalk Sedge *Carex pedunculata**
Long-stalked Aster *Symphyotrichum dumosum**
Long-stem Adder's-tongue *Ophioglossum petiolatum*
Long-Tom *Paspalum denticulatum*
Long-tube Valerian *Valeriana pauciflora*
Lookout Mountain Coreopsis *Coreopsis pulchra*
Lookout Mountain Trillium *Trillium species 3*
Loomis's Mountain-mint *Pycnanthemum loomisii*
Loose Milkwort *Polygala ambigua*
Loose Water-milfoil *Myriophyllum laxum*
Loose-flower Water-willow *Justicia ovata*
Loose-headed Beaksedge *Rhynchospora chalarocephala*
Loosestrife, Appalachian ***Steironema** tonsum*
—, Four-flowered *S. quadriflorum*
—, Fraser's *Lysimachia fraseri*
—, Fringed ***Steironema** ciliatum*
—, Lanceleaf *S. lanceolatum*
—, Lewis's *S. species 1*
—, Lowland *S. hybridum*
—, Narrowleaf ***Lythrum** lineare*
—, Northern Winged *L. alatum*
—, Purple *L. salicaria*
—, Saltmarsh *L. lineare*
—, Smooth ***Steironema** quadriflorum*
—, Southern *S. tonsum*
—, Southern Winged *Lythrum lanceolatum*
—, Swamp *Decodon verticillatus*
—, Thymelaef *Lythrum thymifolium*
—, Trailing *Steironema radicans*
—, Wand *Lythrum lineare*
—, Whorled *Lysimachia quadrifolia*
Lopgrass *Bromus hordeaceus**

*Common name applies to a subspecies or variety of this species.

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Lopseed, American *Phryma leptostachya*
Lopsided Indiangrass *Sorghastrum secundum*
Lop-sided Rush *Juncus secundus*
Loquat *Eriobotrya japonica*
Lords-and-Ladies *Arum italicum**
Loropetalum *Loropetalum chinense*
Lotus, Pink ***Nelumbo** nucifera*
—, Yellow *N. lutea*
Lotus-lily, American *N. lutea*
—, Oriental *N. nucifera*
Louisiana Quillwort *Isoetes louisianensis*
Louisiana Sedge *Carex louisianica*
Louisiana Spikemoss *Lycopodioides ludovicianum*
Louisiana Vetch *Vicia ludoviciana**
Louisiana Yellow-eyed-grass *Xyris louisianica*
Lousewort, Eastern *Pedicularis canadensis*
Lovage, American *Ligusticum canadense*
Love-chain *Antigonon leptopus*
Lovegrass Flatsedge *Cyperus eragrostis*
Lovegrass Tridens *Triplasiella eragrostoides*
Lovegrass, Bahia ***Eragrostis** bahiensis*
—, Bigtop *E. hirsuta*
—, Bluegrass *E. minor*
—, Carolina *E. pectinacea**
—, Coastal *E. refracta*
—, Creeping *E. hypnoides*
—, Creeping *E. reptans*
—, Elliott's *E. elliottii*
—, Feather *E. amabilis*
—, India *E. pilosa**
—, Japanese *E. amabilis*
—, Lace *E. capillaris*
—, Little *E. minor*
—, Long *E. elongata*
—, Mourning *E. lugens*
—, Plains *E. intermedia*
—, Pond *E. japonica*
—, Purple *E. spectabilis*
—, Red *E. oxylepis*
—, Sand *E. trichodes*
—, Sandbar *E. frankii*
—, Slimflower *E. gangetica*
—, Teal *E. hypnoides*
—, Thalia *E. atrovirens*
—, Weeping *E. curvula*
Love-in-a-puff *Cardiospermum halicacabum*
Low Agrimony *Agrimonia microcarpa*
Low Hop Clover *Trifolium dubium*
Low Nutrush *Scleria verticillata*
Low Pinebarren Milkwort *Polygala ramosa*
Low Rattlebox ***Crotalaria** maritima*
— *C. rotundifolia*
Low Showy Aster *Eurybia spectabilis*
Low Spearwort *Ranunculus pusillus*
Low St. John's-wort *Hypericum stragulum*
Low Starbur *Acanthospermum humile*
Low Stiff Witchgrass ***Dichanthelium** ovale**
Low White-haired Witchgrass *D. linearifolium*
Low Wild-petunia *Ruellia humilis*
Low Woodland Sedge *Carex socialis*
Lowland Bladder Fern *Cystopteris protrusa*
Lowland Loosestrife *Steironema hybridum*
Lucerne *Medicago sativa*
Lucerne Dodder *Cuscuta suaveolens*
Lucie Rose *Rosa lucieae*
Lupine Leatherroot ***Orbexilum** lupinellus*
Lupine Scurfpea *O. lupinellus*
Lupine, Blue Sandhill ***Lupinus** diffusus*
—, Pink Sandhill *L. villosus*
—, Small-flowered *L. polycarpus*
—, Southern Sundial *L. perennis**
Lynn Haven Goldenaster *Chrysopsis lanuginosa*
Lyonia-vine *Calycocarpum lyonii*
Lyreleaf Bladderpod *Paysonia lyrata*
Lyreleaf Sage *Salvia lyrata*
Madagascar Periwinkle *Catharanthus roseus*
Madam Gorgon *Acicarpha tribuloides*
Mad-dog Skullcap *Scutellaria lateriflora*
Madwoman's-milk *Euphorbia helioscopia*
Magic Lily *Lycoris squamigera*
Magnolia, Bigleaf ***Magnolia** macrophylla*
—, Cucumber *M. acuminata**
—, Fraser *M. fraseri*
—, Mountain *M. fraseri*
—, Pyramid *M. pyramidata*
—, Saucer *M. soulangeana*
—, Showy Cucumber *M. acuminata**
—, Southern *M. grandiflora*
—, Tulip *M. soulangeana*
—, Umbrella *M. tripetala*
Magnolia-vine *Schisandra glabra*
Mahogany, Carolina *Melia azedarach*
—, Kentucky *Gymnocladus dioicus*
Mahonia, Chinese ***Mahonia** bealei*
—, Leatherleaf *M. bealei*
Maid Marian *Rhexia nashii*
Maiden Fern, Downy ***Christella** dentata*
—, Hairy *C. hispidula*
—, Kunth's *Pelazoneuron kunthii*
—, Mariana *Macrothelypteris torresiana*
—, Ovate *Pelazoneuron ovatum**
Maidenbush *Phyllanthopsis phyllanthoides*
Maidencane *Hymenachne hemitoma*
Maidenhair Spleenwort *Asplenium trichomanes*
Maidenhair Tree *Ginkgo biloba*
Maize *Zea mays**
Malaysian False-pimpernel *Torenia crustacea*
Male Fluellen *Kickxia elatine*
Maleberry, Northern ***Lyonia** ligustrina**
—, Southern *L. ligustrina**
Mallow, Bull *Malva nicaeensis*
—, Bur *Urena lobata*
—, Common ***Malva** neglecta*
—, Common *M. sylvestris*
—, High *M. sylvestris*
—, Three-lobe *Malvastrum coromandelianum*
—, Turk's-cap *Malvaviscus drummondii*
—, Venice *Hibiscus trionum*
Maltese Star-thistle *Centaurea melitensis*
Malva Blanca *Sida cordifolia*
Manatee-grass *Syringodium filiforme*
Manchurian Baby's-Breath *Gypsophila oldhamiana*
Mandarin, Nodding ***Prosartes** maculata*
—, Spotted *P. maculata*
—, Yellow *P. lanuginosa*
Manglier *Baccharis halimifolia*
Manila Temple-grass *Zoysia matrella*
Manioc *Manihot esculenta*
Mannagrass, Eastern ***Glyceria** septentrionalis*
—, Floating *G. septentrionalis*
—, Fowl *G. striata**
Man-of-the-earth ***Ipomoea** pandurata*
Manroot *I. macrorhiza*
— *I. pandurata*
Man-to-man *Peperomia pellucida*
Many-flowered Flatsedge *Cyperus lancastriensis*
Many-flowered Grass-pink *Calopogon multiflorus*
Many-flowered Horseweed *Erigeron floribundus*
Manyfruit Seedbox *Ludwigia polycarpa*
Many-headed Rush *Juncus polycephalos*
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—, Black *A. nigrum*
—, Carolina Red *A. rubrum**
—, Chalk *A. leucoderme*
—, Drummond's *A. rubrum**
—, Drummond's Red *A. rubrum**
—, Eastern Red *A. rubrum**
—, Florida *A. floridanum*
—, Hard *A. saccharum**
—, River *A. negundo**
—, Scheck's *A. saccharum**
—, Silver *A. saccharinum*
—, Soft *A. saccharinum*
—, Southern Hard *A. saccharum**
—, Southern Sugar *A. floridanum*
—, Sugar *A. saccharum**
—, Swamp Red *A. rubrum**
Maple-leaf Oak *Quercus acerifolia*
Mapleleaf Viburnum *Viburnum acerifolium*
Mapleleaf Waterleaf *Hydrophyllum canadense*
Mapleleaf-raspberry, Eastern *Rubacer odoratum*
Maraca Amarilla *Canna glauca*
Margaret's Oak *Quercus margaretiae*
Marginal Woodfern *Dryopteris marginalis*
Marguerite *Leucanthemum vulgare*
Mariana Maiden Fern *Macrothelypteris torresiana*
Marigold, African ***Tagetes** erecta*
—, Aztec *T. erecta*
—, Big *T. erecta*
—, Common *T. erecta*
—, Corn *Glebionis segetum*
—, French ***Tagetes** patula*
—, Sweet-scented *T. lucida*
Marijuana *Cannabis sativa*
Marine-ivy *Cissus trifoliata*
Maritime Bushy Bluestem *Andropogon tenuispatheus*
Maritime Catbriar *Smilax bona-nox**
Maritime Pokeweed *Phytolacca rigida*
Marlberry *Ardisia crenata*
Marlins' Beaksedge *Rhynchospora marliniana*
Maroon Sandhills Spurge *Euphorbia exserta*
Marsh Bedstraw, Stiff *Galium tinctorium**
Marsh Blue Violet *Viola cucullata*
Marsh Clematis *Clematis crispa*
Marsh Cynanchum *Pattalias paluster*
Marsh Dewflower *Murdannia keisak*
Marsh Eryngo *Eryngium aquaticum*
Marsh Fern *Telmatoblechnum serrulatum*
— *Thelypteris palustris**
Marsh Fimbry *Fimbristylis castanea*
Marsh Flatsedge *Cyperus pseudovegetus*
Marsh Frogfruit *Phyla lanceolata*
Marsh Ladies'-tresses *Spiranthes odorata*
Marsh Lilaeopsis *Lilaeopsis chinensis*
Marsh Pea *Lathyrus palustris*
Marsh Pine *Pinus serotina*
Marsh Rosemary *Limonium carolinianum*
Marsh St. John's-wort, Common ***Triadenum** virginicum*
—, Southern *T. tubulosum*
—, Walter's *T. walteri*
Marsh Vetchling *Lathyrus palustris*
Marsh Water-pennywort *Hydrocotyle umbellata*
Marshallia, Sandhill *Marshallia obovata**
Marshcress ***Rorippa** palustris**
—, Stalkless *R. sessiliflora*
Marsh-elder, Dune ***Iva** imbricata*
—, Rough *I. annua*
—, Small-headed *I. microcephala*
—, Southern Maritime *I. frutescens**
Marsh-hay Cordgrass *Spartina patens*
Marsh-mallow, Halberd-leaved *Hibiscus laevis*
Marsh-parsley *Cyclospermum leptophyllum*
Marshpepper Smartweed *Persicaria hydropiper*
Marsh-pink, Common ***Sabatia** angularis*
—, Slender *S. campanulata*
Marsh-stonecrop *Penthorum sedoides*
Marvel-of-Peru *Mirabilis jalapa**
Maryland Golden-aster *Chrysopsis mariana*
Maryland Hawkweed *Hieracium marianum*
Maryland Meadow-beauty *Rhexia mariana**
Maryland Milkwort *Polygala mariana*
Maryland Sanicle *Sanicula marilandica*
Maryland Tick-trefoil *Desmodium marilandicum*
Maryland Wild Senna *Senna marilandica*

*Common name applies to a subspecies or variety of this species.

Mascarene Island Leaf-flower *Moeroris tenella*
Maternity Plant *Bryophyllum daigremontianum*
Matgrass *Phyla nodiflora*
Matrimony-vine, Carolina *Lycium carolinianum*
Matted Paspalum *Paspalum minus*
Matted Tick-trefoil *Desmodium lineatum*
Matting Witchgrass *Dichanthelium meridionale*
Matweed Amaranth *Amaranthus blitoides*
Mauve Sleekwort *Liparis liliifolia*
Maximilian Sunflower *Helianthus maximilianii*
May-apple *Podophyllum peltatum*
Mayberry *Vaccinium elliottii*
Mayflower *Epigaea repens*
Maygrass *Phalaris caroliniana*
May-Plume *Maianthemum racemosum*
Maypops *Passiflora incarnata*
Mayweed *Anthemis cotula*
— *Tripleurospermum inodorum*
—, Scented *Matricaria chamomilla*
Mazus *Mazus pumilus*
McCartney Rose *Rosa bracteata*
McVaugh's Lobelia *Lobelia rogersii*
Meadow Brome *Bromus commutatus*
Meadow Clam *Dionaea muscipula*
Meadow Fescue *Lolium pratense*
Meadow Sedge ***Carex*** *flaccosperma*
—, Limestone *C. granularis*
Meadow Spikemoss *Lycopodioides apodum*
Meadow-beauty, Apalachicola ***Rhexia*** *parviflora*
—, Awned *R. aristosa*
—, Bristly *R. aristosa*
—, Ciliate *R. petiolata*
—, Dull *R. mariana**
—, Fringed *R. petiolata*
—, Golden *R. lutea*
—, Hairy *R. nashii*
—, Maryland *R. mariana**
—, Ozark *R. interior*
—, Pale *R. mariana**
—, Panhandle *R. salicifolia*
—, Short *R. petiolata*
—, Small-flowered White *R. parviflora*
—, Smooth *R. alifanus*
—, Virginia *R. virginica*
—, West Indian *R. cubensis*
—, White *R. mariana**
—, Willowleaf *R. salicifolia*
—, Wing-stem *R. virginica*
—, Yellow *R. lutea*
Meadow-parsnip, Purple *Thaspium trifoliatum**
Meadowsweet, Rosy ***Spiraea*** *tomentosa*
—, Thunberg's *S. thunbergii*
Mead's Sedge ***Carex*** *meadii*
Meager Sedge *C. exilis*
Mealy Colic-root *Aletris farinosa*
Mealy Corydalis *Corydalis crystallina*
Mecardonia *Mecardonia acuminata**
Medick, Black ***Medicago*** *lupulina*
—, Bur *M. minima*
—, Button *M. orbicularis*
—, Shore *M. littoralis*
—, Sickle *M. sativa*
—, Spotted *M. arabica*
—, Toothed *M. polymorpha*
—, Water *M. littoralis*
Meg-many-feet *Ranunculus repens*
Melic, Three-flower ***Melica*** *nitens*
—, Two-flower *M. mutica*
Melilot, Ribbed ***Melilotus*** *officinalis*
—, Small *M. indicus*
—, White *M. albus*
—, Yellow *M. officinalis*
Mellichamp's Skullcap *Scutellaria mellichampii*
Meloncito ***Melothria*** *pendula*
Melonette *M. pendula*
Memorial Rose *Rosa lucieae*
Mendez's Sandmat ***Euphorbia*** *mendezii*
Mercury Spurge *E. mercurialina*
Mercury, Annual ***Mercurialis*** *annua*
—, Herb *M. annua*
Mermaid-weed, Common ***Proserpinaca*** *palustris*
—, Feathery *P. pectinata*
Merrybells *Uvularia sessilifolia*
Mexican Bluebell *Ruellia simplex*
Mexican Fireplant *Euphorbia heterophylla*
Mexican Fireweed *Bassia scoparia*
Mexican Paloverde *Parkinsonia aculeata*
Mexican Petunia *Ruellia simplex*
Mexican Plum *Prunus mexicana*
Mexican Prickly-poppy *Argemone mexicana*
Mexican Primose-willow *Ludwigia octovalvis*
Mexican Sprangletop *Diplachne uninervia*
Mexican-poppy *Argemone mexicana*
Mexican-Tea *Dysphania ambrosioides*
Mezereon *Thymelaea passerina*
Miami-mist *Phacelia purshii*
Michaelmas-daisy *Symphyotrichum novae-angliae*
Michaux's Lily *Lilium michauxii*
Michaux's Orchid *Habenaria quinqueseta*
Michaux's Croton *Croton michauxii*
Michaux's Milkweed *Asclepias michauxii*
Michaux's Whitlow-wort *Paronychia herniarioides*
Michigan Lily *Lilium michiganense*
Midland Sedge *Carex mesochorea*
Midwestern Agalinis *Agalinis gattingeri*
Midwestern Arrowhead *Sagittaria brevirostra*
Midwestern Bishopweed *Ptilimnium nuttallii*
Midwestern Blue Heart-leaved Aster *Symphyotrichum shortii*
Midwestern Blunt Broom Sedge *Carex sangamonensis*
Midwestern Bold Goldenrod *Solidago rigida*
Midwestern Butterflyweed *Asclepias tuberosa**
Midwestern Carrionflower *Smilax lasioneura*
Midwestern Ceanothus *Ceanothus americanus**
Midwestern Evening-primrose *Oenothera pilosella*
Midwestern Fleabane *Erigeron tenuis*
Midwestern Fragrant Sumac *Rhus aromatica**
Midwestern Hops *Humulus pubescens*
Midwestern Indian-physic *Gillenia stipulata*
Midwestern Ninebark *Physocarpus opulifolius**
Midwestern Roughleaf Dogwood *Swida drummondii*
Midwestern Saltmarsh Aster *Symphyotrichum divaricatum*
Midwestern Summer Bluet *Houstonia lanceolata*
Midwestern Tickseed-sunflower ***Bidens*** *aristosa*
Midwestern Tickseeed-sunflower *B. polylepis*
Midwestern Water-hyssop *Bacopa rotundifolia*
Mignonette, Cutleaf ***Reseda*** *lutea*
—, Wild *R. lutea*
—, Yellow *R. lutea*
Mile-a-minute Vine *Ipomoea cairica*
Milk-and-wine Lily *Crinum bulbispermum*
Milkpea, Erect ***Galactia*** *erecta*
—, Florida *G. floridana*
—, Little *G. minor*
Milk-poison, Appalachian ***Ageratina*** *roanensis*
—, Common *A. altissima*
Milk-purslane *Euphorbia maculata*
Milk-thistle *Silybum marianum*
Milkvetch, Bearded ***Astragalus*** *villosus*
—, Canada *A. canadensis**
—, Nuttall's *A. nuttallianus**
—, Southern *A. villosus*
Milkvine, Alabama ***Matelea*** *alabamensis*
—, Limerock *M. obliqua*
Milkweed, Ashy ***Asclepias*** *cinerea*
—, Barrens *A. hirtella*
—, Bog *A. viridula*
—, Carolina *A. cinerea*
—, Clasping *A. amplexicaulis*
—, Common *A. syriaca*
—, Eastern Swamp *A. incarnata**
—, Few-flower *A. lanceolata*
—, Fleshy *A. humistrata*
—, Fourleaf *A. quadrifolia*
—, Glade *A. viridiflora*
—, Green *A. hirtella*
—, Green *A. viridiflora*
—, Largeflower *A. connivens*
—, Little Green *A. viridula*
—, Longleaf *A. longifolia*
—, Michaux's *A. michauxii*
—, Pineland *A. obovata*
—, Poke *A. exaltata*
—, Prairie *A. hirtella*
—, Purple Savanna *A. rubra*
—, Redring *A. variegata*
—, Sand *A. amplexicaulis*
—, Sandhill *A. humistrata*
—, Sandhill *A. tomentosa*
—, Savanna *A. longifolia*
—, Scarlet *A. curassavica*
—, Smoothseed *A. perennis*
—, Southern *A. viridula*
—, Spider *A. viridis*
—, Swamp-forest *A. perennis*
—, Tall *A. exaltata*
—, Western Swamp *A. incarnata**
—, White *A. variegata*
—, Whorled *A. verticillata*
Milkwort, Appalachian ***Polygala*** *curtissii*
—, Baldwin's *P. balduinii*
—, Bitter *P. polygama*
—, Blood *P. sanguinea*
—, Boykin's *P. boykinii**
—, Dwarf *P. nana*
—, Field *P. sanguinea*
—, Georgia *P. leptostachys*
—, Hooker's *P. hookeri*
—, Little-leaf *P. brevifolia*
—, Loose *P. ambigua*
—, Low Pinebarren *P. ramosa*
—, Maryland *P. mariana*
—, Nuttall's *P. nuttallii*
—, Orange *P. lutea*
—, Pink *P. incarnata*
—, Racemed *P. polygama*
—, Scalloped *P. crenata*
—, Short Pinebarren *P. ramosa*
—, Shortleaf *P. brevifolia*
—, Showy *Asemeia grandiflora*
—, Swamp ***Polygala*** *appendiculata*
—, Tall Pinebarren *P. cymosa*
—, White *P. balduinii*
—, Whorled *P. verticillata**
Miller's Witch-alder *Fothergilla milleri*
Millet Beaksedge *Rhynchospora miliacea*
Milo *Sorghum bicolor**
Mimosa *Albizia julibrissin*
—, Powderpuff *Mimosa strigillosa*
—, Prairie *Desmanthus illinoensis*
Mingled Beaksedge *Rhynchospora mixta*
Mini-shiso *Mosla dianthera*
Minnow-fole *Spirodela polyrhiza*
Mint, Apple ***Mentha*** *suaveolens**
—, Horse *M. longifolia**
—, Pineapple *M. suaveolens**
—, Round-leaved *M. suaveolens**
—, Savanna *Pycnanthemum flexuosum*
Minute Bladderwort *Utricularia olivacea*
Miramar-weed *Hygrophila polysperma*
Mirasol *Helianthus annuus*
Mirto *Salvia coccinea*
Miss Price's Aster *Symphyotrichum kentuckiense*
Mississippi Hawthorn *Crataegus florens*

*Common name applies to a subspecies or variety of this species.

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Mississippi Mud-Plantain *Heteranthera missouriensis*
Mississippi Wisteria *Wisteria frutescens**
Missouri Ironweed *Vernonia missurica*
Missouri Mud-Plantain *Heteranthera missouriensis*
Missouri Willow *Salix eriocephala*
Mist Vine *Pouzolzia zeylanica*
Mistflower *Conoclinium coelestinum*
Mistletoe, American ***Phoradendron*** *leucarpum**
—, Christmas *P. leucarpum**
Mitchell's Sedge *Carex mitchelliana*
Miterwort, Caribbean ***Mitreola*** *petiolata*
—, Narrow-leaved *M. angustifolia*
—, Small-leaved *M. sessilifolia*
—, Two-leaved *Mitella diphylla*
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Moccasin-flower *Cypripedium acaule*
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Mock Strawberry *Potentilla indica*
Mockernut Hickory *Carya tomentosa*
Mock-orange, Appalachian***Philadelphus*** *inodorus*
—, Cumberland *P. hirsutus*
—, European *P. coronarius*
—, Hairy *P. hirsutus*
—, Hairy *P. pubescens*
—, Ozark *P. pubescens*
Mohr's Hawthorn *Crataegus mohrii*
Mohr's Eupatorium *Eupatorium mohrii*
Mohr's Three-awn *Aristida mohrii*
Mole Plant *Euphorbia lathyris*
Mondo Grass *Ophiopogon japonicus*
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—, Red *Alysicarpus vaginalis*
Monkey-face Orchid *Platanthera integrilabia*
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—, Winged *M. alatus*
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—, Eastern Blue *A. uncinatum*
Monnier's Water-hyssop *Bacopa monnieri*
Montbretia *Crocosmia crocosmiiflora*
Montia, Narrow-leaved *Montia linearis*
Moonflower, Purple *Ipomoea muricata*
Moonseed *Menispermum canadense*
—, Carolina ***Nephroia*** *carolina*
—, Red *N. carolina*
Moonshine Grass *Danthonia spicata*
Moonvine, Pink *Ipomoea macrorhiza*
Moralia *Corchorus hirtus*
Morefield's Leatherflower *Clematis morefieldii*
Morning-glory, Beach ***Ipomoea*** *imperati*
—, Bigroot *I. pandurata*
—, Coastal *I. cordatotriloba**
—, Common *I. purpurea*
—, Indian-midden *I. macrorhiza*
—, Ivyleaf *I. hederacea*
—, Ocean-blue *I. indica**
—, Red *I. coccinea*
—, Saltmarsh *I. sagittata*
—, Silky Dwarf ***Evolvulus*** *sericeus**
—, Silver Dwarf *E. sericeus**
—, Slender Dwarf *E. alsinoides*
—, Small White ***Ipomoea*** *lacunosa*
—, Wright's *I. heptaphylla*
Morning-rose *Mirabilis jalapa**
Moroccan Chamomile *Cladanthus mixtus*
Moroccan Toadflax *Linaria maroccana*
Morrow's Honeysuckle *Lonicera morrowii*
Mosier's Huckleberry *Gaylussacia mosieri*
Mosla *Mosla dianthera*
Mosote *Triumfetta semitriloba*
Mosquito Fern, Eastern *Azolla caroliniana*
Moss Phlox *Phlox subulata*
Moss Verbena ***Glandularia*** *tenera*
Moss Vervain *G. aristigera*
Mossy Stonecrop *Sedum acre*
Mossycup Oak *Quercus macrocarpa**
Moth Mullein *Verbascum blattaria*
Mother-of-millions*Bryophyllum daigremontianum*
Motherwort *Leonurus cardiaca*
—, Horehound *Chaiturus marrubiastrum*
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Mountain Doghobble *Leucothoe fontanesiana*
Mountain Golden-Alexanders *Zizia trifoliata*
Mountain Highbush Blueberry *Vaccinium simulatum*
Mountain Holly *Ilex montana*
Mountain Indian-physic *Gillenia trifoliata*
Mountain Indigo *Amorpha glabra*
Mountain Juniper *Juniperus communis**
Mountain Laurel *Kalmia latifolia*
Mountain Magnolia *Magnolia fraseri*
Mountain Oak *Quercus montana*
Mountain Pachysandra *Pachysandra procumbens*
Mountain Phlox *Phlox ovata*
Mountain Quillwort *Isoetes valida*
Mountain Rosebay *Rhododendron catawbiense*
Mountain Silverbell *Halesia tetraptera*
Mountain Spleenwort *Asplenium montanum*
Mountain Stewartia *Stewartia ovata*
Mountain Stonecrop *Sedum ternatum*
Mountain Sweet-pepperbush ***Clethra*** *acuminata*
Mountain White-alder *C. acuminata*
Mountain Yellow-eyed-grass *Xyris torta*
Mountain-asphodel *Xerophyllum asphodeloides*
Mountain-mint, Hairy ***Pycnanthemum*** *pilosum*
—, Loomis's *P. loomisii*
—, Savanna *P. flexuosum*
—, Slender *P. tenuifolium*
—, Smooth *P. nudum*
—, Stone Mountain *P. curvipes*
—, Tennessee *P. curvipes*
—, Virginia *P. virginianum*
—, White *P. albescens*
—, White-leaved *P. albescens*
Mountain-pink *Phlox subulata*
Mourning Lovegrass *Eragrostis lugens*
Mouse Barley *Hordeum murinum**
Mouse Melon *Melothria pendula*
Mouse's-ear *Stachys agraria*
Mouse-ear Cress *Arabidopsis thaliana*
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—, Dwarf *C. pumilum*
—, Gray *C. brachypetalum*
—, Little *C. semidecandrum*
—, Sticky *C. glomeratum*
Mousetail *Myosurus minimus*
Muck Sunflower *Helianthus simulans*
Mud-Annie *Murdannia keisak*
Mud-babies *Helanthium tenellum*
Mudbank Crown-grass *Paspalum dissectum*
Mud-hyssop *Gratiola neglecta*
Mud-midgets *Wolffiella gladiata*
Mud-Plantain, Blue ***Heteranthera*** *limosa*
—, Kidneyleaf *H. reniformis*
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—, Missouri *H. missouriensis*
Muehlenberg's Sedge *Carex muehlenbergii**
Mugwort, Annual ***Artemisia*** *annua*
—, Common *A. vulgaris*
—, Western *A. ludoviciana*
Muhlenberg's Sedge *Carex muehlenbergii**
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—, Hair-awn *M. capillaris*
—, Rock *M. sobolifera*
—, Slender *M. tenuiflora*
—, Smooth *M. glabrifloris*
—, Smooth Wirestem *M. frondosa*
—, Woodland *M. sylvatica*
Mulberry, Paper *Broussonetia papyrifera*
—, Red ***Morus*** *rubra*
—, Russian *M. alba*
—, Silkworm *M. alba*
—, White *M. alba*
Mulberry-weed *Fatoua villosa*
Mullein Foxglove *Dasistoma macrophyllum*
Mullein, Common ***Verbascum*** *thapsus**
—, Moth *V. blattaria*
—, Twiggy *V. virgatum*
—, Woolly *V. thapsus**
Mullein-pink *Silene coronaria*
Mullet Bush *Baccharis halimifolia*
Multiflora Rose *Rosa multiflora*
Munson Grape *Muscadinia rotundifolia**
Munson Plum ***Prunus*** *munsoniana*
Munson's Plum *P. munsoniana*
Muricate Amaranth *Amaranthus muricatus*
Muscadine *Muscadinia rotundifolia**
Muscletree *Carpinus caroliniana**
Musk Thistle *Carduus nutans*
Muskie-weed *Potamogeton amplifolius*
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Mustang Grape *Vitis mustangensis*
Mustard Greens *Brassica juncea*
Mustard, Black *Rhamphospermum nigrum*
—, Brown ***Brassica*** *juncea*
—, Chinese *B. juncea*
—, Field *B. rapa*
—, Garlic *Alliaria petiolata*
—, Hare's-ear *Conringia orientalis*
—, Hedge *Sisymbrium officinale*
—, Indian *Brassica juncea*
—, Jim Hill *Sisymbrium altissimum*
—, Leaf *Brassica juncea*
—, Treacle *Conringia orientalis*
—, Treacle *Erysimum repandum*
—, Tumble *Sisymbrium altissimum*
—, Turkey *Cardamine diphylla*
—, White *Sinapis alba**
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—, Yellow *Sinapis alba**
Muster John Henry *Tagetes minuta*
Mutton Grass *Arundinaria tecta*
Myrtle *Vinca minor*
Myrtle Holly *Ilex myrtifolia*
Myrtle Oak *Quercus myrtifolia*
Myrtle Spurge *Euphorbia lathyris*
Myrtle-leaf St. John's-wort *Hypericum myrtifolium*
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—, Common *N. guadalupensis**
—, Narrowleaf *N. filifolia*
—, Slender *N. gracillima*
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—, Spinyleaf *N. minor*
Nailwort, Pineland ***Paronychia*** *patula*
—, Rugel's *P. rugelii*
Naked Ladies *Lycoris radiata**
Naked Tick-trefoil *Hylodesmum nudiflorum*
Naked Witchgrass *Dichanthelium nudicaule*
Naked-stem Dewflower *Murdannia nudiflora*
Naked-stem Sunflower *Helianthus occidentalis**
Nama, Fiddleleaf *Nama jamaicensis*
Nandina *Nandina domestica*
Nannyberry *Viburnum prunifolium*
Nap-at-noon *Ornithogalum umbellatum*
Napier Grass *Cenchrus purpureus*
Naples Garlic *Allium neapolitanum*
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—, Twin-sisters; Two-flower *N. medioluteus*
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*Common name applies to a subspecies or variety of this species.

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Narrow-fruited Watercress *Nasturtium microphyllum*
Narrowhead Goldentop *Euthamia leptocephala*
Narrowleaf Blue Curls *Trichostema setaceum*
Narrowleaf Bluestem *Andropogon perangustatus*
Narrowleaf Bugleweed *Lycopus angustifolius*
Narrowleaf Bushy Eupatorium *Eupatorium linearifolium*
Narrowleaf Cattail *Typha angustifolia*
Narrowleaf Clover *Trifolium angustifolium*
Narrowleaf Cockspur Hawthorn *Crataegus crus-galli**
Narrowleaf Dragonhead *Physostegia angustifolia*
Narrowleaf Firethorn *Pyracantha angustifolia*
Narrowleaf Goosefoot *Chenopodium pratericola*
Narrow-leaf Gumweed *Grindelia lanceolata*
Narrowleaf Loosestrife *Lythrum lineare*
Narrowleaf Naiad *Najas filifolia*
Narrowleaf Obedient-plant *Physostegia angustifolia*
Narrowleaf Paleseed *Leucospora multifida*
Narrowleaf Pepperwort *Lepidium ruderale*
Narrowleaf Pinweed *Lechea tenuifolia*
Narrowleaf Plantain *Plantago lanceolata*
Narrow-leaf Purple Everlasting *Gamochaeta calviceps*
Narrow-leaf Ramps *Allium burdickii*
Narrowleaf Rose-pink *Sabatia brachiata*
Narrowleaf Rushfoil *Croton michauxii*
Narrowleaf Showy Goldenrod *Solidago rigidiuscula*
Narrowleaf Skullcap *Scutellaria integrifolia*
Narrowleaf Sunflower *Helianthus angustifolius*
Narrowleaf Trillium *Trillium lancifolium*
Narrowleaf Vervain *Verbena simplex*
Narrowleaf Vetch *Vicia sativa**
Narrowleaf Whitetop Sedge *Rhynchospora colorata*
Narrow-leaf White-topped Aster *Sericocarpus linifolius*
Narrowleaf Witchgrass *Dichanthelium angustifolium*
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Narrow-leaved Goldenaster *Pityopsis oligantha*
Narrow-leaved Lespedeza *Lespedeza angustifolia*
Narrow-leaved Miterwort *Mitreola angustifolia*
Narrow-leaved Montia *Montia linearis*
Narrow-leaved Smooth Aster *Symphyotrichum concinnum*
Narrow-leaved Violet *Viola lanceolata*
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Nash's Bluestem *Andropogon subtenuis*
Nash's Blue-eyed-grass *Sisyrinchium nashii*
Nash's Witchgrass *Dichanthelium portoricense**
Nashville Breadroot *Pediomelum subacaule*
Nashville Camphorweed *Heterotheca camporum**
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Necklace-weed *Veronica peregrina**
Needle Beaksedge *Rhynchospora capillacea*
Needle Palm *Rhapidophyllum hystrix*
Needle Spikerush *Eleocharis acicularis*
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—, Seaside *Aristida tuberculosa*
Needle-leaf Knotweed *Polygonum aviculare**
Needle-leaf Witchgrass *Dichanthelium aciculare*
Needle-tip Blue-eyed-grass *Sisyrinchium mucronatum*
Nelson's Hedge-nettle *Stachys nelsonii*
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Nestronia *Nestronia umbellula*
Netleaf Leatherflower *Clematis reticulata*
Netted Chain Fern *Lorinseria areolata*
Netted Nutrush *Scleria reticularis*
Nettleleaf Goosefoot *Chenopodiastrum murale*
Nettleleaf Noseburn *Tragia urticifolia*
Nettle-leaf Sage *Salvia urticifolia*
Nettleleaf Vervain *Verbena urticifolia*
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Nevius's Stonecrop *Sedum nevii*
New England Aster*Symphyotrichum novae-angliae*
New England Bulrush *Bolboschoenus novae-angliae*
New Jersey Tea, Common***Ceanothus** americanus**
—, Hairy *C. americanus**
—, Southeastern *C. americanus**
New York Fern *Amauropelta noveboracensis*
New York Ironweed *Vernonia noveboracensis*
Niger-seed ***Guizotia** abyssinica*
Niger-thistle *G. abyssinica*
Night-flowering Catchfly *Silene noctiflora*
Night-flowering Wild-petunia *Ruellia noctiflora*
Night-nodding Bog-dandelion *Chaptalia tomentosa*
Nightshade, American Black***Solanum** americanum*
—, Black *S. nigrescens*
—, Buffalo-bur *S. rostratum*
—, Climbing *S. dulcamara*
—, Dune *S. pseudogracile*
—, Eastern Black *S. emulans*
—, European Black *S. nigrum*
—, Silverleaf *S. elaeagnifolium*
—, Sticky *S. sisymbriifolium*
Nimble-Kate *Sicyos angulatus*
Nimble-Will *Fallopia convolvulus*
— *Muhlenbergia schreberi*
Ninebark, Eastern ***Physocarpus** opulifolius**
—, Midwestern *P. opulifolius**
Nits-and-lice *Hypericum drummondii*
Noble Goldenrod *Solidago speciosa*
Nodding Beaksedge *Rhynchospora inexpansa*
Nodding Beardtongue *Penstemon laxiflorus*
Nodding Bulrush *Scirpus pendulus*
Nodding Bur-marigold *Bidens cernua*
Nodding Clubmoss *Palhinhaea cernua*
Nodding Ettercap *Triphora trianthophoros**
Nodding Evening-primrose *Oenothera nutans*
Nodding Fescue *Festuca subverticillata*
Nodding Foxtail-grass *Setaria faberi*
Nodding Ladies'-tresses *Spiranthes cernua*
Nodding Mandarin *Prosartes maculata*
Nodding Nixie *Apteria aphylla*
Nodding Onion *Allium cernuum*
Nodding Pogonia *Triphora trianthophoros**
Nodding Thistle *Carduus nutans*
Nodding Wild-rye *Elymus canadensis**
Nondo ***Ligusticum** canadense*
—, Scour *L. species 1*
None-so-pretty *Atocion armeria*
Nonesuch Daffodil *Narcissus incomparabilis*
Northeastern Bladderwort *Utricularia resupinata*
Northeastern Ceanothus *Ceanothus americanus**
Northeastern Gaura *Oenothera gaura*
Northeastern Slim-spike Three-awn *Aristida geniculata*
Northeastern Tansy-mustard *Descurainia pinnata**
Northern Blazing-star *Liatris scariosa*
Northern Catalpa *Catalpa speciosa*
Northern Crab Grass *Digitaria sanguinalis*
Northern Croton *Croton glandulosus**
Northern Drumheads *Polygala aquilonia*
Northern Flat-topped White Aster *Doellingeria umbellata**
Northern Frogfruit *Phyla lanceolata*
Northern Hackberry *Celtis occidentalis*
Northern Horsebalm *Collinsonia canadensis*
Northern Maidenhair *Adiantum pedatum*
Northern Maleberry *Lyonia ligustrina**
Northern Meadow Groundsel*Packera paupercula**
Northern Prickly-ash *Zanthoxylum americanum*
Northern Rattlesnake-master *Eryngium yuccifolium**
Northern Roughleaf Goldenrod *Solidago patula*
Northern Sandspur *Cenchrus longispinus*
Northern Six-weeks Fescue *Festuca octoflora**
Northern Spicebush *Lindera benzoin*
Northern Spiderlily *Hymenocallis occidentalis**
Northern Spinypod *Matelea obliqua*
Northern Sundrops *Oenothera tetragona*
Northern Tall Flat-topped Aster *Doellingeria umbellata**
Northern Tickseed-sunflower *Bidens trichosperma*
Northern Toothache Tree*Zanthoxylum americanum*
Northern White Beaksedge *Rhynchospora alba*
Northern White Colic-root *Aletris farinosa*
Northern Wild Hydrangea*Hydrangea arborescens*
Northern Wild Raisin *Viburnum cassinoides*
Northern Wild Senna *Senna hebecarpa*
Northern Winged Loosestrife *Lythrum alatum*
Northern Witch-hazel *Hamamelis virginiana**
Noseburn, Gulf Coast ***Tragia** smallii*
—, Heartleaf *T. cordata*
—, Nettleleaf *T. urticifolia*
—, Sandhill *T. urens*
—, Southeastern *T. urens*
—, Wavyleaf *T. urens*
Nottoway River Brome *Bromus nottowayanus*
November Lily *Lilium longiflorum*
Noyau Vine *Distimake dissectus*
Nutgrass ***Cyperus** rotundus*
—, Yellow *C. esculentus**
Nutmeg Hickory *Carya myristiciformis*
Nutrush, Baldwin's ***Scleria** baldwinii*
—, Broad-leaved Hairy *S. ciliata**
—, Carolina *S. pauciflora**
—, Few-flowered *S. oligantha*
—, Flaccid *S. flaccida*
—, Georgia *S. georgiana*
—, Hairy *S. ciliata**
—, Low *S. verticillata*
—, Netted *S. reticularis*
—, Papillose *S. pauciflora**
—, Pitted *S. muehlenbergii*
—, Riverswamp *S. distans**
—, Savanna *S. verticillata*
—, Shining *S. nitida*
—, Slender *S. minor*
—, Smooth *S. ciliata**
—, Tall *S. triglomerata*
Nutsedge, False ***Cyperus** strigosus*
—, Purple *C. rotundus*
—, Yellow *C. esculentus**
Nuttall Oak *Quercus texana*
Nuttall's Hedge-nettle *Stachys nuttallii*
Nuttall's Lobelia *Lobelia nuttallii*
Nuttall's Milkvetch *Astragalus nuttallianus**
Nuttall's Tick-trefoil *Desmodium nuttallii*
Nuttall's Milkwort *Polygala nuttallii*
Nuttall's Reedgrass *Greeneochloa coarctata*

*Common name applies to a subspecies or variety of this species.

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Nuttall's Thistle *Cirsium nuttallii*
Nuttall's Water-starwort *Callitriche pedunculosa*
Nuttall's Waterweed *Elodea nuttallii*
Oak, Arkansas ***Quercus** arkansana*
—, Basket *Q. michauxii*
—, Bastard *Q. durandii**
—, Black *Q. velutina*
—, Blackjack *Q. marilandica**
—, Bluejack *Q. incana*
—, Bluff *Q. austrina*
—, Boynton *Q. boyntonii*
—, Bur *Q. macrocarpa**
—, Chapman *Q. chapmanii*
—, Cherrybark *Q. pagoda*
—, Chinquapin *Q. muehlenbergii*
—, Darlington *Q. hemisphaerica*
—, Delta *Q. similis*
—, Durand's *Q. durandii**
—, Durand's White *Q. durandii**
—, Dwarf Chinquapin *Q. prinoides*
—, Dwarf Live *Q. minima*
—, Georgia *Q. georgiana*
—, Laurel *Q. laurifolia*
—, Live *Q. virginiana*
—, Maple-leaf *Q. acerifolia*
—, Margaret's *Q. margaretiae*
—, Mossycup *Q. macrocarpa**
—, Mountain *Q. montana*
—, Myrtle *Q. myrtifolia*
—, Nuttall *Q. texana*
—, Oglethorpe *Q. oglethorpensis*
—, Overcup *Q. lyrata*
—, Paddle *Q. nigra*
—, Poison *Toxicodendron pubescens*
—, Post ***Quercus** stellata*
—, Red *Q. rubra**
—, Rock Chestnut *Q. montana*
—, Running *Q. elliottii*
—, Sand Laurel *Q. hemisphaerica*
—, Sand Live *Q. geminata*
—, Sand Post *Q. margaretiae*
—, Sawtooth *Q. acutissima*
—, Scarlet *Q. coccinea*
—, Shingle *Q. imbricaria*
—, Shumard *Q. shumardii*
—, Southeastern Poison *Toxicodendron pubescens*
—, Southern Red ***Quercus** falcata*
—, Spanish *Q. falcata*
—, Swamp Chestnut *Q. michauxii*
—, Swamp Post *Q. similis*
—, Swamp Spanish *Q. pagoda*
—, Swamp White *Q. bicolor*
—, Texas Red *Q. texana*
—, Turkey *Q. laevis*
—, Water *Q. nigra*
—, White *Q. alba*
—, Willow *Q. phellos*
—, Yellow *Q. muehlenbergii*
Oakdrops *Conopholis americana*
Oakleaf Goosefoot *Oxybasis glauca*
Oakleaf Hydrangea *Hydrangea quercifolia*
Oakleaf Thorn-apple *Datura quercifolia*
Oak-leaved Fleabane *Erigeron quercifolius*
Oak-leech, Appalachian ***Aureolaria** levigata*
—, Cumberland *A. patula*
—, Downy *A. virginica*
—, Smooth *A. flava*
—, Southern *A. pectinata*
—, Virginia *A. virginica*
Oatgrass *Gaudinia fragilis*
—, Black *Piptochaetium avenaceum*
Oat-grass, Bog ***Danthonia** epilis*
—, Poverty *D. spicata*
—, Silky *D. sericea*
Oatgrass, Tall ***Arrhenatherum** elatius**
—, Tuber *A. elatius**
Oatmeal Grass *Leersia lenticularis*
Oats *Avena sativa*
—, Prairie False *Sphenopholis interrupta*
—, River *Chasmanthium latifolium*
—, Sea *Uniola paniculata*
—, Wild *Avena fatua*
Obedient-plant, Foxglove ***Physostegia** digitalis*
—, Narrowleaf *P. angustifolia*
—, Southern *P. virginiana**
—, Swamp *P. leptophylla*
—, Tidal Marsh *P. leptophylla*
Ocala Hawthorn *Crataegus lassa**
Ocean-blue Morning-glory *Ipomoea indica**
Ochlockonee Ground-cherry *Solanum perplexum*
Oconee Bells *Shortia galacifolia*
Odorless Bayberry *Morella inodora*
Ogeechee Lime ***Nyssa** ogeche*
Ogeechee Plum *N. ogeche*
Ogeechee Tupelo *N. ogeche*
Oglethorpe Oak *Quercus oglethorpensis*
Ohio Buckeye *Aesculus glabra**
Ohio Spiderwort *Tradescantia ohiensis*
Oil-nut *Pyrularia pubera*
Oklahoma Grass-pink *Calopogon oklahomensis*
Oklahoma Sedge *Carex oklahomensis*
Okra *Abelmoschus esculentus*
Old Cahaba Rosinweed *Silphium perplexum*
Old Field Pine *Pinus taeda*
Old Man's Beard *Chionanthus virginicus*
Old Plainsman *Hymenopappus scabiosaeus**
Old World Hairsedge *Bulbostylis barbata*
Old World Reed *Phragmites australis*
Oldenlandia *Edrastima uniflora*
Old-field Broomstraw *Andropogon virginicus**
Old-field Five-fingers *Potentilla simplex*
Old-witch Grass *Panicum capillare*
Oleander *Nerium oleander*
Oleaster *Elaeagnus angustifolia*
Olive Spikerush *Eleocharis olivacea**
Olney Threesquare *Schoenoplectus americanus*
Oneflower Hawthorn *Crataegus uniflora*
One-flowered Bedstraw *Galium uniflorum*
One-flowered Broomrape *Aphyllon uniflorum*
One-seed Croton *Croton monanthogynus*
Onion Couch *Arrhenatherum elatius**
Onion, Cuthbert's ***Allium** cuthbertii*
—, Flatrock *A. speculae*
—, Mobile *A. mobilense*
—, Nodding *A. cernuum*
—, Wild *A. canadense*
—, Wild *A. vineale*
—, Yorktown *A. ampeloprasum*
Onion-grass *A. vineale*
Open Indiangrass *Sorghastrum apalachicolense*
Open-flower Witchgrass *Dichanthelium laxiflorum*
Opium Poppy *Papaver somniferum*
Opposite-leaf Dwarf-dandelion *Krigia cespitosa*
Orach, Red ***Atriplex** rosea*
—, Seabeach *A. mucronata*
—, Seabeach *A. pentandra*
—, Spear *A. patula*
—, Tartarian *A. tatarica*
Orange Cosmos *Cosmos sulphureus*
Orange Day-lily *Hemerocallis fulva*
Orange Dwarf-dandelion *Krigia biflora**
Orange Grass *Ctenium aromaticum*
Orange Jewelweed *Impatiens capensis*
Orange Milkwort *Polygala lutea*
Orange Touch-me-not *Impatiens capensis*
Orange, Hardy ***Citrus** trifoliata*
—, Trifoliate *C. trifoliata*
Orange-eye Butterfly-bush *Buddleja davidii*
Orange-grass ***Hypericum** gentianoides*
Orangeweed *H. gentianoides*
Orchard Grass *Dactylis glomerata*
Oriental Arborvitae *Platycladus orientalis*
Oriental Bittersweet *Celastrus orbiculatus*
Oriental Garlic *Allium tuberosum*
Oriental Hedge Bamboo *Bambusa multiplex*
Oriental Lotus-lily *Nelumbo nucifera*
Oriental Silverleaf *Elaeagnus umbellata*
Orinoco Jute *Corchorus hirtus*
Ornamental Gourd ***Cucurbita** melopepo**
— *C. pepo*
Orpine, Puck's *Sedum pusillum*
Ortiguilla *Urtica chamaedryoides*
Osage-orange *Maclura pomifera*
Osceola-plume *Stenanthium densum*
Oswego Tea *Monarda didyma*
Outcrop Rushfoil *Croton willdenowii*
Oval Ladies'-tresses *Spiranthes ovalis**
Oval-flowered Witchgrass *Dichanthelium ovale**
Oval-leaved Sedge *Carex cephalophora*
Ovate Fiddleleaf *Hydrolea ovata*
Ovate Maiden Fern *Pelazoneuron ovatum**
Overcup Oak *Quercus lyrata*
Oxeye Daisy *Leucanthemum vulgare*
Oxeye, Beach Creeping *Pascalia glauca*
—, Coastal Plain *Heliopsis gracilis*
—, Creeping *Sphagneticola trilobata*
—, Eastern ***Heliopsis** helianthoides**
—, Pineywoods *H. gracilis*
—, Silver Seaside *Borrichia frutescens*
—, Smooth *Heliopsis gracilis*
Oxtongue, Smallflower *Picris pauciflora*
Ozark Bedstraw *Galium virgatum*
Ozark Bunchflower *Melanthium woodii*
Ozark Chinquapin *Castanea ozarkensis*
Ozark Crownbeard *Verbesina helianthoides*
Ozark Dropseed *Sporobolus ozarkanus*
Ozark Larkspur *Delphinium carolinianum**
Ozark Marbleseed *Lithospermum subsetosum*
Ozark Meadow-beauty *Rhexia interior*
Ozark Mock-orange *Philadelphus pubescens*
Ozark Phlox *Phlox pilosa**
Ozark Rose *Rosa setigera*
Ozark Tassel-rue *Trautvetteria applanata*
Ozark Tickseed-sunflower *Bidens aristosa*
Pachysandra, Mountain *Pachysandra procumbens*
Paddle Oak *Quercus nigra*
Pagoda Beaksedge *Rhynchospora compressa*
Pagoda Cornel ***Swida** alternifolia*
Pagoda Dogwood *S. alternifolia*
Paintbrush, Cahaba ***Castilleja** kraliana*
—, Eastern *C. coccinea*
—, Texas *C. indivisa*
Painted Buckeye *Aesculus sylvatica*
Painted Leaf ***Euphorbia** cyathophora*
— *E. dentata*
Painted Sedge *Carex picta*
Pale Blue-eyed-grass *Sisyrinchium langloisii*
Pale Dock *Rumex altissimus*
Pale Duckweed *Lemna valdiviana*
Pale Grass-pink *Calopogon pallidus*
Pale Hickory *Carya pallida*
Pale Indian-plantain *Arnoglossum atriplicifolium*
Pale Leatherflower *Clematis versicolor*
Pale Lobelia *Lobelia appendiculata*
Pale Meadow-beauty *Rhexia mariana**
Pale Pitcherplant *Sarracenia alata*
Pale Poppy-mallow *Callirhoe alcaeoides*
Pale Purple Coneflower *Echinacea pallida*
Pale Smartweed *Persicaria lapathifolia*
Pale Spiked Lobelia *Lobelia spicata*
Pale Spikerush *Eleocharis flavescens**
Pale Touch-me-not *Impatiens pallida*
Pale Umbrella-wort *Mirabilis albida*
Pale Vetch *Vicia caroliniana*
Pale Violet *Viola striata*

*Common name applies to a subspecies or variety of this species.

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Pale Wild Bergamot *Monarda fistulosa**
Palma Christi *Ricinus communis*
Palmer's Amaranth *Amaranthus palmeri*
Palmetto, Blue *Rhapidophyllum hystrix*
—, Cabbage ***Sabal** palmetto*
—, Dwarf *S. minor*
—, Saw *Serenoa repens*
Pampas Lily-of-the-valley *Salpichroa origanifolia*
Pampasgrass *Cortaderia selloana*
Panhandle Lily *Lilium iridollae*
Panhandle Meadow-beauty *Rhexia salicifolia*
Panhandle Pipewort *Eriocaulon decangulare**
Panhandle White Cedar *Chamaecyparis thyoides**
Panhandle Wild Indigo *Baptisia hirsuta*
Panhandle Yellow-eyed-grass *Xyris longisepala*
Panic Grass, Beaked *Coleataenia anceps**
—, Berg's ***Panicum** bergii*
—, Blue *P. antidotale*
—, Blunt *P. virgatum**
—, Combs ***Coleataenia** longifolia**
—, Dense *C. rigidula**
—, Fall ***Panicum** dichotomiflorum**
—, Flatrock *P. philadelphicum**
—, Gaping *Steinchisma hians*
—, Gattinger's *Panicum philadelphicum**
—, Lax *Steinchisma laxum*
—, Long-leaved ***Coleataenia** longifolia**
—, Redtop *C. rigidula**
—, Small Beaked *C. anceps**
—, Southeastern *C. tenera*
—, Spreading *Panicum dichotomiflorum**
—, Tall Flat *Coleataenia pulchra*
—, Warty *Kellochloa verrucosa*
—, Wiry ***Panicum** flexile*
—, Woodland *P. philadelphicum**
Panicled Tick-trefoil *Desmodium paniculatum**
Pansy ***Viola** tricolor*
—, European Field *V. arvensis*
—, Field *V. rafinesquei*
—, Garden *V. wittrockiana*
—, Wild *V. rafinesquei*
Paper Mulberry *Broussonetia papyrifera*
Paper-white Daffodil *Narcissus papyraceus*
Papillose Nutrush *Scleria pauciflora**
Paprika *Capsicum annuum**
Paraguay Bur ***Acanthospermum** australe*
Paraguay Starbur *A. australe*
Paraguayan Dock *Rumex paraguayensis*
Paraguayan Windmill-grass *Stapfochloa canterae*
Parasol Sedge *Carex umbellata*
Parlin's Pussytoes *Antennaria parlinii**
Parnassia, Appalachian ***Parnassia** asarifolia*
—, Brook *P. asarifolia*
—, Limeseep *P. grandifolia*
Parrot Pitcherplant *Sarracenia psittacina*
Parrot-feather *Myriophyllum aquaticum*
Parrot-lily *Alstroemeria pulchella*
Parsley Haw ***Crataegus** marshallii*
Parsley Hawthorn *C. marshallii*
Parsley-piert *Aphanes australis*
Partridge-berry *Mitchella repens*
Partridge-pea, Common *Chamaecrista fasciculata**
Pasionaria *Passiflora incarnata*
Paspalum, Big ***Paspalum** floridanum*
—, Blue *P. caespitosum*
—, Brownseed *P. plicatulum*
—, Bull *P. boscianum*
—, Florida *P. floridanum*
—, Fringeleaf *P. setaceum**
—, Indian *P. scrobiculatum*
—, Joint *P. distichum*
—, Matted *P. minus*
—, Pitchfork *P. bifidum*
—, Sour *P. conjugatum*
—, Thin *P. setaceum**
—, Walter's *P. dissectum*
—, Water *P. fluitans*
—, Yellow Sand *P. setaceum**
Passionflower, Little ***Passiflora** lutea*
—, Purple *P. incarnata*
—, Yellow *P. lutea*
Pastle *Tillandsia usneoides*
Pasture Fern *Sitobolium punctilobulum*
Path Rush ***Juncus** tenuis*
—, Large *J. anthelatus*
Pattypan Squash *Cucurbita melopepo**
Paulownia *Paulownia tomentosa*
Pawpaw, Common ***Asimina** triloba*
—, Slimleaf *A. spatulata*
—, Small-flowered *A. parviflora*
—, Small-fruited *A. parviflora*
Pea *Pisum sativum*
—, Black-eyed *Vigna unguiculata*
—, Butterfly *Clitoria mariana**
—, Caley *Lathyrus hirsutus*
—, Chick *Cicer arietinum*
—, English *Pisum sativum*
—, Everlasting *Lathyrus latifolius*
—, Field *Vigna unguiculata*
—, Forest *Lathyrus venosus*
—, Garden *Pisum sativum*
—, Marsh ***Lathyrus** palustris*
—, Perennial Sweet *L. latifolius*
—, Rough *L. hirsutus*
—, Singletary *L. hirsutus*
—, Spurred Butterfly *Centrosema virginianum**
—, Sweet ***Lathyrus** odoratus*
—, Tiny *L. pusillus*
—, Veiny *L. venosus*
Peach *Prunus persica*
Peachleaf Dock *Rumex altissimus*
Peanut *Arachis hypogaea*
Peanut-grass, Florida *Amphicarpum muehlenbergianum*
Pear Hawthorn *Crataegus calpodendron*
Pear, Bradford ***Pyrus** calleryana*
—, Callery *P. calleryana*
—, Coastal Prickly *Opuntia stricta**
—, Common *Pyrus communis*
—, Southern Prickly *Opuntia austrina*
Pearl Millet *Cenchrus americanus*
Pearlbush *Exochorda racemosa*
Pearl-twist, Little *Spiranthes tuberosa*
Pearlwort, Annual ***Sagina** decumbens*
—, Eastern *S. decumbens*
Peatree *Sesbania herbacea*
Peatweed *Decodon verticillatus*
Pecan ***Carya** illinoinensis*
—, Bitter *C. aquatica*
Peelbark St. John's-wort *Hypericum fasciculatum*
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—, Pennsylvania *P. pensylvanica*
—, Rock *P. pensylvanica*
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Pencil-flower *Stylosanthes biflora*
Pennsylvania Blackberry *Rubus pensilvanicus*
Pennsylvania Everlasting *Gamochaeta pensylvanica*
Pennsylvania Pellitory *Parietaria pensylvanica*
Pennsylvania Smartweed *Persicaria pensylvanica*
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Pennywort *Obolaria virginica*
—, Dune *Hydrocotyle bonariensis*
Penthorum, American *Penthorum sedoides*
Pentodon *Pentodon pentandrus*
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—, Poor Man's *Lepidium virginicum**
Pepper-and-salt *Erigenia bulbosa*
Pepper-bark *Zanthoxylum clava-herculis*
Pepper-elder *Peperomia pellucida*
Peppergrass, Green-flowered ***Lepidium** densiflorum*
—, Veiny *L. oblongum*
Pepperidge *Nyssa sylvatica*
Peppermint *Mentha piperita**
Pepperoncini *Capsicum annuum**
Peppervine *Nekemias arborea*
—, Amur ***Ampelopsis** glandulosa*
—, Heartleaf *A. cordata*
Pepperweed, Prairie ***Lepidium** densiflorum*
—, Stinking *L. ruderale*
Pepperwort, Field *L. campestre*
—, Narrowleaf *L. ruderale*
Perennial Dune Whitlow-wort *Paronychia baldwinii**
Perennial Foxtail-grass *Setaria parviflora*
Perennial Fuzzy Bean *Strophostyles umbellata*
Perennial Glasswort *Salicornia ambigua*
Perennial Greenhead Sedge *Cyperus brevifolius*
Perennial Ragweed *Ambrosia psilostachya*
Perennial Rye-grass *Lolium perenne*
Perennial Salt-marsh Aster *Symphyotrichum tenuifolium*
Perennial Sand Bean *Strophostyles umbellata*
Perennial Sweet Pea *Lathyrus latifolius*
Perennial Wall-Rocket *Diplotaxis tenuifolia*
Perfoliate Alexanders *Smyrnium perfoliatum*
Perfoliate Bellwort *Uvularia perfoliata*
Perfoliate Horse-gentian *Triosteum perfoliatum*
Perfoliate Pondweed *Potamogeton perfoliatus*
Perilla *Perilla frutescens*
Periwinkle, Common ***Vinca** minor*
—, Greater *V. major*
—, Madagascar *Catharanthus roseus*
Perplexing Tick-trefoil *Desmodium perplexum*
Persian Clover *Trifolium resupinatum*
Persian Lilac *Melia azedarach*
Persimmon, American *Diospyros virginiana*
Peruvian Zinnia *Zinnia peruviana*
Peruvian-daisy, Common ***Galinsoga** quadriradiata*
—, Lesser *G. parviflora**
Peruvian-lily *Alstroemeria pulchella*
Petiteplant *Lepuropetalon spathulatum*
Petty Spurge *Euphorbia peplus*
Petunia, Garden *Petunia atkinsiana*
—, Mexican *Ruellia simplex*
—, Seaside *Calibrachoa parviflora*
—, Violet-flowered ***Petunia** integrifolia*
—, White-flowered *P. axillaris*
—, Wild *Calibrachoa parviflora*
Phacelia, Appalachian ***Phacelia** dubia**
—, Fernleaf *P. bipinnatifida*
—, Flatrock *P. maculata*
—, Forest *P. bipinnatifida*
—, Georgia *P. dubia**
—, Purple *P. bipinnatifida*
Phanopyrum, Swamp *Phanopyrum gymnocarpon*
Phasey Bean *Macroptilium lathyroides*
Pheasant's-eye *Adonis annua*
Pheasant's-eye Daffodil *Narcissus poeticus*
Philadelphia-daisy *Erigeron philadelphicus**
Philippine Lily *Lilium philippinense*
Phlox, Alabama ***Phlox** pulchra*
—, Allegheny *P. ovata*
—, Annual *P. drummondii**
—, Appalachian *P. ovata*
—, Broadleaf *P. amplifolia*
—, Carolina *P. carolina*
—, Chalice *P. amoena*
—, Downy *P. pilosa**
—, Drummond *P. drummondii**
—, Garden *P. paniculata*
—, Giant *P. carolina*
—, Gulf Coast *P. pilosa**

*Common name applies to a subspecies or variety of this species.

—, Hairy *P. amoena*
—, Leafy Meadow *P. maculata**
—, Lighthipe's *P. lighthipei*
—, Moss *P. subulata*
—, Mountain *P. ovata*
—, Ozark *P. pilosa**
—, Pineland *P. nivalis**
—, Smooth *P. glaberrima*
—, Thick-leaf *P. carolina*
—, Trailing *P. nivalis**
—, Western Blue *P. divaricata**
Phoenix Tree *Firmiana simplex*
Pickerelweed, Heartleaf ***Pontederia** cordata**
—, Lanceleaf *P. cordata**
Pickering's Dawnflower *Stylisma pickeringii**
Piedmont Azalea *Rhododendron canescens*
Piedmont Barbara's-buttons *Marshallia obovata**
Piedmont Bedstraw *Galium pedemontanum*
Piedmont Big-leaved Aster *Eurybia jonesiae*
Piedmont Bottlebrush Grass *Elymus hystrix**
Piedmont Crosswort *Galium pedemontanum*
Piedmont Indigo-bush *Amorpha schwerinii*
Piedmont Pale Goldenrod *Solidago pallescens*
Piedmont Pimpernel *Lindernia monticola*
Piedmont Quillwort *Isoetes piedmontana*
Piedmont Wand Goldenrod *Solidago austrina*
Pie-marker *Abutilon theophrasti*
Pie-plant *Eclipta prostrata*
Pigeon Grape *Vitis cinerea*
Pigmy Pipes, Appalachian *Monotropsis odorata*
Pignut Hickory *Carya glabra*
Pig-potato *Oxypolis rigidior*
Pigs *Hexastylis arifolia*
Pigweed *Chenopodium album**
—, Prostrate ***Amaranthus** blitoides*
—, Rough *A. retroflexus*
—, Smooth *A. hybridus**
Pillpod Sandmat *Euphorbia hirta*
Pillwort, American *Pilularia americana*
Pimiento *Capsicum annuum**
Pimpernel, Common *Anagallis arvensis*
—, Flatrock ***Lindernia** monticola*
—, Piedmont *L. monticola*
—, Riverbank *L. monticola*
—, Riverbank *L. saxicola*
—, Scarlet *Anagallis arvensis*
—, Yellow *Taenidia integerrima*
Pin-clover *Erodium cicutarium*
Pindo Palm *Butia odorata*
Pine Lily *Lilium catesbyi*
Pine, Eastern White ***Pinus** strobus*
—, Jersey *P. virginiana*
—, Loblolly *P. taeda*
—, Longleaf *P. palustris*
—, Marsh *P. serotina*
—, Old Field *P. taeda*
—, Pocosin *P. serotina*
—, Pond *P. serotina*
—, Rosemary *P. echinata*
—, Sand *P. clausa*
—, Scrub *P. virginiana*
—, Shortleaf *P. echinata*
—, Slash *P. elliottii*
—, Southern *P. palustris*
—, Spruce *P. glabra*
—, Virginia *P. virginiana*
—, Walter's *P. glabra*
—, Yellow *P. echinata*
—, Yew Plum *Podocarpus macrophyllus*
Pineapple Mint *Mentha suaveolens**
Pine-barren Aster *Oclemena reticulata*
Pinebarren Sedge *Carex turgescens*
Pinebarren Sunrose *Crocanthemum corymbosum*
Pinebarren Tick-trefoil *Desmodium strictum*
Pinehill Bluestem *Schizachyrium scoparium**
Pineland Agalinis *Agalinis divaricata*
Pineland Agrimony *Agrimonia incisa*
Pineland Beaksedge *Rhynchospora perplexa*
Pineland Beard Grass *Gymnopogon brevifolius*
Pineland Bogbutton *Lachnocaulon digynum*
Pineland Catchfly *Polanisia tenuifolia*
Pineland Daisy *Chaptalia tomentosa*
Pineland Dyschoriste *Dyschoriste oblongifolia*
Pineland Flatsedge *Cyperus retrorsus*
Pineland Hedge-hyssop *Sophronanthe hispida*
Pineland Marbleseed *Lithospermum virginianum*
Pineland Milkweed *Asclepias obovata*
Pineland Nailwort *Paronychia patula*
Pineland Phlox *Phlox nivalis**
Pineland Pinweed *Lechea sessiliflora*
Pineland Skeleton Grass *Gymnopogon brevifolius*
Pineland St. John's-wort *Hypericum suffruticosum*
Pineland Thistle *Cirsium horridulum**
Pineland Tick-trefoil *Desmodium strictum*
Pineland Triodia *Tridens ambiguus*
Pineland Wild-petunia *Ruellia pinetorum*
Pineland Wingstem *Pterocaulon pycnostachyum*
Pineland Yellow-eyed-grass *Xyris caroliniana*
Pineland-cress, Sessile-leaf *Warea sessilifolia*
Pineland-ginseng *Tetragonotheca helianthoides*
Pineland-Turnip *Pediomelum canescens*
Pinesap, Appalachian Red ***Hypopitys** lanuginosa*
—, Common Eastern *H. species 3*
—, Hairy *H. lanuginosa*
Pineweed *Hypericum gentianoides*
Pineywoods Coneflower *Rudbeckia heliopsidis*
Pineywoods Dropseed *Sporobolus junceus*
Pineywoods Goldenrod, Hairy ***Solidago** fistulosa*
—, Leafy *S. tortifolia*
Pineywoods Oxeye *Heliopsis gracilis*
Pink Baby's-breath *Talinum paniculatum*
Pink Eupatorium *Fleischmannia incarnata*
Pink Lady's-slipper *Cypripedium acaule*
Pink Laurel *Rhododendron catawbiense*
Pink Lotus *Nelumbo nucifera*
Pink Milkwort *Polygala incarnata*
Pink Moonvine *Ipomoea macrorhiza*
Pink Rain-lily *Zephyranthes minuta*
Pink Redstem *Ammannia latifolia*
Pink Sandhill Lupine *Lupinus villosus*
Pink Spring-cress *Cardamine douglassii*
Pink Sundew *Drosera capillaris*
Pink Thoroughwort *Fleischmannia incarnata*
Pink Valerian *Valeriana pauciflora*
Pink, Childing *Petrorhagia prolifera*
—, Cottage ***Dianthus** plumarius**
—, Deptford *D. armeria**
—, Election ***Rhododendron** periclymenoides*
—, Election *R. prinophyllum*
—, Garden ***Dianthus** plumarius**
—, Grass *D. plumarius**
—, Proliferous *Petrorhagia prolifera*
Pink-head Knotweed *Persicaria capitata*
Pink-ladies *Oenothera speciosa*
Pinkqueen *Tarenaya species 1*
Pinkroot ***Spigelia** marilandica*
—, Alabama *S. alabamensis*
—, Gentian *S. gentianoides*
Pinkweed *Persicaria pensylvanica*
Pinnate-leaf Coneflower *Rudbeckia triloba**
Pinweed, Appalachian ***Lechea** racemulosa*
—, Hairy *L. mucronata*
—, Narrowleaf *L. tenuifolia*
—, Pineland *L. sessiliflora*
—, Sandhill *L. torreyi**
—, Southern Hairy *L. pulchella**
—, Thymeleaf *L. minor*
Pinxterbloom Azalea ***Rhododendron** periclymenoides*
Pinxterflower *R. periclymenoides*
Pipes, Appalachian Pigmy *Monotropsis odorata*
—, Indian *Monotropa uniflora*
Pipestem *Agarista populifolia*
Pipevine ***Isotrema** macrophyllum*
— *I. tomentosum*
Pipewort, Common Ten-angled ***Eriocaulon** decangulare**
—, Panhandle *E. decangulare**
—, Soft-headed *E. compressum*
Pipsissewa *Chimaphila maculata*
Piriqueta, Carolina *Piriqueta caroliniana*
Pissabed *Houstonia caerulea*
Pistachio, Chinese *Pistacia chinensis*
Pitcherplant, Alabama ***Sarracenia** alabamensis**
—, Alabama Canebrake *S. alabamensis**
—, Crimson *S. leucophylla*
—, Green *S. oreophila*
—, Pale *S. alata*
—, Parrot *S. psittacina*
—, Rose *S. rosea*
—, Wherry's *S. alabamensis**
—, Whitetop *S. leucophylla*
—, Yellow *S. flava*
Pitchfork Crown Grass ***Paspalum** bifidum*
Pitchfork Paspalum *P. bifidum*
Pitscale Grass *Mnesithea granularis*
Pitted Bluestem *Bothriochloa pertusa*
Pitted Jointgrass *Mnesithea tessellata*
Pitted Nutrush *Scleria muehlenbergii*
Pittosporum, Japanese *Pittosporum tobira*
Plains Bluehearts *Buchnera americana*
Plains Coreopsis *Coreopsis tinctoria**
Plains Lovegrass *Eragrostis intermedia*
Plains Winecup *Callirhoe alcaeoides*
Planer-tree *Planera aquatica*
Plane-tree *Platanus occidentalis**
Plantain Pussytoes *Antennaria plantaginifolia*
Plantain, American ***Plantago** rugelii*
—, Blackseed *P. rugelii*
—, Broad-leaved *P. rugelii*
—, Buckhorn *P. aristata*
—, Buckhorn *P. coronopus*
—, Common *P. major*
—, English *P. lanceolata*
—, Heartleaf *P. cordata*
—, Hoary *P. virginica*
—, Largebracted *P. aristata*
—, Little *P. pusilla*
—, Many-seeded *P. heterophylla*
—, Narrowleaf *P. lanceolata*
—, Rugel's *P. rugelii*
—, Slender *P. heterophylla*
—, Small *P. heterophylla*
—, Virginia *P. virginica*
—, Woolly *P. patagonica*
—, Wright's *P. wrightiana*
Plantainleaf Sedge *Carex plantaginea*
Plantain-lily, Blue *Hosta ventricosa*
Platanillo *Canna indica*
Plateau Beardtongue *Penstemon tenuiflorus*
Pleated Snowdrop *Galanthus plicatus**
Pluchea, Camphor *Pluchea camphorata*
Plukenet's Flatsedge *Cyperus plukenetii*
Plukenet's Agalinis *Agalinis plukenetii*
Plum Pine, Yew *Podocarpus macrophyllus*
Plum, American Wild ***Prunus** americana*
—, Big-tree *P. mexicana*
—, Cherry *P. cerasifera*
—, Chickasaw *P. angustifolia*
—, European *P. domestica*
—, Flatwoods *P. umbellata*
—, Flowering *P. cerasifera*
—, Hog *P. umbellata*
—, Mexican *P. mexicana*
—, Munson *P. munsoniana*
—, Munson's *P. munsoniana*

*Common name applies to a subspecies or variety of this species.

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—, Ogeechee *Nyssa ogeche*
—, Purpleleaf ***Prunus*** *cerasifera*
—, Sandhill *P. angustifolia*
—, Wild-goose *P. munsoniana*
Plumed Beaksedge *Rhynchospora plumosa*
Plumleaf Azalea *Rhododendron prunifolium*
Pocosin Bayberry *Morella caroliniensis*
Pocosin Flat-topped Aster *Doellingeria sericocarpoides*
Pocosin Pine *Pinus serotina*
Pocosin Sedge *Carex striata**
Poet's Narcissus *Narcissus poeticus*
Pogonia, Appalachian Dragonhead *Cleistesiopsis bifaria*
—, Large Whorled *Isotria verticillata*
—, Nodding *Triphora trianthophoros**
—, Rose *Pogonia ophioglossoides*
—, Small Dragonhead *Cleistesiopsis oricamporum*
Po'ha *Physalis peruviana*
Pointed Flatsedge *Cyperus acuminatus*
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Poison Oak *T. pubescens*
—, Southeastern *T. pubescens*
Poison Sumac *T. vernix*
Poison-bean *Sesbania drummondii*
Poison-hemlock *Conium maculatum*
Poke Milkweed *Asclepias exaltata*
Pokeweed, Common ***Phytolacca*** *americana*
—, Maritime *P. rigida*
Polecat-geranium *Lantana montevidensis*
Polypody, Golden *Phlebodium aureum*
—, Scaly *Pleopeltis michauxiana*
Polypremum *Polypremum procumbens*
Pomegranate *Punica granatum*
Pond Axil-flower *Mecardonia acuminata**
Pond Bluestar ***Amsonia*** *glaberrima*
— *A. rigida*
Pond Lovegrass *Eragrostis japonica*
Pond Pine *Pinus serotina*
Pond Water-starwort *Callitriche stagnalis*
Pondberry *Lindera melissifolia*
Pond-cypress *Taxodium ascendens*
Pond-nuts *Nelumbo lutea*
Pondshore Croton *Croton elliottii*
Pondshore Seedbox *Ludwigia arcuata*
Pondweed, American ***Potamogeton*** *nodosus*
—, Bigleaf *P. amplifolius*
—, Clasping-leaf *P. perfoliatus*
—, Curled *P. crispus*
—, Curly *P. crispus*
—, Fern *P. robbinsii*
—, Flatleaf *P. robbinsii*
—, Heartleaf *P. pulcher*
—, Horned *Zannichellia palustris*
—, Illinois ***Potamogeton*** *illinoensis*
—, Leafy *P. foliosus**
—, Longleaf *P. nodosus*
—, Perfoliate *P. perfoliatus*
—, Ribbonleaf *P. epihydrus*
—, Slender *P. berchtoldii**
—, Small *P. pusillus*
—, Southern Snailseed *P. diversifolius*
—, Spotted *P. pulcher*
—, Waterthread *P. diversifolius*
Ponyfoot, Carolina ***Dichondra*** *carolinensis*
—, Small-flowered *D. micrantha*
Pool-sprite *Gratiola amphiantha*
Poor Man's Pepper *Lepidium virginicum**
Poorjoe *Hexasepalum teres*
Poorland Flatsedge *Cyperus compressus*
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Popcorn Tree *Triadica sebifera*
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—, Lombardy *P. nigra*
—, Silver *P. alba*
—, Southern Yellow *Liriodendron tulipifera**
—, White *Populus alba*
—, Yellow *Liriodendron tulipifera**
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—, Common *P. somniferum*
—, Corn *P. rhoeas*
—, Field *P. rhoeas*
—, Long-headed *P. dubium*
—, Opium *P. somniferum*
—, Red *P. rhoeas*
—, Rough *Roemeria hispida*
—, Shirley *Papaver rhoeas*
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—, Pale *C. alcaeoides*
—, Sand *C. triangulata*
—, Woods *C. papaver*
Porcelain-berry *Ampelopsis glandulosa*
Porter's Flatsedge *Cyperus lancastriensis*
Porter's Goldenrod *Solidago porteri*
Possession-vine *Convolvulus arvensis*
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Possum-haw *Ilex decidua*
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—, Swamp *Q. similis*
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—, Irish *S. tuberosum*
—, Sweet *Ipomoea batatas*
—, White *Solanum tuberosum*
—, Wild Sweet *Ipomoea pandurata*
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Pot-o'-gold Lily *Lilium iridollae*
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Poverty Brome *Bromus sterilis*
Poverty Dropseed *Sporobolus vaginiflorus*
Poverty Oat-grass *Danthonia spicata*
Poverty Rush ***Juncus*** *tenuis*
—, Greater *J. anthelatus*
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Powdery Alligator-flag ***Thalia*** *dealbata*
Powdery Thalia *T. dealbata*
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Prairie Agalinis *Agalinis heterophylla*
Prairie Anemone ***Anemone*** *caroliniana*
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Prairie Azure Sage *Salvia azurea**
Prairie Bishop *Atrema americanum*
Prairie Blue Wild Indigo, Eastern *Baptisia aberrans*
Prairie Bluehearts *Buchnera americana*
Prairie Bluet *Houstonia nigricans**
Prairie Broomrape *Myzorrhiza ludoviciana*
Prairie Broomweed *Amphiachyris dracunculoides*
Prairie Celestial *Nemastylis geminiflora*
Prairie Coneflower, Columnar ***Ratibida*** *columnifera*
—, Globular *R. pinnata*
Prairie Cupgrass *Eriochloa contracta*
Prairie Dodder *Cuscuta campestris*
Prairie False Oats *Sphenopholis interrupta*
Prairie Gaillardia ***Gaillardia*** *aestivalis**
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Prairie Grass-leaved Aster *Eurybia hemispherica*
Prairie Groundsel *Packera plattensis*
Prairie Iris *Iris savannarum*
Prairie Junegrass *Koeleria macrantha*
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Prairie Lion's-foot *Nabalus barbatus*
Prairie Milkweed *Asclepias hirtella*
Prairie Mimosa *Desmanthus illinoensis*
Prairie Pepperweed *Lepidium densiflorum*
Prairie Pleatleaf *Nemastylis geminiflora*
Prairie Purple Coneflower *Echinacea simulata*
Prairie Ragwort *Packera plattensis*
Prairie Rock-pink *Phemeranthus parviflorus*
Prairie Rose, Climbing *Rosa setigera*
Prairie Rosinweed *Silphium integrifolium**
Prairie Sage *Artemisia ludoviciana*
Prairie Scorpion-weed *Phacelia strictiflora**
Prairie Spurge *Euphorbia spathulata*
Prairie Thistle *Cirsium carolinianum*
Prairie Three-awn *Aristida oligantha*
Prairie Trillium ***Trillium*** *recurvatum*
Prairie Wake-robin *T. recurvatum*
Prairie Wedgegrass *Sphenopholis obtusata*
Prairie Willow ***Salix*** *humilis*
—, Dwarf *S. occidentalis*
Prairie-clover, Cahaba ***Dalea*** *cahaba*
—, Cedar Glade *D. foliosa*
—, Gattinger's *D. gattingeri*
—, Leafy *D. foliosa*
—, Purple *D. purpurea*
—, White *D. candida*
Prairie-dock *Silphium terebinthinaceum*
Prairie-gentian *Eustoma exaltatum*
Prairie-parsley *Polytaenia nuttallii*
Prairie-tea *Croton monanthogynus*
Prairie-trefoil, Western *Acmispon americanus*
Prairie-Turnip, Eastern *Pediomelum canescens*
Preacher John *Arisaema quinatum*
Pregnant Sedge *Carex intumescens**
Pretty Dodder *Cuscuta indecora*
Pretty Honeysuckle *Lonicera bella*
Price's Potato-bean *Apios priceana*
Prickly Bog Sedge ***Carex*** *atlantica*
— *C. howei*
Prickly Clover *Trifolium echinatum*
Prickly Gooseberry *Ribes cynosbati*
Prickly Lettuce *Lactuca serriola*
Prickly Sida *Sida spinosa*
Prickly Sow-thistle *Sonchus asper*
Prickly Spiderflower *Tarenaya aculeata*
Prickly-ash *Aralia spinosa*
—, Northern ***Zanthoxylum*** *americanum*
—, Southern *Z. clava-herculis*
Prickly-mallow *Sida spinosa*
Prickly-pear ***Opuntia*** *mesacantha**
—, Common Eastern *O. cespitosa*
—, Dune *O. drummondii*
—, Florida *O. austrina*
—, Little *O. drummondii*
—, Sand-bur *O. drummondii*
—, Shell Midden *O. stricta**
—, Texas *O. lindheimeri*
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—, White *A. albiflora**
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Pride-of-the-peak *Platanthera peramoena*
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Primrose-peerless *Narcissus medioluteus*
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—, Floating *L. peploides**
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Prince's-plume *P. orientalis*
Princess Tree *Paulownia tomentosa*
Princess-feather *Persicaria orientalis*
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—, Broadleaf *L. lucidum*
—, California *L. ovalifolium*
—, Chinese *L. sinense*
—, Common *L. vulgare*
—, Glossy *L. lucidum*
—, Japanese *L. japonicum*
—, Waxy-leaf *L. quihoui*
Procession-flower *Polygala incarnata*
Proliferous Pink *Petrorhagia prolifera*
Prolific Knotweed *Polygonum prolificum*
Proso Millet *Panicum miliaceum**

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Prostrate Bog-Clubmoss *Lycopodiella prostrata*
Prostrate Pigweed *Amaranthus blitoides*
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Prostrate Vervain *Verbena bracteata*
Prune-fruited Sedge *Carex corrugata*
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—, Hoary *L. canescens*
—, Red *Sanguinaria canadensis*
Puck's Orpine *Sedum pusillum*
Puerto Rican Witchgrass *Dichanthelium portoricense**
Pull-and-be-damned *Paspalum denticulatum*
Pumpkin ***Cucurbita*** *maxima*
— *C. pepo*
Pumpkin Ash *Fraxinus profunda*
Punctatum *Rhododendron minus*
Puncture-weed *Tribulus terrestris*
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— *A. cruentus*
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Purple Balduina *Balduina atropurpurea*
Purple Bedstraw *Galium latifolium*
Purple Bladderwort *Utricularia purpurea*
Purple Bluestem *Andropogon cretaceus*
Purple Chokeberry *Aronia prunifolia*
Purple Cliff-brake *Pellaea atropurpurea*
Purple Cockle *Agrostemma githago**
Purple Coneflower, Eastern ***Echinacea*** *purpurea*
—, Pale *E. pallida*
—, Prairie *E. simulata*
Purple Cress *Cardamine douglassii*
Purple Dead-nettle *Lamium purpureum*
Purple Dewdrop *Lobelia puberula*
Purple Flowering-raspberry *Rubacer odoratum*
Purple Fringeless Orchid *Platanthera peramoena*
Purple Honeycomb-head *Balduina atropurpurea*
Purple Loosestrife *Lythrum salicaria*
Purple Lovegrass *Eragrostis spectabilis*
Purple Meadow-parsnip *Thaspium trifoliatum**
Purple Meadowrue *Thalictrum dasycarpum*
Purple Moonflower *Ipomoea muricata*
Purple Nutsedge *Cyperus rotundus*
Purple Passionflower *Passiflora incarnata*
Purple Phacelia *Phacelia bipinnatifida*
Purple Prairie-clover *Dalea purpurea*
Purple Rocket *Iodanthus pinnatifidus*
Purple Sandgrass *Triplasis purpurea**
Purple Sand-spurrey *Spergularia rubra*
Purple Savanna Milkweed *Asclepias rubra*
Purple Shamrock *Oxalis triangularis*
Purple Silkyscale *Anthenantia rufa*
Purple Spikerush *Eleocharis atropurpurea*
Purple Spire Orchid *Platanthera peramoena*
Purple Star-thistle *Centaurea calcitrapa*
Purple Stemodia *Stemodia durantifolia*
Purple Toadshade ***Trillium*** *cuneatum*
Purple Trillium *T. erectum**
Purple Turtlehead *Chelone obliqua**
Purple Wen-dock *Brasenia schreberi*
Purpleheart *Tradescantia pallida*
Purpleleaf Plum *Prunus cerasifera*
Purple-node Joe-pye-weed *Eutrochium purpureum**
Purplequeen *Tradescantia pallida*
Purple-stem Aster *Symphyotrichum puniceum**
Purplestem Beggar-ticks *Bidens connata*
Purpletop Tridens *Tridens flavus*
Purpletop Vervain *Verbena incompta*
Pursh's Rattlebox *Crotalaria purshii*
Pursh's Wild-petunia *Ruellia purshiana*
Purslane, Broadleaf Pink ***Portulaca*** *amilis*
—, Common *P. oleracea*
—, Cultivated *P. grandiflora*
—, Garden *P. oleracea*
Pursley *P. oleracea*
Pussley *P. oleracea*
Pussytoes, Big-head ***Antennaria*** *parlinii**
—, Parlin's *A. parlinii**
—, Plantain *A. plantaginifolia*
—, Southern Single-head *A. solitaria*
Puttyroot *Aplectrum hyemale*
Pygmy Starwort *Cerastium parvum*
Pygmyweed *Crassula aquatica*
Pyramid Magnolia *Magnolia pyramidata*
Quackgrass *Elymus repens*
Quailplant *Heliotropium curassavicum**
Quaker Bittercress *Cardamine pensylvanica*
Quaker Ladies *Houstonia caerulea*
Quaking Grass, Lesser *Briza minor*
Quamash Lily *Camassia scilloides*
Quarterman's Hedge-hyssop *Gratiola quartermaniae*
Queen-Anne's-lace ***Daucus*** *carota**
—, American *D. pusillus*
Queendevil *Hieracium gronovii*
Queen's-delight *Stillingia sylvatica*
Queen's-jewels *Antigonon leptopus*
Quelite *Atriplex mucronata*
Quelite Espinoso *Amaranthus spinosus*
Quercitron *Quercus velutina*
Quicksilver-weed *Thalictrum dioicum*
Quickweed *Galinsoga quadriradiata*
Quill Sedge *Carex tenera*
Quillwort, Appalachian ***Isoetes*** *appalachiana*
—, Blackfoot *I. melanopoda**
—, Boom's *I. boomii*
—, Butler's *I. butleri*
—, Carolina *I. valida*
—, Eastern Blackfoot *I. melanopoda**
—, Louisiana *I. louisianensis*
—, Mountain *I. valida*
—, Piedmont *I. piedmontana*
—, Winged Florida *I. flaccida*
—, Wintergreen *I. hyemalis*
Quillwort-leaved Yellow-eyed-grass *Xyris isoetifolia*
Quince, "Fruiting" ***Cydonia*** *oblonga*
—, Common *C. oblonga*
—, Common Flowering *Chaenomeles speciosa*
—, Edible *Cydonia oblonga*
Rabbit Tobacco, Red-tipped *Laphangium luteoalbum*
Rabbitbells ***Crotalaria*** *maritima*
— *C. rotundifolia*
Rabbiteye Blueberry *Vaccinium virgatum*
Rabbitfoot Clover *Trifolium arvense*
Rabbit-tobacco, Eastern ***Pseudognaphalium*** *obtusifolium*
—, Fragrant *P. obtusifolium*
—, Gulf Coast *Diaperia verna**
—, Heller's *Pseudognaphalium helleri*
Raccoon-grape *Ampelopsis cordata*
Racemed Milkwort *Polygala polygama*
Raceweed *Galinsoga quadriradiata*
Radiant Trillium *Trillium species 4*
Radish ***Raphanus*** *sativus*
—, Garden *R. sativus*
—, Wild *R. raphanistrum**
Rafinesque's Seedbox *Ludwigia hirtella*
Ragged Eupatorium *Eupatorium pilosum*
Ragged Fringed Orchid ***Platanthera*** *lacera*
Ragged Orchid *P. lacera*
Ragweed, Common ***Ambrosia*** *artemisiifolia*
—, Giant *A. trifida**
—, Lanceleaf *A. bidentata*
—, Perennial *A. psilostachya*
Ragwort, Appalachian ***Packera*** *anonyma*
—, Balsam *P. paupercula**
—, Crawford's *P. crawfordii*
—, Golden *P. aurea*
—, Heartleaf *P. aurea*
—, Hempleaf *Senecio brasiliensis**
—, Prairie ***Packera*** *plattensis*
—, Roundleaf *P. obovata*
—, Running *P. obovata*
—, Small's *P. anonyma*
—, Smooth *P. glabella*
—, Woolly *P. dubia*
Railroad Vine *Ipomoea brasiliensis*
Rain-lily, Brazos ***Zephyranthes*** *chlorosolen*
—, Citron *Z. citrina*
—, Evening *Z. chlorosolen*
—, Fall *Z. candida*
—, Pink *Z. minuta*
Ramie *Boehmeria nivea*
Ramps ***Allium*** *tricoccum*
—, Narrow-leaf *A. burdickii*
—, Red *A. tricoccum*
—, White *A. burdickii*
Rampscallions *A. tricoccum*
Ramtilla *Guizotia abyssinica*
Rape ***Brassica*** *napus*
—, Field *B. rapa*
Raspberry, Black ***Rubus*** *occidentalis*
—, Wine *R. phoenicolasius*
Rat-ear *Peperomia pellucida*
Rat's Bane *Chimaphila maculata*
Rat-tail Fescue *Festuca myuros*
Rat-tail Vervain *Stachytarpheta jamaicensis*
Rattlebox ***Sesbania*** *drummondii*
— *S. punicea*
—, Coastal Plain ***Crotalaria*** *purshii*
—, Common *C. sagittalis*
—, Lanceleaf *C. lanceolata*
—, Low *C. maritima*
—, Low *C. rotundifolia*
—, Pursh's *C. purshii*
—, Showy *C. spectabilis*
—, Slenderleaf *C. ochroleuca*
—, Smooth *C. pallida**
—, Velvety *C. incana*
Rattlesnake Fern *Botrypus virginianus*
Rattlesnake Weed *Hieracium venosum*
Rattlesnake-master *Agave virginica*
—, Northern ***Eryngium*** *yuccifolium**
—, Southern *E. yuccifolium**
Rattlesnake-root, Barbed ***Nabalus*** *barbatus*
—, Flatwoods *N. barbatus*
—, Rough *N. asper*
—, Tall *N. altissimus*
Rattlesnakeweed *Daucus pusillus*
Rattlesnake-weed *Stachys floridana*
Ravenel's Hawthorn *Crataegus ravenelii*
Ravenel's Witchgrass *Dichanthelium ravenelii*
Ravenfoot Sedge *Carex crus-corvi*
Rayless Mock-goldenrod *Solidago discoidea*
Rayless Sunflower *Helianthus radula*
Rayless-Goldenrod ***Bigelowia*** *nudata*
—, Glade *B. nuttallii*
—, West Gulf Coastal Plain *B. nuttallii*
Recurved Trillium *Trillium recurvatum*
Red Amaranth *Amaranthus cruentus*
Red Ash *Fraxinus pennsylvanica*
Red Bay *Tamala borbonia*
Red Birch *Betula nigra*
Red Buckeye *Aesculus pavia**
Red Cedar, Coastal ***Juniperus*** *silicicola*
—, Eastern *J. virginiana*
—, Southern *J. silicicola*
Red Chokeberry *Aronia arbutifolia*
Red Clover *Trifolium pratense*
Red Dead-nettle *Lamium purpureum*
Red Dock *Rumex acetosella**
Red Duckweed *Lemna turionifera*
Red Elm *Ulmus rubra*
Red Fescue *Festuca rubra*
Red Flag *Iris fulva*

*Common name applies to a subspecies or variety of this species.

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Red Flax *Linum grandiflorum*
Red Grape *Vitis palmata*
Red Gum *Liquidambar styraciflua*
Red Hickory *Carya ovalis*
Red Hills Azalea *Rhododendron colemanii*
Red Hills Violet *Viola palmata**
Red Jute *Corchorus hirtus*
Red Knotgrass *Polygonum patulum*
Red Lovegrass *Eragrostis oxylepis*
Red Mint Shrub *Clinopodium coccineum*
Red Moneywort *Alysicarpus vaginalis*
Red Moonseed *Nephroia carolina*
Red Morning-glory *Ipomoea coccinea*
Red Mountain Hawthorn *Crataegus venusta*
Red Mulberry *Morus rubra*
Red Oak ***Quercus** rubra**
—, Southern *Q. falcata*
—, Texas *Q. texana*
Red Orach *Atriplex rosea*
Red Poppy *Papaver rhoeas*
Red Puccoon *Sanguinaria canadensis*
Red Ramps *Allium tricoccum*
Red Sesban *Sesbania punicea*
Red Spider Lily *Lycoris radiata**
Red Spiderling *Boerhavia diffusa*
Red Sprangletop *Dinebra panicea**
Red Three-awn *Aristida purpurea**
Red Trillium ***Trillium** erectum**
—, Southern *T. sulcatum*
—, White-flowered *T. erectum**
Red Wood Lettuce *Lactuca hirsuta*
Red-berried Swamp Smilax *Smilax walteri*
Redbud, Eastern *Cercis canadensis*
Redhead Grass *Potamogeton perfoliatus*
Red-hot-poker *Polygala lutea*
Red-margined Atamasco-lily *Zephyranthes simpsonii*
Redpod Rush *Juncus trigonocarpus*
Redring Milkweed *Asclepias variegata*
Redroot *Amaranthus retroflexus*
— *Lachnanthes caroliniana*
Redroot Amaranth *Amaranthus retroflexus*
Redrooted Flatsedge *Cyperus erythrorhizos*
Red-seeded Dandelion *Taraxacum erythrospermum*
Redstem Filaree *Erodium cicutarium*
Redtip, Taiwanese *Photinia serratifolia*
Red-tipped Rabbit Tobacco *Laphangium luteoalbum*
Redtop *Agrostis gigantea*
— *Tridens flavus*
Redtop Panic Grass *Coleataenia rigidula**
Redtop, Tall *Tridens flavus*
Red-veined Dock *Rumex sanguineus*
Redvine *Brunnichia ovata*
Reed Canary-grass *Phalaris arundinacea*
Reedgrass, Nuttall's *Greeneochloa coarctata*
Reek-kudzu *Pouzolzia zeylanica*
Reflexed Flatsedge *Cyperus refractus*
Reflexed Sedge *Carex retroflexa*
Reimar Grass *Paspalum eglume*
Relict Trillium *Trillium reliquum*
Rescue Grass *Bromus catharticus**
Resinous Sunflower *Helianthus resinosus*
Resupinate Bladderwort *Utricularia resupinata*
Resurrection Fern *Pleopeltis michauxiana*
Retama *Parkinsonia aculeata*
Reversed Clover *Trifolium resupinatum*
Reznicek's Sedge *Carex reznicekii*
Rhode Island Bentgrass *Agrostis capillaris*
Rhodes Grass *Chloris gayana*
Rhododendron, Catawba ***Rhododendron** catawbiense*
—, Gorge *R. minus*
Rhombic Copperleaf *Acalypha rhomboidea*
Ribbed Melilot *Melilotus officinalis*
Ribbed Sedge *Carex virescens*
Ribbon Grass *Phalaris arundinacea*
Ribbonleaf Pondweed *Potamogeton epihydrus*
Rib-grass *Plantago lanceolata*
Rice *Oryza sativa*
Rice Cutgrass *Leersia oryzoides*
Rice-field Flatsedge *Cyperus iria*
Ricepaper-plant *Tetrapanax papyrifer*
Richard's Yellow-eyed-grass *Xyris jupicai*
Richardia, Tropical *Richardia brasiliensis*
Richweed *Collinsonia canadensis*
— *Pilea pumila*
Riddell's Spikemoss *Bryodesma arenicola**
Ridgestem Yellow Flax *Linum striatum*
Riffleweed *Podostemum ceratophyllum*
Ringed Witchgrass *Dichanthelium annulum*
Ringseed Rush *Juncus filipendulus*
Rio Grande Copperlily *Zephyranthes tubispatha*
River Birch *Betula nigra*
River Bulrush *Bolboschoenus fluviatilis*
River Cane *Arundinaria gigantea*
River Maple *Acer negundo**
River Oats *Chasmanthium latifolium*
River Scouring-Rush *Equisetum praealtum*
Riverbank Grape *Vitis riparia*
Riverbank Pimpernel ***Lindernia** monticola*
— *L. saxicola*
Riverswamp Nutrush *Scleria distans**
Riverweed *Podostemum ceratophyllum*
Roadside Sand-spurrey *Spergularia rubra*
Roanoke Witchgrass *Dichanthelium roanokense*
Robbins's Spikerush *Eleocharis robbinsii*
Robin's-plantain *Erigeron pulchellus**
Rock Alumroot *Heuchera villosa*
Rock Buttercup *Ranunculus micranthus*
Rock Chestnut Oak *Quercus montana*
Rock Clubmoss ***Huperzia** porophila*
Rock Firmoss *H. porophila*
Rock Muhly *Muhlenbergia sobolifera*
Rock Pellitory *Parietaria pensylvanica*
Rock Sandwort *Sabulina michauxii*
Rock Spikemoss *Bryodesma rupestre*
Rockcap Fern, Appalachian ***Polypodium** appalachianum*
—, Common *P. virginianum*
Rockcress, Canada ***Borodinia** canadensis*
—, Common Smooth *B. laevigata*
—, Georgia ***Arabis** georgiana*
—, Spreading *A. patens*
Rocket Larkspur *Delphinium ajacis*
Rocket-weed *Erucastrum gallicum*
Rockhouse Meadowrue *Thalictrum mirabile*
Rock-pink, Appalachian ***Phemeranthus** teretifolius*
—, Cedar-glade *P. calcaricus*
—, Large-flowered *P. mengesii*
—, Prairie *P. parviflorus*
—, Small-flowered *P. parviflorus*
Rockrose, Canada *Crocanthemum canadense*
Rocktwist *Draba ramosissima*
Rockweed *Pilea microphylla*
Rome Hawthorn *Crataegus aemula*
Romerillo *Bidens alba**
Rope-bark *Dirca palustris*
Rosa de Montana *Antigonon leptopus*
Rose Balsam *Impatiens balsamina*
Rose Bluet *Houstonia rosea*
Rose Campion *Silene coronaria*
Rose Clover *Trifolium hirtum*
Rose Fleabane *Pluchea baccharis*
Rose Glorybower *Clerodendrum bungei*
Rose Natalgrass *Melinis repens**
Rose Pitcherplant *Sarracenia rosea*
Rose Pogonia *Pogonia ophioglossoides*
Rose Verbena ***Glandularia** canadensis*
Rose Vervain *G. canadensis*
Rose, Carolina ***Rosa** carolina**
—, Cherokee *R. laevigata*
—, Chickasaw *R. bracteata*
—, Chinese *R. chinensis*
—, Climbing Prairie *R. setigera*
—, Damask *R. damascena*
—, Dog *R. canina*
—, Dorothy Perkins *R. lucieae*
—, Eglantine *R. rubiginosa**
—, French *R. gallica*
—, Lucie *R. lucieae*
—, McCartney *R. bracteata*
—, Memorial *R. lucieae*
—, Multiflora *R. multiflora*
—, Ozark *R. setigera*
—, Swamp *R. palustris*
—, Sweetbriar *R. rubiginosa**
Roseau-Cane *Phragmites karka*
Rose-gentian, Bartram's ***Sabatia** decandra*
—, Cumberland *S. capitata*
—, Lanceleaf *S. difformis*
—, Largeflower *S. grandiflora*
—, Large-leaf *S. macrophylla**
—, Savanna White *S. brevifolia*
Roseling, Common *Cuthbertia rosea*
Rose-mallow, Dixie Rose-mallow; Confederate ***Hibiscus** mutabilis*
—, Eastern *H. moscheutos*
—, Smooth *H. laevis*
—, Western *H. lasiocarpos*
Rosemary *Ceratiola ericoides*
Rosemary Pine *Pinus echinata*
Rosemary Sunrose *Crocanthemum rosmarinifolium*
Rosemary, Apalachicola *Conradina glabra*
—, Florida *Ceratiola ericoides*
—, Gray *Conradina canescens*
—, Marsh *Limonium carolinianum*
—, Sandhill *Ceratiola ericoides*
Rose-moss *Portulaca grandiflora*
Rose-of-Sharon *Hibiscus syriacus*
Rose-pink, Blackwater ***Sabatia** foliosa*
—, Coastal *S. calycina*
—, Narrowleaf *S. brachiata*
Rose-rush *Lygodesmia aphylla*
Roseshell Azalea *Rhododendron prinophyllum*
Rosinweed, Black Belt ***Silphium** confertifolium*
—, Carolina *S. compositum**
—, Cumberland *S. brachiatum*
—, Florida *S. compositum**
—, Old Cahaba *S. perplexum*
—, Prairie *S. integrifolium**
—, Shaggy *S. mohrii*
—, Sticky *S. glutinosum*
—, Tansy *S. pinnatifidum*
Rosy Meadowsweet *Spiraea tomentosa*
Rosy Sedge *Carex rosea*
Rosy Wake-robin *Trillium catesbyi*
Rosy-periwinkle *Catharanthus roseus*
Rotala, Dwarf *Rotala rotundifolia*
Rough Barnyard-grass *Echinochloa muricata**
Rough Bentgrass *Agrostis scabra*
Rough Blazing-star *Liatris aspera*
Rough Bluegrass *Poa trivialis**
Rough Cinquefoil *Potentilla norvegica*
Rough Clover *Trifolium scabrum*
Rough Dogtail *Cynosurus echinatus*
Rough Dropseed *Sporobolus clandestinus*
Rough Flatsedge *Cyperus retrofractus*
Rough Goldenrod *Solidago radula*
Rough Maidenhair *Adiantum hispidulum*
Rough Marsh-elder *Iva annua*
Rough Mexican-clover *Richardia scabra*
Rough Pea *Lathyrus hirsutus*
Rough Pennyroyal *Hedeoma hispida*
Rough Pigweed *Amaranthus retroflexus*
Rough Poppy *Roemeria hispida*
Rough Rattlesnake-root *Nabalus asper*
Rough Vervain *Verbena scabra*

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Rough Willowleaf Aster *Symphyotrichum praealtum**
Roughfruit Spermolepis *Spermolepis divaricata*
Rough-hairy Witchgrass ***Dichanthelium** strigosum**
Roughish Witchgrass *D. leucothrix*
Roughleaf Eupatorium *Eupatorium scabridum*
Roughleaf Sunflower *Helianthus strumosus*
Roughleaf Yellow-eyed-grass *Xyris scabrifolia*
Rough-pod Copperleaf *Acalypha ostryifolia*
Roughseed Buttercup *Ranunculus muricatus*
Round-fruit Hedge-hyssop *Gratiola virginiana*
Roundfruit St. John's-wort *Hypericum sphaerocarpum*
Round-fruited Witchgrass *Dichanthelium sphaerocarpon*
Round-headed Flatsedge *Cyperus echinatus*
Round-headed Lespedeza *Lespedeza capitata*
Round-headed Rush *Juncus validus*
Roundleaf Bluet *Houstonia procumbens*
Roundleaf Chaste-tree *Vitex rotundifolia*
Roundleaf Fire-pink *Silene rotundifolia*
Roundleaf Groundsel ***Packera** obovata*
Roundleaf Ragwort *P. obovata*
Roundleaf Sandmat *Euphorbia serpens*
Roundleaf Sundew *Drosera rotundifolia*
Roundleaf Sunflower *Helianthus radula*
Roundleaf Tick-trefoil *Desmodium rotundifolium*
Roundleaf Toothcup *Rotala rotundifolia*
Round-leaved Fluellen *Kickxia spuria*
Round-leaved Mint *Mentha suaveolens**
Round-lobed Hepatica ***Hepatica** americana*
Round-lobed Liverleaf *H. americana*
Royal Catchfly *Silene regia*
Royal Fern, American *Osmunda spectabilis*
Royal Flatsedge *Cyperus elegans*
Royal Lily *Lilium regale*
Royal Snoutbean *Rhynchosia cytisoides*
Ruby Falls Trillium *Trillium species 3*
Rue-anemone *Thalictrum thalictroides*
—, False *Enemion biternatum*
Rue-leaved Saxifrage *Saxifraga tridactylites*
Ruellia, Fringeleaf ***Ruellia** humilis*
—, Limestone *R. strepens*
Rufous Bulrush *Scirpus pendulus*
Rufous Mayhaw *Crataegus rufula*
Rugel's Plantain *Plantago rugelii*
Rugel's Nailwort *Paronychia rugelii*
Running Box *Mitchella repens*
Running Clubmoss *Lycopodium clavatum*
Running Five-fingers *Potentilla canadensis*
Running Oak *Quercus elliottii*
Running Ragwort *Packera obovata*
Running Witch-hazel *Hamamelis ovalis*
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—, Brown-fruited *J. pelocarpus*
—, Canadian *J. canadensis*
—, Chairmaker's *Schoenoplectus pungens**
—, Common ***Juncus** effusus**
—, Creeping *J. repens*
—, Diffuse *J. diffusissimus*
—, Elliott's *J. elliottii*
—, Flatrock *J. georgianus*
—, Forked *J. dichotomus*
—, Georgia *J. georgianus*
—, Grass-leaved *J. marginatus*
—, Greater Poverty *J. anthelatus*
—, Inland *J. interior*
—, Large Grass-leaved *J. biflorus*
—, Large Path *J. anthelatus*
—, Large-headed *J. megacephalus*
—, Leathery *J. coriaceus*
—, Lobe-headed *J. scirpoides**
—, Long's *J. longii*
—, Lop-sided *J. secundus*
—, Many-headed *J. polycephalos*
—, Path *J. tenuis*
—, Poverty *J. tenuis*
—, Redpod *J. trigonocarpus*
—, Ringseed *J. filipendulus*
—, Round-headed *J. validus*
—, Secund *J. secundus*
—, Seep *J. gymnocarpus*
—, Sharp-fruited *J. acuminatus*
—, Short-fruited *J. brachycarpus*
—, Slender *J. tenuis*
—, Slim-pod *J. diffusissimus*
—, Soft *J. effusus**
—, Stout *J. nodatus*
—, Stout *J. validus*
—, Swamp *J. paludosus*
—, Swaying *Schoenoplectus subterminalis*
—, Texas Plains ***Juncus** filipendulus*
—, Toad *J. bufonius*
—, Torrey's *J. torreyi*
—, Vigorous *J. validus*
—, Weak *J. debilis*
Rush-featherling *Pleea tenuifolia*
Rushfoil, Broadleaf ***Croton** willdenowii*
—, Glade *C. willdenowii*
—, Narrowleaf *C. michauxii*
—, Outcrop *C. willdenowii*
—, Sand *C. michauxii*
Russet-witch *Liparis liliifolia*
Russian Mulberry *Morus alba*
Russian Olive *Elaeagnus angustifolia*
Rustweed *Polypremum procumbens*
Rusty Black-haw *Viburnum rufidulum*
Rutabaga *Brassica napus*
Rydberg's Blazing-star *Liatris hirsuta*
Rye *Secale cereale*
Rye-brome *Bromus secalinus*
Rye-grass, Annual ***Lolium** multiflorum*
—, English *L. perenne*
—, Italian *L. multiflorum*
—, Perennial *L. perenne*
Sabatia, Four-angle ***Sabatia** quadrangula*
—, White *S. difformis*
Sacatrapo *Caperonia palustris*
Sacred-bamboo *Nandina domestica*
Sacred-lotus *Nelumbo nucifera*
Sadie Price's Yellow Wood-sorrel *Oxalis macrantha*
Sadie's Aster *Symphyotrichum kentuckiense*
Safflower *Carthamus tinctorius*
Sage, Azure ***Salvia** azurea**
—, Blood *S. coccinea*
—, Blue *S. azurea**
—, Chapman's *S. chapmanii*
—, Garden *S. officinalis*
—, Lyreleaf *S. lyrata*
—, Nettle-leaf *S. urticifolia*
—, Prairie *Artemisia ludoviciana*
—, Prairie Azure ***Salvia** azurea**
—, Scarlet *S. coccinea*
—, White *Artemisia ludoviciana*
Sago-palm *Cycas revoluta*
Sago-pondweed *Stuckenia pectinata*
Salad Burnet *Poterium sanguisorba**
Sallow Sedge *Carex lurida*
Salmon Tasselflower *Emilia fosbergii*
Salt Hay *Spartina patens*
Saltgrass *Distichlis spicata*
Saltmarsh Bulrush *Bolboschoenus robustus*
Saltmarsh Cordgrass *Spartina alterniflora*
Saltmarsh Finger-grass *Eustachys glauca*
Saltmarsh Fleabane *Pluchea odorata*
Saltmarsh Foxtail-grass *Setaria magna*
Saltmarsh Loosestrife *Lythrum lineare*
Saltmarsh Morning-glory *Ipomoea sagittata*
Saltmarsh Sand-spurrey *Spergularia marina*
Salt-marsh Water-hemp *Amaranthus cannabinus*
Saltmarsh-mallow *Kosteletzkya pentacarpos*
Saltweed, Tumbling *Atriplex rosea*
Saltwort *Batis maritima*
—, Dwarf *Salicornia bigelovii*
—, Southern *Salsola kali**
Salvinia, Giant *Salvinia molesta*
Sampson's-snakeroot, Western *Orbexilum pedunculatum*
Sand Barren Hawthorn *Crataegus quaesita**
Sand Bean, Annual ***Strophostyles** helvola*
—, Perennial *S. umbellata*
—, Small-flowered *S. leiosperma*
Sand Bittercress *Cardamine parviflora**
Sand Blackberry *Rubus cuneifolius*
Sand Croton *Croton glandulosus**
Sand Dayflower *Commelina erecta**
Sand Dropseed *Sporobolus cryptandrus*
Sand Heath *Ceratiola ericoides*
Sand Hickory *Carya pallida*
Sand Knotgrass *Paspalum vaginatum*
Sand Laurel Oak ***Quercus** hemisphaerica*
Sand Live Oak *Q. geminata*
Sand Lovegrass *Eragrostis trichodes*
Sand Milkweed *Asclepias amplexicaulis*
Sand Pine *Pinus clausa*
Sand Poppy-mallow *Callirhoe triangulata*
Sand Post Oak *Quercus margaretiae*
Sand Rushfoil *Croton michauxii*
Sand Spikemoss *Bryodesma arenicola**
Sand Spikerush *Eleocharis montevidensis*
Sand Three-awn *Aristida tuberculosa*
Sand Violet *Viola affinis*
Sandbar Lovegrass *Eragrostis frankii*
Sandbar Willow *Salix interior*
Sand-bur Prickly-pear *Opuntia drummondii*
Sandgrass, Purple ***Triplasis** purpurea**
—, Southern *T. americana*
Sandhill Balduina *Balduina angustifolia*
Sandhill Beaksedge *Rhynchospora megalocarpa*
Sandhill Bean *Phaseolus sinuatus*
Sandhill Beardtongue *Penstemon australis*
Sandhill Blazing-star *Liatris secunda*
Sandhill Bluestar *Amsonia ciliata*
Sandhill Bristly Locust *Robinia nana*
Sandhill Butterflyweed *Asclepias tuberosa**
Sandhill Ceanothus *Ceanothus microphyllus*
Sandhill Croton *Croton argyranthemus*
Sandhill Dropseed *Sporobolus junceus*
Sandhill Gaillardia ***Gaillardia** aestivalis**
—, Yellow *G. aestivalis**
Sandhill Goldenaster *Pityopsis pinifolia*
Sandhill Ground-cherry *Physalis arenicola*
Sandhill Hawthorn *Crataegus lassa**
Sandhill Honeycomb-head *Balduina angustifolia*
Sandhill Jointweed *Polygonella fimbriata*
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Sandhill Rosemary *Ceratiola ericoides*
Sandhill Sandspur *Cenchrus gracillimus*
Sandhill Spiderwort *Tradescantia roseolens*
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Sandhill Wild-buckwheat *Eriogonum tomentosum*
Sandhill Wild-petunia *Ruellia ciliosa*
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*Common name applies to a subspecies or variety of this species.

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—, Charming *C. blanda*
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—, Collins's *C. collinsii*
—, Common Brome *C. bromoides**
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—, Crawe's *C. crawei*
—, Crested *C. cristatella*
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—, Eastern Narrowleaf *C. amphibola*
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—, Fibrous-rooted *C. communis*
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—, Fox *C. vulpinoidea*
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—, Gray's *C. grayi*
—, Greater Straw *C. normalis*
—, Greene's *C. bullata**
—, Greenish-white *C. albolutescens*
—, Hairy-leaved *C. hirsutella*
—, Hammock *C. fissa**
—, Harper's *C. leptalea**
—, Hirsute *C. complanata*
—, Hitchcock's *C. hitchcockiana*
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—, James's *C. jamesii*
—, Joor's *C. joorii*
—, Kidney *C. reniformis*
—, Kral's *C. kraliana*
—, Large Stalk-grain *C. stipata**
—, Lazy *C. pigra*
—, Leavenworth's *C. leavenworthii*
—, Limestone Forest *C. superata*
—, Limestone Meadow *C. granularis*
—, Limestone Purple *C. purpurifera*
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—, Little-tooth *C. microdonta*
—, Long-fringed *C. crinita**
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—, Long-spiked Slender Woodland *C. digitalis**
—, Longstalk *C. pedunculata**
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—, Meadow *C. flaccosperma*
—, Mead's *C. meadii*
—, Meager *C. exilis*
—, Midland *C. mesochorea*
—, Midwestern Blunt Broom *C. sangamonensis*
—, Mitchell's *C. mitchelliana*
—, Muehlenberg's *C. muehlenbergii**
—, Muhlenberg's *C. muehlenbergii**
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—, Oval-leaved *C. cephalophora*
—, Painted *C. picta*
—, Parasol *C. umbellata*
—, Perennial Greenhead *Cyperus brevifolius*
—, Pinebarren ***Carex** turgescens*
—, Plantainleaf *C. plantaginea*
—, Pocosin *C. striata**
—, Pregnant *C. intumescens**
—, Prickly Bog *C. atlantica*
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—, Prune-fruited *C. corrugata*
—, Quill *C. tenera*
—, Ravenfoot *C. crus-corvi*
—, Reflexed *C. retroflexa*
—, Reznicek's *C. reznicekii*
—, Ribbed *C. virescens*
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—, Sallow *C. lurida*
—, Seersucker *C. plantaginea*
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—, Slender Woodland *C. digitalis**
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—, Southern White-tinged *C. albicans**
—, Southern Willdenow's *C. basiantha*
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—, Hairy *L. pilosa*
—, Harper's *L. maritima*
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—, Savanna *L. virgata*
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*Common name applies to a subspecies or variety of this species.

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—, Flaxleaf *S. linifolia*
—, Greatleaf *S. cordifolia*
—, Prickly *S. spinosa*
Side Saddle Flower *Sarracenia flava*
Side-oats Grama *Bouteloua curtipendula**
Signal-grass, Broadleaf *Urochloa platyphylla*
Silktree *Albizia julibrissin*
Silkworm Mulberry *Morus alba*
Silky Camellia *Stewartia malacodendron*
Silky Dogwood *Swida amomum*
Silky Dwarf Morning-glory *Evolvulus sericeus**
Silky Oat-grass *Danthonia sericea*
Silky Willow *Salix sericea*
Silkyscale, Green ***Anthenantia** villosa*
—, Purple *A. rufa*
Silver Bindweed *Convolvulus equitans*
Silver Bluestem *Bothriochloa torreyana*
Silver Croton *Croton argyranthemus*
Silver Dwarf Morning-glory *Evolvulus sericeus**
Silver Hair Grass *Aira caryophyllea*
Silver Maple *Acer saccharinum*
Silver Plume Grass *Erianthus alopecuroides*
Silver Poplar *Populus alba*
Silver Seaside Oxeye *Borrichia frutescens*
Silver Whitlow-wort *Paronychia argyrocoma*
Silverbell, Common ***Halesia** tetraptera*
—, Common Two-wing *H. diptera**
—, Little *H. carolina*
—, Mountain *H. tetraptera*
Silverberry, Autumn ***Elaeagnus** pungens*
—, Cherry *E. multiflora*
—, Spring *E. umbellata*
Silver-dollar *Lunaria annua*
Silver-lace-vine *Fallopia baldschuanica*
Silverleaf Croton *Croton punctatus*
Silverleaf Grape *Vitis aestivalis**
Silverleaf Nightshade *Solanum elaeagnifolium*
Silverleaf Violet *Viola hastata*
Silverleaf, Oriental *Elaeagnus umbellata*
Silverling *Baccharis halimifolia*
— *Paronychia argyrocoma*
Silver-pine *Diphasiastrum digitatum*
Silvery Cudweed *Gamochaeta argyrinea*
Silvery Lespedeza *Lespedeza hirta**
Silvery Spleenwort *Deparia acrostichoides*
Simmonds's Aster *Symphyotrichum simmondsii*
Simpler East Indian Holly Fern *Arachniodes simplicior*
Simpler's-joy *Verbena hastata*
Single-sorus Spleenwort *Asplenium monanthes*
Single-stemmed Everlasting *Gamochaeta simplicicaulis*
Singletary Pea *Lathyrus hirsutus*
Sister Hawthorn *Crataegus sororia*
Six-weeks Grass *Poa annua*
Skeg *Prunus domestica*
Skeleton Grass, Eastern ***Gymnopogon** ambiguus*
—, Pineland *G. brevifolius*
Skeletonplant, Florida *Lygodesmia aphylla*
Skullcap, Alabama ***Scutellaria** alabamensis*
—, Bottomland *S. nervosa*
—, Drummond's *S. drummondii**
—, Dwarf *S. parvula*
—, Georgia *S. glabriuscula*
—, Glade *S. leonardii*
—, Gulf *S. glabriuscula*
—, Hairy *S. elliptica**
—, Heartleaf *S. ovata**
—, Kentucky *S. elliptica**
—, Mad-dog *S. lateriflora*
—, Mellichamp's *S. mellichampii*
—, Narrowleaf *S. integrifolia*
—, Shale-barren *S. leonardii*
—, South American *S. racemosa*
—, Southern *S. australis*
—, Tall Blue *S. lateriflora*
—, Veined *S. nervosa*
Skunk Meadowrue *Thalictrum amphibolum*
Skunkvine *Paederia foetida*
Skunkweed *Croton texensis*
Slash Pine *Pinus elliottii*
Sleepy Catchfly *Silene antirrhina*
Sleepy Morning *Waltheria indica*
Slender Adder's-tongue *Ophioglossum nudicaule*
Slender Amaranth *Amaranthus viridis*
Slender Beaksedge *Rhynchospora gracilenta*
Slender Bladderwort *Utricularia subulata*
Slender Blazing-star *Liatris gracilis*
Slender Blue Flag ***Iris** prismatica*
Slender Blue Iris *I. prismatica*
Slender Bluestem *Schizachyrium tenerum*
Slender Bush-clover *Lespedeza virginica*
Slender Centaury *Centaurium tenuiflorum*
Slender Clubmoss *Pseudolycopodiella caroliniana*
Slender Copperleaf *Acalypha gracilens*
Slender Cottonweed *Froelichia gracilis*
Slender Crabgrass *Digitaria filiformis**
Slender Deutzia *Deutzia gracilis*
Slender Dwarf Morning-glory *Evolvulus alsinoides*
Slender Fimbry *Fimbristylis autumnalis*
Slender Flatsedge *Cyperus bipartitus*
Slender Foxtail Grass *Alopecurus myosuroides*
Slender Indiangrass *Sorghastrum elliottii*
Slender Knotweed *Duravia species 2*
Slender Loose-flowered Sedge *Carex gracilescens*
Slender Marsh-pink *Sabatia campanulata*
Slender Mountain-mint *Pycnanthemum tenuifolium*
Slender Muhly *Muhlenbergia tenuiflora*
Slender Naiad *Najas gracillima*
Slender Nutrush *Scleria minor*
Slender Plantain *Plantago heterophylla*
Slender Pondweed *Potamogeton berchtoldii**
Slender Rush *Juncus tenuis*
Slender Sandwort *Arenaria leptoclados*
Slender Sea-Purslane *Sesuvium maritimum*
Slender Sedge *Carex tenera*
Slender Sow-thistle *Sonchus tenerrimus*
Slender Spikegrass *Chasmanthium laxum*
Slender Spikerush *Eleocharis tenuis**
Slender Vetch *Vicia tetrasperma*
Slender Wedgegrass *Sphenopholis intermedia*
Slender Wild Basil *Clinopodium gracile*
Slender Woodland Sedge ***Carex** digitalis**
—, Long-spiked *C. digitalis**
—, Southern *C. digitalis**
Slenderleaf Agalinis *Agalinis tenuifolia*
Slenderleaf Clammyweed *Polanisia tenuifolia*
Slenderleaf Rattlebox *Crotalaria ochroleuca*
Slender-stemmed Witchgrass *Dichanthelium acuminatum**
Slickseed Fuzzy Bean *Strophostyles leiosperma*
Slim Amaranth *Amaranthus hybridus**
Slim-bristled Sandspur *Cenchrus brownii*
Slimflower Lovegrass *Eragrostis gangetica*
Slimleaf Pawpaw *Asimina spatulata*
Slimleaf Tick-trefoil *Desmodium tenuifolium*
Slim-pod Rush *Juncus diffusissimus*
Slippery Elm *Ulmus rubra*
Small Beaked Panic Grass *Coleataenia anceps**
Small Bentgrass *Agrostis hyemalis*
Small Bunched Beaksedge *Rhynchospora cephalantha**
Small Butterwort *Pinguicula pumila*
Small Cane *Arundinaria tecta*
Small Cluster Blueberry *Vaccinium tenellum*
Small Dragonhead Pogonia *Cleistesiopsis oricamporum*
Small Green Wood Orchid *Platanthera clavellata*
Small Ivyleaf Speedwell *Veronica sublobata*
Small Jack-in-the-pulpit *Arisaema pusillum*
Small Melilot *Melilotus indicus*
Small Nettle *Urtica urens*
Small Plantain *Plantago heterophylla*
Small Pondweed *Potamogeton pusillus*
Small Saltmeadow Cordgrass *Spartina patens*
Small Sea-Purslane *Sesuvium maritimum*
Small Solomon's-seal *Polygonatum biflorum**
Small Spearwort *Ranunculus pusillus*
Small Spikerush ***Eleocharis** minima*
— *E. parvula*
Small Swollen Bladderwort *Utricularia radiata*
Small Thyme-leaved Sandwort *Arenaria leptoclados*
Small Toadflax *Chaenorhinum minus**
Small Waterclover *Marsilea minuta*
Small White Aster *Symphyotrichum racemosum**
Small White Morning-glory *Ipomoea lacunosa*
Small White Oldfield Aster *Symphyotrichum racemosum**
Small Wood Sunflower *Helianthus microcephalus*
Small Yellow Lady's-slipper *Cypripedium parviflorum**
Small's Hackberry *Celtis smallii*
Small's Sweet Acacia *Vachellia densiflora*
Small's White Ash *Fraxinus smallii*
Small's Wood-sorrel *Oxalis colorea*
Small-flower Baby-blue-eyes *Nemophila aphylla*
Smallflower Ground-cherry *Physalis cinerascens**
Smallflower Halfchaff *Cyperus subsquarrosus*
Smallflower Hawksbeard *Crepis pulchra*
Smallflower Oxtongue *Picris pauciflora*
Smallflower Umbrella Sedge *Cyperus difformis*

*Common name applies to a subspecies or variety of this species.

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Smallflower Vetch *Vicia minutiflora*
Small-flowered Alexander Grass *Urochloa subquadripara*
Small-flowered Buckthorn *Sageretia minutiflora*
Small-flowered Buttercup ***Ranunculus*** *micranthus*
— *R. parviflorus*
Small-flowered Catchfly *Silene gallica*
Small-flowered Crane's-bill *Geranium pusillum*
Small-flowered Desert-Chicory *Pyrrhopappus pauciflorus*
Small-flowered Gaura *Oenothera curtiflora*
Small-flowered Lupine *Lupinus polycarpus*
Small-flowered Pawpaw *Asimina parviflora*
Small-flowered Ponyfoot *Dichondra micrantha*
Small-flowered Rock-pink *Phemeranthus parviflorus*
Small-flowered Sand Bean *Strophostyles leiosperma*
Small-flowered Seedbox *Ludwigia glandulosa*
Small-flowered White Meadow-beauty *Rhexia parviflora*
Small-fruited Pawpaw *Asimina parviflora*
Small-fruited Seedbox *Ludwigia microcarpa*
Small-fruited Witchgrass ***Dichanthelium*** *microcarpon*
— *D. polyanthes*
Small-head Blazing-star *Liatris microcephala*
Small-headed Beaksedge *Rhynchospora microcephala*
Small-headed Marsh-elder *Iva microcephala*
Small-headed Sunflower *Helianthus microcephalus*
Small-leaf Spiderwort ***Tradescantia*** *fluminensis*
— *T. mundula*
Small-leaf Viburnum *Viburnum obovatum*
Small-leaf Wandering Jew ***Tradescantia*** *fluminensis*
— *T. mundula*
Small-leaved Meadowrue *Thalictrum macrostylum*
Small-leaved Miterwort *Mitreola sessilifolia*
Small-leaved White Snakeroot *Ageratina aromatica*
Small-leaved Witchgrass *Dichanthelium ensifolium*
Small-leaved Witch-hazel *Hamamelis virginiana**
Small's Beaksedge *Rhynchospora pinetorum*
Small's Ragwort *Packera anonyma*
Small's Sanicle *Sanicula smallii*
Small's Spikerush *Eleocharis palustris*
Small's Yellow-eyed-grass *Xyris smalliana*
Smartweed, Common ***Persicaria*** *hydropiper*
—, Common *P. pensylvanica*
—, Creeping *P. longiseta*
—, Dense-flower *P. densiflora*
—, Dockleaf *P. lapathifolia*
—, Dotted *P. punctata*
—, Hairy *P. hirsuta*
—, Longbristle *P. longiseta*
—, Marshpepper *P. hydropiper*
—, Pale *P. lapathifolia*
—, Pennsylvania *P. pensylvanica*
—, Swamp *P. setacea*
—, Water *P. amphibia**
Smilax, Dwarf ***Smilax*** *pumila*
—, Red-berried Swamp *S. walteri*
Smith's Sunflower *Helianthus smithii*
Smoketree, American *Cotinus obovata*
Smoky Balm *Dicerandra fumella*
Smooth Alabama Hawthorn *Crataegus teres*
Smooth Alder *Alnus serrulata*
Smooth Amaranth *Amaranthus hybridus**
Smooth Arrow-wood *Viburnum recognitum*
Smooth Azalea *Rhododendron arborescens*
Smooth Beardtongue ***Penstemon*** *digitalis*
—, Eastern *P. laevigatus*
Smooth Blackberry *Rubus canadensis*
Smooth Blue Aster *Symphyotrichum laeve*
Smooth Bluestem *Andropogon virginicus**
Smooth Brome *Bromus inermis*
Smooth Bumelia *Sideroxylon reclinatum**
Smooth Bur-clover *Medicago polymorpha*
Smooth Buttonweed *Spermacoce glabra*
Smooth Carrionflower *Smilax herbacea*
Smooth Cat's-ear *Hypochaeris glabra*
Smooth Cliff-brake *Pellaea glabella**
Smooth Cordgrass *Spartina alterniflora*
Smooth Crab Grass *Digitaria ischaemum*
Smooth Distaff-thistle *Carthamus creticus*
Smooth Elmleaf Goldenrod ***Solidago*** *delicatula*
Smooth Goldenrod *S. gigantea*
Smooth Ground-cherry *Physalis angulata*
Smooth Groundsel *Packera glabella*
Smooth Heart-leaved Aster *Symphyotrichum lowrieanum*
Smooth Hedge-nettle *Stachys tenuifolia*
Smooth Hogweed *Boerhavia erecta*
Smooth Hydrangea *Hydrangea arborescens*
Smooth Jointgrass *Mnesithea tuberculosa*
Smooth Lesser Horse-gentian *Triosteum angustifolium**
Smooth Lipfern *Myriopteris alabamensis*
Smooth Loosestrife *Steironema quadriflorum*
Smooth Meadow-beauty *Rhexia alifanus*
Smooth Mountain-mint *Pycnanthemum nudum*
Smooth Muhly *Muhlenbergia glabrifloris*
Smooth Nutrush *Scleria ciliata**
Smooth Oak-leech *Aureolaria flava*
Smooth Oxeye *Heliopsis gracilis*
Smooth Phlox *Phlox glaberrima*
Smooth Pigweed *Amaranthus hybridus**
Smooth Ragwort *Packera glabella*
Smooth Rattlebox *Crotalaria pallida**
Smooth Rose-mallow *Hibiscus laevis*
Smooth Sawgrass *Cladium mariscoides*
Smooth Serviceberry *Amelanchier laevis*
Smooth Southern Bush-honeysuckle *Diervilla sessilifolia*
Smooth Spiderwort *Tradescantia ohiensis*
Smooth Squareflower *Paronychia erecta**
Smooth Sumac *Rhus glabra*
Smooth Sweet Cicely *Osmorhiza longistylis*
Smooth Tare *Vicia tetrasperma*
Smooth Tick-trefoil *Desmodium laevigatum*
Smooth Trailing Lespedeza *Lespedeza repens*
Smooth Wirestem Muhly *Muhlenbergia frondosa*
Smooth Woodmint *Blephilia subnuda*
Smooth Yellow Forest Violet *Viola eriocarpa*
Smooth-lipped Eulophia *Orthochilus ecristatus*
Smoothseed Milkweed *Asclepias perennis*
Smooth-sheathed Sedge *Carex laevivaginata*
Smoothstem Bedstraw *Galium orizabense**
Smut Grass *Sporobolus indicus*
Snailseed *Nephroia carolina*
Snakeberry *Potentilla indica*
Snakemouth *Pogonia ophioglossoides*
Snakeroot *Zigadenus glaberrimus*
—, Appalachian White *Ageratina roanensis*
—, Black ***Sanicula*** *canadensis**
—, Black *S. marilandica*
—, Broom *Amphiachyris dracunculoides*
—, Clustered *Sanicula odorata*
—, Common White *Ageratina altissima*
—, Florida ***Sanicula*** *canadensis**
—, Fragrant *S. odorata*
—, Small-leaved White *Ageratina aromatica*
—, Southern Senega *Polygala senega**
—, Virginia *Endodeca serpentaria*
—, Yellow-flowered *Sanicula odorata*
Snapdragon, Common *Antirrhinum majus*
—, Dwarf *Chaenorhinum minus**
Sneezeweed, Common ***Helenium*** *autumnale*
—, Savanna *H. pinnatifidum*
—, Shortleaf *H. brevifolium*
—, Southern *H. flexuosum*
Snorkelwort *Gratiola amphiantha*
Snoutbean, Broom ***Rhynchosia*** *cytisoides*
—, Dollarleaf *R. reniformis*
—, Erect *R. tomentosa*
—, Little *R. minima*
—, Royal *R. cytisoides*
Snow Squarestem *Melanthera nivea*
Snowbell, American ***Styrax*** *americanus**
—, Bigleaf *S. grandifolius*
—, Downy American *S. americanus**
Snowdrop ***Galanthus*** *nivalis*
—, Crimean *G. plicatus**
—, Pleated *G. plicatus**
Snowflake *Ornithogalum umbellatum*
—, Summer *Leucojum aestivum*
Snow-on-the-mountain *Euphorbia marginata*
Snow-wreath, Alabama *Neviusia alabamensis*
Snowy Black-anthers *Melanthera nivea*
Snowy Orchid *Platanthera nivea*
Snowy White Eupatorium *Eupatorium petaloideum*
Soapberry, Florida *Sapindus marginatus*
Soapwort *Saponaria officinalis*
Soapwort Gentian *Gentiana saponaria*
Soda Apple ***Solanum*** *capsicoides*
—, Tropical *S. viarum*
Soft Arrow-wood *Viburnum molle*
Soft Chess *Bromus hordeaceus**
Soft Fern *Christella dentata*
Soft Fox Sedge *Carex conjuncta*
Soft Goldenaster *Bradburia pilosa*
Soft Grass *Holcus lanatus*
Soft Ground-fern *Hypolepis tenuifolia*
Soft Maple *Acer saccharinum*
Soft Rush *Juncus effusus**
Soft Sandhill Milk-pea *Galactia mollis*
Soft-headed Pipewort *Eriocaulon compressum*
Soft-leaf Witchgrass *Dichanthelium malacophyllum*
Softstem Bulrush *Schoenoplectus tabernaemontani*
Soldier Orchid *Zeuxine strateumatica*
Solomon's-plume, Eastern *Maianthemum racemosum*
Solomon's-seal, King ***Polygonatum*** *biflorum**
—, Large *P. biflorum**
—, Small *P. biflorum**
Sombrerillo *Hydrocotyle bonariensis*
Sorghum ***Sorghum*** *bicolor**
Sorgo *S. bicolor**
Sorrel Vine *Causonis japonica*
Sorrel-tree *Oxydendrum arboreum*
Sorrel-vine *Cissus trifoliata*
Sour Gum *Nyssa sylvatica*
Sour Paspalum *Paspalum conjugatum*
Sourclover *Melilotus indicus*
Sourgrass *Rumex acetosella**
— *Trichachne insularis*
Sourwood *Oxydendrum arboreum*
South American Horseweed *Erigeron bonariensis*
South American Jelly Palm *Butia odorata*
South American Salt-marsh Aster *Symphyotrichum squamatum*
South American Skullcap *Scutellaria racemosa*
South American Vervain *Glandularia aristigera*
South Carolina Sedge *Carex austrocaroliniana*
Southeastern Arnica *Arnica acaulis*
Southeastern Bold Goldenrod *Solidago jacksonii*
Southeastern Ceanothus *Ceanothus americanus**
Southeastern Flatsedge *Cyperus filiculmis*
Southeastern Flowering Spurge *Euphorbia pubentissima*
Southeastern Gaura *Oenothera simulans*
Southeastern New Jersey Tea *Ceanothus americanus**
Southeastern Noseburn *Tragia urens*

*Common name applies to a subspecies or variety of this species.

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Southeastern Panic Grass *Coleataenia tenera*
Southeastern Poison Oak *Toxicodendron pubescens*
Southeastern Slim-spike Three-awn *Aristida longespica*
Southeastern Tansy-mustard *Descurainia pinnata**
Southeastern Wild-rye *Elymus glabriflorus**
Southeastern Woollywhite *Hymenopappus scabiosaeus**
Southern Adder's-tongue *Ophioglossum pycnostichum*
Southern Agrimony *Agrimonia parviflora*
Southern Arrowfeather *Aristida tenuispica*
Southern Arrowgrass *Triglochin striata*
Southern Arrow-wood *Viburnum scabrellum*
Southern Barren Strawberry *Waldsteinia doniana*
Southern Basswood *Tilia americana**
Southern Bayberry *Morella cerifera*
Southern Beaksedge *Rhynchospora microcarpa*
Southern Beardtongue *Penstemon australis*
Southern Bee-blossom *Oenothera simulans*
Southern Bentgrass *Agrostis elliottiana*
Southern Black Haw *Viburnum rufidulum*
Southern Bladderwort *Utricularia juncea*
Southern Blue Flag *Iris virginica*
Southern Bluet *Houstonia micrantha*
Southern Bog Asphodel *Triantha racemosa*
Southern Bog Goldenrod *Solidago gracillima*
Southern Bog Water-horehound *Lycopus angustifolius*
Southern Bog-Clubmoss *Lycopodiella appressa*
Southern Bracken *Pteridium pseudocaudatum*
Southern Bristly Greenbriar *Smilax hispida**
Southern Bulrush *Schoenoplectus californicus*
Southern Carpetgrass *Axonopus compressus*
Southern Catalpa *Catalpa bignonioides*
Southern Cattail *Typha domingensis*
Southern Chervil *Chaerophyllum tainturieri*
Southern Coastal Violet *Viola septemloba*
Southern Corydalis *Corydalis halei*
Southern Crab Grass *Digitaria ciliaris*
Southern Crownbeard *Verbesina occidentalis*
Southern Cutgrass *Leersia hexandra*
Southern Dark Green Sedge *Carex oblita*
Southern Dawnflower *Stylisma humistrata*
Southern Deerberry *Vaccinium stamineum**
Southern Dewberry *Rubus trivialis*
Southern Doll's-daisy *Boltonia diffusa**
Southern Downy Hawthorn *Crataegus mollis**
Southern Dwarf Blueberry *Vaccinium tenellum*
Southern Dwarf Huckleberry *Gaylussacia dumosa*
Southern Dwarf St. John's-wort *Hypericum mutilum**
Southern Elephant's-foot *Elephantopus elatus*
Southern Evergreen Blueberry *Vaccinium myrsinites*
Southern Flatsedge *Cyperus thyrsiflorus*
Southern Flat-topped Aster *Doellingeria sericocarpoides*
Southern Frank's Sedge *Carex aureolensis*
Southern Germander *Teucrium canadense**
Southern Ghost-pipe *Monotropa brittonii*
Southern Grapefern *Sceptridium biternatum*
Southern Gypsy-spike *Platanthera flava*
Southern Hackberry *Celtis laevigata*
Southern Hairy Pinweed *Lechea pulchella**
Southern Hard Maple *Acer saccharum**
Southern Harebell *Campanula divaricata*
Southern Highbush Blueberry *Vaccinium formosum*
Southern Horsebalm *Collinsonia anisata*
Southern Horseweed *Erigeron pusillus*
Southern Hound's-tongue *Andersonglossum virginianum*
Southern Jack-in-the-pulpit *Arisaema quinatum*
Southern Jointvetch *Aeschynomene indica*
Southern Jointweed *Polygonella americana*
Southern Lady Fern *Athyrium asplenioides*
Southern Leatherflower *Clematis crispa*
Southern Lobelia *Lobelia amoena*
Southern Long Sedge *Carex lonchocarpa*
Southern Loosestrife *Steironema tonsum*
Southern Magnolia *Magnolia grandiflora*
Southern Maidenhair *Adiantum capillus-veneris*
Southern Maleberry *Lyonia ligustrina**
Southern Maritime Marsh-elder *Iva frutescens**
Southern Marsh St. John's-wort *Triadenum tubulosum*
Southern Marsh Yellowcress *Rorippa teres*
Southern Milkvetch *Astragalus villosus*
Southern Milkweed *Asclepias viridula*
Southern Mountain Hawthorn *Crataegus austromontana*
Southern Naiad *Najas guadalupensis**
Southern Nodding Trillium *Trillium rugelii*
Southern Oak-leech *Aureolaria pectinata*
Southern Obedient-plant *Physostegia virginiana**
Southern Pine *Pinus palustris*
Southern Pine Aster *Eurybia hemispherica*
Southern Pinxter Azalea *Rhododendron canescens*
Southern Prickly Pear *Opuntia austrina*
Southern Prickly-ash *Zanthoxylum clava-herculis*
Southern Rattlesnake-master *Eryngium yuccifolium**
Southern Red Cedar *Juniperus silicicola*
Southern Red Oak *Quercus falcata*
Southern Red Trillium *Trillium sulcatum*
Southern Red Witch-hazel *Hamamelis ovalis*
Southern Rein Orchid *Platanthera flava*
Southern Roughleaf Goldenrod *Solidago salicina*
Southern Running-Cedar *Diphasiastrum digitatum*
Southern Saltmarsh Agalinis *Agalinis maritima**
Southern Saltwort *Salsola kali**
Southern Sandgrass *Triplasis americana*
Southern Sandspur *Cenchrus echinatus*
Southern Sanicle *Sanicula smallii*
Southern Seabeach Grass *Panicum amarulum*
Southern Sea-blite *Suaeda linearis*
Southern Seaside Goldenrod *Solidago mexicana*
Southern Seaside Spurge *Euphorbia bombensis*
Southern Sedge *Carex austrina*
Southern Senega Snakeroot *Polygala senega**
Southern Sensitive-plant *Chamaecrista nictitans**
Southern Shield Fern *Pelazoneuron kunthii*
Southern Shieldfern *Dryopteris australis*
Southern Shortia *Shortia galacifolia*
Southern Single-head Pussytoes *Antennaria solitaria*
Southern Six-weeks Fescue *Festuca octoflora**
Southern Skullcap *Scutellaria australis*
Southern Slender Ladies'-tresses *Spiranthes lacera**
Southern Slender Woodland Sedge *Carex digitalis**
Southern Snailseed Pondweed *Potamogeton diversifolius*
Southern Sneezeweed *Helenium flexuosum*
Southern Spermolepis *Spermolepis divaricata*
Southern Spicebush *Lindera melissifolia*
Southern Stoneseed *Lithospermum tuberosum*
Southern Sugar Maple *Acer floridanum*
Southern Sundial Lupine *Lupinus perennis**
Southern Swamp Aster *Symphyotrichum elliottii*
Southern Swamp Dogwood *Swida foemina*
Southern Sweet Bay *Magnolia virginiana**
Southern Tall Flat-topped Aster *Doellingeria sericocarpoides*
Southern Tall Goldenrod *Solidago altissima**
Southern Three-awn *Aristida simpliciflora*
Southern Three-lobed Violet *Viola palmata**
Southern Toothache Tree *Zanthoxylum clava-herculis*
Southern Twayblade *Neottia bifolia*
Southern Umbrella-sedge *Fuirena scirpoidea*
Southern Venus's Looking-glass *Triodanis biflora*
Southern Water Grass *Luziola fluitans**
Southern Water Violet *Viola vittata*
Southern Water-hemlock *Cicuta mexicana*
Southern Water-hemp *Amaranthus australis*
Southern Water-milfoil *Myriophyllum heterophyllum*
Southern Water-plantain *Alisma subcordatum*
Southern Water-purslane *Ludwigia spathulata*
Southern Waxy Sedge *Carex glaucescens*
Southern Wedge-leaf Violet *Viola tenuipes*
Southern White Beaksedge *Rhynchospora macra*
Southern White Colic-root *Aletris obovata*
Southern White-tinged Sedge *Carex albicans**
Southern Wild Comfrey *Andersonglossum virginianum*
Southern Wild Hydrangea *Hydrangea cinerea*
Southern Wild Raisin *Viburnum nudum*
Southern Wild-buckwheat *Eriogonum tomentosum*
Southern Wild-rice *Zizania aquatica**
— *Zizaniopsis miliacea*
Southern Willdenow's Sedge *Carex basiantha*
Southern Winged Loosestrife *Lythrum lanceolatum*
Southern Wiregrass *Aristida beyrichiana*
Southern Woodfern ***Dryopteris*** *australis*
— *D. ludoviciana*
Southern Woodland Violet ***Viola*** *hirsutula*
Southern Woolly Violet *V. villosa*
Southern Yellow Poplar *Liriodendron tulipifera**
Southern Yellow Thistle *Cirsium horridulum**
Southern Yellow Wood-sorrel *Oxalis dillenii*
Southern-privet *Forestiera ligustrina*
Southwestern Cloak Fern *Astrolepis integerrima*
Sowbane *Chenopodiastrum murale*
Sow-thistle, Common ***Sonchus*** *oleraceus*
—, Prickly *S. asper*
—, Slender *S. tenerrimus*
—, Spinyleaf *S. asper*
Soybean *Glycine max*
Spach's Evening-primrose *Oenothera spachiana*
Spaghetti Squash *Cucurbita melopepo**
Spanglegrass, Shiny *Chasmanthium nitidum*
Spanish Dagger *Yucca aloifolia*
Spanish Needles *Bidens bipinnata*
Spanish Oak ***Quercus*** *falcata*
—, Swamp *Q. pagoda*
Spanish Salsify *Scolymus hispanicus*
Spanish-gold *Prionopsis ciliata*
Spanish-larkspur *Ipomopsis rubra*
Spanish-moss *Tillandsia usneoides*
Sparkleberry *Vaccinium arboreum*
Sparrow Vetch *Vicia tetrasperma*
Sparrowgrass *Asparagus officinalis*
Spear Orach *Atriplex patula*
Speargrass ***Poa*** *annua*
— *P. pratensis**
—, Blackseed *Piptochaetium avenaceum*
Spearleaf Violet *Viola hastata*
Spearmint *Mentha spicata**
Spearwort, Coastal Plain ***Ranunculus*** *laxicaulis*
—, Low *R. pusillus*
—, Small *R. pusillus*
Speedwell, American ***Veronica*** *americana*
—, Bird's-eye *V. persica*
—, Common Purslane *V. peregrina**
—, Corn *V. arvensis*
—, Field *V. agrestis*
—, Ivyleaf *V. hederifolia*

*Common name applies to a subspecies or variety of this species.

INDEX OF COMMON NAMES

—, Small Ivyleaf *V. sublobata*
—, Thymeleaf *V. serpyllifolia**
—, Wall *V. arvensis*
—, Water *V. anagallis-aquatica*
—, Wavyleaf Water *V. undulata*
—, Wayside *V. polita*
—, Western Purslane *V. peregrina**
Spermolepis, Bristlefruit ***Spermolepis** echinata*
—, Hooked *S. echinata*
—, Roughfruit *S. divaricata*
—, Southern *S. divaricata*
—, Western *S. inermis*
Spiceberry *Ardisia crenata*
Spicebush, Bog ***Lindera** subcoriacea*
—, Northern *L. benzoin*
—, Southern *L. melissifolia*
Spider Brake *Pteris multifida*
Spider Milkweed *Asclepias viridis*
Spiderflower ***Tarenaya** species 1*
—, Prickly *T. aculeata*
—, Spiny *T. spinosa*
Spiderling, Erect ***Boerhavia** erecta*
—, Red *B. diffusa*
Spider-plant *Chlorophytum comosum*
Spiderwisp *Gynandropsis gynandra*
Spiderwort, Confederate ***Tradescantia** paludosa*
—, Ernest's *T. ernestiana*
—, Hairy *T. hirsuticaulis*
—, Ohio *T. ohiensis*
—, Sandhill *T. roseolens*
—, Small-leaf *T. fluminensis*
—, Small-leaf *T. mundula*
—, Smooth *T. ohiensis*
—, Swamp *T. paludosa*
—, Tropical *Commelina benghalensis*
—, Virginia ***Tradescantia** virginiana*
—, Wide-leaved *T. subaspera*
—, Zigzag *T. subaspera*
Spike Grass *Distichlis spicata*
Spike Three-awn *Aristida spiciformis**
Spike Triodia *Tridens strictus*
Spiked Hoarypea *Tephrosia spicata*
Spiked Medusa *Orthochilus ecristatus*
Spiked Wild Indigo *Baptisia albescens*
Spikegrass, Birdbill ***Chasmanthium** ornithorhynchum*
—, Longleaf *C. sessiliflorum**
—, Slender *C. laxum*
Spikemoss, Blue ***Lycopodioides** uncinatum*
—, Braun's *L. braunii*
—, Gulf *L. ludovicianum*
—, Louisiana *L. ludovicianum*
—, Meadow *L. apodum*
—, Riddell's ***Bryodesma** arenicola**
—, Rock *B. rupestre*
—, Sand *B. arenicola**
—, Treelet *Lycopodioides braunii*
Spikenard *Aralia racemosa*
Spikerush, Bald ***Eleocharis** erythropoda*
—, Baldwin's *E. baldwinii*
—, Beaked *E. rostellata*
—, Black-fruited *E. melanocarpa*
—, Blunt *E. obtusa*
—, Cedar Glade *E. bifida*
—, Common *E. palustris*
—, Dwarf *E. parvula*
—, Engelmann's *E. engelmannii*
—, Flattened *E. compressa**
—, Gulf Coast *E. cellulosa*
—, Horsetail *E. equisetoides*
—, Knotted *E. interstincta*
—, Large *E. macrostachya*
—, Large-tubercled *E. tuberculosa*
—, Needle *E. acicularis*
—, Olive *E. olivacea**
—, Pale *E. flavescens**
—, Purple *E. atropurpurea*
—, Robbins's *E. robbinsii*
—, Sand *E. montevidensis*
—, Slender *E. tenuis**
—, Small *E. minima*
—, Small *E. parvula*
—, Small's *E. palustris*
—, Squarestem *E. quadrangulata*
—, Three-angle *E. tricostata*
—, Torrey's *E. microcarpa**
—, Twisted *E. tortilis*
—, Viviparous *E. vivipara*
—, White *E. albida*
—, Wolf's *E. wolfii*
—, Yellow *E. flavescens**
Spindle-fruited Witchgrass *Dichanthelium fusiforme*
Spindleroot *Ludwigia hirtella*
Spindle-tree, Chinese ***Euonymus** fortunei*
—, Japanese *E. japonicus*
Spindly Agalinis *Agalinis filicaulis*
Spineless Bramble Fern *Hypolepis tenuifolia*
Spiny Amaranth *Amaranthus spinosus*
Spiny Cocklebur *Xanthium spinosum*
Spiny Spiderflower *Tarenaya spinosa*
Spinyleaf Naiad *Najas minor*
Spinyleaf Sow-thistle *Sonchus asper*
Spinypod, Alabama ***Matelea** alabamensis*
—, Carolina *M. carolinensis*
—, Deceptive *M. decipiens*
—, Northern *M. obliqua*
—, White *M. baldwiniana*
—, Yellow *M. flavidula*
Spiraea, Bridal-wreath ***Spiraea** prunifolia*
—, Bridal-wreath *S. vanhouttei*
—, Japanese *S. japonica*
Spiral Orchid, Giant *Spiranthes longilabris*
Spleenwort, Blackstem ***Asplenium** resiliens*
—, Bradley's *A. bradleyi*
—, Cutleaf *A. abscissum**
—, Ebony *A. platyneuron*
—, Lobed *A. pinnatifidum*
—, Maidenhair *A. trichomanes*
—, Mountain *A. montanum*
—, Scott's *A. ebenoides*
—, Silvery *Deparia acrostichoides*
—, Single-sorus ***Asplenium** monanthes*
—, Trudell's *A. trudellii*
—, Tutwiler's *A. tutwilerae*
Splitbeard Bluestem *Andropogon ternarius*
Spongeplant *Limnobium spongia*
Spoonflower *Peltandra sagittifolia*
Spoonleaf Purple Everlasting *Gamochaeta purpurea*
Spoonleaf Sundew *Drosera intermedia*
Spoonleaf Yucca *Yucca filamentosa*
Spoon-leaved Barbara's-buttons *Marshallia obovata**
Spotflower, Creeping *Acmella repens*
Spotted Bur-clover *Medicago arabica*
Spotted Cat's-ear *Hypochaeris radicata*
Spotted Knapweed *Centaurea stoebe**
Spotted Mandarin *Prosartes maculata*
Spotted Medick *Medicago arabica*
Spotted Pondweed *Potamogeton pulcher*
Spotted Sandmat ***Euphorbia** maculata*
Spotted Spurge *E. maculata*
—, Upright *E. nutans*
Spotted St. John's-wort *Hypericum punctatum*
Spotted Touch-me-not *Impatiens capensis*
Spotted Trillium *Trillium maculatum*
Spotted-sheath Witchgrass *Dichanthelium yadkinense*
Sprangletop, Amazon *Dinebra panicoides*
—, Bearded ***Diplachne** fascicularis*
—, Mexican *D. uninervia*
—, Red *Dinebra panicea**
Sprawling Goat's-rue ***Tephrosia** chrysophylla*
Sprawling Hoarypea *T. hispidula*
Sprawling Signalgrass *Urochloa reptans*
Sprawling White-tassels *Dalea mountjoyae*
Sprawling Witchgrass *Dichanthelium commutatum**
Spreading Amaranth *Amaranthus crassipes**
Spreading Bur-Parsley *Torilis helvetica*
Spreading Dogbane *Apocynum androsaemifolium*
Spreading Eryngo *Eryngium prostratum*
Spreading Evening-primrose *Oenothera humifusa*
Spreading Hogweed *Boerhavia diffusa*
Spreading Jacob's-ladder *Polemonium reptans**
Spreading Panic Grass *Panicum dichotomiflorum**
Spreading Rockcress *Arabis patens*
Spreading Sandmat *Euphorbia humistrata*
Spreading Sandwort *Arenaria lanuginosa**
Spreading Sedge ***Carex** copulata*
— *C. laxiculmis*
Spreading Wood-rush *Luzula echinata*
Sprenger's Asparagus-fern *Asparagus aethiopicus*
Spring Avens *Geum vernum*
Spring Bartonia *Bartonia verna*
Spring Coralroot *Corallorhiza wisteriana*
Spring Forget-me-not *Myosotis verna*
Spring Hill Flax *Linum macrocarpum*
Spring Ladies'-tresses *Spiranthes vernalis*
Spring Silverberry *Elaeagnus umbellata*
Spring Star *Ipheion uniflorum*
Spring Thistle *Cirsium carolinianum*
Spring Vetch *Vicia lathyroides*
Spring-beauty ***Claytonia** virginica**
—, Carolina *C. caroliniana*
Spruce Pine *Pinus glabra*
Spurge Flax *Thymelaea passerina*
Spurge, Caper ***Euphorbia** lathyris*
—, Coastal Sand *E. exserta*
—, Cumberland *E. mercurialina*
—, Curtis's *E. curtisii*
—, Cypress *E. cyparissias*
—, Eastern Flowering *E. corollata*
—, Fiddler's *E. heterophylla*
—, Flatwood *E. inundata**
—, Florida *E. floridana*
—, Grassleaf *E. graminea*
—, Graveyard *E. cyparissias*
—, Maroon Sandhills *E. exserta*
—, Mercury *E. mercurialina*
—, Myrtle *E. lathyris*
—, Petty *E. peplus*
—, Prairie *E. spathulata*
—, Southeastern Flowering *E. pubentissima*
—, Southern Seaside *E. bombensis*
—, Spotted *E. maculata*
—, Summer *E. discoidalis*
—, Summer *E. helioscopia*
—, Sun *E. helioscopia*
—, Tinted *E. commutata*
—, Toothed *E. dentata*
—, Upright Spotted *E. nutans*
—, Warty *E. spathulata*
—, White Sandhills *E. curtisii*
—, Woodland *E. commutata*
Spurge-nettle *Cnidoscolus stimulosus*
Spurred Anoda *Anoda cristata*
Spurred Butterfly Pea *Centrosema virginianum**
Spurrey, Corn *Spergula arvensis*
Spurweed *Soliva sessilis*
Squarehead *Tetragonotheca helianthoides*
Squarestem Spikerush *Eleocharis quadrangulata*
Squarrose Sedge *Carex squarrosa*
Squarrose White Aster *Symphyotrichum ericoides**
Squash, Acorn ***Cucurbita** melopepo**
—, Crookneck *C. melopepo**

*Common name applies to a subspecies or variety of this species.

—, Hubbard *C. maxima*
—, Pattypan *C. melopepo**
—, Scallop *C. melopepo**
—, Spaghetti *C. melopepo**
—, Straightneck *C. melopepo**
—, Texas *C. melopepo**
Squawbush *Rhus aromatica**
Squawroot *Conopholis americana*
Squirrel-tail Fescue ***Festuca*** *sciurea*
—, European *F. bromoides*
Squirting Cucumber *Ecballium elaterium*
St. Andrew's Cross ***Hypericum*** *crux-andreae*
— *H. hypericoides*
St. Anthony's Turnip *Ranunculus bulbosus*
St. Augustine Grass *Stenotaphrum secundatum*
St. John's Black-eyed Susan *Rudbeckia nitida*
St. John's-wort, Barrens ***Hypericum*** *sphaerocarpum*
—, Canada *H. canadense*
—, Cedar Glade *H. frondosum*
—, Clasping-leaf *H. gymnanthum*
—, Common Marsh *Triadenum virginicum*
—, Coppery ***Hypericum*** *denticulatum*
—, Drummond's *H. drummondii*
—, Glade *H. dolabriforme*
—, Golden *H. frondosum*
—, Harper's *H. harperi*
—, Interior Bushy *H. interior*
—, Lloyd's *H. lloydii*
—, Mountain Bushy *H. densiflorum*
—, Peelbark *H. fasciculatum*
—, Pineland *H. suffruticosum*
—, Roundfruit *H. sphaerocarpum*
—, Sandhill *H. tenuifolium*
—, Southern Marsh *Triadenum tubulosum*
—, Spotted *Hypericum punctatum*
—, Walter's Marsh *Triadenum walteri*
St. Martin's Buttercup *Ranunculus marginatus**
St. Peter's-wort *Hypericum crux-andreae*
Staghorn Clubmoss *Palhinhaea cernua*
Staghorn Sumac *Rhus typhina*
Stalked Bugleweed *Lycopus rubellus*
Stalk-grain Sedge ***Carex*** *stipata**
—, Large *C. stipata**
Stalkless Marshcress *Rorippa sessiliflora*
Standing-cypress *Ipomopsis rubra*
Standish's Honeysuckle *Lonicera standishii*
Star Chickweed *Stellaria pubera*
Star Daffodil *Narcissus intermedius*
Star Jasmine *Trachelospermum jasminoides*
Star Jonquil *Narcissus intermedius*
Star Sedge, Eastern *Carex radiata*
Star-anise, Florida *Illicium floridanum*
Starburst Flatsedge *Cyperus plukenetii*
Star-cucumber *Sicyos angulatus*
Stargrass *Aletris farinosa*
—, Bristleseed ***Hypoxis*** *wrightii*
—, Common *H. hirsuta*
—, Curtiss's *H. curtissii*
—, Eastern *H. hirsuta*
—, Fringed *H. juncea*
—, Glossy-seed *H. sessilis*
—, Savanna *H. rigida*
—, Swamp *H. curtissii*
—, Water *Heteranthera dubia*
Star-of-Bethlehem *Ipheion uniflorum*
— ***Ornithogalum*** *umbellatum*
—, Drooping *O. nutans*
Starry Campion *Silene stellata*
Star-thistle, Maltese ***Centaurea*** *melitensis*
—, Purple *C. calcitrapa*
Star-toadflax *Comandra umbellata**
Starved Aster *Symphyotrichum lateriflorum*
Starved Witchgrass *Dichanthelium depauperatum*
Starwort, Common *Stellaria pubera*
—, Pygmy *Cerastium parvum*
—, Seepage *Sabulina fontinalis*
—, Tennessee *Stellaria corei*
—, Water *Sabulina fontinalis*
Steele's Dewberry *Rubus steelei*
Steeplebush *Spiraea tomentosa*
Stemless Evening-primrose *Oenothera triloba*
Stemodia, Purple *Stemodia durantifolia*
Stewartia, Mountain ***Stewartia*** *ovata*
—, Virginia *S. malacodendron*
Stickseed Crowfoot *Ranunculus parviflorus*
Stickseed, Virginia *Hackelia virginiana*
Sticky Campion ***Silene*** *noctiflora*
Sticky Cockle *S. noctiflora*
Sticky Flatsedge *Cyperus elegans*
Sticky Hedge-hyssop *Gratiola brevifolia*
Sticky Jointvetch *Ctenodon viscidulus*
Sticky Mouse-ear *Cerastium glomeratum*
Sticky Nightshade *Solanum sisymbriifolium*
Sticky Rosinweed *Silphium glutinosum*
Sticky-willy *Galium aparine*
Stiff Bluestar *Amsonia rigida*
Stiff Greenthread *Thelesperma filifolium**
Stiff Marsh Bedstraw *Galium tinctorium**
Stiff Tick-trefoil *Desmodium obtusum*
Stiff-leaved Aster ***Ionactis*** *linariifolia*
—, Creeping *I. repens*
Stinging Nettle, American ***Urtica*** *gracilis**
—, Dwarf *U. chamaedryoides*
—, European *U. dioica**
Stinkgrass *Eragrostis cilianensis*
Stinking Benjamin *Trillium erectum**
Stinking Chamomile *Anthemis cotula*
Stinking Fleabane *Pluchea foetida**
Stinking Goosefoot *Chenopodium vulvaria*
Stinking Pepperweed *Lepidium ruderale*
Stinking Wall-rocket *Diplotaxis muralis*
Stinking Willie *Trillium erectum**
Stink-tree *Ailanthus altissima*
Stokes Aster ***Stokesia*** *laevis*
Stokesia *S. laevis*
—, Blue *S. laevis*
Stone Mountain Coreopsis *Coreopsis grandiflora**
Stone Mountain Mountain-mint *Pycnanthemum curvipes*
Stonecrop, Bitter ***Sedum*** *acre*
—, Mossy *S. acre*
—, Mountain *S. ternatum*
—, Nevius's *S. nevii*
—, Whorled *S. ternatum*
Stone-mint *Cunila origanoides*
Stone-oak, Henry's *Lithocarpus henryi*
Stoneroot *Collinsonia tuberosa*
Stoneseed, Southern *Lithospermum tuberosum*
Storax, American ***Styrax*** *americanus**
—, Bigleaf *S. grandifolius*
Stork's-Bill, Common *Erodium cicutarium*
Stout Rush ***Juncus*** *nodatus*
— *J. validus*
Straggler-daisy *Calyptocarpus vialis*
Straggling St. John's-wort *Hypericum stragulum*
Straightneck Squash *Cucurbita melopepo**
Strap-leaved Violet *Viola vittata*
Strapwort, Carolina ***Lilaeopsis*** *carolinensis*
—, Tidal *L. chinensis*
Straw Flatsedge *Cyperus strigosus*
Straw Sedge, Greater *Carex normalis*
Strawberry Firetails *Acalypha herzogiana*
Strawberry, Cultivated ***Fragaria*** *ananassa**
—, Garden *F. ananassa**
—, Indian *Potentilla indica*
—, Lobed Barren *Waldsteinia lobata*
—, Mock *Potentilla indica*
—, Southern Barren *Waldsteinia doniana*
—, Wild *Fragaria virginiana*
Strawberry-bush *Euonymus americanus*
Strawberry-shrub *Calycanthus floridus*
Strawberry-tomato *Physalis grisea*
Strawberry-weed *Potentilla norvegica*
Straw-fruited Hawthorn *Crataegus intricata**
Straw-lily *Uvularia sessilifolia*
Strawstem Beggar-ticks *Bidens comosa*
Streak-sorus Fern, Alabama *Leptogramma burksiorum*
Streambed Sedge *Carex torta*
Stretchberry *Smilax bona-nox**
Strict St. John's-wort *Hypericum virgatum*
Strict Yellow-eyed-grass *Xyris stricta*
String-lily *Crinum americanum**
Striped Gentian *Gentiana villosa*
Striped Wintergreen *Chimaphila maculata*
Subterranean Clover *Trifolium subterraneum*
Succory *Cichorium intybus*
Suckering Australian-pine *Casuarina glauca*
Sugar Maple ***Acer*** *saccharum**
—, Southern *A. floridanum*
Sugarberry *Celtis laevigata*
Sugarcane Plume Grass *Erianthus giganteus*
Sugar-tree *Acer saccharum**
Sulphur Cinquefoil ***Potentilla*** *recta*
Sulphur Five-fingers *P. recta*
Sumac, Eastern Flameleaf ***Rhus*** *copallinum**
—, Eastern Winged *R. copallinum**
—, Fragrant *R. aromatica**
—, Midwestern Fragrant *R. aromatica**
—, Poison *Toxicodendron vernix*
—, Smooth ***Rhus*** *glabra*
—, Staghorn *R. typhina*
Summer Bluet ***Houstonia*** *purpurea*
—, Midwestern *H. lanceolata*
Summer Grape *Vitis aestivalis**
Summer Snowflake *Leucojum aestivum*
Summer Spurge ***Euphorbia*** *discoidalis*
— *E. helioscopia*
Summer-cypress *Bassia scoparia*
Summer-lilac *Buddleja davidii*
Sumpweed *Iva annua*
Sun Spurge *Euphorbia helioscopia*
Sunbonnets ***Chaptalia*** *tomentosa*
—, Woolly *C. tomentosa*
Sundew, Dwarf ***Drosera*** *brevifolia*
—, Pink *D. capillaris*
—, Roundleaf *D. rotundifolia*
—, Spoonleaf *D. intermedia*
—, Tracy's *D. tracyi*
—, Water *D. intermedia*
Sunfacing Coneflower *Rudbeckia heliopsidis*
Sunflower, Appalachian ***Helianthus*** *atrorubens*
—, Ashy *H. mollis*
—, Common *H. annuus*
—, Cucumber-leaf *H. debilis**
—, Eggert's *H. eggertii*
—, Florida *H. floridanus*
—, Forest *H. decapetalus*
—, Gray *H. mollis*
—, Gulf Coast Beach *H. debilis**
—, Hairy *H. hirsutus*
—, Longleaf *H. longifolius*
—, Maximilian *H. maximilianii*
—, Muck *H. simulans*
—, Naked-stem *H. occidentalis**
—, Narrowleaf *H. angustifolius*
—, Rayless *H. radula*
—, Resinous *H. resinosus*
—, Roughleaf *H. strumosus*
—, Roundleaf *H. radula*
—, Savanna *H. heterophyllus*
—, Sawtooth *H. grosseserratus*
—, Small Wood *H. microcephalus*
—, Small-headed *H. microcephalus*
—, Smith's *H. smithii*
—, Swamp *H. giganteus*

*Common name applies to a subspecies or variety of this species.

—, Tuberous *H. giganteus*
—, Whorled *H. verticillatus*
—, Woodland *H. divaricatus*
Sunflower-everlasting, Coastal Plain ***Heliopsis*** *gracilis*
—, Eastern *H. helianthoides**
Sunn Hemp *Crotalaria juncea*
Sunny Hawthorn *Crataegus aprica*
Sunnybell, Texas ***Schoenolirion*** *wrightii*
—, Yellow *S. croceum*
Superb Lily *Lilium superbum*
Supplejack ***Berchemia*** *scandens*
—, Alabama *B. scandens*
—, Carolina *B. scandens*
Surprise Lily *Lycoris radiata**
Swallow-wort *Pattalias paluster*
Swamp Agrimony *Agrimonia gryposepala*
Swamp Aster ***Symphyotrichum*** *puniceum**
—, Southern *S. elliottii*
Swamp Azalea ***Rhododendron*** *serrulatum*
— *R. viscosum**
Swamp Barnyard-grass *Echinochloa walteri*
Swamp Bay *Tamala palustris*
Swamp Black Gum *Nyssa biflora*
Swamp Black-eyed Susan *Rudbeckia auriculata*
Swamp Blueberry *Vaccinium virgatum*
Swamp Bulrush *Schoenoplectus etuberculatus*
Swamp Bumelia *Sideroxylon thornei*
Swamp Chestnut Oak *Quercus michauxii*
Swamp Coreopsis *Coreopsis nudata*
Swamp Cottonwood *Populus heterophylla*
Swamp Dewberry *Rubus hispidus*
Swamp Dock *Rumex verticillatus*
Swamp Dodder *Cuscuta gronovii*
Swamp Fern *Telmatoblechnum serrulatum*
Swamp Flatsedge *Cyperus ligularis*
Swamp Forestiera *Forestiera acuminata*
Swamp Hibiscus *Hibiscus grandiflorus*
Swamp Highbush Blueberry *Vaccinium formosum*
Swamp Jack *Arisaema pusillum*
Swamp Jessamine *Gelsemium rankinii*
Swamp Leatherflower *Clematis crispa*
Swamp Loosestrife *Decodon verticillatus*
Swamp Milkwort *Polygala appendiculata*
Swamp Obedient-plant *Physostegia leptophylla*
Swamp Phanopyrum *Phanopyrum gymnocarpon*
Swamp Post Oak *Quercus similis*
Swamp Red Maple *Acer rubrum**
Swamp Rose *Rosa palustris*
Swamp Rush *Juncus paludosus*
Swamp Smartweed *Persicaria setacea*
Swamp Spanish Oak *Quercus pagoda*
Swamp Spiderwort *Tradescantia paludosa*
Swamp Stargrass *Hypoxis curtissii*
Swamp Sunflower *Helianthus giganteus*
Swamp Thistle *Cirsium muticum*
Swamp Tupelo *Nyssa biflora*
Swamp Water-pennywort *Hydrocotyle ranunculoides*
Swamp White Oak *Quercus bicolor*
Swamp Wisteria *Wisteria frutescens**
Swamp-forest Beaksedge *Rhynchospora decurrens*
Swamp-forest Milkweed *Asclepias perennis*
Swamp-lily ***Crinum*** *americanum**
—, African *C. bulbispermum*
Swampmallow *Pavonia hastata*
Swamp-nettle *Boehmeria cylindrica*
Swamp-oats *Sphenopholis pensylvanica*
Swamp-privet *Forestiera acuminata*
Swampweed, East Indian ***Hygrophila*** *polysperma*
—, Gulf *H. lacustris*
Swan's Sedge *Carex swanii*
Swaying Rush *Schoenoplectus subterminalis*
Swede *Brassica napus*
Sweet Alyssum *Lobularia maritima*
Sweet Annie *Artemisia annua*
Sweet Autumn Clematis *Clematis terniflora*
Sweet Azalea *Rhododendron arborescens*
Sweet Beth ***Trillium*** *vaseyi*
Sweet Betsy *T. cuneatum*
Sweet Birch *Betula lenta**
Sweet Bubby-bush *Calycanthus floridus*
Sweet Cicely, Bland ***Osmorhiza*** *claytonii*
—, Hairy *O. claytonii*
—, Smooth *O. longistylis*
Sweet Crabapple *Malus coronaria*
Sweet Gallberry *Ilex coriacea*
Sweet Grass *Muhlenbergia sericea*
Sweet Gum *Liquidambar styraciflua*
Sweet Pea ***Lathyrus*** *odoratus*
—, Perennial *L. latifolius*
Sweet Potato ***Ipomoea*** *batatas*
—, Wild *I. pandurata*
Sweet Sagewort *Artemisia annua*
Sweet Tanglehead *Heteropogon melanocarpus*
Sweet Trillium *Trillium vaseyi*
Sweet Vernal Grass *Anthoxanthum odoratum*
Sweet Water-hyssop *Bacopa caroliniana*
Sweet White Violet *Viola blanda*
Sweet William *Dianthus barbatus**
Sweet William Catchfly *Atocion armeria*
Sweet Woodreed *Cinna arundinacea*
Sweet Wormwood *Artemisia annua*
Sweet-breath-of-spring *Lonicera fragrantissima*
Sweetbriar Rose *Rosa rubiginosa**
Sweet-broom *Scoparia dulcis*
Sweetclover, White ***Melilotus*** *albus*
—, Yellow *M. officinalis*
Sweetflag *Acorus calamus*
Sweetleaf *Symplocos tinctoria*
Sweet-scented Bedstraw *Galium triflorum*
Sweet-scented Jonquil *Narcissus odorus*
Sweet-scented Marigold *Tagetes lucida*
Sweet-shrub *Calycanthus floridus*
Sweetspire *Itea virginica*
Switch Cane *Arundinaria tecta*
Switchgrass *Panicum virgatum**
Switch-ivy *Leucothoe fontanesiana*
Swollen Bladderwort ***Utricularia*** *inflata*
—, Small *U. radiata*
Sword Fern, Narrow *Nephrolepis cordifolia**
Swordgrass *Schoenoplectus pungens**
Sycamore *Platanus occidentalis**
Synandra *Synandra hispidula*
Table Fern ***Pteris*** *cretica**
—, Variegated *P. cretica**
Tag Alder *Alnus serrulata*
Tahitian Bridal-veil *Gibasis pellucida*
Taiwan Cherry *Prunus campanulata*
Taiwanese Redtip *Photinia serratifolia*
Tall Anemone *Anemone virginiana**
Tall Beggar-ticks *Bidens vulgata*
Tall Bellflower *Campanulastrum americanum*
Tall Blue Skullcap *Scutellaria lateriflora*
Tall Buttercup *Ranunculus acris*
Tall Coreopsis *Coreopsis tripteris*
Tall Dock *Rumex altissimus*
Tall Dropseed *Sporobolus compositus**
Tall Fescue *Lolium arundinaceum*
Tall Flat Panic Grass *Coleataenia pulchra*
Tall Gaura *Oenothera filiformis*
Tall Goldenrod ***Solidago*** *altissima**
—, Southern *S. altissima**
Tall Hedge-mustard *Sisymbrium altissimum*
Tall Horned Beaksedge *Rhynchospora macrostachya*
Tall Indigo-bush *Amorpha fruticosa*
Tall Milkweed *Asclepias exaltata*
Tall Nutrush *Scleria triglomerata*
Tall Oatgrass *Arrhenatherum elatius**
Tall Pinebarren Milkwort *Polygala cymosa*
Tall Rattlesnake-root *Nabalus altissimus*
Tall Redtop *Tridens flavus*
Tall Scouring-Rush *Equisetum praealtum*
Tall Swamp Witchgrass *Dichanthelium scabriusculum*
Tall Thistle ***Cirsium*** *altissimum*
—, Coastal *C. nuttallii*
Tall Thoroughwort *Eupatorium altissimum*
Tall Tick-trefoil *Desmodium glabellum*
Tall White Beardtongue *Penstemon digitalis*
Tall White Violet *Viola canadensis*
Talladega Wild Basil *Clinopodium talladeganum*
Tallahassee-vine *Antigonon leptopus*
Tallow-weed *Plantago hookeriana*
Tamarisk, French *Tamarix gallica*
Tanglehead ***Heteropogon*** *contortus*
—, Sweet *H. melanocarpus*
Tansy Dogshade *Limnosciadium pinnatum*
Tansy Rosinweed *Silphium pinnatifidum*
Tansy-mustard, Northeastern ***Descurainia*** *pinnata**
—, Southeastern *D. pinnata**
Tapegrass *Vallisneria americana*
Tapioca ***Manihot*** *esculenta*
—, Hardy *M. grahamii*
Tare, Hairy ***Vicia*** *hirsuta*
—, Smooth *V. tetrasperma*
Taro *Colocasia esculenta*
—, Giant *Alocasia macrorrhizos*
Tartarian Aster *Aster tataricus*
Tartarian Orach *Atriplex tatarica*
Tassel Grape-hyacinth *Muscari comosum*
Tasselflower, Lilac ***Emilia*** *sonchifolia**
—, Salmon *E. fosbergii*
Tassel-rue, Ozark *Trautvetteria applanata*
Tassel-white *Itea virginica*
Tawny Bluestem *Andropogon mohrii*
Tawny Day-lily *Hemerocallis fulva*
Tawny Ironweed *Vernonia glauca*
Tea, Common New Jersey ***Ceanothus*** *americanus**
—, Hairy New Jersey *C. americanus**
—, Oswego *Monarda didyma*
—, Southeastern New Jersey *Ceanothus americanus**
Teaberry *Gaultheria procumbens*
Teal Lovegrass *Eragrostis hypnoides*
Tearthumb, Arrowleaf *Persicaria sagittata*
Teasel, Common ***Dipsacus*** *fullonum*
—, Wild *D. fullonum*
Temple-grass, Manila *Zoysia matrella*
Tennessee Bladder Fern *Cystopteris tennesseensis*
Tennessee Ground-plum *Astragalus tennesseensis*
Tennessee Larkspur *Delphinium carolinianum**
Tennessee Leafcup *Polymnia laevigata*
Tennessee Marbleseed *Lithospermum molle*
Tennessee Mountain-mint *Pycnanthemum curvipes*
Tennessee Starwort *Stellaria corei*
Tennessee Yellow-eyed-grass *Xyris tennesseensis*
Ten-petal Anemone *Anemone berlandieri*
Ternstroemia *Ternstroemia gymnanthera*
Terrell Grass *Elymus virginicus*
Terrestrial Water-starwort *Callitriche terrestris*
Texas Bindweed *Convolvulus equitans*
Texas Bluegrass *Poa arachnifera*
Texas Coreopsis *Coreopsis basalis*
Texas Crane's-bill *Geranium texanum*
Texas Croton *Croton texensis*
Texas Gaura *Oenothera sinuosa*
Texas Geranium *Geranium texanum*
Texas Gourd *Cucurbita melopepo**
Texas Hatpins *Eriocaulon texense*
Texas Ironweed *Vernonia texana*
Texas Lantana *Lantana urticoides*
Texas Millet *Urochloa texana*

*Common name applies to a subspecies or variety of this species.

INDEX OF COMMON NAMES

Texas Paintbrush *Castilleja indivisa*
Texas Plains Rush *Juncus filipendulus*
Texas Prickly-pear *Opuntia lindheimeri*
Texas Red Oak *Quercus texana*
Texas Sedge *Carex texensis*
Texas Signalgrass *Urochloa texana*
Texas Squash *Cucurbita melopepo**
Texas Sunnybell *Schoenolirion wrightii*
Texas Toadflax *Linaria texana*
Texas Vervain *Verbena halei*
Texas Wood-sorrel *Oxalis texana*
Texas Yellow Flax *Linum curtissii*
Texas-weed *Caperonia palustris*
Thalia Lovegrass *Eragrostis atrovirens*
Thalia, Bent ***Thalia*** *geniculata*
—, Powdery *T. dealbata*
Thicket Sedge *Carex abscondita*
Thick-leaf Phlox *Phlox carolina*
Thick-pod White Wild Indigo *Baptisia alba*
Thick-root Buttercup *Ranunculus fascicularis*
Thimbleweed *Anemone virginiana**
Thin Paspalum *Paspalum setaceum**
Thin-tail *Parapholis incurva*
Thistle, Bigspine ***Cirsium*** *horridulum**
—, Bull *C. horridulum**
—, Bull *C. vulgare*
—, Canada *C. arvense*
—, Carolina *C. carolinianum*
—, Coastal Tall *C. nuttallii*
—, Common Yellow *C. horridulum**
—, Field *C. arvense*
—, Field *C. discolor*
—, Golden *Scolymus hispanicus*
—, LeConte's *Cirsium lecontei*
—, Musk ***Carduus*** *nutans*
—, Nodding *C. nutans*
—, Nuttall's ***Cirsium*** *nuttallii*
—, Pineland *C. horridulum**
—, Prairie *C. carolinianum*
—, Scotch *Onopordum acanthium**
—, Southern Yellow ***Cirsium*** *horridulum**
—, Spring *C. carolinianum*
—, Swamp *C. muticum*
—, Tall *C. altissimum*
Thornapple ***Datura*** *stramonium*
Thorn-apple, Oakleaf *D. quercifolia*
Thorne's Beaksedge *Rhynchospora thornei*
Thorne's Bumelia *Sideroxylon thornei*
Thornless Blackberry *Rubus canadensis*
Thorny-olive *Elaeagnus pungens*
Thoroughwax *Bupleurum rotundifolium*
Thoroughwort, Ivy-leaf *Chromolaena ivifolia*
—, Pink *Fleischmannia incarnata*
—, Tall ***Eupatorium*** *altissimum*
—, White-bracted *E. album*
Thousandleaf, Eastern *Achillea gracilis*
Threadfoot *Podostemum ceratophyllum*
Threadleaf Agalinis *Agalinis setacea*
Threadleaf Coreopsis *Coreopsis verticillata*
Threadleaf Sundrops *Oenothera linifolia*
Threadleaved Beaksedge *Rhynchospora filifolia*
Threadstalk Gaura *Oenothera filipes*
Three Birds Orchid *Triphora trianthophoros**
Three-angle Spikerush *Eleocharis tricostata*
Threeflower Hawthorn *Crataegus triflora*
Three-flower Melic *Melica nitens*
Three-lobe Mallow *Malvastrum coromandelianum*
Three-spike Goose-grass *Eleusine tristachya*
Three-stamened Waterwort *Elatine triandra*
Threeway Sedge ***Dulichium*** *arundinaceum**
—, Coosa *D. species 1*
Thunberg's Bush-clover *Lespedeza thunbergii*
Thunberg's Meadowsweet *Spiraea thunbergii*
Thunderwood *Toxicodendron vernix*
Thymelaef Loosestrife *Lythrum thymifolium*
Thymeleaf Pinweed *Lechea minor*
Thymeleaf Speedwell *Veronica serpyllifolia**
Tickle Grass *Panicum capillare*
Ticklegrass *Agrostis hyemalis*
Tickle-tongue *Zanthoxylum clava-herculis*
Tickseed, Ketona *Coreopsis grandiflora**
Tick-trefoil, Clusterleaf *Hylodesmum glutinosum*
—, Creamflower ***Desmodium*** *ochroleucum*
—, Fernald's *D. fernaldii*
—, Few-flowered *Hylodesmum pauciflorum*
—, Florida *Desmodium floridanum*
—, Heartleaf *Hylodesmum glutinosum*
—, Hoary ***Desmodium*** *canescens*
—, Large-bracted *D. cuspidatum*
—, Maryland *D. marilandicum*
—, Matted *D. lineatum*
—, Naked *Hylodesmum nudiflorum*
—, Nuttall's ***Desmodium*** *nuttallii*
—, Panicled *D. paniculatum**
—, Perplexing *D. perplexum*
—, Pinebarren *D. strictum*
—, Pineland *D. strictum*
—, Roundleaf *D. rotundifolium*
—, Sessile-leaf *D. sessilifolium*
—, Slimleaf *D. tenuifolium*
—, Smooth *D. laevigatum*
—, Stiff *D. obtusum*
—, Tall *D. glabellum*
—, Velvety *D. viridiflorum*
—, White *D. ochroleucum*
—, Zarzabacoa *D. incanum*
Tidal Marsh Obedient-plant *Physostegia leptophylla*
Tidal Strapwort *Lilaeopsis chinensis*
Tie-vine *Ipomoea cordatotriloba**
Tiger Lily *Lilium lancifolium*
Timid Sedge *Carex timida*
Timothy *Phleum pratense**
Timothy Canary Grass *Phalaris angusta*
Tinted Spurge *Euphorbia commutata*
Tiny Bluet *Houstonia pusilla*
Tiny Pea *Lathyrus pusillus*
Tiny Vetch *Vicia hirsuta*
Tiny Waterwort *Elatine minima*
Tippitiwitchet *Dionaea muscipula*
Tisswood *Tamala borbonia*
Titi *Cyrilla racemiflora*
—, Black *Cliftonia monophylla*
—, Littleleaf *Cyrilla parvifolia*
Toad Rush *Juncus bufonius*
Toad Trillium ***Trillium*** *sessile*
Toadshade, Large *T. cuneatum*
—, Purple *T. cuneatum*
—, Sessile *T. sessile*
—, Yellow *T. luteum*
Tobacco, Fiddleleaf ***Nicotiana*** *repanda*
—, Long-flower *N. longiflora*
—, Red-tipped Rabbit *Laphangium luteoalbum*
—, Tree *Nicotiana glauca*
Tobera *Pittosporum tobira*
Tomatilla de Suelo *Physalis walteri*
Tomato *Solanum lycopersicum*
Toothache Grass *Ctenium aromaticum*
Toothache Tree, Northern ***Zanthoxylum*** *americanum*
—, Southern *Z. clava-herculis*
Toothcup ***Rotala*** *ramosior*
—, Roundleaf *R. rotundifolia*
—, Scarlet *Ammannia coccinea*
Toothed Flatsedge *Cyperus dentatus*
Toothed Medick *Medicago polymorpha*
Toothed Spurge *Euphorbia dentata*
Toothleaf Ground-cherry *Physalis cordata*
Toothleaf, Water *Stillingia aquatica*
Tooth-leaved Croton *Croton glandulosus**
Toothpick-plant *Visnaga daucoides*
Toothwort ***Cardamine*** *diphylla*
—, Alabama Forked *C. furcata*
—, Cutleaf *C. concatenata*
—, Dissected *C. dissecta*
—, Eastern Slender *C. angustata*
Topsy Blackberry *Rubus pascuus*
Torpedo Grass *Panicum repens*
Torrey's Spikerush *Eleocharis microcarpa**
Torrey's Beaksedge *Rhynchospora torreyana*
Torrey's Eupatorium *Eupatorium torreyanum*
Torrey's Rush *Juncus torreyi*
Touch-me-not, Orange ***Impatiens*** *capensis*
—, Pale *I. pallida*
—, Spotted *I. capensis*
—, Yellow *I. pallida*
Tracy's Beaksedge *Rhynchospora tracyi*
Tracy's Bluestem *Andropogon tracyi*
Tracy's Sundew *Drosera tracyi*
Trailing Arbutus *Epigaea repens*
Trailing Fuzzy Bean *Strophostyles helvola*
Trailing Indigo *Indigofera spicata*
Trailing Lantana *Lantana montevidensis*
Trailing Loosestrife *Steironema radicans*
Trailing Meadowrue *Thalictrum debile*
Trailing Phlox *Phlox nivalis**
Trailing Shrub-verbena *Lantana montevidensis*
Trailing Verbena *Verbena supina*
Tramp's-trouble *Smilax bona-nox**
Trampweed *Facelis retusa*
Treacle Mustard *Conringia orientalis*
— *Erysimum repandum*
Treacleberry *Maianthemum racemosum*
Tread-softly *Cnidoscolus stimulosus*
Tree Tobacco *Nicotiana glauca*
Tree-clubmoss, Flat-branched *Dendrolycopodium obscurum*
Treelet Spikemoss *Lycopodioides braunii*
Tree-of-Heaven *Ailanthus altissima*
Tree-of-life *Platycladus orientalis*
Trichomanes, Appalachian *Crepidomanes intricatum*
Tricky Fimbry *Fimbristylis decipiens*
Tridens, Longspike *Tridens strictus*
—, Lovegrass *Triplasiella eragrostoides*
—, Purpletop *Tridens flavus*
Trifoliate Orange *Citrus trifoliata*
Trilisa *Trilisa paniculata*
Trillium, Alabama Least ***Trillium*** *pusillum**
—, Barksdale's *T. sulcatum*
—, Bashful *T. catesbyi*
—, Bent White *T. flexipes*
—, Catesby's *T. catesbyi*
—, Chattahoochee *T. decipiens*
—, Deceptive *T. decipiens*
—, Decumbent *T. decumbens*
—, Freeman's *T. species 3*
—, Great White *T. grandiflorum*
—, Helicopter *T. stamineum*
—, Lanceleaf *T. lancifolium*
—, Large-flowered *T. grandiflorum*
—, Lemon-scented *T. luteum*
—, Lookout Mountain *T. species 3*
—, Mottled *T. maculatum*
—, Narrowleaf *T. lancifolium*
—, Prairie *T. recurvatum*
—, Purple *T. erectum**
—, Radiant *T. species 4*
—, Recurved *T. recurvatum*
—, Red *T. erectum**
—, Relict *T. reliquum*
—, Ruby Falls *T. species 3*
—, Sessile *T. sessile*
—, Southern Nodding *T. rugelii*
—, Southern Red *T. sulcatum*
—, Spotted *T. maculatum*
—, Sweet *T. vaseyi*

*Common name applies to a subspecies or variety of this species.

—, Toad *T. sessile*
—, Twisted *T. stamineum*
—, Underwood's *T. underwoodii*
—, Vasey's *T. vaseyi*
—, Wax *T. luteum*
—, Wedge-petal *T. cuneatum*
—, White *T. grandiflorum*
—, White-flowered Red *T. erectum**
—, Yellow *T. luteum*
Triodia, Carolina ***Tridens** carolinianus*
—, Chapman's *T. chapmanii*
—, Pineland *T. ambiguus*
—, Spike *T. strictus*
Tropical Bushmint *Cantinoa mutabilis*
Tropical Carpetgrass *Axonopus compressus*
Tropical Dock *Rumex obovatus*
Tropical Green Amaranth *Amaranthus viridis*
Tropical Liverseed Grass *Urochloa subquadripara*
Tropical Neptunia *Neptunia pubescens*
Tropical Reed *Phragmites karka*
Tropical Richardia *Richardia brasiliensis*
Tropical Soda Apple *Solanum viarum*
Tropical Spiderwort *Commelina benghalensis*
Tropical Water-hyssop *Bacopa innominata*
Tropical Whiteweed *Ageratum conyzoides*
Troublesome Sedge *Carex molesta*
Trout Lily, Beaked ***Erythronium** rostratum*
—, Dimpled *E. umbilicatum**
—, Harper's *E. americanum**
—, White *E. albidum*
Trudell's Spleenwort *Asplenium trudellii*
True Forget-me-not *Myosotis scorpioides*
Trumpet Honeysuckle *Lonicera sempervirens*
Trumpet-creeper *Campsis radicans*
Trumpet-flower ***Sarracenia** flava*
Trumpet-leaf *S. flava*
Trumpets *S. flava*
Tubeflower *Clerodendrum indicum*
Tuber Oatgrass *Arrhenatherum elatius**
Tuberous Sunflower *Helianthus giganteus*
Tuckahoe *Peltandra virginica*
Tuffybells *Wahlenbergia linarioides*
Tule *Schoenoplectus californicus*
Tulillo *Cyperus rotundus*
Tulip *Tulipa sylvestris*
Tulip Magnolia *Magnolia soulangeana*
Tulip, Didier's *Tulipa gesneriana*
Tulip-tree ***Liriodendron** tulipifera**
—, Coastal Plain *L. tulipifera**
Tumble Mustard *Sisymbrium altissimum*
Tumble Ringwing *Dysphania atriplicifolia*
Tumble Windmill-grass *Chloris verticillata*
Tumblegrass *Eragrostis spectabilis*
Tumbleweed *Panicum capillare*
Tumbleweed Amaranth *Amaranthus albus*
Tumbling Saltweed *Atriplex rosea*
Tung Tree ***Vernicia** fordii*
Tung-oil Tree *V. fordii*
Tupelo Gum ***Nyssa** aquatica*
Tupelo, Ogeechee *N. ogeche*
—, Swamp *N. biflora*
—, Water *N. aquatica*
Turion Duckweed *Lemna turionifera*
Turkey Mustard *Cardamine diphylla*
Turkey Oak *Quercus laevis*
Turkeybeard *Xerophyllum asphodeloides*
Turkey-berry *Solanum torvum*
Turkeyfoot *Andropogon gerardi*
— *Diphasiastrum digitatum*
Turkey-tangle *Phyla nodiflora*
Turk's-cap Lily *Lilium superbum*
Turk's-cap Mallow *Malvaviscus drummondii*
Turk's-turban *Clerodendrum indicum*
Turnip *Brassica rapa*
—, St. Anthony's *Ranunculus bulbosus*
Turnsole *Heliotropium indicum*
Turpentine-root *Endodeca serpentaria*
Turtlegrass *Thalassia testudinum*
Turtlehead, Appalachian ***Chelone** lyonii*
—, Purple *C. obliqua**
—, White *C. glabra*
Turtleweed *Batis maritima*
Tussock Sedge *Carex stricta*
Tutwiler's Spleenwort *Asplenium tutwilerae*
Twayblade, Large *Liparis liliifolia*
—, Southern *Neottia bifolia*
Twiggy Mullein *Verbascum virgatum*
Twig-rush *Cladium mariscoides*
Twinflower, Blue *Dyschoriste oblongifolia*
Twin-flowered Cynthia *Krigia biflora**
Twinleaf *Jeffersonia diphylla*
Twin-sisters; Two-flower Narcissus *Narcissus medioluteus*
Twisted Eupatorium *Eupatorium linearifolium*
Twisted Sedge *Carex torta*
Twisted Spikerush *Eleocharis tortilis*
Twisted Trillium *Trillium stamineum*
Twisted Yellow-eyed-grass *Xyris torta*
Twisted-leaf White-topped Aster *Sericocarpus tortifolius*
Two-eyed-berry *Mitchella repens*
Two-flower Melic *Melica mutica*
Two-leaved Miterwort *Mitella diphylla*
Two-seeded Copperleaf *Acalypha deamii*
Uhaloa *Waltheria indica*
Umbo Sedge *Carex lupuliformis*
Umbrella Flatsedge *Cyperus diandrus*
Umbrella Magnolia *Magnolia tripetala*
Umbrella Sedge, Smallflower ***Cyperus** difformis*
Umbrella-Plant *C. involucratus*
Umbrella-sedge, Chapman's ***Fuirena** longa*
—, Dwarf *F. pumila*
—, Hairy *F. squarrosa*
—, Short-bristled *F. breviseta*
—, Southern *F. scirpoidea*
Umbrella-tree *Magnolia tripetala*
— *Melia azedarach*
—, Earleaf *Magnolia fraseri*
Umbrella-wort, Heart-leaved ***Mirabilis** nyctaginea*
—, Pale *M. albida*
Underwood's Trillium *Trillium underwoodii*
Unicorn-plant *Proboscidea louisiana**
Upland Bent *Agrostis perennans*
Upland Cotton *Gossypium hirsutum*
Upland Dwarf Iris *Iris verna**
Upland White Aster *Solidago ptarmicoides*
Upland Willow ***Salix** humilis*
—, Dwarf *S. occidentalis*
Upright Sedge *Carex stricta*
Upright Spotted Spurge *Euphorbia nutans*
Uruguayan Tussockgrass *Nassella neesiana*
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—, Pink *V. pauciflora*
Valley Head Hawthorn ***Crataegus** austromontana*
— *C. ignava*
Vallisneria *Vallisneria americana*
Vanilla-leaf *Trilisa odoratissima*
Variable Flatsedge *Cyperus difformis*
Variable Witchgrass *Dichanthelium commutatum**
Variable-leaf Heartleaf *Hexastylis heterophylla*
Variable-leaf Indian-plantain *Arnoglossum diversifolium*
Variegated Table Fern *Pteris cretica**
Vasey Grass *Paspalum urvillei*
Vasey's Goldenrod *Solidago vaseyi*
Vasey's Trillium *Trillium vaseyi*
Vegetable Marrow *Cucurbita pepo*
Veined Skullcap *Scutellaria nervosa*
Veiny Hawkweed *Hieracium venosum*
Veiny Pea *Lathyrus venosus*
Veiny Peppergrass *Lepidium oblongum*
Veiny Vervain *Verbena rigida*
Velvet Grass *Holcus lanatus*
Velvet Sedge ***Carex** dasycarpa*
— *C. vestita*
Velvet Witchgrass *Dichanthelium scoparium*
Velvetleaf *Abutilon theophrasti*
Velvet-plant *Verbascum thapsus**
Velvety Gaura *Oenothera curtiflora*
Velvety Lespedeza *Lespedeza stuevei*
Velvety Rattlebox *Crotalaria incana*
Velvety Tick-trefoil *Desmodium viridiflorum*
Venice Mallow *Hibiscus trionum*
Venus Flytrap *Dionaea muscipula*
Venus'-comb *Scandix pecten-veneris*
Venus'-hair Fern *Adiantum capillus-veneris*
Venus's Looking-glass, Southern *Triodanis biflora*
Verbena, Moss ***Glandularia** tenera*
—, Rose *G. canadensis*
—, Trailing *Verbena supina*
Vergonzosa *Mimosa strigillosa*
Vernal Grass, Annual ***Anthoxanthum** aristatum*
—, Sweet *A. odoratum*
Vervain, Big-bracted ***Verbena** bracteata*
—, Blue *V. hastata*
—, Brazilian *V. brasiliensis*
—, Carolina *V. carnea*
—, Coarse *V. xutha*
—, Common *V. hastata*
—, Creeping ***Glandularia** canadensis*
—, Cumberland River *G. species 1*
—, Dakota *G. bipinnatifida**
—, European *Verbena officinalis*
—, Garden *Glandularia hybrida*
—, Gray ***Verbena** canescens*
—, Gulf *V. xutha*
—, Harsh *V. scabra*
—, Hoary *V. stricta*
—, Jamaica *Stachytarpheta jamaicensis*
—, Lime-bluff ***Glandularia** species 1*
—, Moss *G. aristigera*
—, Narrowleaf ***Verbena** simplex*
—, Nettleleaf *V. urticifolia*
—, Prostrate *V. bracteata*
—, Purpletop *V. incompta*
—, Rat-tail *Stachytarpheta jamaicensis*
—, Rose *Glandularia canadensis*
—, Rough *Verbena scabra*
—, South American *Glandularia aristigera*
—, Texas ***Verbena** halei*
—, Uruguayan *V. montevidensis*
—, Veiny *V. rigida*
—, White *V. urticifolia*
Vetch, Bush *Lathyrus venosus*
—, Carolina ***Vicia** caroliniana*
—, Common *V. sativa**
—, Fodder *V. villosa**
—, Fourleaf *V. acutifolia*
—, Hairy *V. villosa**
—, Hungarian *V. pannonica*
—, Large Yellow *V. grandiflora*
—, Lentil *V. tetrasperma*
—, Louisiana *V. ludoviciana**
—, Narrowleaf *V. sativa**
—, Pale *V. caroliniana*
—, Slender *V. tetrasperma*
—, Smallflower *V. minutiflora*
—, Sparrow *V. tetrasperma*
—, Spring *V. lathyroides*
—, Tiny *V. hirsuta*
—, Winter *V. villosa**
—, Wood *V. caroliniana*
Vetchling, Marsh ***Lathyrus** palustris*

*Common name applies to a subspecies or variety of this species.

—, Yellow *L. aphaca*
Viburnum, Leatherleaf ***Viburnum*** *rhytidophyllum*
—, Mapleleaf *V. acerifolium*
—, Small-leaf *V. obovatum*
—, Walter's *V. obovatum*
Vidrillos *Batis maritima*
Vigorous Rush *Juncus validus*
Vine-spinach *Basella alba*
Vine-wicky *Pieris phillyreifolia*
Violet Burmannia *Burmannia biflora*
Violet Heliotrope *Heliotropium amplexicaule*
Violet Lespedeza *Lespedeza frutescens*
Violet Wild-petunia *Ruellia nudiflora**
Violet Wood-sorrel *Oxalis violacea*
Violet, Alabama Three-lobed ***Viola*** *palmata**
—, Arrowhead *V. sagittata*
—, Bog *V. cucullata*
—, Chinese *Asystasia gangetica**
—, Common Bird's-foot ***Viola*** *pedata**
—, Common Blue *V. sororia**
—, Cream *V. striata*
—, Hairy Yellow Forest *V. pubescens*
—, Halberd-leaf *V. hastata*
—, Halberd-leaved Yellow *V. hastata*
—, Jacksonville *V. chalcosperma*
—, Lanceleaf *V. lanceolata*
—, Langlois's *V. langloisii*
—, Leconte's *V. affinis*
—, Long-spurred *V. rostrata*
—, Marsh Blue *V. cucullata*
—, Narrow-leaved *V. lanceolata*
—, Pale *V. striata*
—, Primrose-leaf *V. primulifolia*
—, Prostrate Blue *V. walteri*
—, Red Hills *V. palmata**
—, Sand *V. affinis*
—, Silverleaf *V. hastata*
—, Smooth Yellow Forest *V. eriocarpa*
—, Southern Coastal *V. septemloba*
—, Southern Three-lobed *V. palmata**
—, Southern Water *V. vittata*
—, Southern Wedge-leaf *V. tenuipes*
—, Southern Woodland *V. hirsutula*
—, Southern Woolly *V. villosa*
—, Spearleaf *V. hastata*
—, Strap-leaved *V. vittata*
—, Sweet White *V. blanda*
—, Tall White *V. canadensis*
—, Walter's *V. walteri*
—, Wavy-leaved *V. subsinuata**
—, Wood *V. hirsutula*
—, Wood *V. palmata**
Violeta *Anoda cristata*
Violet-flowered Petunia *Petunia integrifolia*
Viperina *Zornia bracteata*
Virginia Bartonia *Bartonia virginica*
Virginia Bluebells *Mertensia virginica*
Virginia Brome *Bromus nottowayanus*
Virginia Bugleweed *Lycopus virginicus*
Virginia Bunchflower *Melanthium virginicum*
Virginia Chain Fern *Anchistea virginica*
Virginia Copperleaf *Acalypha virginica*
Virginia Cowslip *Mertensia virginica*
Virginia Cutgrass *Leersia virginica*
Virginia Dayflower *Commelina virginica*
Virginia Dwarf-dandelion *Krigia virginica*
Virginia Goat's-rue *Tephrosia virginiana*
Virginia Ground-cherry *Physalis virginiana*
Virginia Hedge-hyssop *Gratiola virginiana*
Virginia Knotweed *Persicaria virginiana*
Virginia Lespedeza *Lespedeza virginica*
Virginia Marbleseed *Lithospermum virginianum*
Virginia Meadow-beauty *Rhexia virginica*
Virginia Mountain-mint *Pycnanthemum virginianum*
Virginia Oak-leech *Aureolaria virginica*
Virginia Pine *Pinus virginiana*
Virginia Plantain *Plantago virginica*
Virginia Snakeroot *Endodeca serpentaria*
Virginia Spiderwort *Tradescantia virginiana*
Virginia Stewartia *Stewartia malacodendron*
Virginia Stickseed *Hackelia virginiana*
Virginia Whitlow-wort *Paronychia virginica*
Virginia Yellow Flax *Linum virginianum*
Virginia-creeper *Parthenocissus quinquefolia*
Virginia-cress *Planodes virginicum*
Virginia-willow *Itea virginica*
Virgin's-bower ***Clematis*** *virginiana*
—, Coastal *C. catesbyana*
Viscid Hedge-hyssop *Gratiola viscidula*
Vitex, Beach *Vitex rotundifolia*
Viviparous Spikerush *Eleocharis vivipara*
Wafer-ash, Common ***Ptelea*** *trifoliata**
—, Hairy *P. trifoliata**
Wake-robin ***Trillium*** *erectum**
—, Prairie *T. recurvatum*
—, Rosy *T. catesbyi*
Walking Fern *Asplenium rhizophyllum*
Wall Bedstraw ***Galium*** *divaricatum*
— *G. parisiense*
Wall Speedwell *Veronica arvensis*
Wallflower, Bushy *Erysimum repandum*
Wallpepper *Sedum acre*
Wall-Rocket, Annual ***Diplotaxis*** *muralis*
—, Perennial *D. tenuifolia*
—, Stinking *D. muralis*
Walnut, Black ***Juglans*** *nigra*
—, White *J. cinerea*
Walter's Marsh St. John's-wort *Triadenum walteri*
Walter's Paspalum *Paspalum dissectum*
Walter's Sedge *Carex striata**
Walter's Ground-cherry *Physalis walteri*
Walter's Pine *Pinus glabra*
Walter's Viburnum *Viburnum obovatum*
Walter's Violet *Viola walteri*
Walter's Wingstem *Verbesina walteri*
Wand Blackroot *Pterocaulon virgatum*
Wand Goldenrod ***Solidago*** *virgata*
—, Piedmont *S. austrina*
Wand Lespedeza *Lespedeza violacea*
Wand Loosestrife *Lythrum lineare*
Wand River-hemp *Sesbania virgata*
Wandering Jew ***Tradescantia*** *fluminensis*
— *T. mundula*
—, Small-leaf *T. fluminensis*
—, Small-leaf *T. mundula*
Warbonnet, Alabama *Jamesianthus alabamensis*
Warea, Sessile-leaf *Warea sessilifolia*
Ware's Hairsedge *Bulbostylis warei*
Ware's Leatherflower *Clematis species 8*
Wart-cress *Lepidium didymum*
Wartweed *Euphorbia helioscopia*
Warty Panic Grass *Kellochloa verrucosa*
Warty Spurge *Euphorbia spathulata*
Washington Hawthorn *Crataegus phaenopyrum*
Water Ash *Fraxinus caroliniana*
Water Beech *Carpinus caroliniana**
Water Bulrush *Schoenoplectus subterminalis*
Water Dawnflower *Stylisma aquatica*
Water Dropwort *Tiedemannia filiformis**
Water fern *Azolla caroliniana*
Water Flag *Iris pseudacorus*
Water Gum *Nyssa biflora*
Water Hickory *Carya aquatica*
Water Hyacinth *Oshuna crassipes*
Water Lettuce *Pistia stratiotes*
Water Locust *Gleditsia aquatica*
Water Medick *Medicago littoralis*
Water Oak *Quercus nigra*
Water Paspalum *Paspalum fluitans*
Water Scorpion-grass *Myosotis scorpioides*
Water Smartweed *Persicaria amphibia**
Water Spangles *Salvinia minima*
Water Speedwell ***Veronica*** *anagallis-aquatica*
—, Wavyleaf *V. undulata*
Water Stargrass *Heteranthera dubia*
Water Starwort *Sabulina fontinalis*
Water Sundew *Drosera intermedia*
Water Toothleaf *Stillingia aquatica*
Water Tupelo *Nyssa aquatica*
Water-carpet *Chrysosplenium americanum*
Water-celery ***Vallisneria*** *americana*
—, Large *V. neotropicalis*
Water-chinquapin *Nelumbo lutea*
Waterclover, Australian ***Marsilea*** *mutica*
—, Big-footed *M. macropoda*
—, Golden *M. macropoda*
—, Hairy *M. vestita*
—, Small *M. minuta*
Watercress ***Nasturtium*** *officinale*
—, Narrow-fruited *N. microphyllum*
Water-dragon *Saururus cernuus*
Water-elm *Planera aquatica*
Water-hemlock ***Cicuta*** *maculata**
—, Southern *C. mexicana*
Water-horehound, Clasping ***Lycopus*** *amplectens*
—, Southern Bog *L. angustifolius*
Water-hyssop, Blue ***Bacopa*** *caroliniana*
—, Carolina *B. caroliniana*
—, Midwestern *B. rotundifolia*
—, Monnier's *B. monnieri*
—, Sweet *B. caroliniana*
—, Tropical *B. innominata*
Waterleaf, Biennial ***Hydrophyllum*** *appendiculatum*
—, Broadleaf *H. canadense*
—, Canada *H. canadense*
—, Great *H. appendiculatum*
—, Hairy *H. macrophyllum*
—, Mapleleaf *H. canadense*
Waterlily, Banana ***Nymphaea*** *mexicana*
—, White *N. odorata**
—, Yellow *N. mexicana*
Water-mat *Chrysosplenium americanum*
Watermeal, Brazilian ***Wolffia*** *brasiliensis*
—, Colombian *W. columbiana*
Watermelon *Citrullus lanatus*
Water-milfoil, Alternate-leaved ***Myriophyllum*** *pinnatum*
—, Cutleaf *M. pinnatum*
—, Eurasian *M. spicatum*
—, Loose *M. laxum*
—, Southern *M. heterophyllum*
Water-millet *Zizaniopsis miliacea*
Water-oleander *Decodon verticillatus*
Water-parsnip *Sium suave*
Water-pennywort ***Hydrocotyle*** *tribotrys*
—, Lawn *H. sibthorpioides*
—, Marsh *H. umbellata*
—, Swamp *H. ranunculoides*
Waterpepper ***Persicaria*** *hydropiper*
— *P. hydropiperoides*
Water-pimpernel *Samolus parviflorus*
Water-plantain, Little River *Sagittaria secundifolia*
—, Southern *Alisma subcordatum*
Waterpod *Hydrolea quadrivalvis*
Water-primrose, Common ***Ludwigia*** *hexapetala*
—, Showy *L. grandiflora*
—, Wingstem *L. decurrens*
Water-purslane *Didiplis diandra*
—, Common ***Ludwigia*** *palustris*
—, Southern *L. spathulata*
Water-shield *Brasenia schreberi*
Water-spider Orchid *Habenaria repens*
Water-starwort, Common ***Callitriche*** *heterophylla**

*Common name applies to a subspecies or variety of this species.

INDEX OF COMMON NAMES

—, Nuttall's *C. pedunculosa*
—, Pond *C. stagnalis*
—, Terrestrial *C. terrestris*
Waterthread Pondweed *Potamogeton diversifolius*
Water-violet *Hottonia inflata*
Waterweed, Brazilian *Egeria densa*
—, Common ***Elodea*** *canadensis*
—, Free-flowered *E. nuttallii*
—, Nuttall's *E. nuttallii*
Water-willow *Decodon verticillatus*
— *Ludwigia leptocarpa*
—, American ***Justicia*** *americana*
—, Coastal Plain *J. ovata*
—, Loose-flower *J. ovata*
Waterwort, Shortseed ***Elatine*** *brachysperma*
—, Three-stamened *E. triandra*
—, Tiny *E. minima*
Wavy Hairgrass *Avenella flexuosa*
Wavyleaf Aster *Symphyotrichum undulatum*
Wavyleaf Noseburn *Tragia urens*
Wavyleaf Water Speedwell *Veronica undulata*
Wavy-leaved Violet *Viola subsinuata**
Wax Begonia *Begonia cucullata*
Wax Goldenweed *Prionopsis ciliata*
Wax Trillium *Trillium luteum*
Wax-mallow *Malvaviscus drummondii*
Wax-myrtle, Common ***Morella*** *cerifera*
—, Dwarf *M. pumila*
Waxweed, Blue ***Cuphea*** *viscosissima*
—, Colombian *C. carthagenensis*
Waxy Meadowrue *Thalictrum amphibolum*
Waxy-leaf Privet *Ligustrum quihoui*
Wayside Speedwell *Veronica polita*
Weak Rush *Juncus debilis*
Weak Sedge ***Carex*** *debilis*
Weak Stellate Sedge *C. seorsa*
Weakleaf Yucca *Yucca flaccida*
Websteria *Eleocharis confervoides*
Wedgegrass, Prairie ***Sphenopholis*** *obtusata*
—, Slender *S. intermedia*
Wedgeleaf Draba *Tomostima cuneifolia*
Wedgeleaf Eupatorium *Eupatorium glaucescens*
Wedge-petal Trillium *Trillium cuneatum*
Weedy Black-eyed Susan *Rudbeckia hirta**
Weeping Finger-grass *Eustachys distichophylla*
Weeping Forsythia *Forsythia suspensa*
Weeping Hawthorn *Crataegus lacrimata*
Weeping Lovegrass *Eragrostis curvula*
Weeping Willow ***Salix*** *babylonica*
— *S. sepulcralis*
Weft Fern *Crepidomanes intricatum*
West Gulf Coastal Plain Rayless-Goldenrod *Bigelowia nuttallii*
West Indian Bristlegrass *Setaria setosa*
West Indian Chickweed *Drymaria cordata**
West Indian Dropseed *Sporobolus jacquemontii*
West Indian Meadow-beauty *Rhexia cubensis*
West Indian Wood-nettle *Laportea aestuans*
West Indian Wood-sorrel *Oxalis intermedia*
Western Anglepod *Gonolobus suberosus**
Western Bitterweed *Hymenoxys odorata*
Western Blue Lettuce *Mulgedium oblongifolium*
Western Blue Phlox *Phlox divaricata**
Western Indian-plantain *Arnoglossum plantagineum*
Western Marsh Spiderlily; Louisiana Marsh Spiderlily *Hymenocallis liriosme*
Western Mayhaw *Crataegus opaca*
Western Mugwort *Artemisia ludoviciana*
Western Narrowleaf Seedbox *Ludwigia linearis**
Western Prairie-trefoil *Acmispon americanus*
Western Purslane Speedwell *Veronica peregrina**
Western Rose-mallow *Hibiscus lasiocarpos*
Western Sampson's-snakeroot *Orbexilum pedunculatum*
Western Spermolepis *Spermolepis inermis*
Western Swamp Milkweed *Asclepias incarnata**
Western-daisy, Eastern *Astranthium integrifolium*
Wetland White Bluestem *Andropogon dealbatus*
Wheat, Bread *Triticum aestivum*
Wherry's Pitcherplant *Sarracenia alabamensis**
Whippoorwill Shoes *Cypripedium parviflorum**
Whiskfern *Psilotum nudum*
White Arrow-arum *Peltandra sagittifolia*
White Arrowleaf Aster *Symphyotrichum urophyllum*
White Ash ***Fraxinus*** *americana*
—, Biltmore *F. biltmoreana*
—, Small's *F. smallii*
White Avens *Geum canadense*
White Baneberry *Actaea pachypoda*
White Bartonia *Bartonia verna*
White Basswood *Tilia americana**
White Bear Sedge *Carex albursina*
White Beardtongue, Eastern ***Penstemon*** *pallidus*
—, Tall *P. digitalis*
White Beebalm *Monarda russeliana*
White Beech *Fagus grandifolia**
White Blue-eyed-grass *Sisyrinchium albidum*
White Burmannia *Burmannia capitata*
White Cedar *Melia azedarach*
—, Panhandle *Chamaecyparis thyoides**
White Charlock *Raphanus raphanistrum**
— *Sinapis alba**
White Clover ***Trifolium*** *repens*
—, Wild *T. carolinianum*
White Cohosh *Actaea pachypoda*
White Cutgrass *Leersia virginica*
White Daisy *Leucanthemum vulgare*
White Elm *Ulmus americana**
White Evening-primrose *Oenothera speciosa*
White Four-o'clock *Mirabilis albida*
White Fringeless Orchid *Platanthera integrilabia*
White Garlic *Allium neapolitanum*
White Ginger-lily *Hedychium coronarium*
White Grass *Leersia virginica*
White Hickory *Carya tomentosa*
White Horehound *Marrubium vulgare*
White Horse-nettle *Solanum elaeagnifolium*
White Lady's-slipper *Cypripedium candidum*
White Lobelia *Lobelia paludosa*
White Meadow-beauty ***Rhexia*** *mariana**
—, Small-flowered *R. parviflora*
White Melilot *Melilotus albus*
White Milkweed *Asclepias variegata*
White Milkwort *Polygala balduinii*
White Mountain-mint *Pycnanthemum albescens*
White Mulberry *Morus alba*
White Mustard *Sinapis alba**
White Nemophila *Nemophila aphylla*
White Oak ***Quercus*** *alba*
—, Durand's *Q. durandii**
—, Swamp *Q. bicolor*
White Panic *Echinochloa frumentacea*
White Poplar *Populus alba*
White Potato *Solanum tuberosum*
White Prairie-clover *Dalea candida*
White Prairie-goldenrod *Solidago ptarmicoides*
White Prickly-poppy *Argemone albiflora**
White Ramping-fumitory *Fumaria capreolata*
White Ramps *Allium burdickii*
White Sabatia *Sabatia difformis*
White Sage ***Artemisia*** *ludoviciana*
White Sagewort *A. ludoviciana*
White Sandhills Spurge *Euphorbia curtisii*
White Snakeroot, Appalachian ***Ageratina*** *roanensis*
—, Common *A. altissima*
—, Small-leaved *A. aromatica*
White Spikerush *Eleocharis albida*
White Spinypod *Matelea baldwiniana*
White Sweetclover *Melilotus albus*
White Tick-trefoil *Desmodium ochroleucum*
White Trillium ***Trillium*** *grandiflorum*
—, Bent *T. flexipes*
—, Great *T. grandiflorum*
White Trout Lily *Erythronium albidum*
White Turtlehead *Chelone glabra*
White Vervain *Verbena urticifolia*
White Walnut *Juglans cinerea*
White Water Crowfoot *Ranunculus longirostris*
White Waterlily *Nymphaea odorata**
White Yam *Dioscorea alata*
White-alder, Coastal ***Clethra*** *alnifolia*
—, Downy *C. tomentosa*
—, Mountain *C. acuminata*
White-bracted Thoroughwort *Eupatorium album*
White-cloaked Cudweed *Gamochaeta chionesthes*
White-edged Flatsedge *Cyperus flavicomus*
White-edged Sedge *Carex debilis*
White-edged Witchgrass *Dichanthelium tenue*
White-flowered Cat's-ear *Hypochaeris microcephala**
White-flowered Leafcup *Polymnia canadensis*
White-flowered Petunia *Petunia axillaris*
White-flowered Red Trillium *Trillium erectum**
White-haired Witchgrass ***Dichanthelium*** *villosissimum**
—, Low *D. linearifolium*
Whitehead Sedge *Cyperus sesquiflorus*
Whiteleaf Deerberry *Vaccinium stamineum**
Whiteleaf Greenbriar *Smilax glauca*
White-leaved Leatherflower *Clematis glaucophylla*
White-leaved Mountain-mint *Pycnanthemum albescens*
White-lined Cretan Brake *Pteris cretica**
White-Man's-Foot *Plantago major*
White-nymph *Trepocarpus aethusae*
White-seeded Beaksedge *Rhynchospora divergens*
Whitestar *Ipomoea lacunosa*
White-tassels ***Dalea*** *albida*
—, Sprawling *D. mountjoyae*
White-tinged Sedge ***Carex*** *albicans**
—, Southern *C. albicans**
Whitetop Fleabane *Erigeron vernus*
Whitetop Pitcherplant *Sarracenia leucophylla*
White-topped Aster, Narrow-leaf ***Sericocarpus*** *linifolius*
—, Twisted-leaf *S. tortifolius*
Whitewood *Liriodendron tulipifera**
White-woolly Twintip *Stemodia durantifolia*
Whitlow-grass *Draba verna*
Whitlow-wort, American ***Paronychia*** *americana*
—, Annual Dune *P. baldwinii**
—, Canada *P. canadensis*
—, Common Forked *P. fastigiata**
—, Michaux's *P. herniarioides*
—, Perennial Dune *P. baldwinii**
—, Silver *P. argyrocoma*
—, Virginia *P. virginica*
Whorled Horsebalm *Collinsonia verticillata*
Whorled Loosestrife *Lysimachia quadrifolia*
Whorled Milkweed *Asclepias verticillata*
Whorled Milkwort *Polygala verticillata**
Whorled Pogonia, Large *Isotria verticillata*
Whorled Stonecrop *Sedum ternatum*
Whorled Sunflower *Helianthus verticillatus*
Wicky, Hairy *Kalmia hirsuta*
Wicopee *Dirca palustris*
Wideleaf Bedstraw *Galium latifolium*
Wideleaf Blue-stars *Amsonia tabernaemontana*
Wide-leaved Spiderwort *Tradescantia subaspera*
Wide-lip Orchid, Brown *Liparis liliifolia*
Widow Sedge *Carex basiantha*

*Common name applies to a subspecies or variety of this species.

Widow's-cross *Sedum pulchellum*
Widow's-frill *Silene stellata*
Wigeon-grass *Ruppia maritima*
Wild Azalea ***Rhododendron*** *canescens*
— *R. periclymenoides*
Wild Basil, Scarlet ***Clinopodium*** *coccineum*
—, Slender *C. gracile*
—, Talladega *C. talladeganum*
Wild Bean *Phaseolus polystachios*
Wild Bushbean *Macroptilium lathyroides*
Wild Caia *Corynandra viscosa**
Wild Carrot *Daucus carota**
Wild Chufa *Cyperus esculentus**
Wild Clary *Salvia verbenaca*
Wild Coral *Salicornia ambigua*
Wild Cowpea *Vigna luteola*
Wild Crabapple ***Malus*** *angustifolia*
— *M. coronaria*
Wild Dock *Rumex hastatulus*
Wild Four-o'clock *Mirabilis albida*
Wild Geranium *Geranium maculatum*
Wild Ginger *Ctenium aromaticum*
—, Common *Asarum canadense*
Wild Hyacinth *Camassia scilloides*
Wild Indigo, Apalachicola ***Baptisia*** *megacarpa*
—, Bigpod *B. megacarpa*
—, Creamy *B. bracteata*
—, Eastern Prairie Blue *B. aberrans*
—, Glade Blue *B. aberrans*
—, Hairy *B. hirsuta*
—, Narrow-pod White *B. albescens*
—, Panhandle *B. hirsuta*
—, Spiked *B. albescens*
—, Thick-pod White *B. alba*
Wild Kidney Bean *Phaseolus polystachios*
Wild Leek ***Allium*** *ampeloprasum*
— *A. tricoccum*
Wild Mignonette *Reseda lutea*
Wild Mustard *Rhamphospermum arvense*
Wild Oats *Avena fatua*
Wild Olive *Cartrema americanum*
Wild Onion ***Allium*** *canadense*
— *A. vineale*
Wild Pansy *Viola rafinesquei*
Wild Petunia *Calibrachoa parviflora*
Wild Poinsettia *Euphorbia dentata*
Wild Quinine, Common***Parthenium*** *integrifolium**
—, Glade *P. auriculatum*
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*Common name applies to a subspecies or variety of this species.

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*Common name applies to a subspecies or variety of this species.

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*Common name applies to a subspecies or variety of this species.

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